FACULTY OF PSYCHOLOGY
AND EDUCATIONAL SCIENCES

Cognitive and motivational challenges in writing: The impact of explicit instruction and peer-assisted writing in upper-elementary grades

Fien De Smedt

Supervisor: Prof. Dr. Hilde Van Keer

A dissertation submitted to Ghent University in partial fulfilment of the requirements for the degree of Doctor of Educational Sciences

Academic year 2018–2019

GHENT
UNIVERSITY

Schrijven heeft natuurlijk alles met goochelen te maken. Je moet als schrijver de lezer begoochelen.

Jeroen Brouwers

Voorwoord

De voorbije zeven jaren heb ik met veel *goesting* aan dit proefschrift gewerkt. In alle vrijheid maar met de nodige ondersteuning. Steeds gedreven. Het was ongelofelijk genieten! En wat ben ik trots op het uiteindelijke resultaat, dit boekje. Maar ik ben vooral dankbaar. Dankbaar dat ik er niet alleen voor stond, dankbaar voor de vele mensen rondom mij.

Hilde. Je staat met stip bovenaan mijn lijstje. *Ge zijt een grote madam*! Dank je wel voor je hulp, je inspiratie, je aanmoediging, en vooral voor je grenzeloze vertrouwen. Hoe jij omgaat met je mensen is groots. Ik heb onnoemelijk veel respect voor wat je doet maar vooral voor wie je bent. Je leerde me niet alleen de kneepjes van het vak, onder je mentorschap heb ik mezelf, als onderzoekster en als mens, ten volle kunnen ontplooien. Ik ben je hiervoor immens dankbaar. Ik hoop nog lang met je te kunnen samenwerken.

Gert, Steve, Bram en Yves. Jullie input tijdens onze samenkomsten was steeds enorm waardevol en verrijkend. Bedankt! Gert, ik waardeer je onuitputtelijk enthousiasme voor ons onderzoekveld. Heel erg bedankt voor de fijne samenwerking tijdens de vele symposia en de Research School. Een bijzondere dankjewel om jonge schrijfonderzoekers zoals mij te inspireren en om te geloven in ons potentieel. Steve, thank you for giving me the opportunity to work with you and your colleagues at ASU. I had a wonderful time during my visit and enjoyed our collaboration. I lost a piece of my heart in Arizona. I'll be back to admire the beauty of the Grand Canyon and I'll definitely stop at your pie place.

Bedankt aan alle **leraren en leerlingen** die aan mijn onderzoek hebben meegewerkt. Jullie inzet, engagement en medewerking voor mijn schrijfproject was van onschatbare waarde.

Lana Del Rey, my partner in crime during solitary writing. Headphones on. You sing, I write.

Collega's. Jullie zijn het kloppend hart van de vakgroep, de sfeermakers op de werkvloer. Ik pendelde dan ook steeds met veel plezier richting Gent om in jullie midden te vertoeven. Merci voor alle leuke momenten en babbels, de fantastische BHL-jaren en het samenzijn tijdens congressen. *Kep mij vré gejeund met ulder!*

Mijn bureaugenootjes. Het begon allemaal in het warme microklimaat in de BHL. Dikke merci aan alle BHL'ers voor die mooie tijden, jullie zijn één voor één toppers. Ik ruilde de BHL in voor lokaal 120.102. Emme, Sabrina, Ruth, Amélie, Maaike en Rielke, bedankt voor de gezellige sfeer en de nodige afleiding.

De onderzoeksgroep. Wat een heerlijk team vol vrouwelijk geweld! Maar ook geweldig warm. Merci voor de fijne samenwerking, het delen van culinaire geneugtes en de gedeelde passie om ons onderzoek naar de praktijk te brengen. Een bijzonder woordje van dank aan “de anciens” – Emme, Liesje, Sabrina, Jessie – voor die albekende sfeer binnen onze onderzoeksgroep, de sfeer van samenhorigheid. Emme, je bent niet alleen een geweldig lieve en warme collega, je bent een vriendin voor het leven. Liesje, ik waardeer onze babbels enorm: een luisterend oor, een goochelaar met woorden van waarheid. Sabrina, wat een fijne momenten hebben wij samen beleefd. Met en zonder Ryan. Amélie, ik vind het geweldig dat jij aan mijn linkerzijde vertoeft. Je bent een vrouw naar mijn hart: warm van inborst en gedreven in het leven. Sofie, the passion for food unites us!

Chicks, jullie zijn geweldige *wijvekes*. Merci voor alle BBQ’s, (vrijgezelle)feestjes en trouws de afgelopen jaren. *Gulder zit diepe in m’n erte*.

Mijn familie. Moeke en Luc, merci om mij de kans te geven om verder te studeren. Zonder die kans, was er geen sprake van dit proefschrift. Moeke, je bent ongetwijfeld de sterkste vrouw die ik ken. Dankzij je volharding, je positieve ingesteldheid, je zin voor onderneming en je hart voor je (klein)kinderen, heb je niet alleen gezorgd voor een warm nest, maar heb je me ook gestimuleerd om zelfstandig en stevig in het leven te staan. Ik ben geweldig *preus* om je dochter te zijn. Tim, hoewel we soms zo verschillen, zie ik mijn gedrevenheid en mijn no-nonsense aanpak in jou terug.

Mijn man. Pieter, merci om mij de ruimte te geven zodat ik mij ten volle op mijn proefschrift heb kunnen richten. ‘*k Ben echt met mijn gat in de boter gevallen met u!* Ongelofelijk hoe wij elkaar aanvullen en versterken. Je maakt me intens gelukkig. Ons leven, ons gezin, staat nog in de startblokken, maar ik ben ervan overtuigd: the best is yet to come. De toekomst lacht ons toe.

Mijn dochter. Lieze. Mijn allermooiste creatie ooit. Papa en ik zijn nu al geweldig trots op je. Je bent de essentie, ons grootste geluk. Ik hoop dat je je spontaneïteit en vrolijkheid de rest van je leven kan behouden.

Fien,

Februari 2019

Table of contents

L’art d’écrire est avant tout de se faire comprendre.

Eugène Delacroix

1 General introduction

Chapter 1

General introduction

Abstract

This introduction presents a general overview of the research theme and the different chapters included in this dissertation. After a general introduction on the central concepts and an overview of theoretical and empirical literature on today's writing instruction and outcomes, the three research lines that serve as a leitmotiv throughout the different chapters are outlined. Finally, this chapter concludes with an overview of the aims and the methodological approaches applied in each chapter and a visualization of the dissertation structure.

Introduction

In November 2018, the European Literacy Network (ELN) signed a charter declaring engagement in perfecting and spreading literacy so that a truly human world, reflecting democratic values, can be established. Through this action, ELN aims to develop an integrated and inclusive approach to foster foundational literacy across Europe and to ensure that all its citizens have means to develop their literacy, regardless of individual background (e.g., language, age, SES, or disability). As such, ELN acknowledges that the success of our knowledge society is dependent on the level of literacy of its population and that effective literacy skills, such as reading and writing, are crucial to participate in modern society and to foster societal changes (Becker, McElvany, & Kortenbruck, 2010). Research, however, consistently points at causes for concern in this respect. As to writing, for example, which is the central theme of the present dissertation, large-scale writing assessments internationally documented that a substantial portion of students encounter difficulties with writing texts, thereby revealing alarming results on students' poor writing performance all over the globe (Inspectie van het Onderwijs, 2010; National Center for Education Statistics, 2012; Ofsted, 2000; Salahu-Din, Persky, & Miller, 2008).

The internationally established results on students' writing performance can be related to the complexity of proficient writing. The literature, in this respect, especially points at the fact that writing appears especially complex and challenging for novice writers, as they often have

to manage multiple actions simultaneously while concentrating on more basic writing skills (e.g., transcription skills) which are not fully automatized yet (Bereiter & Scardamalia, 1987). Taking this into account, the present dissertation focused explicitly on the age group of upper-elementary school students (age 11-12). Compared to younger children, the automation of basic writing skills is increased already at the end of elementary school, enabling upper-elementary students to engage in higher-order writing skills and strategies (e.g., planning or revising) (Berninger et al., 1992). Previous research, however, showed that higher-order writing still remains *cognitively challenging* for this age group as well, as they often fail to engage in prewriting planning (Cameron & Moshenko, 1996), have difficulties generating sentences fluently (McCutchen, Covill, Hoyne, & Mildes, 1994), and poorly revise texts by focusing mainly on surface-level aspects (e.g., spelling) (McCutchen, Francis, & Kerr, 1997). In addition, research also highlighted *motivational challenges* in writing. Educational writing experiences are often not of interest to students and students perceive writing as a difficult and threatening activity (Hidi & Boscolo, 2006). Because of this, it is hard for upper-elementary students to motivate themselves to put effort in their writing. Moreover, education fails to show students the potential of writing to enhance their ability to think and communicate, because writing for evaluative purposes is perceived as more important than writing to share knowledge and feelings (Bruning & Horn, 2000). Unfortunately and in addition to the international concern regarding students' writing performance, worrying trends regarding students' writing motivation appear as well, with studies indicating declining writing motivation as students progress through school (Cleary, 1991; De Smedt et al., 2019).

In light of the above, education is considered accountable for providing high-quality writing instruction and thereby enhancing students' writing skills and motivation. To gain knowledge and insight in how writing is taught in elementary grades and how students perform on writing, several national assessment studies (eg., in the Netherlands: Inspectie van het Onderwijs, 2010; in the US: National Center for Education Statistics, 2012; in the UK: Ofsted, 2000) and large-scale surveys (e.g., in the US: Cutler & Graham, 2008; in the UK: Dockrell, Marshall, & Wyse, 2016; in China: Hsiang & Graham, 2016; in New Zealand: Parr & Jesson, 2016; in the Netherlands: Rietdijk, Van Weijen, Janssen, van den Bergh, & Rijlaarsdam, 2018) have been conducted worldwide. To date, however, very little is known about the current practice and outcomes of upper-elementary writing instruction in Flanders (Bonset & Hoogeveen, 2007). More particularly, in 2018, students' writing attainment level has been evaluated for the first time by means of the Flemish assessments of educational progress [Peiling Nederlands (basisonderwijs) 2018]. The results of this large-scale assessment, however, have not been

published yet. Consequently, at the start of the PhD research in October 2012 until present[1], there was no indication of any kind whether Flemish elementary school children indeed possess proficient or grade-level-adequate writing skills. In addition, there are no Flemish teacher surveys to provide insight into elementary school teachers' beliefs regarding writing and writing instruction and into their actual and prevalent writing instruction in daily educational practice. Taking these shortcomings into account and in view of creating optimal writing experiences and instruction and improving students' writing performance and motivation, we need a better understanding of the current practices and outcomes of writing instruction in upper-elementary grades in Flanders. Therefore, *gaining in-depth insight in the current state of writing instruction and outcomes in Flanders and providing evidence-based guidelines to improve the quality of writing instruction and, in turn, promote upper-elementary students' writing* forms the main rationale for the present dissertation.

In what follows, we first present the theoretical frameworks underlying the current dissertation. More specifically, these theories of writing provide schemas for understanding the complex cognitive as well as motivational processes involved in writing texts, and served to guide the development of the empirical studies outlined throughout the different chapters in this dissertation. Furthermore, we provide an overview of prior empirical research investigating correlates of elementary students' writing performance and we present two promising evidence-based writing practices to promote students' writing based on these earlier empirical studies. Finally, we put forward three central research lines and present an outline of the different chapters in the current dissertation.

Theories of writing: Cognitive and motivational challenges involved in writing

Graham, Gillespie, and McKeown (2013) highlighted the complexity of the writing process by defining writing as "a goal directed and self-sustained cognitive activity requiring the skillful management of (a) the writing environment; (b) the constraints imposed by the writing topic; (c) the intentions of the writer(s); and (d) the processes, knowledge, and skills involved in composing" (p. 4). Already in the eighties, the cognitive complexity of writing was emphasized in the influential cognitive model of writing by Flower and Hayes (1981). This model provided an overview of the cognitive mental operations skilled writers employ during writing, thereby

[1] Results of the Flemish assessments of educational progress for writing will be published in May, 28, 2019, after the publication of the present dissertation.

highlighting the importance of planning, drafting, and revising text in the composing process. More particularly, proficient writers *plan* their text by setting goals and generating and organizing ideas. They *generate text* by translating ideas into words and sentences and transcribing these on paper. Finally, in view of optimizing their text, they *reread and revise* their work. In contrast, young developing writers are found to typically employ the knowledge-telling model (Bereiter & Scardamalia, 1987). They convert the composing task to simply telling what is known about the topic. In this knowledge-telling process, each burst of text is a stimulus for constructing the next burst of text, and little attention is placed on planning in advance or revising text beyond considering whether it is appropriate for the topic at hand.

Both the Flower and Hayes (1981) and the Bereiter and Scardamalia (1987) model made a significant contribution to the writing research community because of the insights they provided on the *cognitive demands and processes* underlying the writing process of both experienced and developing writers. Although it is explicitly acknowledged, for example by Bruning and Kauffman (2016), that the challenges writers face, are at least as much related to motivational factors as they are to cognitive and linguistic factors, the models did not account for *motivational and affective factors* related to the writing process. Since the nineties, there is an increased attention to include affective factors, such as writing motivation and self-efficacy beliefs, as well in models of writing (e.g., Graham, 2018a; Graham, 2018b; Hayes, 2012; Zimmerman & Risemberg, 1997). Moreover, this increasing attention for motivational factors in the current theoretical writing models goes hand in hand with increasing empirical findings consistently showing a positive relationship between students' writing motivation and self-efficacy for writing and their writing performance (Graham, Berninger, & Fan, 2007; Pajares, 2003; Pajares & Valiante, 1997; Troia, Harbaugh, Shankland, Wolbers, & Lawrence, 2013). Fitting in with this increasing attention for motivational aspects in both theoretical models and empirical studies in the writing research field, *writing motivation* and *self-efficacy for writing* received a central place in the present dissertation as well, next to the more traditionally studied cognitive planning, drafting, and revising strategies or processes (Bereiter & Scardamalia, 1987; Flower & Hayes, 1981). Both motivational variables are conceptualized from current leading motivational theories which are presented below.

In this dissertation, *writing motivation* is conceptualized from the theoretical framework of Self-Determination Theory (SDT) (Ryan & Deci, 2000a, 2000b). SDT is an innovative and well-valued theory of motivation studying the quality of motivation that underlies behavior. Over the last decade, interest for SDT has increased substantially in the field of education in general (e.g., Aelterman, Vansteenkiste, & Haerens, in press; Mouratidis, Michou, Aelterman, Haerens, & Vansteenkiste, 2018), and in the field of language learning in particular (e.g., De Naeghel, Van Keer, Vansteenkiste, & Rosseel, 2012; Guay et al., 2010). Concerning the latter, SDT provides in-depth understanding of children's reasons for getting involved in a literacy

activity. The major strength of this motivational framework lies in the innovative conceptualization of motivation by redefining the classic distinction between intrinsic and extrinsic motivation. More particularly, SDT distinguishes autonomous from controlled writing motivation. The former refers to motives such as writing because of intrinsic pleasure (i.e., intrinsic regulation) or because of the identified value of writing (i.e., identified regulation), while the latter refers to motives such as writing because of external (e.g., good grades) (i.e., external regulation) or internal pressure (e.g., guilt) (i.e., introjected regulation) (Ryan & Deci, 2000b). Previous research highlighted autonomous motivation as the most preferable type of motivation because its positive relationship with affective and cognitive outcomes, such as more positive emotions at school (Levesque, Zuehlke, Stanek, & Ryan, 2004), increased study effort and decreased procrastination (Mouratidis et al., 2018; Vansteenkiste, Zhou, Lens, & Soenens, 2005), more persistence (Pelletier, Fortier, Vallerand, & Briere, 2001), and better performance (De Naeghel et al., 2012). Contrary to autonomous motivation consistently being associated with positive outcomes, controlled motivation has been associated with more negative outcomes, such as for example more superficial learning (Vansteenkiste, Simons, Lens, Soenens, & Matos, 2005) and increased dropout (Vansteenkiste, Sierens, Soenens, Luyckx, & Lens, 2009). In view of creating the most optimal conditions to foster students' autonomous motivation, SDT points to the need of nurturing students' inherent psychological need for autonomy (i.e., feeling of agency), competence (i.e., feeling confident and competent), and relatedness (i.e., feeling related to significant others) (Ryan & Deci, 2000a, 2000b). To ensure the facilitation of these needs, and consequently fostering autonomous motivation, teachers can adopt a qualitatively supportive teaching style characterized by autonomy-supportive, structured, and involved teacher behavior (Soenens & Vansteenkiste, 2005). Autonomy support refers to teachers' interpersonal behavior in identifying and nurturing students' inner motivational resources such as students' psychological needs, values and interests. Offering students structure refers to clearly communicating expectations and ways of accomplishing the desired educational outcomes. Teachers who are involved with their students invest time, personal resources, express their affection, and value the interaction with their students (De Naeghel, Van Keer, Vansteenkiste, Haerens, & Aelterman, 2016). Translated to the context of writing, teachers can, for instance, provide students with choice between different writing assignments (cf., need for autonomy), provide clear guidelines on how to approach complex writing tasks or explicitly teach students writing knowledge and strategies to foster their writing competence (cf., need for competence), and create opportunities in which students can share their writing with others (cf., the need for relatedness).

Self-Efficacy Theory (SET) of Bandura (1977, 1997) also served as the underlying and integrative theoretical framework in our investigation to study students' *self-efficacy for writing*.

SET explains and predicts how one's expectations of perceived capability influences a person's choice of activities, effort, and persistence (Bandura, 1977, 1997). According to SET, self-efficacy beliefs are domain-specific (Bandura, 2006) and multifaceted, implying that self-efficacy should not be assessed globally as a static construct (Bandura, 1977, 2006). In line with SET, Bruning, Dempsey, Kauffman, McKim, and Zumbrunn (2013) acknowledged the domain-specific multifaceted nature of self-efficacy by identifying three types of self-efficacy for writing: (a) self-efficacy for ideation (i.e., believing in one's capabilities to generate ideas), (b) self-efficacy for convention (i.e., believing in one's capabilities to apply language and writing conventions), and (c) self-efficacy for regulation (i.e., believing in one's self-regulation capabilities during writing). Following the work of Bandura (1977, 1997) and Bruning et al. (2013), we include self-efficacy for writing as a multidimensional concept in the current dissertation. Similar to the abovementioned relationship between students' writing motivation and academic writing outcomes, also self-efficacy for writing appears to be related to various positive writing outcomes in school (Bruning & Kauffman, 2016; Pajares, 2003; Pajares & Valiante, 1997) such as being able to manage the writing process and attaining higher grades for writing (Zimmerman & Bandura, 1994). Taking into account the strong relationship between students' self-efficacy beliefs and performance, Bruning and Kauffman (2016) advocated in favor of fostering these beliefs by modeling writing and offering students chances to practice. Translated to the context of writing, teachers can, for instance, demonstrate and model how students can approach a particular writing tasks (i.e., modeling writing strategies) and provide students collaborative writing tasks in which they can practice their writing together and learn from observing their peers. In this way, they can acquire writing knowledge, skills, and strategies and learn to cope with the complexity of writing (Schunk & Zimmerman, 2007).

Correlates of elementary students' writing performance

Within this dissertation, gaining in-depth insight in the current state of students' writing attainment level and identifying possible correlates of elementary students' writing performance is an essential first step in understanding how to improve students' writing. In this respect, the present dissertation particularly focusses on both student and teacher-level correlates of elementary students' writing performance.

As to *student-level correlates*, the theoretical models presented above (i.e., Graham, 2018a; Graham, 2018b; Hayes, 2012; Zimmerman & Risemberg, 1997) explicitly address both cognitive and motivational challenges in writing. Regarding the *cognitive challenges*, empirical research stresses the application of cognitive writing strategies (i.e., planning, translating, and reviewing) (Beauvais, Olive, & Passerault, 2011; Breetvelt, van den Bergh, & Rijlaarsdam,

1994; Wijekumar et al., in press). More particularly, previous research showed that prewriting activities such as planning and organizing ideas (Koster, Bouwer, & van den Bergh, 2016), fluently transcribing ideas into words and sentences (von Koss Torkildsen, Morken, Helland, & Helland, 2015), and reviewing activities, such as text revision, significantly increase elementary students' writing performance (von Koss Torkildsen et al., 2015). Concerning the *motivational challenges*, prior empirical studies identified writing motivation and self-efficacy for writing as key predictors of students' writing performance. More particularly, research indicated that writing motivation significantly improves text structure and coherence (Garcia & de Caso, 2004), and therefore also considerably enhances students' writing performance (Garcia & de Caso, 2004; Graham et al., 2007; Teng & Zhang, 2018; Troia et al., 2013). Furthermore, research indicated that writing self-efficacy beliefs provide the foundation for successful writing performance in elementary grades (Pajares, 2003; Pajares & Valiante, 1997). Next to the cognitive and motivational challenges students face when writing, previous studies also pointed at particular *student background characteristics*, such as students' gender and general achievement level, to be related with students' writing performance. More particularly, prior empirical evidence revealed that more female than male students perform at a proficient and advanced writing level (Babayigit, 2015; National Center for Education Statistics, 2012; Troia et al., 2013) and that high-achieving students write qualitatively better texts than average and low-achieving students (Olinghouse, 2008; Troia et al., 2013).

As to *teacher-level characteristic*s possibly being correlated with students' writing performance, prior research indicates the importance to examine and take into account *teacher beliefs*, such as teacher self-efficacy for writing and attitudes towards writing and writing instruction given the relationship of teacher beliefs with actual teacher behavior (Brindle, Graham, Harris, & Hebert, 2016; Desimone, 2009; Graham, Harris, Fink, & MacArthur, 2001; Rietdijk et al., 2018) and with students' performance (Goddard, Hoy, & Hoy, 2000; Tschannen-Moran, Hoy, & Hoy, 1998). Next to these teacher beliefs, ***teachers' actual behavior during classroom writing instruction*** is taken into account in the present dissertation. More particularly, an extensive body of research on effective writing practices, revealed abundant empirical evidence for the relation between teachers' instructional writing practices on the one hand and students' writing performance on the other hand (Graham, 2006; Graham & Harris, 2018; Graham, Harris, & Chambers, 2016; Graham, McKeown, Kiuhara, & Harris, 2012; Graham & Perin, 2007; Hillocks, 1984; Koster, Tribushinina, de Jong, & van den Bergh, 2015; Rogers & Graham, 2008; Santangelo & Graham, 2015). Various meta-analyses more particularly identified several effective practices, such as teaching transcription skills (e.g., Alves et al., 2015; Graham, Harris, & Fink, 2000), explicit strategy instruction (e.g., Bouwer, Koster, & van den Bergh, 2018; Fidalgo, Torrance, & Garcia, 2008; Rietdijk, Janssen, van Weijen, van den Bergh, & Rijlaarsdam, 2017), peer-assisted writing (e.g., Hoogeveen & van Gelderen, 2018;

Yarrow & Topping, 2001), and using word processing programs to compose texts (e.g., Bangert-Drowns, 1993; Englert, Zhao, Dunsmore, Collings, & Wolbers, 2007; Goldberg, Russel, & Cook, 2003).

Optimizing elementary students' writing: Explicit writing instruction and peer-assisted writing

Within this dissertation, providing evidence-based guidelines to improve the quality of writing instruction and, in turn, promote upper-elementary students' writing is central. While the writing literature already contains a rich evidence base of effective instructional practices in elementary grades (Graham et al., 2016; Graham et al., 2012; Koster et al., 2015), this literature is primarily focused on cognitive outcome measures (e.g., students' writing performance). Notwithstanding the demonstrated direct relationship between students' writing motivation and self-efficacy for writing on the one hand and their writing performance on the other hand (Pajares & Valiante, 1997; Troia et al., 2013), the empirical writing literature to date suffers from a lack of intervention studies focused on motivational outcomes (e.g., writing motivation and self-efficacy for writing). The present dissertation, therefore, moves the research field forward by studying both cognitive and motivational writing outcomes. In view of fostering students' writing performance, writing motivation, and self-efficacy for writing, we particularly focus on studying the effectiveness of *explicit writing instruction* and *peer-assisted writing*. *Explicit writing instruction* refers to the explicit and systematic teaching of writing knowledge and strategies (Graham & Perin, 2007). As to writing knowledge, students acquire genre knowledge such as knowledge on the aim, content, and structure of a specific text genre. As to writing strategies, students learn strategies for planning, revising, and/or editing texts. *Peer-assisted writing* involves students working together to plan, draft, and/or revise texts (Graham & Perin, 2007). We opted to include both writing practices in the present dissertation for empirical as well as a theoretical reasons.

First, both instructional writing practices have been studied widely as to their effectiveness in improving writing performance in elementary grades (see meta-analyses: Graham et al., 2012; Koster et al., 2015). Empirical findings in this respect consistently showed positive effects for explicitly teaching students knowledge and strategies (e.g., Bouwer et al., 2018; Graham, Harris, & Troia, 2000; Limpo & Alves, 2013; López, Torrance, Rijlaarsdam, & Fidalgo, 2017; Rietdijk et al., 2017) and using peer-assisted writing approaches (e.g., Harris, Graham, & Mason, 2006; Hoogeveen & van Gelderen, 2018; Paquette, 2009; Yarrow & Topping, 2001). As to the effect on motivational outcomes, however, there is only a small number of available studies which resulted in inconclusive findings, strengthening the call for more research in this

respect. Concerning the effect of explicit writing instruction, some studies did find an effect for explicit writing instruction on students' motivation or students' self-efficacy (e.g., Graham & Harris, 1989), while others did not (e.g., Graham, Harris, & Mason, 2005; Harris et al., 2006). As to the effectiveness of peer-assisted writing, studies showed more consistent significant effects on both writing motivation and self-efficacy for writing (e.g., De Bernardi & Antolini, 2007; Paquette, 2009). However, also in this regard, the number of prior studies is very limited and more studies are needed to replicate the findings.

Second, investigating the effectiveness of both writing practices was applied because of their alignment with the underlying theoretical writing models (i.e., Graham, 2018a, 2018b; Hayes, 2012; Zimmerman & Risemberg, 1997) and motivational theories (Bandura, 1977; SET: Bandura, 1997; SDT: Ryan & Deci, 2000b) central to the present dissertation. In line with the writing literature*, explicit writing instruction* in the present dissertation covered providing model texts so students can study these and acquire essential writing knowledge (e.g., Abbuhl, 2011); explicitly explaining, demonstrating, modeling, and teaching students how, why, and when to plan, compose, and revise texts (e.g., Bouwer et al., 2018; Graham, Harris, & Troia, 2000); and offering students ample and various writing opportunities to practice writing (e.g., Bouwer et al., 2018; Graham, Harris, & Troia, 2000). These instructional practices concord with theoretical writing models highlighting the need for students to learn the appropriate writing knowledge and to how to apply writing strategies in order to learn to write effectively (Graham, 2018a, 2018b; Hayes, 2012; Zimmerman & Risemberg, 1997). These practices also align with SDT guidelines on how to foster students' autonomous motivation (cf., need for autonomy and competence) (Ryan & Deci, 2000a, 2000b) and with the prominent role of modeling in SET (Bandura, 1977, 1997). *Peer-assisted writing*, in which students work together during planning, composing, and revising texts, is in line with the increased attention for 'writing as a social activity' (Graham, 2018a, 2018b; Hayes, 2012). Peer-assisted writing also shows concordances with motivational theories. According to the SDT-framework, students' writing with a peer can foster their need for relatedness, which in turn, promotes students' autonomous motivation (Ryan & Deci, 2000b; Soenens & Vansteenkiste, 2005). Following SET, peers can function as social models and when other students observe their writing behaviors this can influence these students' self-efficacy (Bandura, 1977, 1997).

Research lines in the present dissertation

Given the fact that little information is available on the current state of writing education in Flanders and based on the theoretical and empirical writing research literature discussed above, three research lines are central in this dissertation.

(1) In view of unraveling the black box of how writing is taught in upper-elementary grades in Flanders, the first research line aims to provide *a state of the art of writing education in Flanders*. More particularly, it is aimed to provide insights in teachers' beliefs concerning writing and writing instruction on the one hand and on how writing is taught in daily instructional practice on the other hand.

(2) In view of understanding students' writing performance, a second research line focusses on studying *student and teacher-level correlates of students' writing performance*. Within this research line, we also specifically zoom in on studying the relationships between students' motivation and cognitive processes and their writing performance.

(3) Based on the in-depth insights required in the research lines above and based on previous theoretical and empirical literature on the effectiveness of explicit writing instruction and peer-assisted writing, the third research line focusses on *optimizing upper-elementary students' writing*. This research line is subdivided in two sub goals:

(a) studying the impact of explicit writing instruction and peer-assisted writing on students' writing performance,

(b) studying the impact of explicit writing instruction and peer-assisted writing on students' writing motivation and self-efficacy for writing.

Design of the studies and overview of the dissertation

The studies included in this dissertation can be typified into three different categories of research. First, *large-scale cross-sectional survey research* is used to provide a 'snapshot of how things are at a specific time' (Kelley, Clark, Brown, & Sitzia, 2003, p. 261). The main aim of this type of research is examining a situation by *describing* (cf., research line 1) and *relating* (cf., research line 2) important characteristics associated with that situation (Kelley et al., 2003). The second category of research, also descriptive in nature, is the *systematic and analytic description of an experimental intervention program* (Bouwer & De Smedt, 2018; Rijlaarsdam, Janssen, Rietdijk, & van Weijen, 2018). The main aim of this type of research is to provide in-depth insight into the design principles, instructional activities, and learning activities that constitute an experimental intervention (cf., research line 3). Finally, *experimental intervention research* is used to study the effectiveness of one or more experimental intervention program(s). The main aim of this type of research is to identify evidence-based practices (cf., research line 3) (Graham et al., 2016).

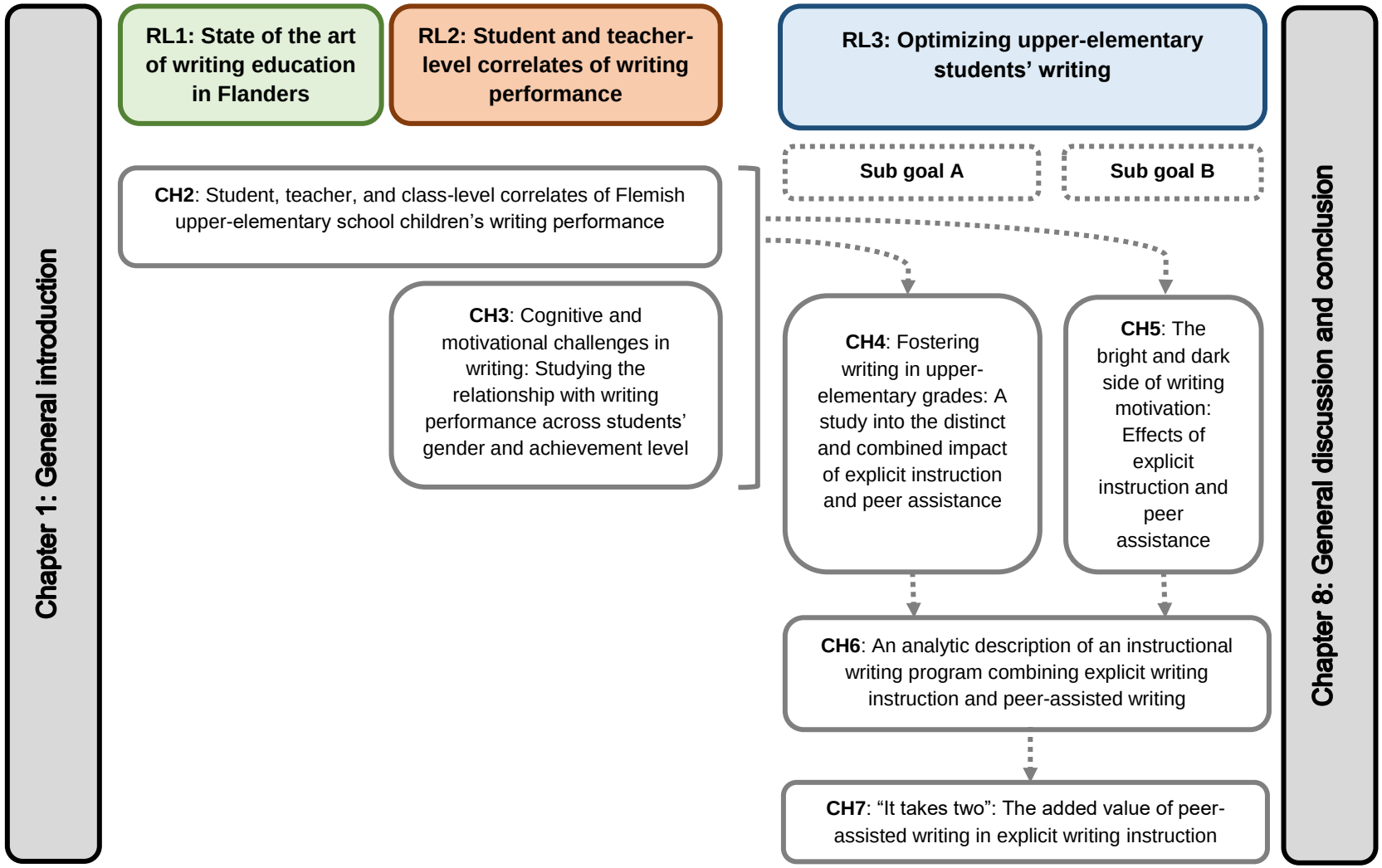


Figure 1. *Overview of the studies and their relation to the general research lines and dissertation chapters.*

Table 1. *A detailed overview of the chapters by outlining the research lines, research objectives, research designs and data collection, and data-analysis techniques.*

Research line	Chapter	Research objectives	Research designs and data collection	Data-analysis techniques
	1	General introduction		
1+2	2	To clarify (a) how writing is taught, (b) how teachers think about writing and writing instruction, and (c) how student characteristics, teacher characteristics, and classroom writing practices correlate with students' writing performance.	Cross-sectional teacher survey (n = 128) Cross-sectional student survey, descriptive writing test, and narrative writing test (n = 800).	Descriptive analyses and multilevel modeling (MLwiN)
2	3	To study (a) how cognitive and motivational challenges mediate and correlate with students' writing performance and (b) whether and how these relationships vary for boys and girls and for writers of different achievement levels.	Cross-sectional student survey (n = 1577) Descriptive writing test (n = 782) and narrative writing test (n = 790).	Exploratory and confirmatory factor analyses (R, Lavaan.Survey) Multiple group measurement invariance (R, Lavaan.Survey) Multiple group structural equation modeling (R, Lavaan.Survey)
3	4	To investigate (a) the distinct and combined effectiveness of two instructional writing practices (i.e., explicit writing instruction and writing with peer assistance), and (b) differential effects for students with different background characteristics (i.e., gender and general achievement level).	Experimental intervention study with pretest-posttest design and 4 experimental ($n_{exp.1}$ = 51, $n_{exp.2}$ = 35, $n_{exp.3}$ = 28, and $n_{exp.4}$ = 41) and 1 business as usual condition (n = 48).	Multilevel modeling (MLwiN)
	5	To study the impact of explicit instruction and peer-assisted writing on students' writing motivation and self-efficacy for writing.	Experimental intervention study with pretest-posttest design and 4 experimental ($n_{exp.1}$ = 51, $n_{exp.2}$ = 35, $n_{exp.3}$ = 28, and $n_{exp.4}$ = 41) and 1 business as usual condition (n = 48).	Multilevel modeling (MLwiN)
	6	To provide an analytic and systematic description of two instructional writing programs.		
	7	To study the incremental effect of peer-assisted writing in an explicit writing instruction program on student's writing performance, writing motivation, and self-efficacy for writing.	Experimental intervention study with pretest-posttest design and 2 experimental ($n_{exp.1}$ = 141, $n_{exp.2}$ = 185) and 1 business as usual condition (n = 97).	Multilevel modeling (MLwiN)
	8	General discussion and conclusion		

This dissertation consists in total of eight chapters. Besides an introductory (chapter 1) and a concluding chapter (chapter 8), six chapters documenting on different empirical studies are included (chapter 2 to 7). Five of these chapters are based on articles published in an international peer reviewed journal (chapter 6) or in journals listed in the Social Science Citation Index (Chapters 2 to 5). Chapter 7 is based on a revised and resubmitted article in an ISI-indexed journal. Table 1 presents a detailed overview of the chapters by outlining the research lines, research objectives, research designs and data collection, and data-analysis techniques. Additionally, Figure 1 visualizes the structure of the present dissertation, highlighting the interrelatedness between the different studies and positioning the studies within the proposed research lines. The first research line *'providing a state of the art of writing instruction in Flanders'* is addressed in chapter 2. The second research line *'clarifying correlates of students' writing performance'* is addressed in chapter 2 and 3. More particularly, chapter 2 focusses on student and teacher-level correlates of writing performance, whereas chapter 3 provides more in-depth information on the relations between student-level correlates. Finally, the insights required in research line 1 and 2 led to the third and final research line *'optimizing students' writing'* which is addressed in chapters 4 to 7. Chapters 4 and 5 report on a first iteration intervention study presenting the impact on either students' writing performance (i.e., sub goal 3a) or students' writing motivation and self-efficacy for writing (i.e., sub goal 3b), respectively. The findings obtained in chapters 4 and 5 provided input for chapter 6 and 7 which report on a second iteration intervention study. More particularly, chapter 6 provides a detailed and systematic description of the instructional writing programs, of which the impact was evaluated in chapter 7. In this chapter, sub goals 3a and 3b are addressed by exploring the impact of the experimental programs on students' writing performance, writing motivation, and self-efficacy for writing. Content-wise, the research lines in general and the different chapters in particular are strongly interrelated as findings obtained in one study, provide the input for another study. From a methodological point of view, the studies are also related because of the recurrent use of instruments (i.e., questionnaires and tests) and text quality assessment procedures (i.e., benchmark rating) throughout the dissertation.

Chapter 1 is an introductory chapter elaborating the central concepts and providing a concise overview of the theoretical and empirical literature on today's writing instruction and outcomes. Furthermore, the three research lines that serve as a leitmotiv throughout the different chapters are outlined. This chapter concludes with an overview of the design and the studies included in the dissertation.

Chapter 2, *'Student, teacher, and class-level correlates of Flemish upper-elementary school children's writing performance',* presents a-state-of-the-art study of the practice of writing instruction in Flemish upper-elementary education. The study puts forward three objectives: (a) to describe how writing is taught in upper-elementary grades in Flanders (i.e.,

classroom writing practices, amount of time spent on writing in class, and types of writing activities implemented in the class), (b) to describe teachers' beliefs (i.e., teacher self-efficacy and attitudes towards writing and writing instruction), and (c) to study how student characteristics (i.e., self-efficacy for writing, writing motivation, and writing strategies), teacher characteristics (i.e., teacher self-efficacy and attitudes), and classroom writing practices (i.e., explicit instruction of basic writing skills, explicit instruction of writing strategies, peer-assisted writing, and integrating ICT) correlate with students' writing performance. The first two objectives were addressed by teacher questionnaires, completed by 128 upper-elementary grade teachers. In this study we used the following teacher questionnaires: (a) the questionnaire on teachers' attitudes towards writing and writing instruction (Brindle, 2013; Brindle et al., 2016) and (b) the Teacher Efficacy Scale for Writing (Brindle, 2013; Brindle et al., 2016; Graham et al., 2001). To investigate the third research objective, 800 fifth and sixth-graders completed student questionnaires and two writing tests (i.e., writing a descriptive text and a narrative text). We used the following student questionnaires: (a) the Self-efficacy for Writing Scale (SEWS) (Bruning et al., 2013), (b) the Self-Regulation Questionnaire-Writing Motivation (SRQ-Writing Motivation), based on the SRQ-Reading Motivation (De Naeghel et al., 2012), and (c) a questionnaire on students' planning and revising writing strategies (Kieft, Rijlaarsdam, & van den Bergh, 2006, 2008). A holistic scoring procedure based on benchmarking was used to assess the quality of students' texts (Bouwer, Koster, & van den Bergh, 2016; Tillema, van den Bergh, Rijlaarsdam, & Sanders, 2012). Descriptive and multilevel analyses were conducted using the statistical software program MLwiN (Rasbash, Steele, Browne, & Goldstein, 2012). This chapter is published in the special issue 'Writing Education Around the Globe' in *Reading and Writing*.

Chapter 3, *'Cognitive and motivational challenges in writing: Studying the relationship with writing performance across students' gender and achievement level',* specifically zooms in on student-level variables by providing more in-depth insight in: (a) how cognitive and motivational challenges mediate and correlate with students' writing performance and (b) whether and how these relationships vary for boys and girls and for writers of different achievement levels (i.e., low, average, and high achievers). In total, 1577 fifth and sixth-grade students completed questionnaires regarding their self-efficacy for writing, writing motivation, and writing strategies. In addition, half of the students completed two writing tests, respectively focusing on the descriptive (n = 782) and narrative text genre (n = 790). To evaluate overall text quality, we used a holistic scoring procedure based on benchmarking (Bouwer et al., 2016; Tillema et al., 2012). Furthermore, we used the following questionnaires: (a) the Self-efficacy for Writing Scale (SEWS) (Bruning et al., 2013), (b) the Self-Regulation Questionnaire-Writing Motivation (SRQ-Writing Motivation), based on the SRQ-Reading Motivation (De Naeghel et al., 2012), and (c) a questionnaire on students' planning and revising writing strategies (Kieft et al., 2006,

2008). To ensure the validity of these questionnaires in the context of writing instruction in elementary grades in Flanders, we first conducted preparatory analyses. More particularly, the structure of the scales was examined by means of exploratory factor analyses (EFA). Then, we conducted confirmatory factor analyses (CFA) and calculated estimators of internal consistency (Bentler, 2009). Finally, we studied multiple group measurement invariance (MG-MI) across gender and across achievement level. As to the main analyses, multiple group structural equation modeling (MG-SEM) was conducted by means of R – lavaan.survey package (Oberski, 2014). This chapter is published in *Reading Research Quarterly*.

Chapter 4*, 'Fostering writing in upper-elementary grades: A study into the distinct and combined impact of explicit instruction and peer assistance'*, investigates (a) the distinct and combined effectiveness of two instructional writing practices (i.e., explicit writing instruction and writing with peer assistance), and (b) differential effects for students with different background characteristics (i.e., gender and general achievement level). Eleven teachers and their 206 fifth and sixth-grade students participated in the study and were randomly assigned to either one of the four experimental conditions (i.e., EI+IND: explicit instruction + individual writing, EI+PA: explicit instruction + writing with peer assistance, IND: matched individual practice comparison condition, and PA: matched peer-assisted practice comparison condition) or the business as usual condition (BAU). The 5-week interventions were implemented in authentic classes by regular class teachers, who received a prior professional development training. To ensure fidelity of implementation of the intervention (Dumas, Lynch, Laughlin, Smith, & Prinz, 2001; O'Donnell, 2008), three safeguards were implemented: (a) researchers checked the individual writing portfolios in which the students kept their texts, (b) experimental teachers completed logbooks, and (c) three researchers conducted observations in all experimental classes to ensure intervention fidelity. Finally, researchers also conducted observations in the BAU condition to analyze the instructional writing practices and mode of delivery and to determine whether there was any contamination of instruction in the BAU classes. The overall quality of students' texts was assessed by means of the benchmark rating procedure (cf., chapter 2 and 3) (Bouwer et al., 2016; Tillema et al., 2012). To study the impact of the interventions a pretest-posttest design was applied and multilevel modeling was conducted to allow for hierarchical nesting of students within classes. This chapter is published in *Reading and Writing*.

Chapter 5, *'The bright and dark side of writing motivation: Effects of explicit instruction and peer assistance'*, investigated the impact of explicit instruction and peer-assisted writing on students' writing motivation and self-efficacy for writing. A 2x2 experimental design, as outlined in chapter 4, was applied. Students' writing motivation was measured by means of the SRQ-Writing motivation and self-efficacy for writing was measured by means of the SEWS (cf., the structure and the fit of the scales of both questionnaires were examined in chapter 3). The

effect of the interventions was investigated by means of multilevel analyses. This chapter is published in *The Journal of Educational Research.*

Chapter 6, '*An analytic description of an instructional writing program combining explicit writing instruction and peer-assisted writing',* provides in-depth insight into two instructional writing programs via an analytic and systematic description of both programs. More particularly, EI+PA students received explicit writing instruction and practiced their writing collaboratively, while EI+IND students received the same explicit writing instruction; however, they practiced by writing individually. Both interventions were analytically described by means of a newly-developed reporting system (Rijlaarsdam et al., 2018). Following this procedure, the writing lesson programs were more particularly described by defining overlapping and diverging design principles, instructional teaching activities, and student learning activities. This chapter is published in the special issue 'How to report instructional interventions in writing research' in *Journal of Writing Research.*

Chapter 7, *'"It takes two": The added value of peer-assisted writing in explicit writing instruction'*, reports on a second iteration intervention study (cf., chapter 5 and 6 report on the first iteration intervention study). In this study, we investigate the incremental effect of peer-assisted writing in an explicit writing instruction program on students' writing performance, writing motivation, and self-efficacy for writing. A pretest-posttest design with two experimental conditions (i.e., EI+IND and EI+PA, systematically described in chapter 6) and one business as usual condition (BAU) was applied. Participating classes (n = 431 students, n = 20 teachers) were randomly assigned to the three conditions. To study the effectiveness of both the experimental and BAU writing programs, a stepwise procedure was applied: (a) a 30-min information session for all participating teachers, (b) a 3-h group training session for the experimental teachers, (c) pretest administration, (d) a 10-week intervention period, and (e) posttest administration. Fidelity of implementation was ensured by means of the methods used for fidelity checks in chapter 5 and 6 and the benchmark rating procedure was used to assess text quality (cf., see chapters 2, 3, and 4). Students' writing motivation was measured by means of the SRQ-Writing motivation and self-efficacy for writing was measured by means of the SEWS (cf., chapters 2, 3, and 5). The manuscript of this chapter has been revised and resubmitted to *Reading Research Quarterly*.

Chapter 8 serves as a concluding chapter, summarizing the results of the previous chapters and providing a general conclusion and discussion related to the proposed research lines central in this dissertation. Furthermore, we aim to take a meta-perspective by discussing the limitations, suggestions for future research, and implications of the present dissertation and position these within current and emerging issues and developments in the field of writing research. More particularly, we provide a 'future retrospective' on this dissertation. In this way, we take the perspective of a future member of the writing research community and we look

back at the history and development in our field and position and discuss this dissertation within this field. In this respect, we present nine highlights that reflect issues potentially valuable for future agendas of educational writing practice, policy, and research.

References

Abbuhl, R. (2011). Using models in writing instruction: A comparison with native and nonnative speakers of English. *SAGE Open, 1*(3), 1-12. doi:10.1177/2158244011426295

Aelterman, N., Vansteenkiste, M., & Haerens, L. (in press). Correlates of students' internalization and defiance of classroom rules: A self-determination theory perspective. *British Journal of Educational Psychology*. doi:10.1111/bjep.12213

Alves, R., Limpo, T., Fidalgo, R., Carvalhais, L., Pereira, L., & Castro, S. (2015). The impact of promoting transcription on early text production: Effects on bursts and pauses, levels of written language, and writing performance. *Journal of Educational Psychology, 108*(5), 665-679. doi:10.1037/edu0000089

Babayigit, S. (2015). The dimensions of written expression: Language group and gender differences. *Learning and Instruction, 35*, 33-41. doi:10.1016/j.learninstruc.2014.08.006

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84*(2), 191-125. doi:10.1037/0033-295X.84.2.191

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York, NY: Freeman.

Bandura, A. (2006). Guide to constructing self-efficacy scales. In F. Pajares & T. Urdan (Eds.), *Self-efficacy beliefs of adolescents* (pp. 307-337). Greenwich: Information Age Publishing.

Bangert-Drowns, R. (1993). The word processor as an instructional tool: A meta-analysis of word processing in writing instruction. *Review of Educational Research, 63*(1), 69-93. doi:10.2307/1170560

Beauvais, C., Olive, T., & Passerault, J. (2011). Why are some texts good and others not? Relationship between text quality and management of the writing process. *Journal of Educational Psychology, 103*(2), 415-428. doi:10.1037/a0022545

Becker, M., McElvany, N., & Kortenbruck, M. (2010). Intrinsic and extrinsic reading motivation as predictors of reading literacy: A longitudinal study. *Journal of Educational Psychology, 102*(4), 773-785. doi:10.1037/a0020084

Bentler, P. (2009). Alpha, dimension-free, and model-based internal consistency reliability. *Psychometrika, 74*(1), 137-143. doi:10.1007/S11336-008-9100-1

Bereiter, C., & Scardamalia, M. (1987). *The psychology of written composition*. Hillsdale, N.J.: L. Erlbaum Associates.

Berninger, V., Yates, C., Cartwright, A., Rutberg, J., Remy, E., & Abbott, R. (1992). Lower-level developmental skills in beginning writing. *Reading and Writing, 4*(3), 257-280. doi:10.1007/BF01027151

Bonset, H., & Hoogeveen, M. (2007). *Schrijven in het basisonderwijs. Een inventarisatie van empirisch onderzoek in het perspectief van leerplanontwikkeling.* Enschede: Stichting leerplanontwikkeling.

Bouwer, R., & De Smedt, F. (2018). Introduction special issue: Considerations and recommendations for reporting writing interventions in research publications. *Journal of Writing Research, 10*(2), 115-137. doi:10.17239/jowr-2018.10.02.01

Bouwer, R., Koster, M., & van den Bergh, H. (2016). *Benchmark rating procedure, best of both worlds? Comparing procedures to rate text quality in a reliable and valid manner*. Bringing writing research into the classroom. The effectiveness of Tekster, a newly developed writing program for elementary students (Doctoral Dissertation). Utrecht University. Utrecht, the Netherlands.

Bouwer, R., Koster, M., & van den Bergh, H. (2018). Effects of a strategy-focused instructional program on the writing quality of upper elementary students in the Netherlands. *Journal of Educational Psychology, 110*(1), 58-71. doi:10.1037/edu0000206

Breetvelt, I., van den Bergh, H., & Rijlaarsdam, G. (1994). Relations between writing processes and text quality: When and how? *Cognition and Instruction, 12*(2), 103-123. doi:10.1207/s1532690xci1202_2

Brindle, M. (2013). *Examining relationships among teachers' preparation, efficacy, and writing practices.* Vanderbilt University, Nashville, Tennessee.

Brindle, M., Graham, S., Harris, K. R., & Hebert, M. (2016). Third and fourth grade teacher's classroom practices in writing: A national survey. *Reading and Writing, 29*(5), 929-954. doi:10.1007/s11145-015-9604-x

Bruning, R., Dempsey, M., Kauffman, D., McKim, C., & Zumbrunn, S. (2013). Examining dimensions of self-efficacy for writing. *Journal of Educational Psychology, 105*(1), 25-38. doi:10.1037/a0029692

Bruning, R., & Horn, C. (2000). Developing motivation to write. *Educational Psychologist, 35*(1), 25-37. doi:10.1207/S15326985ep3501_4

Bruning, R., & Kauffman, D. (2016). Self-efficacy beliefs and motivation in writing development. In C. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of Writing Research* (pp. 160-173). New York: The Guilford Press.

Cameron, C., & Moshenko, B. (1996). Elicitation of knowledge transformational reports while children write narratives. *Canadian Journal of Behavioural Science, 28*(4), 271-280. doi:10.1037/0008-400X.28.4.271

Cleary, M. (1991). Affect and cognition in the writing processes of eleventh graders: A study of concentration and motivation. *Written Communication, 8*(4), 473-508. doi:10.1177/0741088391008004003

Cutler, L., & Graham, S. (2008). Primary grade writing instruction: A national survey. *Journal of Educational Psychology, 100*(4), 907-919. doi:10.1037/A0012656

De Bernardi, B., & Antolini, E. (2007). Fostering students'willingness and interest in argumentative writing: An intervention study. In S. Hidi & P. Boscolo (Eds.), *Writing and Motivation* (pp. 183-202). Oxford: Elsevier.

De Naeghel, J., Van Keer, H., Vansteenkiste, M., Haerens, L., & Aelterman, N. (2016). Promoting elementary school students' autonomous reading motivation: Effects of a teacher professional development workshop. *The Journal of Educational Research, 109*(3), 232-252. doi:10.1080/00220671.2014.942032

De Naeghel, J., Van Keer, H., Vansteenkiste, M., & Rosseel, Y. (2012). The relation between elementary students' recreational and academic reading motivation, reading frequency, engagement, and comprehension: A self-determination theory perspective. *Journal of Educational Psychology, 104*(4), 1006-1021. doi:10.1037/a0027800

De Smedt, F., Rogiers, A., Heirweg, S., Vandamme, S., Merchie, E., & Van Keer, H. (2019). Reading and writing motivation across grades in primary and secondary education: A self-determination theory perspective. *Submitted for publication*.

Desimone, L. (2009). Improving impact studies of teachers' professional development: Toward better conceptualizations and measures. *Educational Researcher, 38*(3), 181-199. doi:10.3102/0013189X08331140

Dockrell, J., Marshall, C., & Wyse, D. (2016). Teachers' reported practices for teaching writing in England. *Reading and Writing, 29*(3), 409-434. doi:10.1007/s11145-015-9605-9

Dumas, J., Lynch, A., Laughlin, J., Smith, E., & Prinz, R. (2001). Promoting intervention fidelity: Conceptual issues, methods and preliminary results form the EARLY ALLIANCE prevention trial. *American Journal of Preventive Medicine, 20*(1), 38-47. doi:10.1016/S0749-3797(00)00272-5

Englert, C., Zhao, Y., Dunsmore, K., Collings, N., & Wolbers, K. (2007). Scaffolding the writing of students with disabilities through procedural facilitation: Using an internet-based technology to improve performance. *Learning Disability Quarterly, 30*(9), 9-29. doi:10.2307/30035513

Fidalgo, R., Torrance, M., & Garcia, J. (2008). The long-term effects of strategy-focussed writing instruction for grade six students. *Contemporary Educational Psychology, 33*(4), 672-693. doi:10.1016/j.cedpsych.2007.09.001

Flower, L., & Hayes, J. (1981). A cognitive process theory of writing. *College Composition and Communication, 32*(4), 365-387. doi:10.2307/356600

Garcia, J., & de Caso, A. (2004). Effects of a motivational intervention for improving the writing of children with learning disabilities. *Learning Disability Quarterly, 27*(3), 141-159. doi:10.2307/1593665

Goddard, R., Hoy, W., & Hoy, A. (2000). Collective teacher efficacy: Its meaning, measure, and impact on student achievement. *American Educational Research Journal, 37*(2), 479-507. doi:10.3102/00028312037002479

Goldberg, A., Russel, M., & Cook, A. (2003). The effect of computers on student writing: A meta-analysis of studies from 1992 to 2002. *The Journal of Technology, Learning, and Assessment, 2*(1), 3-51.

Graham, S. (2006). Strategy instruction and the teaching of writing. In C. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of writing research* (pp. 187-207). New York: The Guilford Press.

Graham, S. (2018a). A revised Writer(s)-Within-Community Model of writing. *Educational Psychologist, 53*(4), 258-279. doi:10.1080/00461520.2018.1481406

Graham, S. (2018b). A writer(s) within community model of writing. In C. Bazerman, V. Berninger, D. Brandt, S. Graham, J. Langer, S. Murphy, P. Matsuda, D. Rowe, & M. Schleppegrell (Eds.), *The lifespan development of writing* (pp. 271-325). Urbana, IL: National Council of English.

Graham, S., Berninger, V., & Fan, W. (2007). The structural relationship between writing attitude and writing achievement in first and third grade students. *Contemporary Educational Psychology, 32*(3), 516-536. doi:10.1016/j.cedpsych.2007.01.002

Graham, S., Gillespie, A., & McKeown, D. (2013). Writing: importance, development, and instruction. *Reading and Writing, 26*(1), 1-15. doi:10.1007/s11145-012-9395-2

Graham, S., & Harris, K. (1989). Components analysis of cognitive strategy instruction: Effects on learning-disabled students' compositions and self-efficacy. *Journal of Educational Psychology, 81*(3), 353-361. doi:10.1037/0022-0663.81.3.353

Graham, S., & Harris, K. (2018). Evidence-based writing practices: A meta-analysis of existing meta-analyses. In R. Fidalgo, K. Harris, & M. Braaksma (Eds.), *Design Principles for Teaching Effective Writing* (pp. 13-37). Leiden: Brill.

Graham, S., Harris, K., & Chambers, A. (2016). Evidence-based practice and writing instruction: A review of reviews. In C. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of Writing Research* (pp. 211-226). New York: The Guilford Press.

Graham, S., Harris, K., & Fink, B. (2000). Is handwriting causally related to learning to write? Treatment of handwriting problems in beginning writers. *Journal of Educational Psychology, 92*(4), 620-633. doi:10.1037/0022-0663.92.4.620

Graham, S., Harris, K., Fink, B., & MacArthur, C. (2001). Teacher efficacy in writing: A construct validation with primary grade teachers. *Scientific Studies of Reading, 5*(2), 177-202. doi:10.1207/S1532799Xssr0502_3

Graham, S., Harris, K., & Mason, L. (2005). Improving the writing performance, knowledge, and self-efficacy of struggling young writers: The effects of self-regulated strategy

development. *Contemporary Educational Psychology, 30*(2), 207-241. doi:10.1016/j.cedpsych.2004.08.001

Graham, S., Harris, K., & Troia, G. (2000). Self-regulated strategy development revisited: Teaching writing strategies to struggling writers. *Topics in Language Disorders, 20*(4), 1-14. doi:10.1097/00011363-200020040-00003

Graham, S., McKeown, D., Kiuhara, S., & Harris, K. (2012). A meta-analysis of writing instruction for students in the elementary grades. *Journal of Educational Psychology, 104*(3), 879-896. doi:10.1037/A0029185

Graham, S., & Perin, D. (2007). A meta-analysis of writing instruction for adolescent students. *Journal of Educational Psychology, 99*(3), 445-476. doi:10.1037/0022-0663.99.3.445

Guay, F., Chanal, J., Ratelle, C., Marsh, H., Larose, S., & Boivin, M. (2010). Intrinsic, identified, and controlled types of motivation for school subjects in young elementary school children. *British Journal of Educational Psychology, 80*(4), 711-735. doi:10.1348/000709910x499084

Harris, K., Graham, S., & Mason, L. (2006). Improving the writing, knowledge, and motivation of struggling young writers: Effects of self-regulated strategy development with and without peer support. *American Educational Research Journal, 43*(2), 295-340. doi:10.3102/00028312043002295

Hayes, J. (2012). Modeling and remodeling writing. *Written Communication, 29*(3), 369-388. doi:10.1177/0741088312451260

Hidi, S., & Boscolo, P. (2006). Motivation and writing. In C. A. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of writing research* (pp. 144-157). New York: The Guilford Press.

Hillocks, G. (1984). What works in teaching composition: A meta-analysis of experimental treatment studies. *American Journal of Education, 93*(1), 133-170.

Hoogeveen, M., & van Gelderen, A. (2018). Writing with peer response using different types of genre knowledge: Effects on linguistic features and revisions of sixth-grade writers. *The Journal of Educational Research, 111*(1), 66-80. doi:10.1080/00220671.2016.1190913

Hsiang, T., & Graham, S. (2016). Teaching writing in grades 4-6 in urban schools in the Greater China Region. *Reading and Writing, 29*(5), 869-902. doi:10.1007/s11145-015-9597-5

Inspectie van het Onderwijs. (2010). *Het onderwijs in het schrijven van teksten. De kwaliteit van het schrijfonderwijs in het basisonderwijs.* Utrecht: Ministerie van Onderwijs, Cultuur en Wetenschap.

Kelley, K., Clark, B., Brown, V., & Sitzia, J. (2003). Good practice in the conduct and reporting of survey research. *International Journal of Quality in Health Care, 15*(3), 261-266. doi:10.1093/intqhc/mzg031

Kieft, M., Rijlaarsdam, G., & van den Bergh, H. (2006). Writing as a learning tool: Testing the role of students' writing strategies. *European Journal of Psychology of Education, 12*(1), 17-34. doi:10.1007/BF03173567

Kieft, M., Rijlaarsdam, G., & van den Bergh, H. (2008). An aptitude-treatment interaction approach to writing-to-learn. *Learning and Instruction, 18*(4), 379-390. doi:10.1016/j.learninstruc.2007.07.004

Koster, M., Bouwer, R., & van den Bergh, H. (2016). *Think first! The effect of prewriting on the writing performance of elementary students*. Bringing writing research into the classroom. The effectiveness of Tekster, a newly developed writing program for elementary students (Doctoral Dissertation). Utrecht University. Utrecht, the Netherlands.

Koster, M., Tribushinina, E., de Jong, P., & van den Bergh, H. (2015). Teaching children to write: A meta-analysis of writing intervention research. *Journal of Writing Research, 7*(2), 299-324. doi:10.17239/jowr-2015.07.02.2

Levesque, C., Zuehlke, A., Stanek, L., & Ryan, R. (2004). Autonomy and competence in German and American university students: A comparative study based on self-determination theory. *Journal of Educational Psychology, 96*(1), 68-84. doi:10.1037/0022-0663.96.1.68

Limpo, T., & Alves, R. (2013). Teaching planning or sentence-combining strategies: Effective SRSD interventions at different levels of written composition. *Contemporary Educational Psychology, 38*(4), 328-341. doi:10.1016/j.cedpsych.2013.07.004

López, P., Torrance, M., Rijlaarsdam, G., & Fidalgo, R. (2017). Effects of direct instruction and strategy modeling on upper-primary students' writing development. *Frontiers in Pyschology, 8*(1054). doi:10.3389/fpsyg.2017.01054

McCutchen, D., Covill, A., Hoyne, S., & Mildes, K. (1994). Individual differences in writing: Implications of translating fluency. *Journal of Educational Psychology, 86*(2), 256-266. doi:10.1037/0022-0663.86.2.256

McCutchen, D., Francis, M., & Kerr, S. (1997). Revising for meaning, effects of knowledge and strategy. *Journal of Educational Psychology, 89*(4), 667-676. doi:0.1037/0022-0663.89.4.667

Mouratidis, A., Michou, A., Aelterman, N., Haerens, L., & Vansteenkiste, M. (2018). Begin-of-school-year perceived autonomy-support and structure as predictors of end-of-school-year study efforts and procrastination: the mediating role of autonomous and controlled motivation. *Educational Psychology, 38*(4), 435-450. doi:10.1080/01443410.2017.1402863

National Center for Education Statistics. (2012). *The nation's report card: Writing 2011*. Washington, D.C.: Institute of Education Sciences, U.S. Department of Education.

O'Donnell. (2008). Defining, conceptualizing, and measuring fidelity of implementation and its relationship to outcomes in K-12 curriculum intervention research. *Review of Educational Research, 78*(1), 33-48. doi:10.3102/0034654307313793

Oberski, D. (2014). lavaan.survey: An R package for complex survey analysis of structural equation models. *Journal of Statistical Software, 57*(1), 1-27. doi:10.18637/jss.v057.i01

Ofsted. (2000). *Teaching of writing in primary schools: could do better*. Manchester: Ofsted.

Olinghouse, N. (2008). Student and instruction-level predictors of narrative writing in third-grade students. *Reading and Writing, 21*(1), 3-26. doi: 10.1007/s11145-007-9062-1

Pajares, F. (2003). Self-efficacy beliefs, motivation, and achievement in writing: A review of the literature. *Reading & Writing Quarterly: Overcoming Learning Difficulties, 19*(2), 139-158. doi:10.1080/10573560390143085

Pajares, F., & Valiante, G. (1997). Influence of self-efficacy on elementary students' writing. *The Journal of Educational Research, 90*(6), 353-360. doi:10.1080/00220671.1997.10544593

Paquette, K. (2009). Integrating the 6+1 writing traits model with cross-age tutoring: An investigation of elementary students' writing development. *Literacy Research and Instruction, 48*(1), 28-38. doi:10.1080/19388070802226261

Parr, J., & Jesson, R. (2016). Mapping the landscape of writing instruction in New Zealand primary school classrooms. *Reading and Writing, 29*(5), 981-1011. doi:10.1007/s11145-015-9589-5

Pelletier, L., Fortier, M., Vallerand, R., & Briere, N. (2001). Associations among perceived autonomy support, forms of self-regulation, and persistence: A prospective study. *Motivation and Emotion, 25*(4), 279-306. doi:10.1023/A:1014805132406

Rasbash, J., Steele, F., Browne, W., & Goldstein, H. (2012). *A User's Guide to MLwiN, v2.26*. Retrieved from Centre for Multilevel Modelling:

Rietdijk, S., Janssen, T., van Weijen, D., van den Bergh, H., & Rijlaarsdam, G. (2017). Improving writing in primary schools through a comprehensive writing program. *Journal of Writing Research, 9*(5), 173-225. doi:10.17239/jowr-2017.09.02.04

Rietdijk, S., Van Weijen, D., Janssen, T., van den Bergh, H., & Rijlaarsdam, G. (2018). Teaching writing in primary education: Classroom practice, time, teachers' beliefs and skills. *Journal of Educational Psychology, 110*(2), 640-663. doi:10.1037/edu0000237

Rijlaarsdam, G., Janssen, T., Rietdijk, S., & van Weijen, D. (2018). Reporting design principles for effective instruction of writing: Interventions as constructs. In R. Fidalgo, K. Harris, & M. Braaksma (Eds.), *Design Principles for Teaching Effective Writing* (Vol. 34, pp. 280-313). Leiden; Boston: Brill.

Rogers, L., & Graham, S. (2008). A meta-analysis of single subject design writing intervention research. *Journal of Educational Psychology, 100*(4), 879-906. doi:10.1037/0022-0663.100.4.879

Ryan, R., & Deci, E. (2000a). The darker and brighter sides of human existence: Basic psychological needs as a unifying concept. *Psychological Inquiry, 11*(4), 319-338. doi:10.1207/S15327965PLI1104_03

Ryan, R., & Deci, E. (2000b). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology, 25*(1), 54-67. doi:10.1006/ceps.1999.1020

Salahu-Din, D., Persky, H., & Miller, J. (2008). *The nation's report card: Writing 2007*. Washington, D.C.: National Center for Education Statistics, Institute for Education Sciences.

Santangelo, T., & Graham, S. (2015). A comprehensive meta-analysis of handwriting instruction. *Educational Psychology Review, 27*(2), 1-41. doi:10.1007/s10648-015-9335-1

Schunk, D., & Zimmerman, B. (2007). Influencing children's self-efficacy and self-regulation of reading and writing through modeling. *Reading & Writing Quarterly, 23*(1), 7-25. doi:10.1080/10573560600837578

Soenens, B., & Vansteenkiste, M. (2005). Antecedents and outcomes of self-determination in 3 life domains: The role of parents' and teachers' autonomy support. *Journal of Youth and Adolescence, 34*(6), 589-604. doi:10.1007/s10964-005-8948-y

Teng, L., & Zhang, L. (2018). Effects of motivational regulation strategies on writing performance: A mediation model of self-regulated learning of writing in English as a second/foreign language. *Metacognition Learning, 13*(2), 213-240. doi:10.1007/s11409-017-9171-4

Tillema, M., van den Bergh, H., Rijlaarsdam, G., & Sanders, T. (2012). Quantifying the quality difference between L1 and L2 essays: A rating procedure with bilingual raters and L1 and L2 benchmark essays. *Language Testing, 30*(1), 71-97. doi:10.1177/0265532212442647

Troia, G., Harbaugh, A., Shankland, R., Wolbers, K., & Lawrence, A. (2013). Relationships between writing motivation, writing activity, and writing performance: Effects of grade, sex, and ability. *Reading and Writing, 26*(1), 17-44. doi:10.1007/s11145-012-9379-2

Tschannen-Moran, M., Hoy, A., & Hoy, W. (1998). Teacher efficacy: Its meaning and measure. *Review of Educational Research, 68*(2), 202-248. doi:10.3102/00346543068002202

Vansteenkiste, M., Sierens, E., Soenens, B., Luyckx, K., & Lens, W. (2009). Motivational profiles from a self-determination perspective: The quality of motivation matters. *Journal of Educational Psychology, 101*(3), 671-688. doi:10.1037/a0015083

Vansteenkiste, M., Simons, J., Lens, W., Soenens, B., & Matos, L. (2005). Examining the motivational impact of intrinsic versus extrinsic goal framing and autonomy-supportive versus internally controlling communication style on early adolescents' academic achievement. *Child Development, 76*(2), 483-501. doi:10.1111/j.1467-8624.2005.00858.x

Vansteenkiste, M., Zhou, M., Lens, W., & Soenens, B. (2005). Experiences of autonomy and control amon Chinese learners: Vitalizing or immobilizing? *Journal of Educational Psychology, 97*(3), 468-483. doi:10.1037/0022-0663.97.3.468

von Koss Torkildsen, J., Morken, F., Helland, W. A., & Helland, T. (2015). The dynamics of narrative writing in primary grade children: writing process factors predict story quality. *Reading and Writing, 29*(3), 529-554. doi:10.1007/s11145-015-9618-4

Wijekumar, K., Graham, S., Harris, K., Lei, P., Barkel, A., Aitken, A., . . . Houston, J. (in press). The roles of writing knowledge, motivation, strategic behaviors, and skills in predicting elementary students' persuasive writing from source material. *Reading and Writing*, 1-27. doi:10.1007/s11145-018-9836-7

Yarrow, F., & Topping, K. (2001). Collaborative writing: The effects of metacognitive prompting and structured peer interaction. *British Journal of Educational Psychology, 71*, 261-282. doi:10.1348/000709901158514

Zimmerman, B., & Bandura, A. (1994). Impact of self-regulatory influences on writing course attainment. *American Educational Research Journal, 31*(4), 845-862. doi:10.3102/00028312031004845

Zimmerman, B., & Risemberg, R. (1997). Becoming a self-regulated writers: A social cognitive perspective. *Contemporary Educational Psychology, 22*, 73-101. doi:10.1006/ceps.1997.0919

Easy reading is damned hard writing.

Nathaniel Hawthorne

2 Student, teacher, and class-level correlates of Flemish upper-elementary school children's writing performance

This chapter is based on:

De Smedt, F., Van Keer, H., & Merchie, E. (2016). Student, teacher, class-level correlates of Flemish late elementary school children's writing performance. *Reading and Writing, 29*(5), 833-868. doi:10.1007/s11145-015-9590-z

Chapter 2

Student, teacher, and class-level correlates of Flemish upper-elementary school children's writing performance

Abstract

In Flanders, there are neither Flemish assessments nor teacher surveys to provide insights into the current practice and outcomes of writing instruction. In the present study, we provide a-state-of-the-art study of the practice of writing instruction in Flemish upper-elementary education by investigating: (a) how writing is taught, (b) how teachers think about writing and writing instruction, and (c) how student characteristics, teacher characteristics, and classroom writing practices correlate with students' writing performance. In total, 128 teachers and 800 fifth and sixth-grade students completed teacher and student questionnaires. Students also completed two writing tests (i.e., writing a descriptive and a narrative text). The descriptive results on the teacher questionnaire showed that upper-elementary school teachers spent only about 65 minutes each week on various writing assignments in class (e.g., stories and worksheets). During these lessons, teachers primarily focused on explicit instruction of writing skills. In addition, teachers were generally positive towards writing and writing instruction and they felt self-efficacious in teaching writing. As to the relationships with students' writing performance, multilevel analyses indicated that students with a high self-efficacy for ideation and autonomous motivation wrote qualitatively better narrative and descriptive texts, while students with controlled motivation were significantly less successful in writing narrative texts. Also, teacher self-efficacy for writing was positively correlated with students' descriptive text quality. In conclusion, this study represents an important starting point in unraveling the black box of writing instruction in Flanders. However, more research is needed to further investigate correlates on student, teacher, and class levels.

Introduction

Effective writing skills empower people to express their ideas and feelings, to articulate their knowledge, and to communicate and exchange ideas, feelings, and knowledge, offering people opportunities to engage and participate in society (Graham, Gillespie, & McKeown, 2013). Skilled writers have the ability to communicate and exchange ideas and knowledge effectively and therefore benefit from these essential communication skills in educational, professional, and private life (Graham & Perin, 2007). Despite the necessity of writing skills to be successful, there is international concern regarding the indications that students fail to develop essential writing skills (Inspectie van het Onderwijs, 2010; National Center for Education Statistics, 2012). Because education is found accountable for high-quality writing instruction, traditional writing instruction, primarily focusing on teacher-led instruction and feedback on students' writing products, has been questioned (Zimmerman & Kitsantas, 2007). Very little is known about the current practice of writing instruction and whether this more traditional teacher-led writing instruction is still mainly used in today's classrooms. In view of creating optimal writing experiences and improving students' writing outcomes, we need a better understanding of the current practices and outcomes of writing instruction (i.e., time spent on writing, applied writing activities, and classroom writing practices). Moreover, insights into writing instruction in elementary grades are crucial because children do not develop these complex writing skills and strategies automatically (Flower & Hayes, 1981) and they often encounter writing difficulties (Bereiter & Scardamalia, 1987). Therefore, it is important to initiate writing skills from elementary grades on (Cutler & Graham, 2008).

The black box of teaching writing in elementary schools in Flanders

In Flanders, the majority of the Flemish elementary schools receive financial support from the government and they can autonomously decide on their educational methods and curriculum (Flemish Ministry of Education and Training, 2008). The Flemish government, however, ensures the quality of its education by imposing attainment targets to be met by the schools in order to receive financial support. These attainment targets, which are minimum objectives found necessary and attainable for elementary school children, encompass knowledge, insights, attitudes, and skills (Flemish Ministry of Education and Training, 2008). An overview of the attainment targets for students' writing at the end of elementary education can be found in Appendix A.

Two specific actions are undertaken by the government to evaluate the implementation of the attainment targets. First, the educational inspectorate of the Flemish Ministry of Education and Training conducts school audits to evaluate the implementation of the targets and whether the majority of the children reach them. This results in a report to the Flemish Parliament so that policy makers can follow up on the quality assessments. Second, there are also Flemish assessments of educational progress done on a representative sample of schools and students to evaluate students' attainment level in specific subjects. Students writing attainment level, however, has not been evaluated yet by means of the Flemish assessments[2]. In Flanders we have no indication of any kind whether elementary school children indeed possess proficient or grade-level-adequate writing skills. In addition, there are no Flemish teacher surveys to provide insights into the writing instruction of Flemish elementary teachers. In Flanders, we have no idea how writing is taught (i.e., time spent on writing, applied writing activities, or classroom writing practices) or how teachers think about writing and writing instruction. Taking this into account, we provide a-state-of-the-art study regarding the practice of writing instruction in Flemish elementary education by investigating: (a) how writing is taught in daily instructional practice, (b) how teachers think about writing and writing instruction, and (c) how student characteristics (i.e., self-efficacy, writing motivation, and the application of writing strategies), teacher characteristics (i.e., teacher self-efficacy and attitudes) and classroom writing practices (i.e., teaching writing skills and strategies, peer-assisted writing practices, and integrating information and communication technologies [ICT]) correlate with upper-elementary students' writing performance. We specifically focus on upper-elementary grades (i.e., grades 5 and 6) because these students have the capacity to engage in higher-order writing skills and strategies (e.g., planning) while students in lower grades of elementary school are still developing lower-order writing skills (e.g., handwriting) (Berninger et al., 1992).

Writing instruction in elementary schools

When considering how writing is taught, it is important to take into account both the quantity and quality of current writing instruction. The quantity of writing instruction refers to the amount of time spent on writing and applied writing activities (e.g., writing stories, informational texts, and poems). The quality of writing instruction refers to specific writing practices (e.g., teaching writing skills, teaching writing strategies, peer-assisted writing, and integrating ICT) (see meta-analysis Graham, McKeown, Kiuhara, & Harris, 2012). As to the quantity of writing instruction,

[2] In May 2019, the results of the first Flemish assessment of educational progress for writing will be published.

prior research in the United States showed that students do not spend a lot of time on writing at school. More particularly, students spend only about 20 to 30 minutes on writing each day (Cutler & Graham, 2008; Gilbert & Graham, 2010; Graham, Harris, MacArthur, & Fink-Chorzempa, 2002). Research further revealed a considerable variability in the amount of time spent on writing and teaching basic writing skills (e.g., spelling) and strategies (e.g., planning) (Cutler & Graham, 2008), as well as a large variability in the types of writing activities students worked on during a school year. The most common activities involved writing narrative texts, letters, completing worksheets, and responding to material read (Cutler & Graham, 2008). Because the Flemish attainment targets in writing are rather broadly described (see Appendix A), it is expected that there will be a large variability between Flemish teachers in the amount of time they spend on writing and in the different types of writing activities they implement during writing instruction.

Besides studying the amount of time students spend on writing and the types of writing activities, it is also important to consider the quality of teachers' writing instruction. Previous survey research in the United States (Cutler & Graham, 2008) indicated that elementary teachers combined traditional skills instruction (i.e., teaching basic writing skills such as spelling, grammar, and punctuation skills) with a process approach. In this process approach, they created a supportive writing environment, in which students engaged in cycles of planning and reviewing while interacting with each other, writing for real audiences and feeling ownership for their writing (Cutler & Graham, 2008). These previous surveys also illustrated the limited use of computers during writing lessons. More specifically, 42% of the participating teachers indicated that students never used a computer while writing in class (Cutler & Graham, 2008; Graham, Harris, Fink-Chorzempa, & MacArthur, 2003).

Based on the Flemish writing attainment targets, it is expected that Flemish elementary school teachers will teach basic writing skills so students are able to develop readable handwriting and lay-out and apply spelling conventions and rules. The attainment targets do not make reference to students being able to apply writing strategies such as planning and revising. Therefore, it is expected that there will be a large variability between teachers in whether and how they explicitly teach writing strategies. Finally, the attainment targets state the minimum goals that the government considers achievable and necessary for students, but the schools can autonomously decide on their educational methods to attain these targets. Therefore, it is expected that there will be a large variability between teachers in whether and how they integrate peer-assisted writing practices and ICT into their writing lessons.

Teacher beliefs

To understand the practice of writing instruction, we also need to understand teachers' perceptions and judgments about writing and writing instruction, because these beliefs affect their actual behavior in the classroom (Pajares, 1992). In this respect, previous research showed that teacher self-efficacy (i.e., teachers' judgment about their ability to improve students' learning) was a key factor influencing teachers' behavior (Graham, Harris, Fink, & MacArthur, 2001; Tschannen-Moran, Hoy, & Hoy, 1998). Concerning teacher self-efficacy in writing, research in the United States indicated that teachers felt moderately confident (Brindle, 2013; Cutler & Graham, 2008; Graham et al., 2001).

Besides teacher self-efficacy in writing, research also showed that teachers' attitudes towards writing instruction are a significant factor in predicting teachers' use of evidence-based writing practices (Brindle, 2013). In general, elementary grade teachers in the United States appeared to have a rather positive attitude towards writing and writing instruction (Brindle, 2013; Cutler & Graham, 2008). In Flanders, however, there are no studies specifically focusing on general teacher self-efficacy or teacher self-efficacy in specific subjects (e.g., writing or reading). Therefore, it is difficult at this point to predict whether Flemish elementary school teachers feel capable of teaching writing or how they feel about writing and writing instruction.

Predicting students' writing performance: Student characteristics, teacher characteristics, and writing practices

To gain deeper insight into possible approaches to optimizing students' writing, it is important to investigate how student characteristics, teacher characteristics, and classroom writing practices are correlated with elementary students' writing performance. As to student characteristics, both cognitive and motivational aspects should be considered because of the complex nature of the writing process in which writers have to skillfully manage cognitive and affective processes (Flower & Hayes, 1981; Hidi & Boscolo, 2006). To write effectively, students have to master: (a) writing knowledge (e.g., knowledge about text genres), (b) transcription skills (e.g., spelling), (c) self-regulation skills (e.g., monitoring), and (d) writing strategies (e.g., planning, text production, and text revision) (Flower & Hayes, 1981; Graham et al., 2013; Graham & Harris, 2000). In light of this complex interplay between writing knowledge, skills, and strategies, novice writers often experience difficulties while writing texts (Bereiter & Scardamalia, 1987). More specifically, they fail to apply planning strategies

(Cameron & Moshenko, 1996), fluent text production (McCutchen, Covill, Hoyne, & Mildes, 1994), and deep-level revision (McCutchen, Francis, & Kerr, 1997). Based on influential cognitive models of writing (e.g., Bereiter & Scardamalia, 1987; Flower & Hayes, 1981), it is predicted that writing strategies such as planning, composition, and revision strategies will be positively correlated with students' writing performance.

The writing process is not only influenced by the (meta)cognitive strategies mentioned above. Affective and motivational processes are inextricably intertwined with the writing process as well (Hidi & Boscolo, 2006; McLeod, 1987). More specifically, research showed that students' motivation for writing (e.g., Graham, Berninger, & Fan, 2007; Troia, Harbaugh, Shankland, Wolbers, & Lawrence, 2013) and self-efficacy for writing (e.g., Pajares & Valiante, 1997; Zimmerman & Bandura, 1994) were positively correlated with students' writing achievement. According to the Self-Determination Theory (SDT) (Ryan & Deci, 2000), writing motivation can be either autonomous or controlled. More specifically, SDT acknowledges two types of motivation: (a) autonomous motivation, which entails the engagement in an activity because of its inherent satisfaction or because of its value, and (b) controlled motivation, which involves the engagement in an activity because of internal (e.g., guilt) or external pressure (e.g., rewards) (Ryan & Deci, 2000). Autonomous motivation is particularly interesting because it is a qualitatively better type of motivation. Prior writing research, however, did not always take into account this important distinction. Based on the theoretical framework of SDT (Ryan & Deci, 2000) and on previous SDT-research on reading motivation (De Naeghel, Van Keer, Vansteenkiste, & Rosseel, 2012), it can be predicted that autonomously motivated writers will perform better on writing tests compared to controlled motivated writers.

A second important motivational aspect in writing is self-efficacy, which has been principally conceptualized as a unidimensional construct (Bruning, Dempsey, Kauffman, McKim, & Zumbrunn, 2013). Recently, however, Bruning et al. (2013) argued for recognizing its multidimensional character by distinguishing between different types of self-efficacy for writing namely, (a) self-efficacy for ideation (i.e., beliefs about one's ability to invent ideas), (b) self-efficacy for conventions (i.e., beliefs about one's ability to apply writing conventions), and (c) self-efficacy for regulation (i.e., beliefs about one's ability to regulate writing behavior). Based on previous research (Bruning et al., 2013), it is expected that self-efficacy for conventions will be more strongly correlated with writing performance compared to self-efficacy for ideation and self-efficacy for regulation.

As to teacher characteristics being possibly correlated with students' writing performance, it is important to examine teacher beliefs, such as teacher self-efficacy for writing and attitudes towards writing and writing instruction. Previous research on teacher self-efficacy already showed that these characteristics were a key factor in influencing teachers' behavior (Graham et al., 2001) and students' achievement level (Goddard, Hoy, & Hoy, 2000; Tschannen-Moran

et al., 1998). The relationship between teacher self-efficacy for writing and students' writing performance, however, has not yet been investigated. Likewise, there are no studies relating teachers' attitudes towards writing and writing instruction to students' writing achievement. Based on previous research, indicating that teacher self-efficacy and teachers' attitudes predicted teachers' use of evidence-based writing practices (Brindle, 2013), it is expected that these teacher beliefs will be positively correlated with students' writing outcomes.

Finally, it is important to consider classroom writing practices in trying to predict students' writing outcomes, since various meta-analyses summarized an extensive body of research in this respect (e.g., Bangert-Drowns, 1993; Goldberg, Russel, & Cook, 2003; Graham, 2006; Graham et al., 2012; Graham & Perin, 2007; Graham & Sandmel, 2011; Hillocks, 1984; Koster, Tribushinina, de Jong, & van den Bergh, 2015; Morphy & Graham, 2012; Rogers & Graham, 2008; Santangelo & Graham, 2015). The meta-analyses more particularly identified several effective practices, such as (a) teaching transcription skills (e.g., Graham, Harris, & Fink, 2000), (b) explicit strategy instruction (e.g., Fidalgo, Torrance, & Garcia, 2008), (c) peer interaction (e.g., Yarrow & Topping, 2001), and (d) using word processing programs to compose texts (e.g., Englert, Zhao, Dunsmore, Collings, & Wolbers, 2007).

As to the first two identified writing practices, Graham and Harris (2000) emphasized the importance of both lower-order transcription skills (e.g., handwriting and spelling) and higher-order writing strategies (e.g., planning). With regard to stimulating the acquisition of lower-order transcription skills, research showed that these skills need to be explicitly taught by teachers (Santangelo & Graham, 2015). In view of fostering higher-order writing strategies, explicit strategy instruction showed great promise: this is when teachers explicitly teach students planning, revising, and composing strategies (often in combination with self-regulation strategies such as goal setting and self-monitoring) (Graham, 2006; Graham et al., 2012; Graham & Perin, 2007; Rogers & Graham, 2008). An increasing body of evidence illustrates the effectiveness of such instruction in optimizing students' writing ability (e.g., Fidalgo et al., 2008; Harris, Graham, & Mason, 2006; Zumbrunn & Bruning, 2013). Despite increasing empirical evidence of the benefits of strategy instruction for struggling writers as well as writers at grade level, this evidence-based practice is not prominent in schools in the United States (Graham & Harris, 1997).

Concerning peer interaction, the third identified effective writing practice, research showed the importance of students writing together and assisting each other during the writing process (Graham et al., 2012; Graham & Perin, 2007). In this respect, various peer-assisted writing practices appeared to be effective in improving students' writing performance: (a) peer tutoring (Paquette, 2009), (b) paired writing (Yarrow & Topping, 2001), (c) peer feedback (Olson, 1990), (d) peer collaboration (Daiute & Dalton, 1993), and (e) group discussions (De Bernardi & Antolini, 2007). Additionally, several empirical studies provided evidence for the

effectiveness of these peer-assisted writing practices for students' writing motivation (e.g., De Bernardi & Antolini, 2007; Schultz, 1997) and self-efficacy (e.g., De Bernardi & Antolini, 2007; Paquette, 2009).

As to the fourth identified effective writing practice, word processing, research indicated that writing is no longer a paper-pencil activity since people increasingly write in a "technology-infused world" (Peterson-Karlan, 2011; Wollak & Koppenhaver, 2011). Therefore, integrating ICT in current educational writing practices is important to acquaint students with the necessary 21st-century writing skills (Wollak & Koppenhaver, 2011). Until now, research primarily focused on the impact of word processing on students' writing achievement. In this respect, the meta-analysis of Morphy and Graham (2012) revealed the effectiveness of word processing programs, especially when these programs provided feedback on text quality and/or prompted writing strategies, such as planning, drafting, and revising. However, research on technology-enabled writing (e.g., new tools that enhance sharing and editing) and multimedia writing (e.g., hypermedia) is scarce (MacArthur, 2006).

Based on this extensive body of research on effective writing practices, it can be predicted that writing practices such as explicitly teaching writing skills and strategies, peer collaboration, and integrating ICT will be positively correlated with Flemish students' writing achievement.

Method

Study design

The present study has three purposes: (a) to describe how writing is taught in upper-elementary grades in Flanders, (b) to describe teachers' beliefs (i.e., teacher self-efficacy and attitudes towards writing and writing instruction), and (c) to investigate how student characteristics (i.e., self-efficacy for writing, writing motivation, and writing strategies), teacher characteristics (i.e., teacher self-efficacy and attitudes), and educational writing practices are correlated with students' writing performance. To examine the proposed research questions a cross-sectional survey was set up in which both upper-elementary teachers and their students participated (Table 1). The first two research questions were addressed by teacher questionnaires, completed by upper-elementary grade teachers from grade 4 to grade 6. The schools were randomly selected across schools in Flanders. To investigate the third research question, fifth and sixth-graders completed student questionnaires and writing tests (i.e. writing a descriptive text and a narrative text). Because fourth-graders were not included in this study,

the data from the fourth-grade teachers were not included in the analyses relating student and teacher characteristics and classroom practices to students' writing performance.

Table 1. *Study Design: a cross-sectional survey.*

Students (*n*=800)		**Teachers (*n*=128)**
		Grade 4
Grade 5		Grade 5
Grade 6		Grade 6
Day 1	Day 2	Day 1
Student questionnaires Writing test 1 (descriptive or narrative)	Writing test 2 (descriptive or narrative)	Teacher questionnaires

Participants

In total, 128 teachers from 44 Flemish (Belgium) schools and 800 fifth- and sixth-grade students in 43 classes from the schools that participated. The majority of the teachers were female (74.2%), which is representative for the elementary teacher population in Flanders (Flemish Ministry of Education and Training, 2015). In total, 43 fourth-grade teachers (33.6%), 41 fifth-grade teachers (32%), 41 sixth-grade teachers (32%), 2 multigrade teachers (1.6%), and 1 language teacher (0.8%) were engaged in this study. Multigrade teachers teach classes comprising students from both fifth and sixth grade (Little, 2001). Teachers of all upper-elementary grades were thus equally involved in the study. In total, teachers had on average 16.51 years of teaching experience in elementary grades (*SD* = 10.55), ranging from teachers in their first year to teachers who had 39 years of experience. Therefore, the sample of teachers was representative for both starting and experienced teachers.

Furthermore, 369 fifth-graders (46.1%) and 431 sixth-graders (53.9%) were engaged in this study (52.4% boys, 47.6% girls). The majority of the students were native Dutch speakers (72.4%), 8.1% of the students had a foreign home language (French, English, Arabic, Berber, Turkish, Kurdish, or other), and 18.5% of the students were bilingual (Dutch and a foreign language).

Measures

Dependent variables

Writing performance. To assess students' writing performance, two writing tests were developed, each focusing on a specific genre (i.e., descriptive and narrative genre). The writing tests were developed in agreement with the Flemish writing attainment targets for elementary education. Furthermore, an expert panel on writing instruction was consulted to evaluate the validity of the writing prompts for the tests. More particularly, students were asked to write texts based on a visual prompt for each text genre. A visual prompt was chosen instead of a source text in order to prevent students' writing performance being influenced by their reading comprehension skills. For testing students' writing performance of descriptive texts, students were asked to describe what a school is to a visiting alien. This topic was chosen because all students are familiar with this writing topic. For testing students' writing performance of narrative texts, students were asked to invent a story about why and how a message in a bottle washed ashore. To reduce testing overload for students, the writing tests were organized on two different days (see Table 1) leading to a small difference in the number of participating students. Specifically, 363 fifth-graders (46.4%) and 419 sixth-graders (53.6%) wrote a descriptive text, while 363 fifth-graders (45.9%) and 427 sixth-graders (54.1%) wrote a narrative text.

To assess the quality of students' texts, all spelling, punctuation, and capitalization errors were first corrected to reduce presentation effects (Graham, Harris, & Hebert, 2011). Then the texts were scored by three independent, trained coders using a holistic scoring procedure based on benchmarking (de Milliano, van Gelderen, & Sleegers, 2012; Tillema, van den Bergh, Rijlaarsdam, & Sanders, 2012). Following this procedure, five targets texts for each genre were put forward as benchmarks representing the range in text quality from low, medium, and high levels (Schoonen, 2005; Tillema et al., 2012). The benchmark score for the average text was 100, with an interval of 15 between target texts. By providing a broad range of scores between the target texts, the scoring procedure acknowledged large differences across writers (Schoonen, 2005). Each benchmark text was also described in detail so the raters had an idea of which aspects of the text were strong or weak. In order to assign a score to a text, raters were asked to consider the following aspects for both text genres and to compare these with the benchmark texts: text genre (i.e., the writer provides information or tells a story), assignment (i.e., the text corresponds to the given assignment), text structure (i.e., the text is well structured), sentence structure (i.e., the sentences are well composed), and word choice (i.e., the word choice is varied). The raters also examined genre-specific aspects for both the descriptive texts (i.e., development of ideas and the quality of information) and narrative texts

(i.e., story line and creativity). The texts were scored by one of the three independent coders, all of whom received a one-day training in the benchmark rating procedure. In total, 23% of each text genre (i.e., 180 descriptive texts; 180 narrative texts) was double-scored by two of the three raters (i.e., switching between rater 1 and 2, rater 1 and 3, and rater 2 and 3). Interrater reliability for both text genres was acceptable to good (i.e., descriptive text: Pearson r = .84, p < .001, narrative text: Pearson r =.83, p < .001).

Student-level variables

Self-efficacy for writing. The Self-Efficacy for Writing Scale (SEWS) was administered, consisting of three dimensions: self-efficacy for (a) writing ideation (e.g., "I can think of many ideas for my writing" or "I can put my ideas into writing"), (b) writing conventions (e.g., "I can spell my words correctly" or "I can write complete sentences"), and (c) writing self-regulation (e.g., "I don't get distracted while I write" or "I can keep writing even when it's difficult") (Bruning et al., 2013). Confirmatory factor analyses (CFA) revealed a good fit to the data (SB $\chi^2(51)$ = 204.88, p < .001, CFI = .95, RMSEA = .04, SRMR = .04). Internal consistencies of the three scales were high (ideation: Bentler's ρ = .82, conventions: Bentler's ρ = .75, regulation: Bentler's ρ = .74) (Bentler, 2009). For more information on the scales, see De Smedt et al. (2018).

Writing motivation. Based on the Self-Regulation Questionnaire-Reading Motivation (SRQ-Reading Motivation) (De Naeghel et al., 2012), the SRQ-Writing Motivation was developed (i.e., by replacing "reading" with "writing" to reflect the context of writing education) and administered. The SRQ-Writing Motivation measures both autonomous writing motivation (e.g., "I write a text because I enjoy writing" or "I write a text because I think writing is meaningful") (Bentler's ρ = .90) and controlled writing motivation (e.g., "I write a text because I will feel guilty if I don't do it" or "I write a text because others will only reward me if I write") (Bentler's ρ = .79) (Bentler, 2009). Based on the CFA of the writing items, the fit of the two-factor model was acceptable, SB $\chi^2(116)$ = 653.45, p < .001, CFI =.94, RMSEA =.06, SRMR =.05. For more information on the scales, see De Smedt et al. (2018).

Writing strategies. To measure students' applied writing strategies, the questionnaire of Kieft, Rijlaarsdam, and van den Bergh (2006, 2008) was used, measuring four writing strategies: (a) thinking (e.g., "When I write a text, I think about how to approach it" or "When I write a text, I first need good ideas before I can start writing"), (b) planning (e.g., "When I write a text, I first write an outline of my text before I start writing" or "When I write a text, I prefer to write down what I think or know about the topic on a piece of scrap paper in advance"), (c) revising (e.g., "When I reread and rewrite a text, the structure/organization of my text may still change a lot" or "When I reread and rewrite a text, the content of my text may still change a

lot"), and (d) controlling (e.g., "When I write a text, I always check whether my text is well structured before I hand it in" or "When I write a text, I regularly check whether I didn't write too many incorrect or long sentences"). The CFA showed a good model fit, SB $\chi^2(59) = 148.93$, $p < .001$, CFI =.97, RMSEA =.03, SRMR =.03, and the internal consistencies of the scales were acceptable to high (thinking: Bentler's $\rho = .65$, planning: Bentler's $\rho = .78$, revising: Bentler's $\rho = .68$, and control strategies: Bentler's $\rho = .67$) (Bentler, 2009). For more information on the scales, see De Smedt et al. (2018).

All scales, except for the SEWS, were measured using a 5-point Likert scale ranging from "I strongly disagree" (score = 1) to "I strongly agree" (score = 5). The SEWS used a 100-point scale ranging from no confidence (score = 0) to complete confidence (score = 100).

Teacher-level variables

Teacher attitudes towards writing and writing instruction. The questionnaire on teachers' attitudes towards writing and writing instruction (Brindle, 2013) was used. Based on the CFA in the present study on the original questionnaire items, two types of teachers' attitudes were distinguished: (a) attitudes towards writing (e.g., "I am a good writer" or "I enjoy writing") (Bentler's $\rho = .79$) and (b) attitudes towards teaching writing (e.g., "I like to teach writing" or "I like giving writing lessons") (Bentler's $\rho = .85$) (Bentler, 2009). The fit of the two-factor model revealed an acceptable model fit (YB $\chi^2(19) = 34.93$, $p = .014$, CFI =.95, RMSEA =.08, SRMR =.05).

Teacher self-efficacy for writing. All teachers completed the Teacher Efficacy Scale for Writing (TES-W) (Brindle, 2013; Graham et al., 2001). In the present study, the CFA revealed an acceptable two-factor model (YB $\chi^2(13) = 13.96$, $p = .038$, CFI =.99, RMSEA =.02, SRMR =.04) revealing two dimensions of teacher self-efficacy: (a) feeling self-efficacious to teach struggling writers (e.g., "When I try really hard, I can help students with the most difficult writing problems" or "When a student is having difficulties with a writing assignment, I can accurately assess whether the assignment was the correct level of difficulty") (Bentler's $\rho = .72$) and (b) attributing students' successful writing performance to one's own writing instruction (e.g., "When students' writing performance improves, it is usually because I found better ways of teaching them" or "When students master a writing concept quickly, this is because I knew the necessary steps in teaching this concept") (Bentler's $\rho = .59$) (Bentler, 2009).

Class-level variables

Classroom writing practices. To investigate classroom writing practices, all teachers completed a writing survey (Cutler & Graham, 2008). This instrument measured the extent to which teachers included the following writing practices in their daily teaching: (a) teaching writing skills (e.g., "I teach spelling skills" or "I teach grammar skills"), (b) teaching writing strategies (e.g., "I teach strategies for planning" or "I teach strategies for self-regulation"), (c) peer-assisted writing (e.g., "Students share their writing process with each other" or "Students publish their writing for each other"), and (d) integrating ICT (e.g., "Students use a computer to write" or "Students use the internet as an inspiration to write"). A 5-point Likert scale ranging from "I never do this" (score = 1) to "I always do this" (score = 5) was applied. The CFA, conducted in the present study, showed an acceptable four-factor structure (YB $\chi^2(180) = 263.970$, $p < .001$, CFI =.91, RMSEA =.06, SRMR =.07) and the internal consistencies of the four subscales were acceptable to good (Bentler's $\rho = .71$, Bentler's $\rho = .81$, Bentler's $\rho = .83$, Bentler's $\rho = .82$, respectively) (Bentler, 2009).

Amount of time spent on writing in class. Teachers were asked to indicate how many minutes students spend on writing texts (i.e., planning, composing, and editing texts of paragraph length or longer) each week. Additionally, teachers were also asked to specify how much time per week they devoted to teaching spelling, grammar, handwriting, and writing strategies (i.e., planning, composing, and revising).

Types of writing activities implemented in the class. Teachers were asked to indicate, on a list of 23 options (e.g., writing stories, poems, or summaries, and completing worksheets), which writing activities students would work on during the year.

Data analysis

First, to describe students' writing skills and the practice of writing in Flemish elementary education, means and standard deviations for the different scales in the questionnaires were computed with the statistical software program MLwiN 2.29 (Rasbash, Steele, Browne, & Goldstein, 2012). Second, multilevel analyses were performed to correlate student, teacher, and class-level characteristics with students' writing performance (MLwiN 2.29). Thereby, the hierarchical nesting of students (level 1) within classes (level 2) was taken into account. In this respect, the interdependency between students belonging to the same class and thus sharing common experiences was acknowledged (Maas & Hox, 2005).

The data were analyzed by comparing 17 multilevel models for each text genre in which: (a) student-level, (b) teacher-level, and (c) class-level explanatory variables were added stepwise (e.g., De Naeghel & Van Keer, 2013). The significance of each parameter was tested

and the model fit was evaluated. First, the fully unconditional two-level null models partitioned the total variance of students' writing performance into student-level and class-level variance. Second, student-level explanatory variables were added as follows: self-efficacy for ideation (i.e., model 1), self-efficacy for conventions (i.e., model 2), self-efficacy for regulation (i.e., model 3), autonomous motivation (i.e., model 4), controlled motivation (i.e., model 5), thinking (i.e., model 6), planning (i.e., model 7), revising (i.e., model 8), and controlling strategies (i.e., model 9). Third, the following teacher-level variables were included in the subsequent models: teachers' attitudes towards writing (i.e., model 10), teachers' attitudes towards writing instruction (i.e., model 11), attributing students' successful writing performance to their own writing instruction (i.e., model 12), and teacher self-efficacy for teaching struggling writers (i.e., model 13). Finally, class-level variables were added stepwise: teaching writing skills (i.e., model 14), teaching writing strategies (i.e., model 15), peer-assisted writing (i.e., model 16) and, integrating ICT (i.e., model 17).

Results

Descriptive statistics on student variables (i.e., writing performance, self-efficacy, writing motivation, and writing strategies), teacher variables (attitudes and teacher self-efficacy), and classroom writing practices are presented in Table 2.

Writing instruction in elementary schools

Descriptive statistics revealed that there was considerable variability in the amount of time spent on student writing and teaching basic writing skills and strategies, which can be derived from the range between the minimum and maximum scores and the large standard deviations (see Table 3). Table 4 provides information on 23 writing activities and the percentage of teachers who indicated that their students were involved in such an activity during the school year. The most common activities involved writing stories (94.4%), completing worksheets (92.9%), writing poems (92.1%), writing summaries (89.7%), writing letters (83.3%), writing in response to material read (79.4%), book reports (79.4%), and informational texts (75%).

Concerning classroom writing practices (see Table 2), teachers primarily focused on the explicit instruction of writing skills (M = 4.16, SD = 0.35) and to a lesser extent on writing strategies (M = 3.88, SD = 0.32) and peer-assisted writing (M = 3.08, SD = 0.32). They integrated ICT into their writing lessons in a limited manner (M = 2.90, SD = 0.36). Additionally,

almost all teachers reported using a commercial program to teach the language curriculum, including writing (96.9%), but only 15.3% of them based their writing instruction exclusively on this specific program. Finally, most of the teachers indicated that there was a school policy on teaching the language curriculum (70.3%), but only 23.9% of the teachers participated regularly in policy meetings regarding the language curriculum.

Table 2. *Descriptive Statistics – Student variables, teacher variables and classroom writing practices.*

Scale	***M (SD)***
Student-level	
Writing performance	
Descriptive text	96.90 (16.90)
Narrative text	95.20 (15.90)
Self-efficacy	
Ideation	70.80 (20.90)
Conventions	81.30 (16.10)
Self-regulation	69.70 (21.20)
Writing motivation	
Autonomous writing motivation	3.23 (0.92)
Controlled writing motivation	2.77 (0.70)
Writing strategies	
Thinking	3.80 (0.61)
Planning	3.42 (0.91)
Revision	3.54 (0.83)
Control	3.88 (0.78)
Teacher-level	
Teacher attitudes	
Towards writing	3.19 (0.47)
Towards writing instruction	3.69 (0.32)
Teacher self-efficacy	
Teaching struggling writers	3.63 (0.26)
Attributing successful writing	3.41 (0.21)
Class-level	
Classroom writing practices	
Teaching writing skills	4.16 (0.35)
Teaching writing strategies	3.88 (0.32)
Peer-assisted writing	3.08 (0.32)
Integrating ICT	2.90 (0.36)

Table 3. *Descriptive Statistics – Amount of time (in minutes) students spend on writing and teachers spend on teaching basic writing skills and strategies each week.*

Time spent on	Minimum	Maximum	*M (SD)*	*Mdn*
students' writing	15	350	64.96 (52.13)	50.0
teaching spelling	0	180	53.40 (32.78)	50.0
teaching grammar	0	350	56.31 (45.41)	50.0
teaching handwriting	0	200	10.47 (22.27)	0
teaching strategies	0	350	48.63 (49.93)	42.5

Table 4. *Types of writing activities students are engaged in during the school year.*

Writing activities	% of teachers including the activity
Stories	94.4
Completing worksheets	92.9
Poems	92.1
Summaries	89.7
Letters	83.3
Writing in response to material read	79.4
Book reports	79.4
Informational texts	75.0
Personal narratives	72.2
Drawing a picture and writing something to go with it	70.6
Copying text	67.5
PowerPoint	65.1
Comic strips	57.9
Class or school newspapers	56.3
Emails	54.0
Journal writing	41.3
Plays	41.3
Books	26.2
Blogs	25.4
Websites	19.0
Writing to persuade	11.9
Autobiographies	4.0
Biographies	1.6

Teacher beliefs

Descriptive statistics revealed that teachers had a rather positive attitude towards writing (M = 3.19, SD = 0.47) and writing instruction (M = 3.69, SD = 0.32). Generally, they reported they were self-efficacious in teaching struggling writers (M = 3.63, SD = 0.26) and in attributing students' successful writing performance to their own writing instruction (M = 3.41, SD = 0.21). Half of the participating teachers (51.6%) perceived the quality of their education and training for writing instruction to be adequate.

Predicting students' writing performance: Student characteristics, teacher characteristics and writing practices

This data was analyzed by comparing 17 subsequent multilevel models (for each genre). First, the composition of the models and their model fit is presented briefly. A more extensive summary of the model estimates is presented in Appendix B. Finally, the models that fitted the data best are explained in more detail.

Null models. Variances on each level were significantly different from zero for all dependent variables (student level: χ^2 = 369.10, *df* = 1, $p < .001$ and χ^2 = 373.52, *df* = 1, $p < .001$, respectively, and class level: χ^2 = 13.71, *df* = 1, $p < .001$ and χ^2 = 15.91, *df* = 1, $p < .001$, respectively), justifying the application of multilevel modeling. More particularly, 18.37% and 25.69%, respectively of the overall variability in descriptive and narrative text quality was due to differences between classes, while 81.63% and 74.31% respectively, could be attributed to differences between individual students within classes.

Student-level explanatory variables

Models 1, 2, and 3. Results showed that only self-efficacy for ideation was positively correlated with descriptive (χ^2 = 17.31, *df* = 1, $p < .001$) and narrative text quality (χ^2 = 38.40, *df* = 1, $p < .001$). Model 1, including self-efficacy for ideation, fitted the data better than the null model (χ^2 = 41.42, *df* = 1, $p < .001$ and χ^2 = 55.32, *df* = 1, $p < .001$, respectively). Adding self-efficacy for conventions (model 2) and self-efficacy for regulation (model 3) did not significantly improve the models (compared with model 1: χ^2 = 0.18, *df* = 1, $p = .674$; χ^2 = 1.72, *df* = 1, $p = .191$ and χ^2 = 1.60, *df* = 1, $p = .207$; χ^2 = 0.63, *df* = 1, $p = .426$, respectively).

Models 4 and 5. Model 4 fitted the data significantly better than model 1 for both text genres (χ^2 = 37.18, *df* = 1, $p < .001$ and χ^2 = 34.25, *df* = 1, $p < .001$ respectively), while model 5 fitted the data significantly better than model 4 (χ^2 = 40.36, *df* = 1, $p < .001$ and χ^2 = 46.83, *df* = 1, $p < .001$, respectively). The positive fixed slopes showed that autonomous writing motivation was positively correlated with descriptive (χ^2 = 4.64, *df* = 1, $p = .031$) and narrative text quality (χ^2 = 4.35, *df* = 1, $p = .037$), while the negative slope indicated that controlled writing motivation was negatively correlated with narrative text quality (χ^2 = 5.46, *df* = 1, $p = .020$).

Models 6, 7, 8, and 9. For the descriptive text quality as well as for the narrative text quality, model 8 fitted the data best (for the descriptive text compared with model 6: χ^2 = 19.82, *df* = 1,

$p < .001$ and for the narrative text compared with model 7: $\chi^2 = 15.41$, $df = 1$, $p < .001$). Results showed that planning strategies were negatively correlated with narrative text quality ($\chi^2 = 4.49$, $df = 1$, $p = .034$).

Teacher-level explanatory variables

Models 10 and 11. Adding teachers' attitudes towards writing (model 10) and writing instruction (model 11) did not improve the models significantly compared with model 8 ($\chi^2 = 0.28$, $df = 1$, $p = .597$; $\chi^2 = 3.12$, $df = 1$, $p = .078$ and $\chi^2 = 1.88$, $df = 1$, $p = .170$; $\chi^2 = 1.67$, $df = 1$, $p = .197$, respectively).

Models 12 and 13. For the descriptive text quality as well as for the narrative text quality, model 13 fitted the data best (compared with model 12: $\chi^2 = 204.42$, $df = 1$, $p < .001$ and $\chi^2 = 189.85$, $df = 1$, $p < .001$ respectively). The positive fixed slope indicated that teacher self-efficacy attributing students' writing performance to their own writing instruction was positively correlated with the quality of students' descriptive texts ($\chi^2 = 4.43$, $df = 1$, $p = .035$).

Class-level explanatory variables

Models 14, 15, 16, and 17. Adding the class-level parameters did not significantly improve the models (compared with model 13: $\chi^2 = 0.86$, $df = 1$, $p = .353$; $\chi^2 = 1.71$, $df = 1$, $p = .191$; $\chi^2 = 0.95$, $df = 1$, $p = .330$; $\chi^2 = 0.56$, $df = 1$, $p = .456$ and $\chi^2 = 0.00$, $df = 1$, $p = 1.000$; $\chi^2 = 1.22$, $df = 1$, $p = .270$; $\chi^2 = 0.867$, $df = 1$, $p = .352$; $\chi^2 = 2.69$, $df = 1$, $p = .101$, respectively).

The final models

In sum, model 13 was put forward as the final model for both text genres, as it fitted the data for both the descriptive and narrative text quality best (Table 5). Overall, in these final models 5.21% of the variance in the quality of the descriptive text and 6.45% of the variance in the quality of the narrative text was explained by the predictors in model 13. Only 3.34% and 5.69% of the variance was explained at the student level, while 13.54% and 8.64% of the variance was explained at the class level.

Table 5. *Summary of the model estimates for the final models of the quality of students' descriptive and narrative texts.*

	Model 13: descriptive text	**Model 13: narrative text**
Fixed part		
CONS	97.284 (1.403)***	94.865 (1.604)***
(Self-efficacy for ideation -70.77)	0.097 (0.033)**	0.139 (0.031)***
(Self-efficacy for convention -81.32)		
(Self-efficacy for regulation -69.72)		
(Autonomous writing motivation -3.23)	2.122 (0.773)**	1.616 (0.727)*
(Controlled writing motivation -2.77)	-0.183 (0.919)	-1.687 (0.858)*
(Thinking strategies -3.8)	-0.215 (1.140)	1.009 (1.101)
(Planning strategies -3.42)		-1.385 (0.732)
(Revising strategies -3.54)	-0.609 (0.839)	-0.133 (0.784)
(Control strategies -3.88)		
(Attitudes writing -3.23)		
(Attitiudes instruction -3.68)		
(Teacher efficacy: attributing success -3.38)	7.660 (3.638)*	3.026 (4.178)
(Teacher efficacy: struggling writers -3.58)	-4.578 (3.954)	-0.838 (4.511)
Random part		
Level: Class		
CONS/CONS	55.764 (15.909)***	80.297 (20.834)***
R^2	16.75%	25.09%
Level: Student		
CONS/CONS	277.111 (14.994)	239.789 (12.905)***
R^2	83.25%	74.91%
Loglikelihood	6188.317	6167.573
Units: Class	41	41
Units: Student	724	732
Reference Model	Model 12	Model 12

Note. Standard error estimates are placed between brackets

***p < .001. **p < .01. *p < .05.

A more extensive summary of the model estimates of all the 17 models is presented in Appendix B

The intercept of 97.28 in the final model represents the overall mean for the descriptive writing performance of students with an average score on self-efficacy for ideation (*M* = 70.77), both types of motivation (autonomous writing motivation: *M* = 3.23 and controlled writing motivation: *M* = 2.77), thinking (*M* =3.80), and revising strategies (*M* = 3.54), and with a teacher scoring average on both types of teacher self-efficacy (attributing students' successful writing to their own writing instruction: *M* =3.38 and teaching struggling writers: *M* = 3.58). Likewise, the intercept of 94.87 represents the overall mean for the narrative writing performance of students with an average score on self-efficacy for ideation (*M* = 70.77), both types of motivation (autonomous writing motivation: *M* = 3.23 and controlled writing motivation: *M* = 2.77), thinking (*M* = 3.80), planning (*M* = 3.42), and revising strategies (*M* = 3.54) and with a teacher scoring average on both types of teacher self-efficacy (attributing students' successful

writing to their own writing instruction: *M* = 3.38 and teaching struggling writers: *M* = 3.58). Based on the final models, the multilevel analyses indicated that students with higher self-efficacy for ideation (χ^2 = 8.55 , *df* = 1, *p* < 0.01 and χ^2 = 19.97, *df* = 1, *p* < 0.001, respectively) and autonomous motivation (χ^2 = 7.46, *df* = 1, *p* < 0.01 and χ^2 = 4.94, *df* = 1, *p* < 0.05, respectively) wrote qualitatively better descriptive and narrative texts. Students with higher controlled motivation, however, were significantly less successful in writing narrative texts (χ^2 = 3.86, *df* = 1, *p* < 0.05). Finally, teacher self-efficacy for writing in which teachers attributed students' successful writing performance to their own writing instruction, was positively correlated with the quality of students' descriptive texts (χ^2 = 4.43, *df* = 1, *p* < 0.05). As can be seen in the final model, planning strategies were no longer negatively correlated with narrative text quality (χ^2 = 3.58, *df* = 1, *p* = .059).

To obtain a better understanding of the relative impact of the significant student and teacher-level correlates, standardized regression coefficients (*SD*) were calculated (Cohen, 1977). These standardized regression coefficients can be interpreted as effect sizes (i.e., the standardized mean difference statistics). To interpret these effect sizes, Cohen's benchmarks for interpreting effect sizes in the social sciences were used (i.e., small effect size: *SD* = 0.2, medium effect size: *SD* = 0.5, and large effect size: *SD* = 0.8) (Cohen, 1977). The effect sizes for self-efficacy for ideation and writing motivation were rather small (i.e., self-efficacy for ideation: 0.01 *SD* and 0.18 *SD*, respectively; autonomous motivation: 0.13 *SD* and 0.09 *SD,* respectively; and controlled motivation for the narrative text: -0.07 *SD*). Teacher self-efficacy, attributing students' successful writing performance to their own writing instruction, had a moderate effect size of 0.45 *SD* for the descriptive text.

Discussion

In the present study, we tried to provide a-state-of-the-art study of the practice of writing instruction in Flemish elementary education by investigating: (a) how writing is taught; (b) how teachers think about writing and writing instruction; and (c) how student characteristics (i.e., self-efficacy, writing motivation, and writing strategies), teacher characteristics (i.e., teacher self-efficacy and attitudes), and classroom writing practices correlate with late-elementary students' writing performance.

Writing instruction in elementary schools

In investigating how writing is taught in Flanders, we not only focused on the amount of time students spend on writing and the applied writing activities (the quantity of instruction) but also considered the quality of teachers' writing instruction. Teachers in the present study indicated that students wrote about 65 minutes each week. This means that students only spent about 13 minutes each day on planning, composing, or revising texts of paragraph length or longer. This finding was in line with previous research showing that students did not spend a lot of time writing at school (Cutler & Graham, 2008; Gilbert & Graham, 2010; Graham et al., 2003). Moreover, students in the present study spent remarkably less time on writing compared to students in other studies (i.e., 20-30 minutes each day) (Cutler & Graham, 2008; Gilbert & Graham, 2010; Graham et al., 2003). Furthermore, there was considerable variability in the amount of time spent on writing and teaching basic writing skills and strategies. Based on the present and previous findings (Cutler & Graham, 2008; Gilbert & Graham, 2010; Graham et al., 2003), Flemish students do not spend a lot of time writing. Previous research, however, showed that increasing students' writing time improved their writing performance (Graham et al., 2012). More research is needed to investigate the effectiveness of increasing writing time in Flemish elementary schools. In this respect, it is not only important to study the amount of time students spend on writing, but also to consider the types of writing activities and the quality of teachers' writing instruction. Concerning the last, it is not only important to examine whether teachers implement specific writing practices (e.g., teaching writing strategies) but also to investigate the quality of their writing practices.

In addition, the results showed that the most common writing assignments involved writing stories, completing worksheets, writing poems, writing summaries, writing letters, writing in response to material read, book reports, and informational texts. In this respect, elementary students in Flanders were frequently asked to write both text genres investigated in the present study (i.e., descriptive and narrative writing). The reported writing activities were in line with previous survey research, except for informational writing. Cutler and Graham (2008) stated that expository writing activities (i.e., writing to inform or to persuade) were less common in the United States and they therefore suggested that students should spend more time on writing expository texts. In Flanders, however, students wrote informational texts on a more regular basis, probably because the attainment targets clearly state that elementary students should be able to write informational texts (see Appendix A).

Concerning the classroom writing practices, results showed that teachers predominantly teach writing skills and, to a lesser extent, writing strategies. Moreover, results in the present study indicated that in Flanders, peer-assisted writing practices were occasionally implemented in daily educational practice and teachers failed to integrate ICT regularly into

their writing lessons. The present study was in line with previous survey research indicating that elementary school teachers combined traditional skills instruction with a process approach (Cutler & Graham, 2008). In Flanders, the writing attainment targets state the minimum objectives that students must attain at the end of elementary education. However, they do not specify how these targets are to be attained. In other words, the attainment targets do not prescribe how teachers should stimulate students' writing skills by means of certain writing practices. Nonetheless, teachers did spend some time teaching writing skills and strategies as well as applying peer-assisted writing to attain these targets. The limited use of ICT during writing lessons is probably correlated with the fact that Flemish elementary school students on average are given few opportunities to use ICT in the classroom (Aesaert et al., 2015; Pynoo, Kerckaert, Goeman, Elen, & Van Braak, 2013).

Teacher beliefs

Regarding teacher beliefs, the results showed that teachers reported a rather positive attitude towards writing and writing instruction. Teachers also reported relatively high self-efficacy in teaching struggling writers, and they generally attributed students' successful writing performance to their own writing instruction. These findings were in line with previous research in which teachers moderately agreed that they liked to both write and teach writing, and they were effective writing teachers (Brindle, 2013; Cutler & Graham, 2008). A possible explanation for these positive teacher beliefs can be correlated with the fact that half of the participating teachers perceived the quality of their preparation for writing instruction as adequate. Feeling well prepared to teach writing, likely increased this self-efficacy and enjoyment to teach writing. Future research studies could examine in more depth the possible relationships between teachers' perceived quality of preparation and their attitudes and self-efficacy.

Predicting students' writing performance: Student characteristics, teacher characteristics and writing practices

The third aim of this study was to investigate student, teacher, and class-level characteristics in relation to students' writing performance. As to the student-level correlates, the results indicated that students with a higher self-efficacy for ideation wrote qualitatively better descriptive and narrative texts. These findings complement previous research indicating that self-efficacy for writing positively correlated with students' writing achievement (Pajares &

Valiante, 1997; Zimmerman & Bandura, 1994). The present study, however, went beyond previous research by explicitly recognizing self-efficacy for writing as a multidimensional (i.e., consisting of cognitive, linguistic, and self-regulatory aspects) instead of a unidimensional construct (Bruning et al., 2013). In this respect and in contrast to previous research, not all types of self-efficacy for writing were positively associated with writing quality. Surprisingly, in the present study, only self-efficacy for ideation was positively associated with writing quality. This was not in line with the findings of Bruning et al. (2013) who found that self-efficacy for conventions and writing performance shared significantly more variance compared to self-efficacy for ideation and self-efficacy for regulation in relation to writing performance. These contradictory findings, however, were not surprising in light of the administered writing achievement test. In this study, all spelling, punctuation, and capitalization errors were corrected so presentation effects were reduced (Graham et al., 2011), which was not the case in the research of Bruning et al. (2013). In addition, effect sizes in the present study showed that self-efficacy for ideation was a stronger predictor of students' narrative writing performance than of students' descriptive writing performance. An interesting finding, this indicates that students who felt self-efficacious to invent ideas to write, wrote better texts across both genres, but self-efficacy for ideation had a relatively stronger impact on students' narrative writing. Narrative writing, compared to descriptive writing, is more dependent on the writers' creativity and consequently good stories are often based on good and creative ideas. Therefore, it is likely that students who were confident about inventing ideas, and therefore also confident about their creativity, wrote better texts across genres, and the relative impact of this type of self-efficacy was larger on their narrative writing.

Second, the results showed that autonomously motivated students wrote qualitatively better texts across both genres, while controlled motivated students performed significantly lower on the narrative text. In other words, students writing for inherent satisfaction or personal value, wrote significantly better than students writing because of internal (e.g., guilt or shame) or external pressure (e.g., reward or punishment). These findings correspond with previous SDT-research on reading motivation, indicating that autonomously motivated readers performed better at reading comprehension compared to controlled motivated readers (De Naeghel et al., 2012). With regard to writing genre, it was interesting to find a negative relationship between controlled writing motivation and the narrative text quality whereas controlled writing motivation did not correlate to descriptive text quality. This finding indicates that students who wrote because of internal or external pressure performed significantly lower on the narrative text, but not on the descriptive text.

Because writing motivation was related to writing performance in the present study, we suggest that motivating students to write is an important challenge. Therefore, we emphasize the need for more experimental research on effective writing interventions to enhance

students' autonomous writing motivation. More particularly, SDT suggests that teachers are more likely to autonomously motivate students when fostering students' needs for autonomy (i.e., the experience of volition initiating one's own behavior), competence (i.e., the experience of feeling confident), and relatedness (i.e., the experience of feeling connected to others).

Third, in contrast with previous North American research (see meta-analyses Graham, 2006; Graham et al., 2012; Graham & Perin, 2007; Rogers & Graham, 2008), none of the student-reported writing strategies (i.e., thinking, planning, revising, and controlling) in the present study were significantly associated with students' writing performance. This was surprising, given the importance attributed to writing strategies in influential cognitive models (e.g., Flower & Hayes, 1981; Hayes, 2012). In light of these unexpected findings, some possible measurement issues should be acknowledged. In the present study, students reported rather high levels of all writing strategies. However, previous research showed that novice writers actually experience difficulties planning their text (Cameron & Moshenko, 1996), generating sentences fluently (McCutchen et al., 1994), and revising deep-level aspects (McCutchen et al., 1997). Therefore, the issue of self-report measures applied in the present study requires specific attention due to the probability of students overestimating their actual use of writing strategies. Therefore, we suggest future studies investigating students' writing strategies, to focus on data triangulation, combining research methods such as trace methodology (e.g., Braten & Samuelstuen, 2007), analysis of pen movements (i.e., measuring actual planning, writing, and revision time) (e.g., Alamargot, Plane, Lambert, & Chesnet, 2010; Merchie & Van Keer, 2014), student interviews, classroom observations, or think-aloud measures.

As to the teacher-level correlates, the present study first corroborated previous findings regarding the positive relationship between teacher self-efficacy in which teachers attributed students' successful writing performance to their own instruction and students' writing achievement on the descriptive text. In this respect, previous research showed that teachers with a higher teacher self-efficacy were more likely to provide high-quality instruction (Graham et al., 2001; Tschannen-Moran et al., 1998) and increasingly stimulate students' performance (Goddard et al., 2000; Tschannen-Moran et al., 1998). Concerning differences in writing genre, the results showed that teacher self-efficacy only related to descriptive writing performance and not to narrative writing. This finding suggests that students performed better on the descriptive writing test when their teachers attributed their students' successful writing performance to their own writing instruction. Based on the findings in the present study, we suggest that teachers' personal efficacy for writing should be stimulated. Therefore, teachers should be properly informed on and trained in applying effective writing practices so they feel capable of teaching writing effectively.

Second, although previous research revealed a positive relationship between teachers' attitudes towards writing and writing instruction and teachers' use of evidence-based writing practices (Brindle, 2013), teachers' attitudes were not significantly associated with students' writing performance in the present study. Based on previous research indicating such a relationship (Brindle, 2013), it may be possible that teacher attitudes did not directly predict students' writing outcomes. More insight is needed into how teacher attitudes affect the use of evidence-based writing practices related to writing achievement.

With respect to the class-level correlates, teachers' instructional writing practices were also not related to students' achievement in the present study, which is again in contrast with previous research (Bangert-Drowns, 1993; Graham, 2006; Graham et al., 2012; Graham & Perin, 2007; Morphy & Graham, 2012; Rogers & Graham, 2008). In light of these unexpected findings, the self-reported nature of the classroom writing practices should be acknowledged. What teachers report themselves about their writing practices does not automatically correspond to what they actually do during writing instruction. Therefore, we suggest future studies investigating teachers' writing practices, to conduct classroom observations to examine the extent to which teachers actually apply evidence-based writing practices and to investigate the quality of these writing practices. Since there is no research on effective writing practices in Flanders, we additionally need more experimental research investigating whether evidence-based writing practices in elementary grades (e.g., strategy instruction and peer-assisted writing) (see meta-analysis Graham et al., 2012) are also effective in stimulating Flemish elementary students' writing achievement.

Concerning the relative impact of the significant student and class-level correlates, the reported effect sizes were generally rather small in the narrative text, ranging from -0.07 to 0.18 *SD*. In the descriptive text, the reported effect sizes ranged from very small (0.01 *SD*) to moderate (0.45 *SD*). In interpreting these findings, it is important to consider that effect sizes in social sciences are likely to be small (Cohen, 1977) and some areas, such as education, are likely to have smaller effect sizes than others (Valentine & Cooper, 2003). Compared to the effect sizes of the significant student-level variables (i.e., self-efficacy for ideation and autonomous writing motivation), the effect size of teacher self-efficacy was notably larger. Consequently, teacher self-efficacy was a stronger predictor of students' writing performance on the descriptive text compared to students' self-efficacy and motivation. These findings underline the importance of class-level correlates of writing performance.

In conclusion, this study adds to the literature by providing insight to how writing is taught in Flanders. However, it is important to point out the limited variance explained by the models presented. This suggests that the student and teacher-level variables included in the present study were not very strong predictors of students' writing performance and that other variables might play a more important part in predicting students' writing outcomes. Future research

studies should further unravel this black box by investigating possible correlates on the student level (e.g., gender, general achievement, and home language), teacher level (e.g., perceived quality of the teacher preparation and beliefs about the importance of writing), and class level (e.g., time spent on writing and relating reading activities with writing) and/or by operationalizing the variables in the present study differently (e.g., studying writing strategies by means of trace methodology, analysis of pen movements or think-aloud measures and investigating classroom writing practices by means of observations).

References

Aesaert, K., Van Nijlen, D., Vanderlinde, R., Tondeur, J., Devlieger, I., & Van Braak, J. (2015). The contribution of pupil, classroom and school level characteristics to primary school pupils' ICT competences: A performance-based approach. *Computers & Education, 87*, 55-69. doi:10.1016/j.compedu.2015.03.014

Alamargot, D., Plane, S., Lambert, E., & Chesnet, D. (2010). Using eye and pen movements to trace the development of writing expertise: Case studies of a 7th, 9th and 12th grader, graduate students, and professional writer. *Reading and Writing, 23*(7), 853-888. doi:10.1007/s11145-009-9191-9

Bangert-Drowns, R. (1993). The word processor as an instructional tool: A meta-analysis of word processing in writing instruction. *Review of Educational Research, 63*(1), 69-93. doi:10.2307/1170560

Bentler, P. (2009). Alpha, dimension-free, and model-based internal consistency reliability. *Psychometrika, 74*(1), 137-143. doi:10.1007/S11336-008-9100-1

Bereiter, C., & Scardamalia, M. (1987). *The psychology of written composition*. Hillsdale, N.J.: L. Erlbaum Associates.

Berninger, V., Yates, C., Cartwright, A., Rutberg, J., Remy, E., & Abbott, R. (1992). Lower-level developmental skills in beginning writing. *Reading and Writing, 4*(3), 257-280. doi:10.1007/BF01027151

Braten, I., & Samuelstuen, M. (2007). Measuring strategic processing: Comparing task-specific self-reports to traces. *Metacognition Learning, 2*(1), 1-20. doi:10.1007/s11409-007-9004-y

Brindle, M. (2013). *Examining relationships among teachers' preparation, efficacy, and writing practices.* Vanderbilt University, Nashville, Tennessee.

Bruning, R., Dempsey, M., Kauffman, D., McKim, C., & Zumbrunn, S. (2013). Examining dimensions of self-efficacy for writing. *Journal of Educational Psychology, 105*(1), 25-38. doi:10.1037/a0029692

Cameron, C., & Moshenko, B. (1996). Elicitation of knowledge transformational reports while children write narratives. *Canadian Journal of Behavioural Science, 28*(4), 271-280. doi:10.1037/0008-400X.28.4.271

Cohen, J. (1977). *Statistical power analysis for the behavioral sciences*. New York: Academic Press.

Cutler, L., & Graham, S. (2008). Primary grade writing instruction: A national survey. *Journal of Educational Psychology, 100*(4), 907-919. doi:10.1037/A0012656

Daiute, C., & Dalton, B. (1993). Collaboration between children learning to write. Can novices be masters? *Cognition and Instruction, 10*(4), 281-333. doi:10.1207/s1532690xci1004_1

De Bernardi, B., & Antolini, E. (2007). Fostering students'willingness and interest in argumentative writing: An intervention study. In S. Hidi & P. Boscolo (Eds.), *Writing and Motivation* (pp. 183-202). Oxford: Elsevier.

de Milliano, I., van Gelderen, A., & Sleegers, P. (2012). Patterns of cognitive self-regulation of adolescent struggling writers. *Written Communication, 29*(3), 303-325. doi:10.1177/0741088312450275

De Naeghel, J., & Van Keer, H. (2013). The relation of student and class-level characteristics to primary school students' autonomous reading motivation: A multilevel approach. *Journal of Research in Reading, 36*(4), 351-370. doi:10.1111/j.1467-9817.2013.12000.x

De Naeghel, J., Van Keer, H., Vansteenkiste, M., & Rosseel, Y. (2012). The relation between elementary students' recreational and academic reading motivation, reading frequency, engagement, and comprehension: A self-determination theory perspective. *Journal of Educational Psychology, 104*(4), 1006-1021. doi:10.1037/a0027800

De Smedt, F., Merchie, E., Barendse, M., Rosseel, Y., De Naeghel, J., & Van Keer, H. (2018). Cognitive and motivational challenges in writing: Studying the relationship with writing performance across students' gender and achievement level. *Reading Research Quarterly, 53*(2), 249-272. doi:10.1002/rrq.193

Englert, C., Zhao, Y., Dunsmore, K., Collings, N., & Wolbers, K. (2007). Scaffolding the writing of students with disabilities through procedural facilitation: Using an internet-based technology to improve performance. *Learning Disability Quarterly, 30*(9), 9-29. doi:10.2307/30035513

Fidalgo, R., Torrance, M., & Garcia, J. (2008). The long-term effects of strategy-focussed writing instruction for grade six students. *Contemporary Educational Psychology, 33*(4), 672-693. doi:10.1016/j.cedpsych.2007.09.001

Flemish Ministry of Education and Training. (2008). *Education in Flanders. The Flemish educational landscape in a nutshell.* Retrieved from http://www.vlaanderen.be/nl/publicaties/detail/education-in-flanders-the-flemish-educational-landscape-in-a-nutshell-2008.

Flemish Ministry of Education and Training. (2015). *Statistisch jaarboek van het Vlaams onderwijs schooljaar 2013-2014*. Retrieved from http://www.vlaanderen.be/nl/publicaties/detail/statistisch-jaarboek-van-het-vlaams-onderwijs-schooljaar-2013-2014.

Flower, L., & Hayes, J. (1981). A cognitive process theory of writing. *College Composition and Communication, 32*(4), 365-387. doi:10.2307/356600

Gilbert, J., & Graham, S. (2010). Teaching writing to elementary students in grades 4-6: A national survey. *The Elementary School Journal, 110*(4), 494-518. doi:10.1086/651193

Goddard, R., Hoy, W., & Hoy, A. (2000). Collective teacher efficacy: Its meaning, measure, and impact on student achievement. *American Educational Research Journal, 37*(2), 479-507. doi:10.3102/00028312037002479

Goldberg, A., Russel, M., & Cook, A. (2003). The effect of computers on student writing: A meta-analysis of studies from 1992 to 2002. *The Journal of Technology, Learning, and Assessment, 2*(1), 3-51.

Graham, S. (2006). Strategy instruction and the teaching of writing. In C. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of writing research* (pp. 187-207). New York: The Guilford Press.

Graham, S., Berninger, V., & Fan, W. (2007). The structural relationship between writing attitude and writing achievement in first and third grade students. *Contemporary Educational Psychology, 32*(3), 516-536. doi:10.1016/j.cedpsych.2007.01.002

Graham, S., Gillespie, A., & McKeown, D. (2013). Writing: importance, development, and instruction. *Reading and Writing, 26*(1), 1-15. doi:10.1007/s11145-012-9395-2

Graham, S., & Harris, K. (1997). It can be taught, but it does not develop naturally: Myths and realities in writing instruction. *School Psychology Review, 26*(3), 414-424.

Graham, S., & Harris, K. (2000). The role of self-regulation and transcription skills in writing and writing development. *Educational Psychologist, 35*(1), 3-12. doi:10.1207/S15326985EP3501_2

Graham, S., Harris, K., Fink-Chorzempa, B., & MacArthur, C. (2003). Primary grade teachers' instructional adaptations for struggling writers: A national survey. *Journal of Educational Psychology, 95*(2), 279-292. doi:10.1037/0022-0663.95.2.279

Graham, S., Harris, K., & Fink, B. (2000). Is handwriting causally related to learning to write? Treatment of handwriting problems in beginning writers. *Journal of Educational Psychology, 92*(4), 620-633. doi:10.1037/0022-0663.92.4.620

Graham, S., Harris, K., Fink, B., & MacArthur, C. (2001). Teacher efficacy in writing: A construct validation with primary grade teachers. *Scientific Studies of Reading, 5*(2), 177-202. doi:10.1207/S1532799Xssr0502_3

Graham, S., Harris, K., & Hebert, M. (2011). It is more than just the message: Analysis of presentation effects in scoring writing. *Focus on Exceptional Children, 44*(4), 1-12.

Graham, S., Harris, K., MacArthur, C., & Fink-Chorzempa, B. (2002). Primary grade teachers' theoretical orientations concerning writing instruction: Construct validation and a nationwide survey. *Contemporary Educational Psychology, 27*(2), 147-166. doi:DOI 10.1006/ceps.2001.1085

Graham, S., McKeown, D., Kiuhara, S., & Harris, K. (2012). A meta-analysis of writing instruction for students in the elementary grades. *Journal of Educational Psychology, 104*(3), 879-896. doi:10.1037/A0029185

Graham, S., & Perin, D. (2007). A meta-analysis of writing instruction for adolescent students. *Journal of Educational Psychology, 99*(3), 445-476. doi:10.1037/0022-0663.99.3.445

Graham, S., & Sandmel, K. (2011). The process writing approach: A meta-analysis. *Journal of Educational Research, 104*(6), 396-407. doi:10.1080/00220671.2010.488703

Harris, K., Graham, S., & Mason, L. (2006). Improving the writing, knowledge, and motivation of struggling young writers: Effects of self-regulated strategy development with and

without peer support. *American Educational Research Journal, 43*(2), 295-340. doi:10.3102/00028312043002295

Hayes, J. (2012). Modeling and remodeling writing. *Written Communication, 29*(3), 369-388. doi:10.1177/0741088312451260

Hidi, S., & Boscolo, P. (2006). Motivation and writing. In C. A. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of writing research* (pp. 144-157). New York: The Guilford Press.

Hillocks, G. (1984). What works in teaching composition: A meta-analysis of experimental treatment studies. *American Journal of Education, 93*(1), 133-170.

Inspectie van het Onderwijs. (2010). *Het onderwijs in het schrijven van teksten. De kwaliteit van het schrijfonderwijs in het basisonderwijs.* Utrecht: Ministerie van Onderwijs, Cultuur en Wetenschap.

Kieft, M., Rijlaarsdam, G., & van den Bergh, H. (2006). Writing as a learning tool: Testing the role of students' writing strategies. *European Journal of Psychology of Education, 12*(1), 17-34. doi:10.1007/BF03173567

Kieft, M., Rijlaarsdam, G., & van den Bergh, H. (2008). An aptitude-treatment interaction approach to writing-to-learn. *Learning and Instruction, 18*(4), 379-390. doi:10.1016/j.learninstruc.2007.07.004

Koster, M., Tribushinina, E., de Jong, P., & van den Bergh, H. (2015). Teaching children to write: A meta-analysis of writing intervention research. *Journal of Writing Research, 7*(2), 299-324. doi:10.17239/jowr-2015.07.02.2

Little, A. (2001). Multigrade teaching: Towards an international research and policy agenda. *International Journal of Educational Development, 21*(6), 481-497. doi:10.1016/S0738-0593(01)00011-6

Maas, C., & Hox, J. (2005). Sufficient sample sizes for multilevel modeling. *Methodology, 1*(3), 86-92. doi:10.1027/1614-1881.1.3.86

MacArthur, C. (2006). The effects of new technologies on writing and writing processes. In C. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of writing research* (pp. 248-262). New York: Guilford Press.

McCutchen, D., Covill, A., Hoyne, S., & Mildes, K. (1994). Individual differences in writing: Implications of translating fluency. *Journal of Educational Psychology, 86*(2), 256-266. doi:10.1037/0022-0663.86.2.256

McCutchen, D., Francis, M., & Kerr, S. (1997). Revising for meaning, effects of knowledge and strategy. *Journal of Educational Psychology, 89*(4), 667-676. doi:0.1037/0022-0663.89.4.667

McLeod, S. (1987). Some thoughts about feelings: The affective domain and the writing process. *College Composition and Communication, 38*(4), 426-435. doi:10.2307/357635

Merchie, E., & Van Keer, H. (2014). Using on-line and off-line measures to explore fifth and sixth graders' text-learning strategies and schematizing skills. *Learning and Individual Differences, 32*, 193-203. doi:10.1016/j.lindif.2014.03.012

Morphy, P., & Graham, S. (2012). Word processing programs and weaker writers/readers: A meta-analysis of research findings. *Reading and Writing, 25*(3), 641-678. doi:10.1007/s11145-010-9292-5

National Center for Education Statistics. (2012). *The nation's report card: Writing 2011*. Washington, D.C.: Institute of Education Sciences, U.S. Department of Education.

Olson, V. (1990). The revising processes of sixth-grade writers with and without peer feedback. *Journal of Educational Research, 84*(1), 22-29.

Pajares, F. (1992). Teachers' beliefs and educational research: Cleaning up a messy construct. *Review of Educational Research, 62*(3), 307-332. doi:10.3102/00346543062003307

Pajares, F., & Valiante, G. (1997). Influence of self-efficacy on elementary students' writing. *The Journal of Educational Research, 90*(6), 353-360. doi:10.1080/00220671.1997.10544593

Paquette, K. (2009). Integrating the 6+1 writing traits model with cross-age tutoring: An investigation of elementary students' writing development. *Literacy Research and Instruction, 48*(1), 28-38. doi:10.1080/19388070802226261

Peterson-Karlan, G. (2011). Technology to support writing by students with learning and academic disabilities: Recent research trends and findings. *Assistive Technology Outcomes and Benefits, 7*(1), 39-62.

Pynoo, B., Kerckaert, S., Goeman, K., Elen, J., & Van Braak, J. (2013). *MICTIVO2012. Monitor voor ICT-integratie in het Vlaamse onderwijs. Eindrapport van OBPWO-project 11.02*. Universiteit Gent / KU Leuven / Hogeschool Universiteit Brussel.

Rasbash, J., Steele, F., Browne, W., & Goldstein, H. (2012). *A User's Guide to MLwiN, v2.26*. Retrieved from Centre for Multilevel Modelling:

Rogers, L., & Graham, S. (2008). A meta-analysis of single subject design writing intervention research. *Journal of Educational Psychology, 100*(4), 879-906. doi:10.1037/0022-0663.100.4.879

Ryan, R., & Deci, E. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology, 25*(1), 54-67. doi:10.1006/ceps.1999.1020

Santangelo, T., & Graham, S. (2015). A comprehensive meta-analysis of handwriting instruction. *Educational Psychology Review, 27*(2), 1-41. doi:10.1007/s10648-015-9335-1

Schoonen, R. (2005). Generalizability of writing scores: An application of structural equation modeling. *Language Testing, 22*(1), 1-30. doi:10.1191/0265532205lt295oa

Schultz, K. (1997). 'Do you want to be in my story?': Collaborative writing in an urban elementary classroom. *Journal of Literacy Research, 29*(2), 253-287. doi:10.1080/10862969709547958

Tillema, M., van den Bergh, H., Rijlaarsdam, G., & Sanders, T. (2012). Quantifying the quality difference between L1 and L2 essays: A rating procedure with bilingual raters and L1 and L2 benchmark essays. *Language Testing, 30*(1), 71-97. doi:10.1177/0265532212442647

Troia, G., Harbaugh, A., Shankland, R., Wolbers, K., & Lawrence, A. (2013). Relationships between writing motivation, writing activity, and writing performance: Effects of grade, sex, and ability. *Reading and Writing, 26*(1), 17-44. doi:10.1007/s11145-012-9379-2

Tschannen-Moran, M., Hoy, A., & Hoy, W. (1998). Teacher efficacy: Its meaning and measure. *Review of Educational Research, 68*(2), 202-248. doi:10.3102/00346543068002202

Valentine, J., & Cooper, H. (2003). *Effect size substantive interpretation guidelines: Issues in the interpretation of effect sizes*. Retrieved from Washington, DC:

Wollak, B., & Koppenhaver, D. (2011). Developing technology-supported, evidence-based writing instruction for adolescents with significant writing disabilities. *Assistive Technology Outcomes and Benefits, 7*(1), 1-23.

Yarrow, F., & Topping, K. (2001). Collaborative writing: The effects of metacognitive prompting and structured peer interaction. *British Journal of Educational Psychology, 71*, 261-282. doi:10.1348/000709901158514

Zimmerman, B., & Bandura, A. (1994). Impact of self-regulatory influences on writing course attainment. *American Educational Research Journal, 31*(4), 845-862. doi:10.3102/00028312031004845

Zimmerman, B., & Kitsantas, A. (2007). A writer's discipline: The development of self-regulatory skills. In S. Hidi & P. Boscolo (Eds.), *Writing and Motivation* (1st ed., Vol. 19, pp. 51-69). Oxford: Elsevier.

Zumbrunn, S., & Bruning, R. (2013). Improving the writing and knowledge of emergent writers: The effects of self-regulated strategy development. *Reading and Writing, 26*(1), 91-110. doi:10.1007/s11145-012-9384-5

Appendices

Appendix A. *Overview of the attainment targets for students in writing at the end of elementary education.*

Students can	- write and copy notes, overviews, announcements - communicate an announcement or an invitation to peers - write a letter to an acquaintance to communicate a personal message or experience - write a report to an acquaintance to communicate a story, an experience, or an informational text - fill in a file with information about themselves - write down answers on content-related questions - develop readable handwriting and layout - apply spelling conventions and rules (e.g., writing capital letters, interpunction such as . , ? : !)

Students develop following attitudes:	- writing readiness - writing fun - openness to think about their own writing behavior - openness to follow writing conventions - self-reliance

Appendix B1: *Summary of the model estimates for the two-level analysis of the quality of students' descriptive texts*

	Model 0	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Fixed part							
CONS	96.899 (1.370)***	96.956 (1.349)***	96.952 (1.349)***	96.962 (1.359)***	96.920 (1.355)***	96.887 (1.359)***	96.861 (1.364)***
(Self-efficacy for ideation - 70.77)		0.118 (0.028)***	0.112 (0.032)***	0.100 (0.032)**	0.095 (0.031)**	0.093 (0.031)**	0.097 (0.032)**
(Self-efficacy for convention - 81.32)			0.019 (0.044)				
(Self-efficacy for regulation - 69.72)				0.043 (0.033)			
(Autonomous writing motivation -3.23)					1.540 (0.715)*	1.567 (0.717)*	1.762 (0.748)*
(Controlled writing motivation -2.77)						-0.533 (0.879)	-0.522 (0.8588)
(Thinking strategies -3.8)							-0.684 (1.103)
Random part							
Level: Class							
CONS/CONS	64.498 (17.417)***	62.200 (16.869)***	62.233 (16.871)***	63.476 (17.135)***	62.845 (17.089)***	63.084 (17.133)***	63.479 (17.191)***
R^2	18.37%	18.12%	18.13%	18.47%	18.34%	18.35%	18.41%
Level: student							
CONS/CONS	286.684 (14.922)***	281.144 (14.655)***	281.070 (14.655)***	280.236 (14.608)***	279.848 (14.726)***	280.658 (14.726)***	281.370 (14.818)***
R^2	81.63%	81.88%	81.87%	81.53%	81.66%	81.65%	81.59%
Loglikelihood	6713.570	6672.151	6671.974	6670.439	6634.976	6594.615	6554.081
Units: Class	43	43	43	43	43	43	43
Units: Student	782	779	779	779	775	770	765
Reference model		Model 0	Model 1	Model 1	Model 1	Model 4	Model 5

Note. Standard error estimates are placed between brackets

Summary of the model estimates for the two-level analysis of the quality of students' descriptive texts (Continued)

	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
Fixed part						
CONS	96.797 (1.349)***	96.895 (1.350)***	96.900 (1.348)***	96.853 (1.346)***	97.280 (1.322)***	96.897 (1.317)***
(Self-efficacy for ideation -70.77)	0.089 (0.032)**	0.097 (0.032)**	0.097 (0.032)**	0.098 (0.032)**	0.099 (0.032)**	0.106 (0.032)**
(Self-efficacy for convention -81.32)						
(Self-efficacy for regulation -69.72)						
(Autonomous writing motivation -3.23)	2.089 (0.766)**	1.839 (0.756)*	1.891 (0.775)*	1.849 (0.756)*	1.854 (0.755)*	1.915 (0.762)*
(Controlled writing motivation -2.77)	-0.243 (0.898)	-0.448 (0.900)	-0.443 (0.900)	-0.426 (0.901)	-0.384 (0.900)	-0.494 (0.908)
(Thinking strategies -3.8)	0.031 (1.163)	-0.424 (1.117)	-0.363 (1.136)	-0.435 (1.117)	-0.486 (1.117)	-0.254 (1.125)
(Planning strategies -3.42)	-1.441 (0.753)					
(Revising strategies -3.54)		-0.818 (0.811)	-0.732 (0.860)	-0.806 (0.811)	-0.791 (0.811)	-0.862 (0.817)
(Control strategies -3.88)			-0.279 (0.932)			
(Attitudes writing -3.23)				-0.962 (1.815)		
(Attitiudes instruction -3.68)					-4.985 (2.887)	
(Teacher efficacy: attributing success -3.38)						5.717 (2.954)
Random part						
Level: Class						
CONS/CONS	61.772 (16.842)***	61.825 (16.981)***	61.615 (16.872)***	61.146 (16.726))***	56.655 (15.742)***	56.402 (15.876)***
R^2	18.06%	18.05%	18.00%	17.89%	16.80%	16.76%
Level: student						
CONS/CONS	280.324 (14.753)***	280.656 (14.826)***	280.666 (14.791)***	280.693 (14.793)***	280.589 (14.788)***	280.108 (14.918)***
R^2	81.94%	81.95%	82.00%	82.11%	83.20%	83.24%
Loglikelihood	6550.430	6534.260	6534.171	6533.981	6531.144	6392.736
Units: Class	43	43	43	43	43	42
Units: Student	765	763	763	763	763	747
Reference model	Model 6	Model 6	Model 8	Model 8	Model 8	Model 8

Note. Standard error estimates are placed between brackets.

Summary of the model estimates for the two-level analysis of the quality of students' descriptive texts (Continued)

	Model 13	Model 14	Model 15	Model 16	Model 17
Fixed part					
CONS	97.284 (1.403)***	97.459 (1.402)***	97.412 (1.384)***	97.361 (1.386)***	97.037 (1.433)***
(Self-efficacy for ideation -70.77)	0.097 (0.033)**	0.095 (0.033)**	0.098 (0.033)**	0.097 (0.033)**	0.096 (0.033)**
(Self-efficacy for convention -81.32)					
(Self-efficacy for regulation -69.72)					
(Autonomous writing motivation -3.23)	2.122 (0.773)**	2.151 (0.774)**	2.086 (0.773)**	2.104 (0.773)**	2.134 (0.774)**
(Controlled writing motivation -2.77)	-0.183 (0.919)	-0.197 (0.919)	-0.190 (0.918)	-0.168 (0.919)	-0.197 (0.919)
(Thinking strategies -3.8)	-0.215 (1.140)	-0.222 (1.140)	-0.229 (1.140)	-0.151 (1.142)	-0.228 (1.140)
(Planning strategies -3.42)					
(Revising strategies -3.54)	-0.609 (0.839)	-0.604 (0.839)	-0.590 (0.839)	-0.613 (0.839)	-0.600 (0.839)
(Control strategies -3.88)					
(Attitudes writing -3.23)					
(Attitiudes instruction -3.68)					
(Teacher efficacy: attributing success -3.38)	7.660 (3.638)*	8.197 (3.648)*	7.092 (3.605)*	7.468 (3.593)*	8.121 (3.667)*
(Teacher efficacy: struggling writers -3.58)	-4.578 (3.954)	-5.155 (3.965)	-3.271 (4.017)	-4.975 (3.922)	-4.643 (3.930)
(Teaching writing skills -4.17)		2.341 (2.510)			
(Teaching writing strategies -3.83)			-3.509 (2.667)		
(Peer-assisted writing -3.01)				-2.382 (2.423)	
(Integrating ICT -2.7)					1.666 (2.228)
Random part					
Level: Class					
CONS/CONS	55.764 (15.909)***	54.401 (15.606)***	53.510 (15.408)***	53.822 (15.848)***	54.845 (15.705)***
R^2	16.75%	16.41%	16.19%	16.26%	16.52%
Level: student					
CONS/CONS	277.111 (14.994)***	277.079 (14.992)***	276.948 (14.985)***	277.179 (14.998)***	277.099 (14.994)***
R^2	83.25%	83.59%	83.81%	83.74%	83.48
Loglikelihood	6188.317	6187.455	6186.608	6187.367	6187.762
Units: Class	41	41	41	41	41
Units: Student	724	724	724	724	724
Reference model	Model 12	Model 13	Model 13	Model 13	Model 13

Note. Standard error estimates are placed between brackets.

Appendix B2: *Summary of the model estimates for the two-level analysis of the quality of students' narrative texts*

	Model 0	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Fixed part							
CONS	95.004 (1.541)***	95.104 (1.517)***	95.096 (1.521)***	95.112 (1.521)***	95.129 (1.520)***	95.032 (1.520)***	95.113 (1.500)***
(Self-efficacy for ideation - 70.77)		0.164 (00.27)***	0.147 (0.030)***	0.154 (0.029)***	0.143 (0.029)***	0.138 (0.029)***	0.139 (0.029)***
(Self-efficacy for convention - 81.32)			0.052 (0.041)				
(Self-efficacy for regulation - 69.72)				0.024 (0.031)			
(Autonomous writing motivation -3.23)					1.372 (0.658)*	1.446 (0.657)*	1.336 (0.678)*
(Controlled writing motivation -2.77)						-1.892 (0.810)*	-1.858 (0.813)*
(Thinking strategies -3.8)							0.634 (1.009)
Random part							
Level: Class							
CONS/CONS	87.893 (22.036)***	85.341 (21.343)***	85.925 (21.343)***	85.884 (21.391)***	85.627 (21.396)***	85.617 (21.421)***	82.942 (20.815)***
R^2	25.69%	26.08%	26.26%	26.22%	26.16%	26.29%	25.89%
Level: student							
CONS/CONS	254.267 (13.156)***	241.919 (12.534)***	241.324 (12.534)***	241.639 (12.540)***	241.641 (12.631)***	240.040 (12.513)***	237.366 (12.432)***
R^2	74.31%	73.92%	73.74%	73.78%	73.84%	73.71%	74.11%
Loglikelihood	6702.482	6647.160	6645.565	6646.527	6612.910	6566.07	6506.44
Units: Class	43	43	43	43	43	43	43
Units: Student	790	788	788	788	784	779	773
Reference model		Model 0	Model 1	Model 1	Model 1	Model 4	Model 5

Note. Standard error estimates are placed between brackets

Summary of the model estimates for the two-level analysis of the quality of students' narrative texts (Continued)

	Model 7	Model 8	Model 9	Model 10	Model 11	Model 12
Fixed part						
CONS	95.047 (1.497)***	95.034 (1.476)***	95.008 (1.482)***	94.916 (1.447)***	95.347 (1.470)***	94.855 (1.483)***
(Self-efficacy for ideation -70.77)	0.131 (0.030)***	0.130 (0.030)***	0.129 (0.030)***	0.132 (0.030)***	0.131 (0.030)***	0.131 (0.030)***
(Self-efficacy for convention -81.32)						
(Self-efficacy for regulation -69.72)						
(Autonomous writing motivation -3.23)	1.677 (0.696)*	1.726 (0.701)*	1.589 (0.712)*	1.738 (0.701)*	1.720 (0.701)*	1.695 (0.712)*
(Controlled writing motivation -2.77)	-1.589 (0.821)	-1.503 (0.830)	-1.482 (0.830)	-1.470 (0.831)	-1.478 (0.830)	-1.491 (0.842)
(Thinking strategies -3.8)	1.338 (1.060)	1.358 (1.067)	1.234 (1.072)	1.318 (1.067)	1.294 (1.067)	1.291 (1.078)
(Planning strategies -3.42)	-1.466 (0.692)*	-1.422 (0.704)*	-1.613 (0.726)*	-1.395 (0.704)*	-1.372 (0.705)	-1.347 (0.715)
(Revising strategies -3.54)		-0.370 (0.751)	-0.631 (0.790)	-0.353 (0.751)	-0.368 (0.751)	-0.355 (0.760)
(Control strategies -3.88)			0.940 (0.885)			
(Attitudes writing -3.23)				-2.703 (1.949)		
(Attitiudes instruction -3.68)					-4.005 (3.078)	
(Teacher efficacy: attributing success -3.38)						2.859 (3.341)
Random part						
Level: Class						
CONS/CONS	80.319 (20.258)***	79.850 (20.260)***	80.629 (20.173)***	75.872 (19.316)***	76.563 (19.462)***	78.348 (20.105)***
R^2	25.37%	25.22%	25.44%	24.57%	24.44%	24.70%
Level: student						
CONS/CONS	236.311 (12.369)***	236.805 (12.413)***	236.328 (12.412)***	236.801 (12.411)***	236.764 (12.410)***	238.876 (12.651)***
R^2	74.63%	74.78%	74.56%	75.43%	75.56%	75.30%
Loglikelihood	6501.984	6486.575	6485.449	6484.693	6484.910	6357.421
Units: Class	43	43	43	43	43	42
Units: Student	773	771	771	771	771	755
Reference model	Model 6	Model 7	Model 8	Model 8	Model 8	Model 8

Note. Standard error estimates are placed between brackets

Summary of the model estimates for the two-level analysis of the quality of students' narrative texts (Continued)

	Model 13	Model 14	Model 15	Model 16	Model 17
Fixed part					
CONS	94.865 (1.604)***	94.866 (1.619)***	94.740 (1.582)***	94.949 (1.588)***	94.275 (1.594)***
(Self-efficacy for ideation -70.77)	0.139 (0.031)***	0.139 (0.031)***	0.139 (0.031)***	0.140 (0.031)***	0.138 (0.031)***
(Self-efficacy for convention -81.32)					
(Self-efficacy for regulation -69.72)					
(Autonomous writing motivation -3.23)	1.616 (0.727)*	1.617 (0.728)*	1.650 (0.728)*	1.611 (0.727)*	1.653 (0.727)*
(Controlled writing motivation -2.77)	-1.687 (0.858)*	-1.687 (0.858)	-1.670 (0.858)	-1.682 (0.858)	-1.709 (0.858)
(Thinking strategies -3.8)	1.009 (1.101)	1.009 (1.101)	1.041 (1.102)	1.043 (1.102)	0.980 (1.101)
(Planning strategies -3.42)	-1.385 (0.732)	-1.385 (0.733)	-1.439 (0.733)*	-1.372 (0.732)	-1.376 (0.732)
(Revising strategies -3.54)	-0.133 (0.784)	-0.133 (0.784)	-0.146 (0.784)	-0.138 (0.784)	-0.134 (0.784)
(Control strategies -3.88)					
(Attitudes writing -3.23)					
(Attitiudes instruction -3.68)					
(Teacher efficacy: attributing success -3.38)	3.026 (4.178)	3.027 (4.228)	3.550 (4.137)	2.812 (4.135)	4.169 (4.101)
(Teacher efficacy: struggling writers -3.58)	-0.838 (4.511)	-0.839 (4.565)	-2.081 (4.578)	-1.276 (4.484)	-0.989 (4.372)
(Teaching writing skills -4.17)		0.003 (2.901)			
(Teaching writing strategies -3.83)			3.385 (3.044)		
(Peer-assisted writing -3.01)				-2.605 (2.779)	
(Integrating ICT -2.7)					4.136 (2.482)
Random part					
Level: Class					
CONS/CONS	80.297 (20.834)***	80.297 (20.810)***	77.277 (20.142)***	78.125 (20.332)***	74.487 (19.521)***
R^2	25.09%	25.09%	24.37%	24.57%	23.70%
CONS/CONS	239.789 (12.905)***	239.789 (12.900)***	239.831 (12.902)***	239.820 (12.902)***	239.761 (12.899)***
R^2	74.91%	74.91%	75.63%	75.43%	76.30%
Loglikelihood	6167.573	6167.573	6166.358	6166.706	6164.880
Units: Class	Level: student	41	41	41	41
Units: Student	732	732	732	732	732
Reference model	Model 12	Model 13	Model 13	Model 13	Model 13

Note. Standard error estimates are placed between brackets

Wenige schreiben wie ein Architekt baut, der zuvor seinen Plan entworfen und bis ins einzelne durchdacht hat; vielmehr die meisten nur so, wie man Domino spielt.

Arthur Schopenhauer

3

Cognitive and motivational challenges in writing: Studying the relationship with writing performance across students' gender and achievement level

This chapter is based on:

De Smedt, F., Merchie, E., Barendse, M., Rosseel, Y., De Naeghel, J., & Van Keer, H. (2018). Cognitive and motivational challenges in writing: Studying the relationship with writing performance across students' gender and achievement level. *Reading Research Quarterly, 53*(2), 249-272. doi:10.1002/rrq.193

Chapter 3

Cognitive and motivational challenges in writing: Studying the relationship with writing performance across students' gender and achievement level

Abstract

In the past, several assessment reports on writing repeatedly showed that elementary school students do not develop the essential writing skills to be successful in school. In this respect, prior research points at the fact that cognitive as well as motivational challenges are at the root of the rather basic level of elementary students' writing performance. Additionally, previous research also revealed gender and achievement-level differences in elementary students' writing. In view of providing effective writing instruction for all students to overcome writing difficulties, the present study provides more in-depth insight in: (a) how cognitive and motivational challenges mediate and correlate with students' writing performance and (b) whether and how these relationships vary for boys and girls and for writers of different achievement levels. In the present study, 1577 fifth and sixth-grade students completed questionnaires regarding their self-efficacy for writing, writing motivation, and writing strategies. In addition, half of the students completed two writing tests, respectively focusing on the descriptive and narrative text genre. Based on multiple group structural equation modeling (MG-SEM) we put forward two models: (a) a MG-SEM model for boys and girls and (b) a MG-SEM model for low, average, and high achievers. The results underline the importance of studying writing models for different groups of students to gain a more refined insight on the complex interplay between motivational and cognitive challenges related to students' writing performance.

Introduction

In contemporary society, effective communication skills, such as reading and writing, are essential to communicate in personal and professional contexts. Being able to compose understandable and structured texts is necessary for successfully expressing oneself and is highly valued in professional, educational, and private contexts. Based on the social cognitive model of writing (Zimmerman & Risemberg, 1997), Graham, Gillespie, and McKeown (2013) define writing as "a goal directed and self-sustained cognitive activity requiring the skillful management of (a) the writing environment; (b) the constraints imposed by the writing topic; (c) the intentions of the writer(s); and (d) the processes, knowledge, and skills involved in composing" (p. 4). By highlighting the complexity of the writing process in all these facets, this definition goes beyond describing writing as a set of cognitive skills, processes, and knowledge. Writing appears especially complex for novice writers, as they often have to manage multiple actions simultaneously while concentrating on more basic writing skills (e.g., transcription skills) which are not fully automatized yet (Bereiter & Scardamalia, 1987). In this respect, the present study focused explicitly on upper-elementary students' writing. Compared to students in the lower grades, the automation of basic writing skills is increased, enabling upper-elementary students to engage in higher-order writing skills and strategies (e.g., revising) (Berninger et al., 1992). Previous research, however, showed that applying these higher-order writing skills remains cognitively challenging for this age group, as they often fail to prewriting planning (Cameron & Moshenko, 1996), have difficulties generating sentences fluently (McCutchen, Covill, Hoyne, & Mildes, 1994), and poorly revise their text by focusing mainly on surface-level aspects (e.g., spelling) (McCutchen, Francis, & Kerr, 1997).

Next to these cognitive challenges, research also highlighted motivational challenges in writing. Educational writing experiences are often not of interest to students and students perceive writing as a difficult and daunting activity (Hidi & Boscolo, 2006). In addition, education fails to show students the potential of writing to enhance their ability to think and communicate, because writing for evaluative purposes is perceived as more important than writing to share knowledge and feelings (Bruning & Horn, 2000).

Both abovementioned cognitive and motivational challenges have implications for students' actual writing performance, most often measured by means of text length (i.e., number of words), the inclusion of basic genre elements or parts in a composition, and overall text quality (i.e., the overall value of a text) (Graham, 2006). Several assessment reports on writing repeatedly showed that elementary school students do not develop the essential writing skills to be successful in school, thereby signaling the rather basic level of students' writing skills (Inspectie van het Onderwijs, 2010; National Center for Education Statistics, 2012).

Furthermore, these reports and numerous other studies indicated that more female than male students perform at a proficient and advanced writing level (e.g., Babayigit, 2015; Troia, Harbaugh, Shankland, Wolbers, & Lawrence, 2013) and that high-achieving students perform better in writing narrative texts (Olinghouse, 2008). Also Troia et al. (2013) showed that students rated by their teachers as good writers, indeed wrote qualitatively better texts than average and poor writers, while average writers in their turn wrote better texts than poor writers.

Taking into account gender, achievement differences, and the identified rather basic level of students' writing performance, providing high quality and differentiated writing instruction is important to foster all students' writing. In this respect, additional research is needed into both *cognitive* and *motivational* challenges related to writing. Because research from a cognitive perspective has been dominant in writing research (MacArthur & Graham, 2016), more studies regarding motivational challenges in writing are warranted (Boscolo & Hidi, 2007; Zimmerman & Risemberg, 1997). Although some research on motivational aspects of writing has been conducted, there are still a number of unexplored areas in this research field (Hidi & Boscolo, 2006; Troia, Shankland, & Wolbers, 2012). More specifically, researchers have called for more scientific studies on (a) the possible impact of motivational factors on writing performance (Pajares & Valiante, 2001; Williams & Larkin, 2013) and (b) the mutual relationships between cognitive and motivational components of writing (Hidi & Boscolo, 2006; MacArthur & Graham, 2016). Shell, Colvin, and Bruning (1995), for instance, stated that beliefs relate to writing performance; however, beliefs themselves cannot directly cause achievement. Therefore, more insight is needed into how beliefs potentially affect cognitive strategies, which in turn can be related to achievement (Shell et al., 1995; Zimmerman & Risemberg, 1997). In line with this call for further research, the present study investigates (a) how cognitive and motivational challenges mediate and correlate with students' writing performance and (b) whether and how these relationships vary for boys and girls and for writers of different achievement levels.

In what follows, we first present the social cognitive model of writing (Zimmerman & Risemberg, 1997) as theoretical foundation to address both cognitive and motivational challenges discussed in the present study. Next, we present prior research on gender and achievement-level differences in *cognitive* and *motivational* writing challenges. Finally, based on the social cognitive view of writing and the literature overview, we put forward the hypothesized relational model of the present study. Based on this relational model, two structural equation models are tested and presented in the result section. Based on these, we discuss (a) how cognitive and motivational challenges mediate and correlate with writing performance and (b) significant differences in the regression coefficients between boys and girls on the one hand (i.e., model 1) and low, average, and high achievers on the other hand (i.e., model 2).

A social cognitive view on writing

Earlier theoretical models of writing mainly focused on the cognitive writing processes underlying the composition of texts (Bereiter & Scardamalia, 1987; Flower & Hayes, 1981). Zimmerman and Risemberg (1997) acknowledged both abovementioned cognitive models as important accounts of cognitive challenges in writing. In their social cognitive model of writing, however, Zimmerman and Risemberg (1997) point out that in order to completely understand students' writing performance and its self-regulated development, we need to include the role of social, motivational, and behavioral processes next to cognitive processes. More particularly, they theorize that processes of self-regulation of writing (i.e., self-initiated thoughts, feelings, and actions to improve writing performance) can be grouped into three categories: (a) *covert* self-regulation (e.g., time planning and management, goal setting, self-evaluative standards, cognitive strategies, and mental imagery), (b) *behavioral* self-regulation (e.g., self-monitoring, self-consequences, and self-verbalization), and (c) *environmental* self-regulation (e.g., environmental structuring and self-selected models, tutors, or books) (Zimmerman & Risemberg, 1997).

The *cognitive* writing challenges mentioned above and included in the present study can be situated within the first category of self-regulation of writing, namely covert self-regulation. More specifically, the present study especially focuses on the cognitive strategies within covert self-regulation. Zimmerman and Risemberg (1997) define these cognitive strategies as rule governed methods for planning (i.e., referring to generating and organizing ideas; Berninger, Fuller, & Whitaker 1996), translating (i.e., referring to text generation and transcription; Berninger et al., 1996), and reviewing or revising (i.e., referring to the process of rewriting by detecting and repairing problems in the text; Berninger et al., 1996).

Zimmerman and Risemberg (1997, p. 76) further theorize that "writing is more than a literary expression of cognitive skill." In this view, writing motivation is inherently connected to students' writing as writers must be motivated to devote time and effort in planning, revising, and finalizing texts until they communicate effectively (Zimmerman & Risemberg, 1997). Finally, Zimmerman and Risemberg (1997) stated that motivational aspects such as self-efficacy beliefs are related to students' use of these self-regulatory processes (e.g., cognitive strategies) as self-efficacy beliefs predict the level of self-regulation.

Cognitive challenges in elementary school writing: gender and achievement-level differences

Cognitive writing strategies and writing performance

Empirical research supported the importance of applying cognitive writing strategies (i.e., planning, translating, and reviewing) as theorized by influential cognitive models (Bereiter & Scardamalia, 1987; Flower & Hayes, 1981). Previous research has shown that prewriting activities such as planning and organizing ideas (Koster, Bouwer, & van den Bergh, 2016), fluently transcribing ideas into words and sentences (von Koss Torkildsen, Morken, Helland, & Helland, 2015), and reviewing activities such as text revision, significantly increased elementary students' text quality (von Koss Torkildsen et al., 2015).

Gender and achievement-level differences in cognitive writing strategies

In mapping the landscape of research on gender and writing, Jones (2011) presented prior research in the field of cognitive psychology revealing gender differences concerning students' cognitive writing strategies. More particularly, boys outperform girls in verbal fluency (i.e., retrieval of words) (Berninger & Fuller, 1992), whereas girls significantly outperform boys in orthographic fluency (i.e., retrieval and production of letters), compositional fluency (i.e., the ease in which writers produce words to express ideas), and compositional micro-organization (i.e., the ability to translate ideas into the syntax of language) (Aitken & Martinussen, 2013; Berninger & Fuller, 1992; Olinghouse, 2008). Notwithstanding the fact that Bourke and Adams (2011) showed that boys and girls have the same cognitive resources (i.e., working memory functioning) available to support writing development and although boys and girls have the same potential for composing, boys experience more difficulties in transcribing their thoughts in writing (Olinghouse, 2008). In this way, boys have more difficulties engaging in higher-order writing processes such as planning and revision activities (Berninger et al., 1992). Compared to the rather extensive research on gender differences, research focusing on achievement-level differences in cognitive writing processes is lacking.

Motivational challenges in elementary school writing: gender and achievement-level differences

In the present study, the motivational challenges of writing refer to students' self-efficacy for writing and their motives for engaging in writing. These constructs are rooted respectively in Self-Efficacy Theory (SET) (Bandura, 1997; Zimmerman & Bandura, 1994) and Self-Determination Theory (SDT) (Ryan & Deci, 2000). In the present study we integrate both theoretical frameworks, since these are well aligned and share the assumption that humans are agents of their behavior (Sweet, Fortier, Strachan, & Blanchard, 2012).

Self-efficacy for writing and writing performance

Self-efficacy for writing refers to individuals' perceptions of their writing ability (Zimmerman & Bandura, 1994). Self-efficacy beliefs for writing received modest attention from both writing and self-efficacy researchers (Pajares, 2003; Pajares, Valiante, & Cheong, 2007). However, compared to other motivational constructs (e.g., interest) in writing research, research on self-efficacy for writing is dominant (Zimmerman & Kitsantas, 2007). Research indicated that writing self-efficacy beliefs provide the foundation for successful writing performance in elementary grades (De Smedt, Van Keer, & Merchie, 2016; Pajares & Valiante, 1997). Even when controlling for other covariates (e.g., initial writing competence, gender), self-efficacy for writing still makes a significant independent contribution to elementary students' writing performance (Pajares, 2003; Pajares & Valiante, 1997). Moreover, Pajares (2003) stated that research consistently indicated that the influence of typical motivational correlates on writing performance (e.g., writing apprehension, perceived value of writing) is nullified when self-efficacy beliefs are taken into account (Pajares, Miller, & Johnson, 1999; Pajares & Valiante, 1997).

Writing motivation and writing performance

Although students often experience writing as an unpleasant activity (Hidi & Boscolo, 2006), previous research highlighted the importance of motivating students to engage in writing activities (Bruning & Horn, 2000). In particular, research indicated that writing motivation significantly enhances text structure and coherence (Garcia & de Caso, 2004), and therefore also considerably improves elementary students' writing performance (De Smedt et al., 2016; Garcia & de Caso, 2004; Graham, Berninger, & Fan, 2007; Troia et al., 2013). An interesting theoretical framework to investigate students' motives for writing is the Self-Determination

Theory (SDT) (in line with SDT, we further refer to these motives as writing motivation). This framework distinguishes qualitatively different types of motivation, namely autonomous motivation and controlled motivation (Ryan & Deci, 2000). According to SDT, students can write for inherent satisfaction or personal value (i.e., autonomous writing motivation) or because of internal or external pressure such as guilt or punishment (i.e., controlled writing motivation). In this respect, De Smedt et al. (2016) showed that autonomously motivated students write qualitatively better texts, while controlled motivated students perform significantly lower. In line with the theoretical framework of SDT (Ryan & Deci, 2000), they therefore argued that building long-lasting motivation is challenging but that students' autonomous writing motivation can be enhanced by fostering students' need for autonomy, competence, and relatedness (De Smedt et al., 2016).

Gender and achievement-level differences in self-efficacy for writing and writing motivation

Regarding the motivational challenges in writing, studies point to particular gender differences. Research has generally indicated that girls have more positive beliefs and attitudes towards writing (Graham et al., 2007). Further, previous writing research applying SDT as a theoretical framework in elementary education, showed that girls have increased writing motivation compared to boys (Guay et al., 2010). More specifically, girls report significantly higher autonomous motivation, indicating that they are more motivated to write because of its inherent satisfaction or because they value the activity (Guay et al., 2010).

Although gender differences with writing motivation are documented in the literature, documentation of gender differences in writing self-efficacy, at the elementary level, is inconclusive (Pajares et al., 1999). Evidence from some studies suggest that girls have more confidence in their writing ability (e.g., Pajares & Valiante, 1997), whereas others did not find gender differences in self-efficacy for writing (e.g., Shell et al., 1995). An important consideration in interpreting these findings, however, is that boys and girls may use different metrics when assessing their own writing capabilities as they probably use different frames of reference (Pajares et al., 1999).

Concerning achievement-level differences in writing motivation, to our knowledge, no prior studies investigating achievement-level differences in writing motivation from the framework of SDT are reported in the literature yet. However, Gottfried (1990) studied elementary students' motivation within the framework of intrinsic motivation theories and found that high performers are generally more intrinsically motivated. Further, Shell et al. (1995) found that high-achievers

have a higher self-efficacy for writing compared to both low and average achievers, while average achievers reported a higher self-efficacy compared to low achievers.

The hypothesized relational model

First, the present study addresses how cognitive (i.e., writing strategies) and motivational challenges (i.e., writing motivation and self-efficacy for writing) mediate and correlate with students' writing performance. Based on the social cognitive model of Zimmerman and Risemberg (1997) and the literature overview presented above we hypothesize that: (a) students' writing motivation and self-efficacy for writing are correlated with cognitive writing strategies (hypothesis 1) (e.g., Shell et al., 1995), (b) writing motivation and self-efficacy are directly related to students' writing performance (hypothesis 2) (e.g., De Smedt et al., 2016; Pajares & Valiante, 1997), and (c) cognitive writing strategies are directly correlated with students' writing performance (hypothesis 3) (e.g., Koster et al., 2016; von Koss Torkildsen et al., 2015). Because writing motivation and self-efficacy for writing are expected to make an independent contribution to students' cognitive writing processes and writing performance, we included both writing motivation and self-efficacy for writing as independent predictors in the present study (Parallel to studies in reading research: e.g., De Naeghel, Van Keer, Vansteenkiste, & Rosseel, 2012; Guthrie, Klauda, & Ho, 2013). The hypothesized relational model is summarized in Figure 1.

Second, this study expands prior research by examining whether and how these relationships, as stipulated in the hypothesized relational model, vary for boys and girls and for writers of different achievement levels. Based on the literature overview, we can conclude that there is abundant evidence for existing gender and achievement-level differences in both cognitive (e.g., Berninger & Fuller, 1992; Olinghouse, 2008) and motivational writing challenges (e.g., Guay et al., 2010; Pajares & Valiante, 1997). These previous studies, however, did not address how cognitive and motivational challenges in writing mediate and whether they do so differentially based upon gender and achievement levels. As there is no previous research on how these relationships may vary for girls and boys and for students at different achievement levels, no specific hypotheses can be formulated. Consequently, we examined possible gender and achievement-level differences in the relationships between motivational and cognitive challenges and students' writing performance in an exploratory way. More specifically, we tested two structural equation models, based on the abovementioned relational model, to analyze: (a) the proposed hypotheses and (b) possible significant differences in the regression coefficients between boys and girls on the one hand (i.e., first model) and low, average, and high achievers on the other hand (i.e., second model).

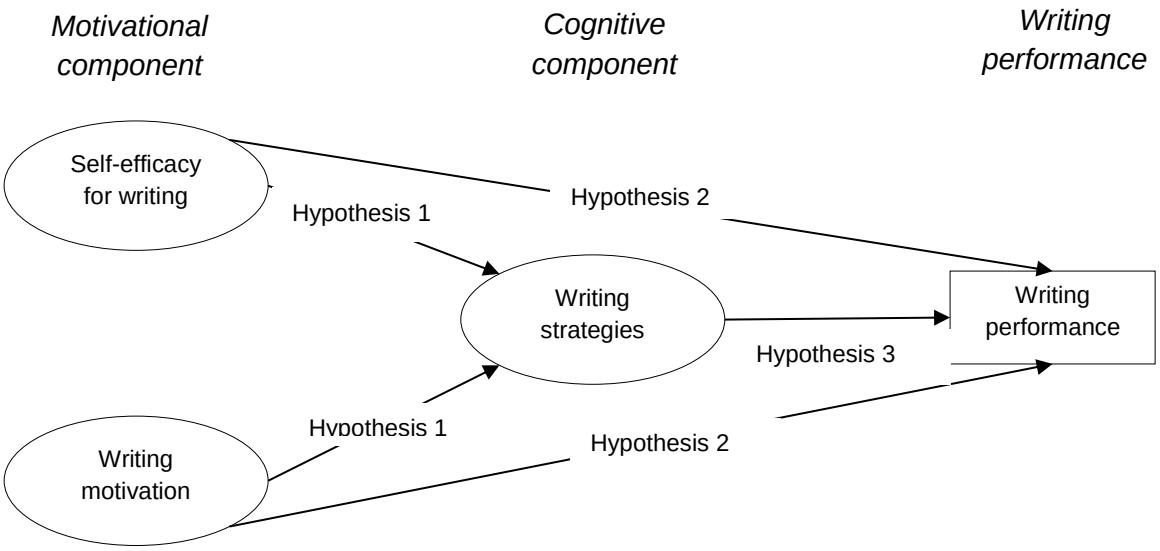


Figure 1. *Hypothesized relational model relating self-efficacy for writing, writing motivation, and writing strategies to writing performance.*

Method

Educational context

In Flanders, the Flemish government ensures the quality of its elementary education (i.e., comprising of six consecutive years of study, starting at the age of 6) by imposing attainment targets. These attainment targets, which are minimum objectives found necessary and attainable for elementary school children, encompass knowledge, attitudes, and skills (Flemish Ministry of Education and Training, 2005). The attainment targets for students' writing by the end of elementary school focuses upon copying and writing notes, announcements, letters, reports, stories, and informational texts. In addition, students should develop a legible handwriting and apply spelling conventions and rules. Finally, the attainment targets state that students should develop attitudes such as writing readiness and writing fun.

Study design

We randomly selected elementary schools across Flanders (Belgium) and we set up a cross-sectional survey with fifth and sixth-grade students (i.e., 11-12 years old) (*N*=1577) (see Figure 2). In light of the data analysis procedure, we used the full sample to examine the structure and reliability of the questionnaires (i.e., preparatory analyses) and we worked with a subsample of the full sample to relate the questionnaire data to students' performance on writing tests (i.e., main analyses: multiple group structural equation modeling). As to the full sample, all fifth and sixth-grade students (*N*=1577) from the selected schools completed questionnaires regarding self-efficacy for writing, writing motivation, and writing strategies. Half of the participating students (i.e., a subsample of the full sample) also completed two writing tests (*N* = 799) (i.e., writing a descriptive and a narrative test). In this respect, 364 fifth (46.5%) and 418 sixth graders (53.5%) wrote a descriptive text and 363 fifth (45.9%) and 427 sixth graders (54.1%) wrote a narrative text. To reduce testing overload for students, we conducted the writing tests on two different days, resulting in the small difference in the number of participating students.

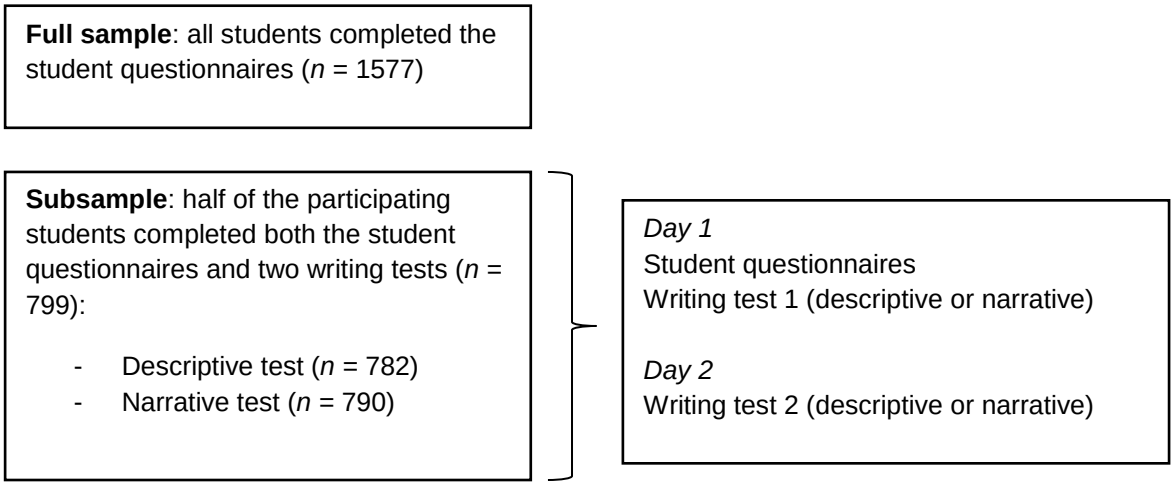


Figure 2. *Overview of the data collection procedure.*

Participants

Overall characteristics

The fifth and sixth graders (age 11-12) in the participating schools were mainly from middle-class families, with 23.53% (*SD* = 19.51) being identified as an 'SES student'. In Flemish elementary education this indicates that a student is a non-native speaker, receives a school allowance, or that the student's mother has no certificate of secondary education. In light of privacy, these data are only available at school level. 92.9% of the participating schools were located in Flemish villages and small cities, while only 7.1% of the schools were located in one of the major cities in Flanders (i.e., Brussels, Ghent, and Antwerp).

Full sample

In total, 784 fifth (49.7%) and 793 sixth graders (50.3%) from 82 classes from 44 randomly selected Flemish elementary schools participated (i.e., full sample). Participants consisted of 51.4% boys and 48.6% girls. The majority of the students were native Dutch speakers (72.4%) and 18.8% of the students were bilingual (i.e., speaking Dutch and a foreign language at home). Only a small percentage (8.8%) of the students spoke solely a foreign language at home (i.e., French, English, Arabic, Berber, Turkish, Kurdish, or other). We asked the participating teachers to typify each student based on their general achievement. Teachers characterized about half of the students (51.4%) as average achievers (i.e., performing at their grade level), while they characterized 23.1% and 25.5% of the students as low achievers (i.e., performing below their grade level) and high achievers (i.e., performing above their grade level), respectively (see Table 1).

Subsample

The subsample of the students who completed both questionnaires and writing tests (*n* = 799), included 369 fifth (46.1%) and 430 sixth graders (53.9%). Girls comprised about half of the subsample (47.6%). The majority of the students were native Dutch speakers (73.2%), 18.7% were bilingual and only 8.1% of the students spoke a foreign home language. Teachers characterized about half of the students (52.4%) as average achievers, while they characterized 22.6% and 24.6% as low and high achievers, respectively (see Table 1).

Table 1. *Student characteristics.*

Full sample: all students completed student questionnaires						
	Fifth grade		Sixth grade		Total	
	N	%	*N*	%	*N*	%
Gender						
Boys	387	47.7	424	52.3	811	51.4
Girls	397	51.8	369	48.2	766	48.6
Home Language						
Dutch	559	49.3	575	50.7	1134	72.4
Foreign language	73	52.9	65	47.1	138	8.8
Bilingual	150	50.8	145	49.2	295	18.8
General achievement						
Low achievers	164	49.8	165	50.2	329	23.1
Average achievers	345	47.1	387	52.9	732	51.4
High achievers	191	52.5	173	47.5	364	25.5
Total	784	49.7	793	50.3	1577	100

Subsample: half of the students completed student questionnaires and writing tests						
	Fifth grade		Sixth grade		Total	
	N	%	N	%	N	%
Gender						
Boys	193	52.3	225	52.3	418	52.4
Girls	176	47.7	205	47.7	381	47.6
Home Language						
Dutch	297	80.9	282	66.5	578	73.2
Foreign language	15	4.1	49	11.6	73	8.1
Bilingual	55	15	93	21.9	148	18.7
General achievement						
Low achievers	68	20.2	104	24.5	172	22.6
Average achievers	179	53.3	222	52.4	400	52.4
High achievers	89	26.5	98	23.1	187	24.6
Total	369	46.1	430	53.9	799	100

Measures

In this study we used the following questionnaires: (a) the Self-efficacy for Writing Scale (SEWS) (Bruning, Dempsey, Kauffman, McKim, & Zumbrunn, 2013), (b) the Self-Regulation Questionnaire-Writing Motivation (SRQ-Writing Motivation), based on the SRQ-Reading Motivation (De Naeghel et al., 2012), and (c) a questionnaire on students' planning and revising writing strategies (Kieft, Rijlaarsdam, & van den Bergh, 2006, 2008). Prior research studies tested or validated all questionnaires. In the present study we modified these questionnaires by translating, rephrasing or adjusting the items to the context of writing instruction in elementary grades. To ensure the validity of these questionnaires in this context, we used a multistep process. First, two fifth graders performed cognitive pretesting to verify the cognitive

validity of the items (Woolley, Bowen, & Bowen, 2006). We slightly rephrased misinterpreted items, so students were able to interpret them correctly. Second, the first author pilot-tested all questionnaires in 1 fifth-grade and 3 sixth-grade classes (i.e., 22 fifth and 61 sixth graders) to examine the factor structure using exploratory factor analysis. Third, all participating students completed the questionnaires (*N*=1577). Fourth, we conducted preparatory analyses on the full sample (*N* = 1577) to examine the structure and reliability of the questionnaires used in the present study (see Figure 2 for additional information on the data collection procedure). We examined the structure of the scales by means of exploratory factor analyses (EFA) using maximum-likelihood extraction with oblimin rotation. In order to determine the number of factors to retain, we used parallel analysis. When the factor loadings of the items were lower than .30 and when loading higher than .30 on two or more factors, we removed the items. Further, we conducted confirmatory factor analyses (CFA) and calculated estimators of internal consistency (Bentler, 2009). Finally, we studied multiple group measurement invariance (MG-MI) across gender and across achievement level. Small changes in CFI (i.e., a value of ΔCFI smaller than or equal to 0.01) (Cheung & Rensvold, 2002) and satisfying overall model results revealed strong invariance for the measurement model across gender and general achievement (for more information, see Appendix B and C). The items of the SEWS, the SRQ-Writing Motivation, and the questionnaire on writing strategies are included in Appendix A. Standardized factor loadings for these items and factor correlations are also presented in Appendix A.

Self-efficacy for writing

The Self-Efficacy for Writing Scale (SEWS) conceptualizes self-efficacy as a multidimensional construct considering cognitive, linguistic, and self-regulatory aspects of writing (Bruning et al., 2013). Bruning et al. (2013) proposed a three-factor model of writing self-efficacy, which includes self-efficacy for writing ideation (i.e., writers' beliefs about their abilities to come up with good ideas), writing conventions (i.e., writers' beliefs about their abilities to apply language and writing conventions), and writing self-regulation (i.e., writers' beliefs about their capabilities to regulate their writing behavior). The first author translated the SEWS, a scale ranging from 0 to 100, into Dutch and adjusted the items to the context of Flemish elementary education. The CFA results showed that the stability of the three-factor model provided a good fit to the data (SB $\chi^2(51) = 204.88$, $p < .001$, CFI = .95, RMSEA = .04, SRMR = .04). Internal consistencies of the three subscales were high (ideation: Bentler's ρ = .82, conventions: Bentler's ρ = .75, and regulation: Bentler's ρ = .74)

Writing motivation

Based on the Self-Determination Theory (SDT), which distinguishes between qualitatively different types of motivation (Ryan & Deci, 2000), the Self-Regulation Questionnaire-Reading Motivation (SRQ-Reading Motivation) captures two types of reading motivation (De Naeghel et al., 2012). Autonomous reading motivation refers to engaging in a reading activity for its inherent satisfaction or personal value. On the contrary, controlled reading motivation involves engaging in a reading activity due to internal or external pressure (De Naeghel et al., 2012). The SRQ-Reading Motivation is based upon a 5 point Likert scale and the first author adapted the items to the context of writing, resulting in the SRQ-Writing Motivation. Based on the CFA of the SRQ-Writing Motivation data, the fit of the two-factor model was acceptable, SB $\chi^2(116) = 653.45$, $p < .001$, CFI =.94, RMSEA =.06, SRMR =.05 and reliabilities of the subscales were good (autonomous motivation: Bentler's $\rho = .90$ and controlled motivation: Bentler's $\rho = .79$).

Writing strategies

Kieft et al. (2006, 2008) developed a questionnaire, on a 5 point Likert scale, for high school students' planning and revising writing strategies. Planning strategies refer to strategies focusing on thinking, planning, and outlining a text before starting to write. Revision strategies refer to a writing-and-rewriting-process in which a writer produces a series of drafts (Galbraith & Torrance, 2004). In the present study, the first author reformulated and adapted the items from this questionnaire to the context of elementary education in Flanders. The EFA showed a four-factor model, whereas we expected a two-factor model based on the original instrument (Kieft et al., 2006, 2008). The first factor, labeled 'thinking', refers to the extent to which students first think about the content of their text and about their writing approach before they start writing. The second factor 'planning' assessed the extent to which students use planning strategies, such as writing an outline. The third factor, labeled 'revising', refers to the extent to which students revise the content or structure of a text. The fourth factor 'controlling' assesses to what extent students check the content or structure of their text. The CFA showed a good model fit, SB $\chi^2(98) = 305.38$, $p < .001$, CFI =.94, RMSEA =.04, SRMR =.04. Internal consistencies of the four subscales were acceptable (thinking: Bentler's $\rho = .65$, planning: Bentler's $\rho = .78$, revising: Bentler's $\rho = .68$, and control strategies Bentler's $\rho = .67$).

Writing performance

In the present study we specifically focused on the overall text quality to assess students' writing performance. The present study took into account essential prerequisites to assess writing in a valid and reliable manner because the assessment of writing performance is extremely difficult (Schoonen, 2005). Two tests, focusing on multiple genres (i.e., descriptive and narrative texts) measured students' writing performance. More specifically, students had to write a descriptive text within the genre of reports and a narrative text within the story genre (Martin & Rose, 2008). Furthermore, an expert panel on writing instruction evaluated the validity of the writing prompts for the test. For both text genres, we used a visual prompt, instead of a source text, (see appendix D) to control for students' writing performance being influenced by their reading comprehension. For testing students' writing performance of descriptive texts, students had to explain and describe what happens at school (cf., a report). We opted for this topic because all students are familiar with schools. For testing students' writing performance of narrative texts, students had to write a narrative about why and how a message in a bottle washed ashore (cf., a story).

In order to minimize presentation effects in scoring students' texts, the handwritten texts were typed and spelling, punctuation, and capital errors were corrected (Graham, Harris, & Hebert, 2011). Next, three trained raters assessed the texts (Schoonen, 2005). To evaluate overall text quality, we used a holistic scoring procedure based on benchmarking (Bouwer, Koster, & van den Bergh, 2016; Tillema, van den Bergh, Rijlaarsdam, & Sanders, 2012). For both genres, we identified five target texts as benchmarks to represent the diversity in text quality at low, medium, and high levels (Schoonen, 2005; Tillema et al., 2012). The range of scores between the target texts was broad enough, such that the scoring procedure would be sensitive to differences across writers (i.e., benchmark score for the average text was 100, with an interval of 15 between target texts) (Schoonen, 2005). Appendix E presents English translations of the benchmark texts which illustrate the writing ability of the participating students and provide an impression of the large differences across writers. We also described each benchmark text in detail, ensuring that the raters had an idea of which aspects of the text were strong or weak. In determining a holistic quality score, raters considered the following aspects for both the descriptive and narrative text: text genre (i.e., the writer explains/describes or tells a story), assignment (i.e., the text corresponds to the assignment), text structure (i.e., the text is well structured), sentence structure (i.e., the sentences are well composed), and word choice (i.e., the word choice is varied). They also considered genre-specific aspects for the descriptive (i.e., idea development and quality of the description) as well as the narrative text (i.e., story line and creativity). The raters did not assess the abovementioned aspects separately (i.e., analytic scoring), but they assessed each text holistically (see Appendix E for

more information). In total, two of the three raters scored 23% of both text genres (i.e., switching between rater 1 and 2, rater 1 and 3, and rater 2 and 3). Interrater reliabilities for both text genres were good (i.e., descriptive text: Pearson r = .84, p < .001, narrative text: Pearson r = .83, p < .001).

Student characteristics

Gender. We registered information on gender (0 = boy, 1 = girl) for each student.

General achievement-level. Taking into account the high level of agreement between teachers' judgments regarding students' general achievement and students' actual achievement on standardized tests, teacher judgment is a fairly reliable and efficient assessment technique to asses students' achievement level (see meta-analyses Hoge & Coladarci, 1989; Südkamp, Kaiser, & Möller, 2012). In this respect, teachers in the present study typified each student based on their general achievement by indicating which students are (a) below average achievers (i.e., performing below their current grade level), (b) average achievers (i.e., performing at their grade level), or (c) above average achievers (i.e., performing above their current grade level). We used this indication as a categorical variable for grouping low, average, and high achievers. Students' writing performance on both the descriptive and narrative writing test corroborated the achievement-level distinction. More particularly, there were significant differences between the scores of high achievers (descriptive: M = 101.93, SD = 15.60 ; narrative: M = 99.47, SD = 19.47), average achievers (descriptive: M = 96.44, SD = 19.17; narrative: M = 95.34, SD = 17.40), and low achievers (descriptive: M = 91.04, SD = 20.55; narrative: M = 89.96, SD = 19.67) (F(2, 742) = 14.61, p < .001; F(2,752) = 13.11, p < .001)

Data analysis

Multiple group structural equation modeling

For all statistical analyses we used R 3.1.1., lavaan package (Rosseel, 2012) and lavaan.survey package 0.5-17 (Oberski, 2014). We conducted multiple group structural equation modeling (MG-SEM) on the data collected from the student questionnaires and writing tests (i.e., subsample: N = 799) (see Figure 2 for additional information on the data collection procedure). By means of MG-SEM we aimed at: (a) relating motivational (i.e., self-efficacy for writing and writing motivation) and cognitive challenges (i.e., writing strategies) to

students' writing performance and (b) analyzing whether and how these relationships vary across groups (i.e., gender and general achievement).

Non-normal and clustered data

Because the data were not normally distributed (skewness values ranging from -1.31 to 0.11 and kurtosis values ranging from -0.49 to 1.94) we applied the robust maximum likelihood estimation method with a Satorra-Bentler (SB) scaled chi-square test statistic in CFA, MG-MI and MG-SEM (Chou, Bentler, & Satorra, 1991; Oberski, 2014; Yuan & Bentler, 2000). We also took the clustered nature (i.e., students within classes) of the data into account by adjusting the standard errors and the fit statistics (lavaan.survey; Muthén & Satorra, 1995; Oberski, 2014; Stapleton, 2006).

Model fit indices

To evaluate the model fit, we reported several fit indices: (a) the chi-square test statistic and *p*-value, (b) the comparative fit index (CFI), (c) the root mean square error of approximation (RMSEA), and (d) the standardized root mean residual (SRMR). Browne and Cudeck (1992) stated that CFI should be above .90 for adequate fit. In addition, a cut-off value for RMSEA close to .06 is necessary for an acceptable fit (Hu & Bentler, 1999), while a value lower than .08 indicates a reasonable fit (Schreiber, Nora, Stage, Barlow, & King, 2006). Following Hu and Bentler (1999), the value of SRMR of .08 or lower indicates acceptable fit.

Results

Descriptive results

Table 2 presents the descriptive statistics concerning students' self-efficacy for writing, writing motivation, and writing strategies. As results revealed strong invariance for the measurement model, gender and achievement-level differences in the mean structure of the factors can be interpreted (see Table 3). The results showed that boys, compared to girls, report a significantly lower self-efficacy for regulation and autonomous writing motivation, while being more controlled motivated to write. Additionally, results revealed significantly lower scores for boys on all of the reported writing strategies. As to achievement-level differences, the results indicated that low achievers, as compared to average achievers have a lower self-

efficacy for ideation, conventions, and regulation. In addition, high achievers, as compared to average achievers have a higher self-efficacy for ideation, conventions, and regulation and they are more autonomously motivated to write.

Multiple group structural equation modeling

In order to analyze the relationships between motivational challenges (i.e., self-efficacy for writing and writing motivation), cognitive challenges (i.e., writing strategies) and students' writing performance across groups (i.e., gender and general achievement), we compared two MG-SEM-models. More specifically, we compared a first model (i.e., equal factor loadings and intercepts across groups) to a second model (i.e., equal factor loadings, intercepts and regressions across groups). Following this procedure, significant differences between both models indicated significant differences in the regression coefficients across groups.

Table 2. *Descriptive statistics concerning students' self-efficacy for writing, writing motivation, and writing strategies.*

Scale	Gender		Achievement level			All students
	M (SD) girls	*M (SD)* boys	*M (SD)* low achievers	*M (SD)* average achievers	*M (SD)* high achievers	*M (SD)* all
Self-efficacy for ideation	70.85 (21.74)	69.35 (22.39)	66.13 (20.22)	69.59 (22.66)	74.61 (21.74)	70.06 (22.02)
Self-efficacy for conventions	81.95 (16.28)	80.45 (16.16)	73.69 (19.56)	81.35 (15.06)	87.49 (12.07)	81.30 (15.96)
Self-efficacy for regulation	72.34 (20.49)	67.48 (21.51)	64.89 (23.25)	68.39 (21.31)	77.24 (16.52)	69.30 (21.36)
Autonomous writing motivation	3.50 (0.88)	2.91 (0.95)	3.11 (0.95)	3.15 (0.99)	3.36 (0.91)	3.19 (0.96)
Controlled writing motivation	2.64 (0.71)	2.84 (0.73)	2.77 (0.75)	2.75 (0.75)	2.72 (0.64)	2.74 (0.72)
Thinking strategies	3.85 (0.57)	3.79 (0.65)	3.73 (0.61)	3.83 (0.63)	3.87 (0.63)	3.81 (0.63)
Planning strategies	3.52 (0.93)	3.23 (0.99)	3.45 (0.95)	3.33 (1.02)	3.38 (0.88)	3.35 (0.97)
Revision strategies	3.56 (0.81)	3.52 (0.83)	3.53 (0.74)	3.55 (0.87)	3.52 (0.77)	3.52 (0.83)
Control strategies	4.04 (0.76)	3.76 (0.82)	3.81 (0.81)	3.89 (0.84)	3.96 (0.71)	3.88 (0.80)

Table 3. *Gender and achievement-level differences in the structure of the factors for self-efficacy for writing, writing motivation, and writing strategies.*

Gender differences[a]				
Factor	**Mean factor score**	***SE***	***p***	**Standardized factor score**
Self-efficacy for ideation	0.02	0.07	.803	0.02
Self-efficacy for regulation	-0.30	0.08	.000***	-0.28
Self-efficacy for convention	-0.11	0.07	.124	-0.11
Autonomous writing motivation	-0.70	0.08	.000***	-0.63
Controlled writing motivation	0.24	0.08	.002**	0.23
Thinking strategies	-0.26	0.09	.003**	-0.21
Planning strategies	-0.33	0.09	.000***	-0.33
Revising strategies	-0.20	0.07	.005**	-0.11
Control strategies	-0.49	0.09	.000***	-0.46
Achievement-level differences[b]				
Factor	**Mean factor score**	***SE***	***p***	**Standardized factor score**
Self-efficacy for ideation (high)	0.22	0.09	.015*	0.23
Self-efficacy for regulation (high)	0.37	0.09	.000***	0.44
Self-efficacy for convention (high)	0.50	0.09	.000***	0.64
Autonomous writing motivation (high)	0.20	0.09	.020*	0.21
Controlled writing motivation (high)	-0.05	0.08	.523	-0.06
Thinking strategies (high)	0.04	0.09	.618	0.05
Planning strategies (high)	-0.04	0.10	.674	-0.05
Revising strategies (high)	-0.05	0.08	.531	-0.05
Control strategies (high)	0.11	0.10	.260	0.12
Self-efficacy for ideation (low)	-0.23	0.09	.016*	-0.23
Self-efficacy for regulation (low)	-0.20	0.10	.047*	-0.19
Self-efficacy for convention (low)	-0.54	0.11	.000***	-0.40
Autonomous writing motivation (low)	-0.07	0.09	.413	-0.08
Controlled writing motivation (low)	0.11	0.09	.220	0.11
Thinking strategies (low)	-0.15	0.10	.121	-0.16
Planning strategies (low)	0.06	0.10	.531	0.07
Revising strategies (low)	-0.10	0.09	.264	-0.10
Control strategies (low)	-0.17	0.10	.093	-0.16

Note. [a] Girls as reference category; [b] Average achievers as reference category.
***p < .001. **p < .01. *p < .05.

Gender differences

Results concerning gender differences in the structural model showed that there were no significant differences between both MG-SEM-models (SB $\chi^2(38) = 46.63$, $p = .159$), indicating no significant gender differences in the regression coefficients (see Table 4). However, taking into account the possibility that small differences in specific regressions are 'invisible' because we estimated all regression coefficients simultaneously, we adapted the second model by allowing one specific regression to vary across boys and girls. The difference between the log-likelihood values associated with both models has approximately a chi-square distribution with one degree of freedom, subject to the scaling correction factors of the two models (Satorra & Bentler, 2001). In this way, we specifically tested each regression in the MG-SEM-model to check for significant gender differences in the regression coefficients. The results revealed no significant gender differences in the regression coefficients (see Table 4). Therefore, we put forward the second model (i.e., equal factor loadings, intercepts and regressions across gender) as the MG-SEM-model for both boys and girls with an acceptable fit to the data (SB $\chi^2(2082) = 2913.92$, $p < .001$, CFI =.90, RMSEA =.03, SRMR =.06). Based on these results, we investigated a final MG-SEM-model in which: (a) intercepts, factor loadings and regressions were equal across gender, and (b) we deleted the non-significant regressions. The final model showed an acceptable fit to the data (SB $\chi^2(2090) = 2968.98$, $p < .001$, CFI =.90, RMSEA =.03, SRMR =.06). The chi-square test is consistently significant, indicating that none of the models fit the data perfectly. However, the RMSEA that takes the sample size into account is satisfactory (see Browne & Cudeck, 1992) and the SRMR also suggests an acceptable fit. Figure 3 presents the significant standardized parameter estimates of the final MG-SEM-model across gender.

Table 4. *Multiple Group Structural Equation Modeling: Comparison of different MG-SEM models across gender.*

	SB χ^2	***df***	**Compared models**	**ΔSB χ^2**	**Δ*df***	***p***
Models						
Model 1[a]	2867.29	2044				
Model 2[b]	2913.92	2082	Model 1 vs. Model 2	46.63	38	.159
Adaptions of model 2: allowing one specific regression to vary across gender						
Self-efficacy → Writing strategies	SB χ^2	*df*	Compared models	ΔSB χ^2	Δ*df*	*p*
Self-efficacy for ideation → Thinking strategies	2913.72	2081	vs. model 2	0.20	1	.655
Self-efficacy for ideation → Planning strategies	2913.65	2081	vs. model 2	0.27	1	.603
Self-efficacy for ideation → Revision strategies	2912.35	2081	vs. model 2	1.57	1	.210
Self-efficacy for ideation → Control strategies	2914.21	2081	vs. model 2	0.29	1	.590
Self-efficacy for regulation → Thinking strategies	2914.02	2081	vs. model 2	0.10	1	.752
Self-efficacy for regulation → Planning strategies	2914.02	2081	vs. model 2	0.10	1	.752
Self-efficacy for regulation → Revision strategies	2913.88	2081	vs. model 2	0.04	1	.841
Self-efficacy for regulation → Control strategies	2913.39	2081	vs. model 2	0.53	1	.467
Self-efficacy for convention → Thinking strategies	2913.22	2081	vs. model 2	0.70	1	.403
Self-efficacy for convention → Planning strategies	2913.01	2081	vs. model 2	0.91	1	.340
Self-efficacy for convention → Revision strategies	2913.51	2081	vs. model 2	0.41	1	.522
Self-efficacy for convention → Control strategies	2913.15	2081	vs. model 2	0.77	1	.380
Writing motivation → Writing strategies	SB χ^2	*df*	Compared models	ΔSB χ^2	Δ*df*	*p*
Autonomous motivation → Thinking strategies	2912.40	2081	vs. model 2	1.52	1	.218
Autonomous motivation → Planning strategies	2914.45	2081	vs. model 2	0.53	1	.467
Autonomous motivation → Revision strategies	2913.79	2081	vs. model 2	0.13	1	.718
Autonomous motivation → Control strategies	2912.71	2081	vs. model 2	1.21	1	.271
Controlled motivation → Thinking strategies	2914.14	2081	vs. model 2	0.22	1	.639
Controlled motivation → Planning strategies	2913.12	2081	vs. model 2	0.80	1	.371
Controlled motivation → Revision strategies	2913.23	2081	vs. model 2	0.69	1	.406
Controlled motivation → Control strategies	2914.19	2081	vs. model 2	0.27	1	.603
Writing strategies → Writing performance	SB χ^2	*df*	Compared models	ΔSB χ^2	Δ*df*	*p*
Thinking strategies → Quality descriptive text	2912.95	2081	vs. model 2	0.97	1	.325
Thinking strategies → Quality narrative text	2912.72	2081	vs. model 2	1.20	1	.273
Planning strategies → Quality descriptive text	2913.66	2081	vs. model 2	0.26	1	.610
Planning strategies → Quality narrative text	2913.34	2081	vs. model 2	0.58	1	.446
Revision strategies → Quality descriptive text	2912.04	2081	vs. model 2	1.88	1	.170
Revision strategies → Quality narrative text	2913.01	2081	vs. model 2	0.91	1	.340
Control strategies → Quality - descriptive text	2913.59	2081	vs. model 2	0.33	1	.566
Control strategies → Quality narrative text	2913.29	2081	vs. model 2	0.63	1	.427
Self-efficacy → Writing performance	SB χ^2	*df*	Compared models	ΔSB χ^2	Δ*df*	*p*
Self-efficacy for ideation → Quality descriptive text	2914.24	2081	vs. model 2	0.32	1	.572
Self-efficacy for ideation → Quality narrative text	2912.68	2081	vs. model 2	1.24	1	.265
Self-efficacy for regulation → Quality descriptive text	2913.41	2081	vs. model 2	0.51	1	.475
Self-efficacy for regulation → Quality narrative text	2913.07	2081	vs. model 2	0.85	1	.357
Self-efficacy for convention → Quality descriptive text	2913.27	2081	vs. model 2	0.65	1	.420

Self-efficacy for convention → Quality narrative text	2913.24	2081	vs. model 2	0.68	1	.410
Writing motivation → Writing performance	SB χ^2	*df*	Compared models	ΔSB χ^2	Δ*df*	*p*
Autonomous motivation → Quality descriptive text	2914.51	2081	vs. model 2	0.59	1	.442
Autonomous motivation → Quality narrative text	2913.38	2081	vs. model 2	0.54	1	.462
Controlled motivation → Quality descriptive text	2913.61	2081	vs. model 2	0.31	1	.578
Controlled motivation → Quality narrative text	2913.78	2081	vs. model 2	0.14	1	.708

Note. [a] Equal factor loadings and equal intercepts across gender, [b] Equal factor loadings, equal intercepts, and equal regression coefficients across gender. ***p < .001. **p < .01. *p < .05.

As to the first hypothesis, self-efficacy for writing conventions was negatively related to all writing strategies (i.e., thinking, planning, revision, and control strategies), while self-efficacy for regulation was positively related to all strategies. Self-efficacy for ideation was negatively related to planning and control strategies (see Figure 3). There was no relationship between autonomous and controlled writing motivation and the cognitive writing strategies.

Concerning the second hypothesis, none of the different types of self-efficacy (i.e., self-efficacy for ideation, convention, regulation) nor students' writing motivation (i.e., autonomous and controlled motivation) made an independent contribution to students' writing performance (i.e., quality descriptive and narrative text).

As to the final hypothesis, the planning strategies were negatively related to students' narrative writing performance. In addition, there was no relationship between the thinking, revision, and control strategies and students' writing performance. This final model for both boys and girls accounted for only 1% of the variance in students' narrative writing performance, 61% and 64% of the variance in the thinking strategies respectively, 61% and 52% of the variance in the planning strategies, 46% and 34% of the variance in the revision strategies, and 67% and 54% of the variance in the control strategies (see Figure 3).

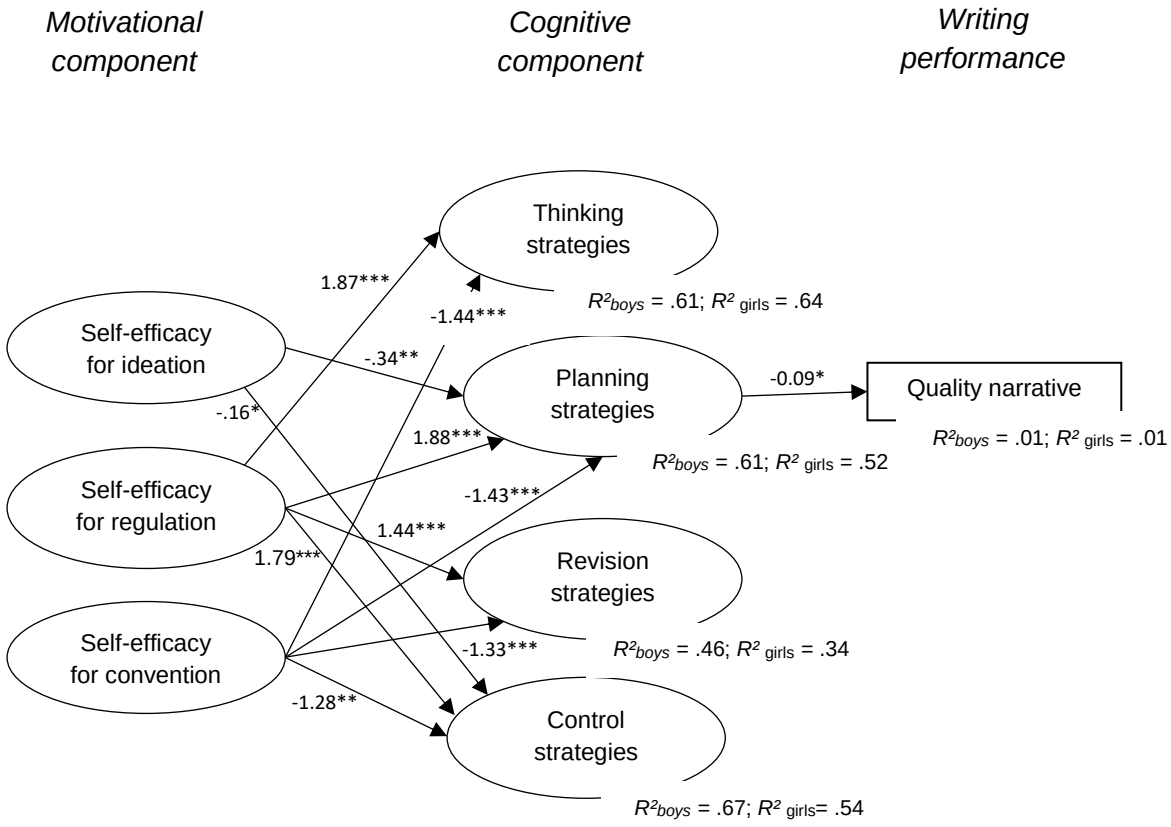


Figure 3. *Significant standardized parameter estimates of the structural model for boys and girls.*

****p < .001. **p < .01. *p < .05.*

Achievement-level differences

Concerning the achievement-level differences, the procedure in which we compared both MG-SEM-models was slightly adapted. Due to having too few clusters relative to the number of parameters and due to the small sample size of high and low achievers compared to average achievers, the first complete model did not converge. Therefore, we decided to directly compare the second MG-SEM-model to the models in which we allowed one specific regression to vary across low, average, and high achievers. The results indeed revealed significant achievement-level differences, more particularly in the regressions between self-efficacy for regulation and revision strategies (SB $\chi^2(2) = 9.82$, $p < .01$) and between self-efficacy for convention and revision strategies (SB $\chi^2(2) = 9.41$, $p < .01$) (see Table 5). Therefore, we decided to study the MG-SEM-model in which we allowed both regressions to

vary simultaneously. The model showed a reasonable fit (SB $\chi^2(3175) = 4330.09$, $p < .001$, CFI =.87, RMSEA =.04, SRMR =.07). Based on these results, we investigated a final MG-SEM-model in which: (a) intercepts, factor loadings, and regressions were equal across low, average, and high achievers (except for the regressions between self-efficacy for regulation and revision strategies and between self-efficacy for convention and revision strategies), and (b) we deleted the non-significant regressions. Although the CFI was not satisfactory, this final model showed a reasonable fit for the RMSEA and SRMR (SB $\chi^2(3159) = 4339.42$, p < .001, CFI =.87, RMSEA =.04, SRMR =.07), we therefore continued with this model. Figure 4 presents the significant standardized parameter estimates of the final MG-SEM-model for low, average, and high achievers.

Table 5. *Multiple Group Structural Equation Modeling: Comparison of different MG-SEM models across achievement level.*

	SB χ^2	***df***				
Model 2[a]	4340.71	3179				
Adaptions of model 2: allowing one specific regression to vary across gender						
Self-efficacy → Writing strategies	SB χ^2	*df*	Compared models	ΔSB χ^2	Δ*df*	*p*
Self-efficacy for ideation → Thinking strategies	4337.87	3177	vs. model 2	2.84	2	.242
Self-efficacy for ideation → Planning strategies	4338.74	3177	vs. model 2	1.97	2	.373
Self-efficacy for ideation → Revision strategies	4336.80	3177	vs. model 2	3.91	2	.142
Self-efficacy for ideation → Control strategies	4338.78	3177	vs. model 2	1.93	2	.381
Self-efficacy for regulation → Thinking strategies	4340.24	3177	vs. model 2	0.47	2	.791
Self-efficacy for regulation → Planning strategies	4338.14	3177	vs. model 2	2.57	2	.277
Self-efficacy for regulation → Revision strategies	4330.89	3177	vs. model 2	9.82	2	.007**
Self-efficacy for regulation → Control strategies	4337.25	3177	vs. model 2	3.46	2	.177
Self-efficacy for convention → Thinking strategies	4340.37	3177	vs. model 2	0.34	2	.844
Self-efficacy for convention → Planning strategies	4339.90	3177	vs. model 2	0.81	2	.667
Self-efficacy for convention → Revision strategies	4331.30	3177	vs. model 2	9.41	2	.009**
Self-efficacy for convention → Control strategies	4337.91	3177	vs. model 2	2.8	2	.247
Writing motivation → Writing strategies	SB χ^2	*df*	Compared models	ΔSB χ^2	Δ*df*	*p*
Autonomous motivation → Thinking strategies	4338.00	3177	vs. model 2	2.71	2	.258
Autonomous motivation → Planning strategies	4336.10	3177	vs. model 2	4.61	2	.100
Autonomous motivation → Revision strategies	4338.28	3177	vs. model 2	2.43	2	.297
Autonomous motivation → Control strategies	4338.20	3177	vs. model 2	2.51	2	.285
Controlled motivation → Thinking strategies	4339.66	3177	vs. model 2	1.05	2	.592
Controlled motivation → Planning strategies	4340.49	3177	vs. model 2	0.22	2	.896
Controlled motivation → Revision strategies	4338.63	3177	vs. model 2	2.08	2	.353
Controlled motivation → Control strategies	4338.91	3177	vs. model 2	1.80	2	.407
Writing strategies → Writing performance	SB χ^2	*df*	Compared models	ΔSB χ^2	Δ*df*	*p*
Thinking strategies → Quality descriptive text	4337.68	3177	vs. model 2	3.03	2	.220
Thinking strategies → Quality narrative text	4339.30	3177	vs. model 2	1.41	2	.494
Planning strategies → Quality descriptive text	4339.06	3177	vs. model 2	1.65	2	.438
Planning strategies → Quality narrative text	4337.22	3177	vs. model 2	3.49	2	.175
Revision strategies → Quality descriptive text	4338.29	3177	vs. model 2	2.42	2	.298

Revision strategies → Quality narrative text	4339.21	3177	vs. model 2	1.50	2	.472
Control strategies → Quality descriptive text	4337.96	3177	vs. model 2	2.75	2	.253
Control strategies → Quality narrative text	4338.80	3177	vs. model 2	1.91	2	.385
Self-efficacy → Writing performance	SB χ^2	*df*	Compared models	ΔSB χ^2	Δ*df*	*p*
Self-efficacy for ideation → Quality descriptive text	4338.13	3177	vs. model 2	2.58	2	.275
Self-efficacy for ideation → Quality narrative text	4337.72	3177	vs. model 2	2.99	2	.224
Self-efficacy for regulation → Quality descriptive text	4338.26	3177	vs. model 2	2.45	2	.294
Self-efficacy for regulation → Quality narrative text	4339.60	3177	vs. model 2	1.11	2	.574
Self-efficacy for convention → Quality descriptive text	4338.80	3177	vs. model 2	1.91	2	.385
Self-efficacy for convention → Quality narrative text	4339.36	3177	vs. model 2	1.35	2	.509
Writing motivation → Writing performance	SB χ^2	*df*	Compared models	ΔSB χ^2	Δ*df*	*p*
Autonomous motivation → Quality descriptive text	4339.33	3177	vs. model 2	1.38	2	.502
Autonomous motivation → Quality narrative text	4340.16	3177	vs. model 2	0.55	2	.760
Controlled motivation → Quality descriptive text	4340.36	3177	vs. model 2	0.35	2	.839
Controlled motivation → Quality narrative text	4337.56	3177	vs. model 2	3.15	2	.207

Note. [a] Equal factor loadings, equal intercepts, and equal regression coefficients across achievement level. Model 1 (equal factor loadings and equal intercepts across achievement level) was not able to converge due to having too few clusters relative to the number of parameters and due to the small sample size of high and low achievers. ***p < .001. **p < .01. *p < .05.

Concerning the first hypothesis, self-efficacy for regulation was positively related to thinking, planning, and control strategies, but self-efficacy for convention was negatively related to thinking, planning, and control strategies. Self-efficacy for ideation was not related to students' cognitive writing strategies. The dotted lines in Figure 4 indicate that the relationship between (a) self-efficacy for regulation and revision strategies and (b) self-efficacy for convention and revision strategies significantly differed for average, high, and low achievers. For average achievers (β = 0.75, p < .01) and low achievers (β = 0.78, p < .01) self-efficacy for regulation was positively related to revision strategies, but this relationship was not significant for high achievers (β = 0.23, p = .251). Similarly, self-efficacy for convention was negatively related to the revision strategies for both average achievers (β = -0.69, p < .01) and low achievers (β = -0.41, p < .01), but this relationship was not significant for high achievers (β = -0.12, p = .555) (see Figure 4). Results revealed no significant relationships between the different types of writing motivation and the cognitive writing strategies.

As to the second hypothesis, students' autonomous writing motivation had a positive association with students' writing performance across both genres (i.e., quality of both the descriptive and narrative text) while controlled writing motivation was not related to students' writing performance. The different types of self-efficacy (i.e., self-efficacy for ideation, convention, and regulation) did not make an independent contribution to students' writing performance.

Concerning the final hypothesis, none of the cognitive writing strategies (i.e., thinking, planning, revision, and control strategies) were associated with students' writing performance.

This final model for low, average, and high achievers accounted for only 3%, 4%, and 3% of the variance in students' descriptive writing performance respectively, 3%, 2%, and 2% of the variance in students' narrative writing performance, 36%, 22%, and 46% of the variance in thinking strategies, 17%, 11%, and 24% of the variance in planning strategies, 24%, 2%, and 34% of the variance in revision strategies, and 31%, 18%, and 33% of the variance in control strategies (see Figure 4).

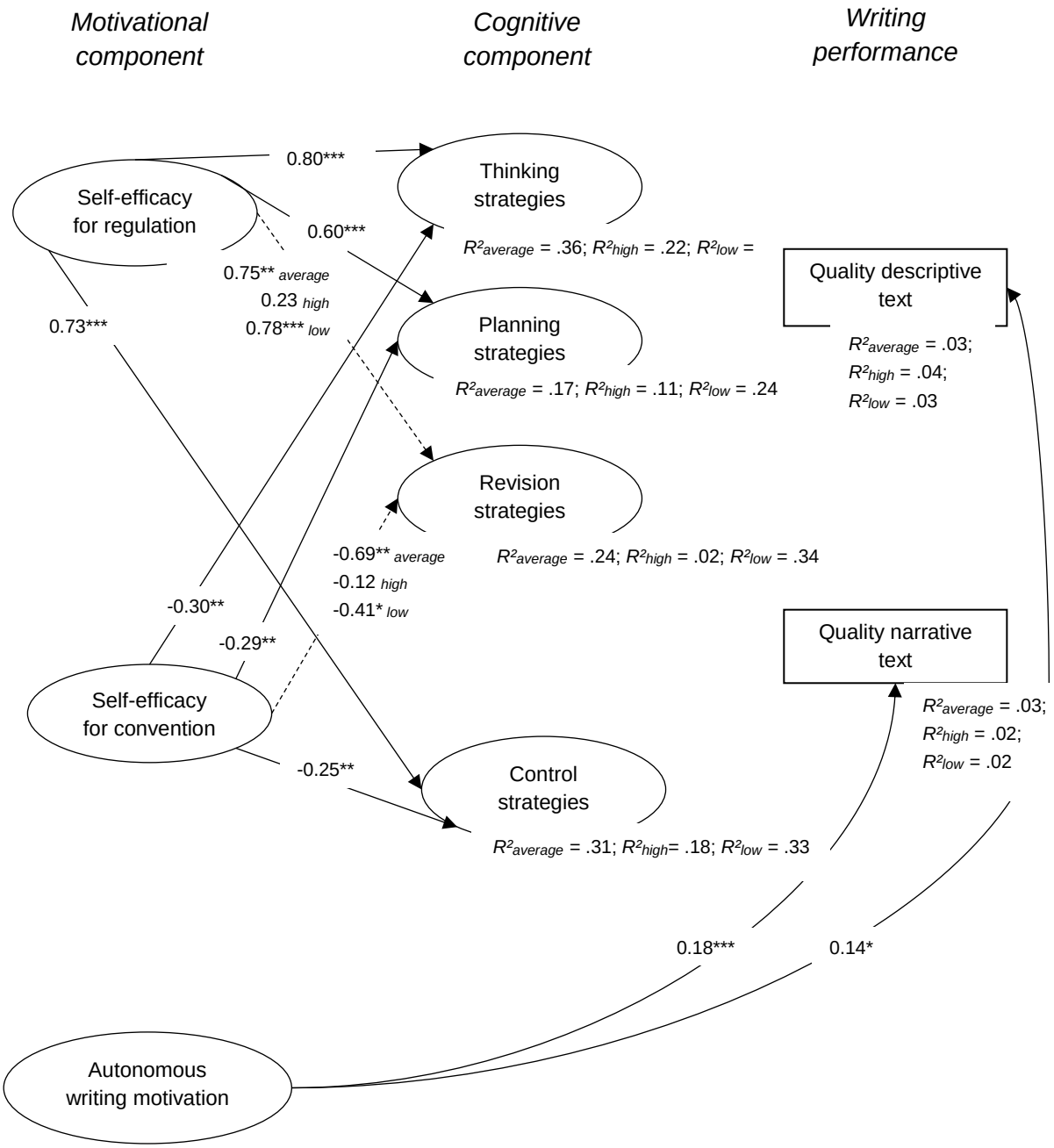


Figure 4. *Significant standardized parameter estimates of the structural model for low, average, and high achievers.*

Note. The dotted lines indicate a significant difference in regressions between average, high and low achievers. ***p < .001. **p < .01. *p < .05.

Discussion

Based on the social cognitive view of writing (Zimmerman & Risemberg, 1997), the present study first investigated how motivational (i.e., self-efficacy for writing and writing motivation) and cognitive challenges (i.e., cognitive writing strategies) mediate and correlate with students' actual writing performance. Second, we examined whether and how these relationships vary by gender and achievement. We put forward two different structural models, both showing a reasonable fit to the data: (a) a MG-SEM model for boys and girls (see Figure 3), and (b) a MG-SEM model for low, average, and high achievers (see Figure 4). Both of these models were based on the same hypothesized relational model relating: (a) motivational and cognitive challenges, (b) motivational challenges and writing performance, and (c) cognitive challenges and writing performance (see Figure 2).

Relating cognitive and motivational challenges to students' writing: parallels between the MG-SEM models

Results showed some interesting parallels between the MG-SEM model for boys and girls on the one hand and the MG-SEM model for low, average, and high achievers on the other hand. First, it appeared that self-efficacy for convention was negatively related to students' writing strategies (i.e., thinking, planning, revision, and control strategies). A possible explanation for this finding might be that students who are confident about applying writing conventions are more focused on low-level transcription skills (e.g., spelling), while failing to apply higher-order writing strategies (e.g., planning) (Graham & Harris, 2000). In addition, previous research showed that elementary school teachers place considerable emphasis on teaching basic writing skills (Brindle, Graham, Harris, & Hebert, 2016; Coker et al., 2016; De Smedt et al., 2016; Dockrell, Marshall, & Wyse, 2016). Consequently, students perceive writing increasingly as 'correct writing' by following writing conventions and applying these basic writing skills therefore neglecting higher-order writing strategies.

Second, results indicated that students who were more self-efficacious concerning the regulation of their own writing process, applied more thinking, planning, revision, and control strategies. This finding corroborated previous research which found that confidence in the ability to apply self-regulatory strategies was associated with greater strategy use (Pajares & Valiante, 2006; Zimmerman & Kitsantas, 1999). It therefore appears important to stimulate self-efficacy for regulation by providing students with explicit instructions in why, how, and when to apply writing strategies; which consequently can raise students' awareness and

confidence about their own ability to apply these strategies (see meta-analyses for evidence-based writing practices on strategy instruction: Graham, Harris, & Chambers, 2016; Graham, McKeown, Kiuhara, & Harris, 2012; Koster, Tribushinina, de Jong, & van den Bergh, 2015).

Finally, the present study also showed some surprising results concerning the relative strength of the significant relationships in both MG-SEM models. Specifically, the effect sizes (i.e., standardized parameter estimates can be interpreted as effect sizes, (Cohen, 1977)) and the proportion of variance explained revealed an interesting parallel between the MG-SEM model for gender and the MG-SEM model for achievement level. The first parallel concerning the relative strength focuses on the relationship between the motivational and cognitive challenges. Specifically, the reported effect sizes regarding the relationships between self-efficacy for writing and the cognitive writing strategies were, in general, quite large in both models (i.e., effect sizes up to 1.88 *SD*). Accordingly, the proportion of variance explained in students' cognitive writing strategies by their perceived self-efficacy was also rather high (i.e., ranging from R^2 = .17 to R^2 = .67). The second parallel concerning the relative strength has to do with the relationship between the motivational challenges and students' writing performance on one hand and the relationship between the cognitive challenges and students' writing performance on the other hand. As to these relations, the reported effect sizes were very small in both models (e.g., effect sizes not larger than 0.19 *SD*). Consequently, the proportion of variance explained in students' writing performance by the motivational and cognitive challenges was very low (i.e., ranging from R^2 = .01 to R^2 = .04). The findings concerning the relative strength of the relationships in both MG-SEM models might be due to the specific operationalization of the variables used in the present study and will be discussed below in more detail.

Relating cognitive and motivational challenges to students' writing: differences between the MG-SEM models

Besides the abovementioned parallels, the final MG-SEM models also differed for boys and girls on the one hand and for low, average, and high achievers on the other hand. First, girls and boys who were more self-efficacious to come up with ideas to write, applied significantly less planning and control strategies (see Figure 3). It can be hypothesized that students who are confident about generating ideas to write are less focused on planning strategies to come up with ideas (e.g., planning a text by generating ideas using questions such as: who, what, when, where,…). Similarly, students who are confident in coming up with good, original ideas are perhaps less inclined to revise these ideas. A pitfall related to this finding is, however, that students who are overestimating their capability to come up with ideas might consequently not

put sufficient effort into applying planning and revising strategies. In this respect, it is in particular worrying that previous research showed that especially struggling writers overestimate their writing capabilities (Klassen, 2002). Therefore, it is important that teachers explicitly deal with students' overconfidence in writing, especially for the group of struggling writers. Rather than lowering students' self-efficacy, teachers should in this respect try to improve students' calibration skills by improving their task understanding (Pajares, 1996).

Second, autonomous writing motivation made a positive contribution to students' writing performance in the MG-SEM model for low, average, and high achievers (see Figure 4). This finding is in line with previous SDT-research stating that the more students write for its inherent satisfaction or personal value, the better they write (De Smedt et al., 2016). Previous research has shown that writing motivation is an important predictor of students' writing performance (De Smedt et al., 2016; Garcia & de Caso, 2004; Graham et al., 2007; Lam & Law, 2007; Troia et al., 2013). To increase students' writing performance, it is important to stimulate students' autonomous writing motivation by fostering students' need for autonomy, competence, and relatedness (De Smedt et al., 2016). For instance, autonomy-supportive teachers can: (a) offer students the choice between different writing topics (cf., autonomy), (b) provide directions in how to plan, write, and revise texts (cf., competence), and (c) be involved with their students by showing interest in their written work (cf., relatedness).

Finally, planning strategies were negatively related to the narrative text quality in the model for boys and girls (see Figure 3). This theoretically unexpected finding, however, points at possible measurement issues with the self-reported student questionnaires measuring writing strategies, which will be discussed below in more detail.

In conclusion, the abovementioned differentiated findings concerning both MG-SEM models underscore the importance of going beyond establishing a single model for all students simultaneously in the context of writing. It is therefore important to consider different learner characteristics when modeling and relating motivational and cognitive writing challenges and students' writing performance.

Relating cognitive and motivational challenges to students' writing: gender and achievement-level differences

Next to the abovementioned parallels and differences between the MG-SEM models, we studied gender differences within the first MG-SEM model and achievement-level differences within the second MG-SEM model. Concerning the first MG-SEM model (see Figure 3), the results revealed no significant gender differences in the regression coefficients. Consequently, all considered relationships were comparable for boys and girls indicating that relationships

between cognitive challenges, motivational challenges and students' writing performance did not differ for boys and girls. The present study is in line with previous research that indicated gender differences in the cognitive (e.g., Berninger & Fuller, 1992; Olinghouse, 2008) and motivational latent variables (e.g., Guay et al., 2010; Pajares & Valiante, 1997) of the proposed MG-SEM model.

As to the second MG-SEM model (see Figure 4) the results did reveal significant achievement-level differences. In this respect, the present study underlines the importance of distinguishing between low, average, and high achievers when considering the interplay between motivational and cognitive challenges related to students' writing performance. Particularly, the results revealed differences in the relationship between: (a) self-efficacy for regulation and revision strategies and (b) self-efficacy for convention and revision strategies. The higher the confidence average and low achievers had in regulating their writing behavior, the more they reported applying revision strategies. Similarly, the higher the confidence average and low achievers had in applying writing conventions, the less they reported using revision strategies. Both relationships were not significant for high achievers. These findings suggest that the relationships between self-efficacy and writing strategies differ for low and average achievers as compared to high achievers. In this respect, the importance of differentiated writing instruction to stimulate students' strategy use is highlighted (Pajares & Valiante, 2006; Zimmerman & Kitsantas, 1999). In particular, fostering low and average achievers' self-efficacy for regulation by providing explicit strategy instruction appears important to stimulate the use of revision strategies. In light of differentiated instruction, previous studies highlighted the effectiveness of explicit strategy instruction to teach struggling writers (Graham et al., 2012). In this respect, the framework of response to intervention (RTI) in writing is promising to obtain in-depth insight for differentiated writing instruction (Saddler & Asaro-Saddler, 2012). One purpose of the RTI program is to identify struggling writers and to intervene as soon as possible by providing immediate support for struggling writers in a multi-tiered problem-solving process (Mesmer & Mesmer, 2008). Additional insights on achievement-level differences concerning cognitive and motivational writing challenges could be obtained during the screening, intervention, and progress monitoring of students' writing within the RTI framework.

Limitations and suggestions for future research

As stated, the findings concerning the relative strength of the relationships in both MG-SEM models might be due to the specific operationalization of the variables used in the present study. Specifically, it is possible that common method variance (Lindell & Whitney, 2001) or

shared method variance (Van den Berghe, Cardon, Tallir, Kirk, & Haerens, 2016) may have inflated strong associations between the motivational challenges and the cognitive challenges because we measured both constructs by means of self-report questionnaires. Similarly, the weak associations between the motivational and cognitive challenges (i.e., assessed by means of subjective measures based on self-report) and students' writing performance (i.e., assessed by means of objective measures based on writing tests) also might be explained by the operationalization. In this respect, a major limitation of the present study is that we measured students' applied writing strategies solely by means of self-report questionnaires. Indeed, previous research indicated that novice writers often fail to plan their text in advance (Cameron & Moshenko, 1996), have difficulties generating sentences fluently (McCutchen et al., 1994), and poorly revise their text by focusing on surface-level aspects (McCutchen et al., 1997). In the present study, however, students reported rather high levels of thinking, planning, revision, and control strategies. This finding may point to an overestimation of the reported writing strategies or to a tendency to provide socially desirable responses. Consequently, the issue of self-reported measures by means of student questionnaires warrants specific attention (Schellings & Van Hout-Wolters, 2011).

Nevertheless, researchers within the field of self-regulated learning also acknowledged the value of self-report data (e.g., Vandevelde, Van Keer, & Rosseel, 2013), as it provides insights into students' perceptions of using a particular strategy when learning (McCardle & Hadwin, 2015; Zimmerman, 2008). These insights are extremely valuable, since students regulate their learning behavior in relation to how they view their own learning (Winne & Jamieson-Noel, 2002). These findings within the field of self-regulated learning can be transferred to the context of students' writing, because writers have to self-regulate their writing behavior in order to compose their texts (Graham & Harris, 1997; Zimmerman & Risemberg, 1997). Taking into account this parallel, self-report measures on writing strategies can therefore provide valuable information and input for educational practice and research. Notwithstanding the value of self-report information, data-triangulation should be considered in further research to meet the related abovementioned shortcomings. Consequently, in addition to using off-line measures (e.g., student questionnaires based on self-report) to assess students' applied writing strategies, we need to integrate more objective, on-line measures, such as for example trace methodology (e.g., Braten & Samuelstuen, 2007; Fidalgo, Torrance, Rijlaarsdam, van den Bergh, & Alvarez, 2015), analysis of pen movements (e.g., Alamargot, Plane, Lambert, & Chesnet, 2010; Alves et al., 2015; Merchie & Van Keer, 2014), keystroke logging (e.g., Leijten & Van Waes, 2013; von Koss Torkildsen et al., 2015), or think aloud measures (e.g., Beauvais, Olive, & Passerault, 2011). These on-line measures can overcome the methodological limitations related to the exclusive reliance on students' self-report (e.g., shared method variance resulting in artificially inflated associations) and could therefore strengthen the results

of the present study. On-line measures such as trace methodology, analysis of pen movements or think aloud measures are, however, often very time and labor-intensive methodologies. Taking the large sample size in the present study into account (i.e., about 790 elementary students writing two texts) it would have been impractical to administer and examine all these on-line data. In the present study, we specifically focused on elementary students writing texts via pen and paper, as students in elementary education in Flanders are not used to writing on computers (De Smedt et al., 2016). Therefore, applying keystroke logging (i.e., observing students' writing processes on a computer, (Leijten & Van Waes, 2013)) would have not addressed the authentic writing situation in the classroom.

Further, the present study only focused on gender and achievement-level differences in writing. Future research studies could also consider other relevant student characteristics such as home language or grade-level to model students' cognitive and motivational writing challenges. Next to investigating other relevant student characteristics, it may also be useful to include other cognitive (e.g., writing fluency) and motivational challenges (e.g., interest) in the structural equation models.

Finally, as we examined gender and achievement-level differences in the relationships between motivational and cognitive components and students' writing performance in an exploratory way, future research studies should confirm and cross-validate both MG-SEM models. Additionally, longitudinal research could then investigate how writing performance in turn can affect students' cognitive (i.e., cognitive writing strategies) and motivational challenges (i.e., self-efficacy for writing and writing motivation) as well as how cognitive writing strategies can affects students' writing self-efficacy and writing motivation (Zimmerman & Risemberg, 1997).

Conclusion

Implications for teaching writing and for research on modeling students' writing

Based on the results of the present study, we present some implications for teaching writing in elementary grades and for research on modeling students' writing. As to the implications for teaching, we argue that tackling motivational writing challenges is of equal importance as teaching students cognitive writing strategies. In this respect, educational writing practices and experiences should foster students' cognitive strategy usage as well as enhance their self-efficacy for writing and writing motivation. Additionally, we urge for more differentiated writing

instruction because results showed achievement-level differences in the relationship between motivational and cognitive writing challenges. In this respect, more in-depth insights on achievement-level differences can be obtained during the screening, intervention, and progress monitoring of students' writing within an RTI approach.

As to the implications for research, we argue that studying complex models for different groups of students is necessary to receive more refined insight on how motivational and cognitive challenges mediate and relate to students' writing performance. In this respect, researchers must meet two preconditions. First, as a lot of parameters must be estimated to model these kinds of complex models, a large sample size is needed. When testing structural models for different groups of students, each group must be well represented, so the models are able to converge for each group. Second, data-triangulation, focusing on on-line writing measures in combination with self-report questionnaires, appears essential to more accurately assess students' applied cognitive writing strategies. In this respect, we argued in favor of a combination of trace methodology, analysis of pen movements, or think aloud measures. Nevertheless, to ensure the power to run the intended complex writing models, we had to set up a large-scale study. Consequently, investigating elementary students' writing strategies by on-line writing measures was infeasible because of the amount of data. To conclude, we underline the paradox within research focused on modeling elementary students' writing, namely: (a) conducting solid research in which on-line writing measures are essential to accurately assess students' applied writing strategies and (b) taking the feasibility of this type of research into account. The present study revealed this paradox by the incompatibility of the abovementioned preconditions to model the complex writing models.

References

Aitken, M., & Martinussen, R. (2013). Exploring predictors of performance on a curriculum-based measure of written expression. *Journal of Writing Research, 4*(3), 281-299. doi:10.17239/jowr-2013.04.03.3

Alamargot, D., Plane, S., Lambert, E., & Chesnet, D. (2010). Using eye and pen movements to trace the development of writing expertise: Case studies of a 7th, 9th and 12th grader, graduate students, and professional writer. *Reading and Writing, 23*(7), 853-888. doi:10.1007/s11145-009-9191-9

Alves, R., Limpo, T., Fidalgo, R., Carvalhais, L., Pereira, L., & Castro, S. (2015). The impact of promoting transcription on early text production: Effects on bursts and pauses, levels of written language, and writing performance. *Journal of Educational Psychology, 108*(5), 665-679. doi:10.1037/edu0000089

Babayigit, S. (2015). The dimensions of written expression: Language group and gender differences. *Learning and Instruction, 35*, 33-41. doi:10.1016/j.learninstruc.2014.08.006

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York, NY: Freeman.

Beauvais, C., Olive, T., & Passerault, J. (2011). Why are some texts good and others not? Relationship between text quality and management of the writing process. *Journal of Educational Psychology, 103*(2), 415-428. doi:10.1037/a0022545

Bentler, P. (2009). Alpha, dimension-free, and model-based internal consistency reliability. *Psychometrika, 74*(1), 137-143. doi:10.1007/S11336-008-9100-1

Bereiter, C., & Scardamalia, M. (1987). *The psychology of written composition*. Hillsdale, N.J.: L. Erlbaum Associates.

Berninger, V., & Fuller, F. (1992). Gender differences in orthographic, verbal, and compositional fluency: Implications for assessing writing disabilities in primary grade children. *Journal of School Psychology, 30*(4), 363-382. doi:10.1016/0022-4405(92)90004-O

Berninger, V., Fuller, F., & Whitaker , D. (1996). A process model of writing development across the life span. *Educational Psychology Review, 8*(3), 193-218. doi:10.1007/BF01464073

Berninger, V., Yates, C., Cartwright, A., Rutberg, J., Remy, E., & Abbott, R. (1992). Lower-level developmental skills in beginning writing. *Reading and Writing, 4*(3), 257-280. doi:10.1007/BF01027151

Boscolo, P., & Hidi, S. (2007). The multiple meanings of motivation to write. In G. Rijlaarsdam (Ed.), *Studies in Writing* (pp. 1-16). Oxford: Elsevier.

Bourke, L., & Adams, A. (2011). Is it difference in language skills and working memory that account for girls being better at writing than boys. *Jounal of Writing Research, 3*(3), 249-277. doi:10.17239/jowr-2012.03.03.5

Bouwer, R., Koster, M., & van den Bergh, H. (2016). *Benchmark rating procedure, best of both worlds? Comparing procedures to rate text quality in a reliable and valid manner*. Bringing writing research into the classroom. The effectiveness of Tekster, a newly developed writing program for elementary students (Doctoral Dissertation). Utrecht University. Utrecht, the Netherlands.

Braten, I., & Samuelstuen, M. (2007). Measuring strategic processing: Comparing task-specific self-reports to traces. *Metacognition Learning, 2*(1), 1-20. doi:10.1007/s11409-007-9004-y

Brindle, M., Graham, S., Harris, K. R., & Hebert, M. (2016). Third and fourth grade teacher's classroom practices in writing: A national survey. *Reading and Writing, 29*(5), 929-954. doi:10.1007/s11145-015-9604-x

Browne, M., & Cudeck, R. (1992). Alternative ways of assessing model fit. *Sociological, Methods & Research, 21*(2), 230-258. doi: 10.1177/0049124192021002005

Bruning, R., Dempsey, M., Kauffman, D., McKim, C., & Zumbrunn, S. (2013). Examining dimensions of self-efficacy for writing. *Journal of Educational Psychology, 105*(1), 25-38. doi:10.1037/a0029692

Bruning, R., & Horn, C. (2000). Developing motivation to write. *Educational Psychologist, 35*(1), 25-37. doi:10.1207/S15326985ep3501_4

Cameron, C., & Moshenko, B. (1996). Elicitation of knowledge transformational reports while children write narratives. *Canadian Journal of Behavioural Science, 28*(4), 271-280. doi:10.1037/0008-400X.28.4.271

Cheung, G., & Rensvold, R. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling, 9*(2), 233-255. doi:10.1207/S15328007SEM0902_5

Chou, C., Bentler, P., & Satorra, A. (1991). Scaled test statistics and robust standard errors for nonnormal data in covariance structure analysis: A Monte-Carlo study. *British Journal of Mathematical and Statistical Psychology, 44*(2), 347-357. doi:10.1111/j.2044-8317.1991.tb00966.x

Cohen, J. (1977). *Statistical power analysis for the behavioral sciences*. New York: Academic Press.

Coker, D., Farley-Ripple, E., Jackson, A., Wen, H., MacArthur, C., & Jennings, A. (2016). Writing in first grade: an observational study. *Reading and Writing, 29*(5), 793-832. doi:10.1007/s11145-015-9596-6

De Naeghel, J., Van Keer, H., Vansteenkiste, M., & Rosseel, Y. (2012). The relation between elementary students' recreational and academic reading motivation, reading frequency, engagement, and comprehension: A self-determination theory perspective. *Journal of Educational Psychology, 104*(4), 1006-1021. doi:10.1037/a0027800

De Smedt, F., Van Keer, H., & Merchie, E. (2016). Student, teacher, and class-level correlates of Flemish late elementary school children's writing performance. *Reading and Writing, 29*(5), 833-868. doi:10.1007/s11145-015-9590-z

Dockrell, J., Marshall, C., & Wyse, D. (2016). Teachers' reported practices for teaching writing in England. *Reading and Writing, 29*(3), 409-434. doi:10.1007/s11145-015-9605-9

Fidalgo, R., Torrance, M., Rijlaarsdam, G., van den Bergh, H., & Alvarez, M. (2015). Strategy-focused writing instruction: just observing and reflecting on a model benefits 6th grade students. *Contemporary Educational Psychology, 41*, 37-50. doi:10.1016/j.cedpsych.2014.11.004

Flemish Ministry of Education and Training. (2005). *Education in Flanders. The Flemish educational landscape in a nutshell.* Retrieved from http://planipolis.iiep.unesco.org/sites/planipolis/files/ressources/belgium_flanders_education_nutshell.pdf.

Flower, L., & Hayes, J. (1981). A cognitive process theory of writing. *College Composition and Communication, 32*(4), 365-387. doi:10.2307/356600

Galbraith, D., & Torrance, M. (2004). Revision in the context of different drafting strategies. In L. Allal, L. Chanquoy, & P. Largy (Eds.), *Revision Cognitive and Instructional Processes* (Vol. 13, pp. 63-85). Dordrecht: Kluwer.

Garcia, J., & de Caso, A. (2004). Effects of a motivational intervention for improving the writing of children with learning disabilities. *Learning Disability Quarterly, 27*(3), 141-159. doi:10.2307/1593665

Gottfried, A. (1990). Academic intrinsic motivation in young elementary school children. *Journal of Educational Psychology, 82*(3), 525-538. doi:10.1037/0022-0663.82.3.525

Graham, S. (2006). Strategy instruction and the teaching of writing. In C. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of writing research* (pp. 187-207). New York: The Guilford Press.

Graham, S., Berninger, V., & Fan, W. (2007). The structural relationship between writing attitude and writing achievement in first and third grade students. *Contemporary Educational Psychology, 32*(3), 516-536. doi:10.1016/j.cedpsych.2007.01.002

Graham, S., Gillespie, A., & McKeown, D. (2013). Writing: importance, development, and instruction. *Reading and Writing, 26*(1), 1-15. doi:10.1007/s11145-012-9395-2

Graham, S., & Harris, K. (2000). The role of self-regulation and transcription skills in writing and writing development. *Educational Psychologist, 35*(1), 3-12. doi:10.1207/S15326985EP3501_2

Graham, S., Harris, K., & Chambers, A. (2016). Evidence-based practice and writing instruction: A review of reviews. In C. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of Writing Research* (pp. 211-226). New York: The Guilford Press.

Graham, S., Harris, K., & Hebert, M. (2011). It is more than just the message: Analysis of presentation effects in scoring writing. *Focus on Exceptional Children, 44*(4), 1-12.

Graham, S., & Harris, K. R. (1997). Self-regulation and writing: Where do we go from here? *Contemporary Educational Psychology, 22*(1), 102-114. doi:10.1006/ceps.1997.0920

Graham, S., McKeown, D., Kiuhara, S., & Harris, K. (2012). A meta-analysis of writing instruction for students in the elementary grades. *Journal of Educational Psychology, 104*(3), 879-896. doi:10.1037/A0029185

Guay, F., Chanal, J., Ratelle, C., Marsh, H., Larose, S., & Boivin, M. (2010). Intrinsic, identified, and controlled types of motivation for school subjects in young elementary school

children. *British Journal of Educational Psychology, 80*(4), 711-735. doi:10.1348/000709910x499084

Guthrie, J. T., Klauda, S. L., & Ho, A. N. (2013). Modeling the relationships among reading instruction, motivation, engagement, and achievement for adolescents. *Reading Research Quarterly, 48*(1), 9-26. doi:10.1002/rrq.035

Hidi, S., & Boscolo, P. (2006). Motivation and writing. In C. A. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of writing research* (pp. 144-157). New York: The Guilford Press.

Hoge, R., & Coladarci, T. (1989). Teacher-based judgments of academic achievement: A review of literature. *Review of Educational Research, 59*(3), 297-313. doi:10.3102/00346543059003297

Hu, L., & Bentler, P. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*(1), 1-55. doi:10.1080/10705519909540118

Inspectie van het Onderwijs. (2010). *Het onderwijs in het schrijven van teksten. De kwaliteit van het schrijfonderwijs in het basisonderwijs.* Utrecht: Ministerie van Onderwijs, Cultuur en Wetenschap.

Jones, S. (2011). Mapping the landscape: Gender and the writing classroom. *Journal of Writing Research, 3*(3), 161-179. doi:10.17239/jowr-2012.03.03.2

Kieft, M., Rijlaarsdam, G., & van den Bergh, H. (2006). Writing as a learning tool: Testing the role of students' writing strategies. *European Journal of Psychology of Education, 12*(1), 17-34. doi:10.1007/BF03173567

Kieft, M., Rijlaarsdam, G., & van den Bergh, H. (2008). An aptitude-treatment interaction approach to writing-to-learn. *Learning and Instruction, 18*(4), 379-390. doi:10.1016/j.learninstruc.2007.07.004

Klassen, R. (2002). A question of calibration: A review of the self-efficacy beliefs of students with learning disabilities. *Learning Disability Quarterly, 25*(2), 88-102. doi:10.2307/1511276

Koster, M., Bouwer, R., & van den Bergh, H. (2016). *Think first! The effect of prewriting on the writing performance of elementary students*. Bringing writing research into the classroom.

The effectiveness of Tekster, a newly developed writing program for elementary students (Doctoral Dissertation). Utrecht University. Utrecht, the Netherlands.

Koster, M., Tribushinina, E., de Jong, P., & van den Bergh, H. (2015). Teaching children to write: A meta-analysis of writing intervention research. *Journal of Writing Research, 7*(2), 299-324. doi:10.17239/jowr-2015.07.02.2

Lam, S., & Law, Y. (2007). The roles of instructional practices and motivation in writing performance. *Journal of Experimental Education, 75*(2), 145-164. doi:10.3200/JEXE.75.2.145-164

Leijten, M., & Van Waes, L. (2013). Keystroke logging in writing research: Using Inputlog to analyze and visualize writing processes. *Written Communication, 30*(3), 358-392. doi:0.1177/0741088313491692

Lindell, M., & Whitney, D. (2001). Accounting for common method variance in cross-sectional research designs. *Journal of Applied Psychology, 86*(1), 114-121. doi:10.1037/0021-9010.86.1.114

MacArthur, C., & Graham, S. (2016). Writing research from a cognitive perspective. In C. A. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of writing research*. New York: The Guilford Press.

Martin, J., & Rose, D. (2008). *Genre relations: Mapping culture*. London: Equinox.

McCardle, L., & Hadwin, A. (2015). Using multiple, contextualized data sources to measure learners' perceptions of their self-regulated learning. *Metacognition Learning, 10*(1), 43-75. doi:10.1007/s11409-014-9132-0

McCutchen, D., Covill, A., Hoyne, S., & Mildes, K. (1994). Individual differences in writing: Implications of translating fluency. *Journal of Educational Psychology, 86*(2), 256-266. doi:10.1037/0022-0663.86.2.256

McCutchen, D., Francis, M., & Kerr, S. (1997). Revising for meaning, effects of knowledge and strategy. *Journal of Educational Psychology, 89*(4), 667-676. doi:0.1037/0022-0663.89.4.667

Merchie, E., & Van Keer, H. (2014). Using on-line and off-line measures to explore fifth and sixth graders' text-learning strategies and schematizing skills. *Learning and Individual Differences, 32*, 193-203. doi:10.1016/j.lindif.2014.03.012

Mesmer, E., & Mesmer, H. (2008). Response to intervention (RTI): What teachers of reading need to know. *Reading Teacher, 62*(4), 280-290. doi:10.1598/RT.62.4.1

Muthén, B., & Satorra, A. (1995). Complex sample data in structural equation modeling. *Sociological Methodology, 25*, 267-316. doi:10.2307/271070

National Center for Education Statistics. (2012). *The nation's report card: Writing 2011*. Washington, D.C.: Institute of Education Sciences, U.S. Department of Education.

Oberski, D. (2014). lavaan.survey: An R package for complex survey analysis of structural equation models. *Journal of Statistical Software, 57*(1), 1-27. doi:10.18637/jss.v057.i01

Olinghouse, N. (2008). Student and instruction-level predictors of narrative writing in third-grade students. *Reading and Writing, 21*(1), 3-26. doi: 10.1007/s11145-007-9062-1

Pajares, F. (1996). Self-efficacy beliefs in academic settings. *Review of Educational Research, 66*(4), 543-578. doi:10.3102/00346543066004543

Pajares, F. (2003). Self-efficacy beliefs, motivation, and achievement in writing: A review of the literature. *Reading & Writing Quarterly: Overcoming Learning Difficulties, 19*(2), 139-158. doi:10.1080/10573560390143085

Pajares, F., Miller, M., & Johnson, M. (1999). Gender differences in writing self-beliefs of elementary school students. *Journal of Educational Psychology, 19*(1), 50-61. doi:10.1037/0022-0663.91.1.50

Pajares, F., & Valiante, G. (1997). Influence of self-efficacy on elementary students' writing. *The Journal of Educational Research, 90*(6), 353-360. doi:10.1080/00220671.1997.10544593

Pajares, F., & Valiante, G. (2001). Gender differences in writing motivation and achievement of middle school students: A function of gender orientation? *Contemporary Educational Psychology, 26*(3), 366-381. doi:10.1006/ceps.2000.1069

Pajares, F., & Valiante, G. (2006). Self-efficacy beliefs and motivation in writing development. In C. A. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of writing research* (pp. 158-170). New York: The Guilford Press.

Pajares, F., Valiante, G., & Cheong, Y. (2007). Writing self-efficacy and its relation to gender, writing motivation, and writing competence: A developmental perspective. In S. Hidi & P. Boscolo (Eds.), (pp. 141-159). Oxford: Elsevier.

Rosseel, Y. (2012). lavaan: An R package for structural equation modeling. *Journal of Statistical Software, 48*(2), 1-36.

Ryan, R., & Deci, E. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology, 25*(1), 54-67. doi:10.1006/ceps.1999.1020

Saddler, B., & Asaro-Saddler, K. (2012). Response to intervention in writing: A suggested framework for screening, intervention, and progress monitoring. *Reading & Writing Quarterly: Overcoming Learning Difficulties, 29*(1), 20-43. doi:10.1080/10573569.2013.741945

Satorra, A., & Bentler, P. (2001). A scaled difference chi-square test statistic for moment structure analysis. *Psychometrika, 66*(4), 507-514. doi:10.1007/BF02296192

Schellings, G., & Van Hout-Wolters, B. (2011). Measuring strategy use with self-report instruments: theoretical and empirical considerations. *Metacognition Learning, 6*(2), 83-90. doi:10.1007/s11409-011-9081-9

Schoonen, R. (2005). Generalizability of writing scores: An application of structural equation modeling. *Language Testing, 22*(1), 1-30. doi:10.1191/0265532205lt295oa

Schreiber, J., Nora, A., Stage, F., Barlow, E., & King, J. (2006). Reporting structural equation modeling and confirmatory factor analysis results: A review. *The Journal of Educational Research, 99*(6), 323-338. doi:10.3200/JOER.99.6.323-338

Shell, D., Colvin, C., & Bruning, R. (1995). Self-efficacy, attribution, and outcome expectancy mechanisms in reading and writing achievement: Grade-level and achievement-level differences. *Journal of Educational Psychology, 87*(3), 386-398. doi:10.1037/0022-0663.87.3.386

Stapleton, L. (2006). An assessment of practical solutions for structural equation modeling with complex sample data. *Structural Equation Modeling: A Multidisciplinary Journal, 13*(1), 28-58. doi:10.1207/s15328007sem1301_2

Südkamp, A., Kaiser, J., & Möller, J. (2012). Accuracy of teachers' judgements of students' academic achievement: A meta-analysis. *Journal of Educational Psychology, 104*(3), 743-762. doi:10.1037/a0027627

Sweet, S., Fortier, M., Strachan, S., & Blanchard, C. (2012). Testing and integrating Self-Determination Theory and Self-Efficacy Theory in a physical activity context. *Canadian Psychology, 53*(4), 319-327. doi:10.1037/a0030280

Tillema, M., van den Bergh, H., Rijlaarsdam, G., & Sanders, T. (2012). Quantifying the quality difference between L1 and L2 essays: A rating procedure with bilingual raters and L1 and L2 benchmark essays. *Language Testing, 30*(1), 71-97. doi:10.1177/0265532212442647

Troia, G., Harbaugh, A., Shankland, R., Wolbers, K., & Lawrence, A. (2013). Relationships between writing motivation, writing activity, and writing performance: Effects of grade, sex, and ability. *Reading and Writing, 26*(1), 17-44. doi:10.1007/s11145-012-9379-2

Troia, G., Shankland, R., & Wolbers, K. (2012). Motivation research in writing: Theoretical and empirical considerations. *Reading & Writing Quarterly: Overcoming Learning Difficulties, 28*(1), 5-28. doi:10.1080/10573569.2012.632729

Van den Berghe, L., Cardon, G., Tallir, I., Kirk, D., & Haerens, L. (2016). Dynamics of need-supportive and need-thwarting teaching behavior: the bidirectional relationship with student engagement and disengagement in the beginning of a lesson. *Physical Education and Sport Pedagogy, 21*(6), 653-670. doi:10.1080/17408989.2015.1115008

Vandevelde, S., Van Keer, H., & Rosseel, Y. (2013). Measuring the complexity of upper primary school children's self-regulated learning: A multi-component approach. *Contemporary Educational Psychology, 38*(4), 407-425. doi:10.1016/j.cedpsych.2013.09.002

von Koss Torkildsen, J., Morken, F., Helland, W. A., & Helland, T. (2015). The dynamics of narrative writing in primary grade children: writing process factors predict story quality. *Reading and Writing, 29*(3), 529-554. doi:10.1007/s11145-015-9618-4

Williams, G., & Larkin, R. (2013). Narrative writing, reading and cognitive processes in middle childhood: What are the links? *Learning and Individual Differences, 28*, 142-150. doi:10.1016/j.lindif.2012.08.003

Winne, P., & Jamieson-Noel, D. (2002). Exploring students' callibration of self reports about study tactics and achievement. *Contemporary Educational Psychology, 27*(4), 551-572. doi:10.1016/s0361-476x(02)00006-1

Woolley, M., Bowen, G., & Bowen, N. (2006). The development and evaluation of procedures to assess child self-report item validity. *Educational and Psychological Measurement, 66*(4), 687-700. doi:10.1177/0013164405282467

Yuan, K., & Bentler, P. (2000). Three likelihood-based methods for mean and covariance structure analysis with nonnormal missing data. *Sociological Methodology, 30*(1), 165-200. doi:10.1111/0081-1750.00078

Zimmerman, B. (2008). Investigating self-regulation and motivation: Historical background, methodological developments, and future prospects. *American Educational Research Journal, 45*(1), 166-183. doi:10.3102/0002831207312909

Zimmerman, B., & Bandura, A. (1994). Impact of self-regulatory influences on writing course attainment. *American Educational Research Journal, 31*(4), 845-862. doi:10.3102/00028312031004845

Zimmerman, B., & Kitsantas, A. (1999). Acquiring writing revision skill: Shifting from process to outcome self-regulatory goals. *Journal of Educational Psychology, 91*(2), 241-250. doi:10.1037//0022-0663.91.2.241

Zimmerman, B., & Kitsantas, A. (2007). A writer's discipline: The development of self-regulatory skills. In S. Hidi & P. Boscolo (Eds.), *Writing and Motivation* (1st ed., Vol. 19, pp. 51-69). Oxford: Elsevier.

Zimmerman, B., & Risemberg, R. (1997). Becoming a self-regulated writers: A social cognitive perspective. *Contemporary Educational Psychology, 22*, 73-101. doi:10.1006/ceps.1997.0919

Appendices

Appendix A1. *Self-efficacy for Writing Scale (SEWS)[a]: items, standardized factor loadings and factor correlations.*

Items	Ideation	Convention	Regulation	R^2
I can **think of many ideas** for my writing.	.73			.54
I can **put my ideas into writing**.	.69			.48
I can **think of many words** to describe my ideas.	.73			.53
I can think of a lot of **original ideas** to write about.	.76			.58
I can **spell** my words **correctly**.		.64		.41
I can write **complete sentences**.		.60		.36
I can **punctuate** my sentences **correctly**.		.67		.45
I can write **correct sentences**.		.65		.42
I can **concentrate for at least one hour** when I write.			.64	.41
I **don't get distracted** while I write.			.65	.42
I can **control myself** when I write, even when it's difficult.			.53	.29
I can **keep writing** even when it's difficult.			.78	.60
Factor correlations	**Ideation**	**Convention**	**Regulation**	
Ideation				
Convention	.55			
Regulation	.62	.69		

Note. Due to low factor loadings or cross-loadings, 4 items were removed. The deleted items were left out of the final instrument.

[a] Original scale, see Bruning et al. (2013). Adapted to the context of elementary writing education.

Appendix A2. *SRQ-Writing Motivation[a]: items, standardized factor loadings and factor correlations.*

Items	Autonomous	Controlled	R^2
I write a text because…			
I **enjoy** writing.	.75		.56
I think it is **very useful** for me to write.	.67		.44
It's **fun** to write.	.82		.67
I **really like it**.	.81		.65
I think writing is **meaningful**.	.74		.55
I think writing is **interesting**.	.81		.66
It is **important to me to write**.	.68		.47
I think writing is **fascinating**.	.66		.44
I don't want to **disappoint others**.		.59	.35
That is what **others expect me to do**.		.56	.31
I will feel **guilty** if I don't do it.		.66	.44
Others will only reward me if I write.		.56	.31
I have t**o prove to myself that I can get good writing grades**.		.43	.18
Others will punish me if I don't write.		.56	.31
I will feel **ashamed** of myself if I don't write.		.65	.42
Others think that I have to.		.65	.41
I can just be **proud of myself if I get good writing grades**.		.35	.12
Factor correlations	**Autonomous**	**Controlled**	
Autonomous			
Controlled	-.00		

Note. Parallel with De Naeghel et al. (2012), a correlation between the error terms of two items regarding autonomous motivation (i.e., "I write a text because I really like it" and "I write a text because it's fun to write") and two items regarding controlled motivation (i.e., "I write a text because I can be proud of myself if I get good writing grades" and "I write a text because I have to prove to myself that I can get good writing grades") was allowed.

[a] Original scale: SRQ-Reading Motivation, see De Naeghel et al. (2012). Adapted to the context of writing education.

Appendix A3. *Questionnaire on writing strategies[a]: items, standardized factor loadings and factor correlations.*

Items	Thinking	Planning	Revising	Controlling	R^2
* When I write a text, I **don't know in advance what I will write.**	.18				.03
When I write a text, I think about **how to approach it**.	.57				.33
When I write a text, I know **in advance what I want to say in my text to my readers**.	.49				.24
When I write a text, I **first need good ideas** before I can start writing.	.51				.25
When I write a text, I **first have the sentences in my head** before I write them down.	.53				.28
When I write a text, it is easier if I know **in advance what I roughly want to write** in my text.	.54				.29
When I write a text, I first write **my ideas on a piece of scrap paper**. Afterwards, I write down full sentences.		.70			.49
When I write a text, I first write an **outline** of my text before I start writing.		.68			.46
When I write a text, I want to know what I will write in my text. Therefore, **planning** is important to me.		.67			.45
When I write a text, I prefer to write down what I **think or know about the topic on a piece of scrap paper** in advance.		.69			.47
When I reread and rewrite a text, the **structure/organization** of my text **may still change a lot**.			.59		.47
When I reread and rewrite a text, the **content** of my text **may still change a lot**.			.64		.41
When I write a text, I reread and improve my text at the end. **My text may still change a lot**.			.59		.35
When I write a text, I always check whether my text is **well structured** before I hand it in.				.64	.41
When I write a text, I regularly **check** whether I didn't write too many **incorrect or long sentences**.				.67	.44
When I write a text, I have to reread my text carefully at the end **to check whether no unnecessary things are in it**.				.59	.35

Factor correlations	Thinking	Planning	Revising	Controlling
Thinking				
Planning	.59			
Revising	.44	.43		
Controlling	.60	.61	.61	

Note. Starred item (*) was recoded in the analyses. Due to low factor loadings or cross-loadings, 10 items were removed. The deleted items were left out of the final instrument.

[a] Original scale: questionnaire on planning and revising strategies, see Kieft et al. (2008). Adapted to the context of elementary writing education.

Appendix B. *Multiple group measurement invariance testing on the measurement model: Summary of goodness of fit statistics*

	Overall results							Model difference results					
Measurement invariance	SB χ^2	*df*	*p*	CFI	RMSEA	SRMR		Δ SB χ^2	Δ*df*	*p*	ΔCFI	ΔRMSEA	ΔSRMR
Gender													
Configural invariance	3113.14	1814	.000	.923	.031	.048							
Weak invariance	3128.14	1841	.000	.924	.030	.049	Model 1 vs. Model 2	15.00	27	.969	.001	.001	.001
Strong invariance	3284.94	1886	.000	.917	.031	.049	Model 2 vs. Model 3	156.80	45	.000	.007	.001	.000
General achievement													
Configural invariance	4110.28	2721	.000	.913	.033	.053							
Weak invariance	4463.58	2793	.000	.906	.036	.055	Model 1 vs. Model 2	353.30	72	.000	.007	.003	.002
Strong invariance	4363.14	2865	.000	.906	.034	.056	Model 2 vs. Model 3	100.44	72	.015	.000	.002	.001

Note. SB χ^2 = Satorra Bentler chi-square; *df* = degrees of freedom; CFI = comparative fit index; RMSEA = root mean square error of approximation; SRMR = the standardized root mean residual

The baseline model was tested for equivalent factor structures (i.e., configural invariance). The subsequent models tested more conservative restrictions, more specifically, weak invariance (i.e., equal loadings) and strong invariance (i.e., equal loadings and intercepts).

Appendix C. *Multiple Group Measurement Invariance Testing on SEWS, SRQ-Writing motivation, and Questionnaire on Writing Strategies: Summary of Goodness of Fit Statistics*

	Overall results							Model difference results					
Measurement invariance tests	SB χ^2	*df*	*p*	CFI	RMSEA	SRMR		ΔSB χ^2	Δ*df*	*p*	ΔCFI	ΔRMSEA	ΔSRMR
SEWS													
Gender													
Configural invariance	252.70	102	.000	.955	.043	.041							
Weak invariance	265.57	114	.000	.955	.041	.046	Model 1 vs. Model 2	12.87	12	.379	.000	.002	.005
Strong invariance	279.58	123	.000	.953	.040	.046	Model 2 vs. Model 3	14.01	9	.122	.002	.001	.000
General achievement													
Configural invariance	384.25	153	.000	.931	.056	.049							
Weak invariance	449.51	177	.000	.919	.057	.088	Model 1 vs. Model 2	65.26	24	.000	.012	.001	.039
Strong invariance	486.86	195	.000	.914	.056	.089	Model 2 vs. Model 3	34.35	18	.011	.005	.001	.001
SRQ-Writing Motivation													
Gender													
Configural invariance	781.84	232	.000	.935	.055	.055							
Weak invariance	814.19	249	.000	.933	.054	.062	Model 1 vs. Model 2	32.35	17	.014	.002	.001	.007
Strong invariance	916.70	264	.000	.923	.057	.065	Model 2 vs. Model 3	102.51	15	.000	.010	.003	.003
General achievement													
Configural invariance	899.73	348	.000	.933	.058	.062							
Weak invariance	975.36	382	.000	.927	.058	.070	Model 1 vs. Model 2	75.63	34	.000	.006	.000	.008
Strong invariance	1034.44	412	.000	.924	.057	.071	Model 2 vs. Model 3	59.08	30	.001	.003	.001	.001

	Overall results						Model difference results					
Measurement invariance	SB χ^2	*df*	*p*	CFI	RMSEA	SRMR		ΔSB χ^2	Δ*df*	*p*	ΔCFI	ΔRMSEA	ΔSRMR
Questionnaire on writing strategies													
Gender													
Configural invariance	403.42	196	.000	.939	.037	.041							
Weak invariance	418.28	212	.000	.939	.036	.048	Model 1 vs. Model 2	14.86	16	.535	.000	.001	.007
Strong invariance	445.91	224	.000	.934	.036	.049	Model 2 vs. Model 3	27.63	12	.006	.005	.000	.001
General achievement													
Configural invariance	472.26	294	.000	.943	.036	.046							
Weak invariance	506.77	326	.000	.943	.035	.054	Model 1 vs. Model 2	34.51	32	.349	.000	.001	.008
Strong invariance	547.85	350	.000	.937	.035	.055	Model 2 vs. Model 3	41.08	24	.016	.004	.000	.001

Note. SB χ^2 = Satorra Bentler chi-square; *df* = degrees of freedom; CFI = comparative fit index; RMSEA = root mean square error of approximation, SRMR = the standardized root mean residual.

Appendix D. *Writing test assignment: descriptive text*

Last week an alien landed on our planet Earth. King Filip gave him permission to visit our country to see how people live here. One day, the alien walks past a large building. He is surprised when he sees several little persons entering the building through a large gate. The alien does not know what happens in that building and what these little persons do there.

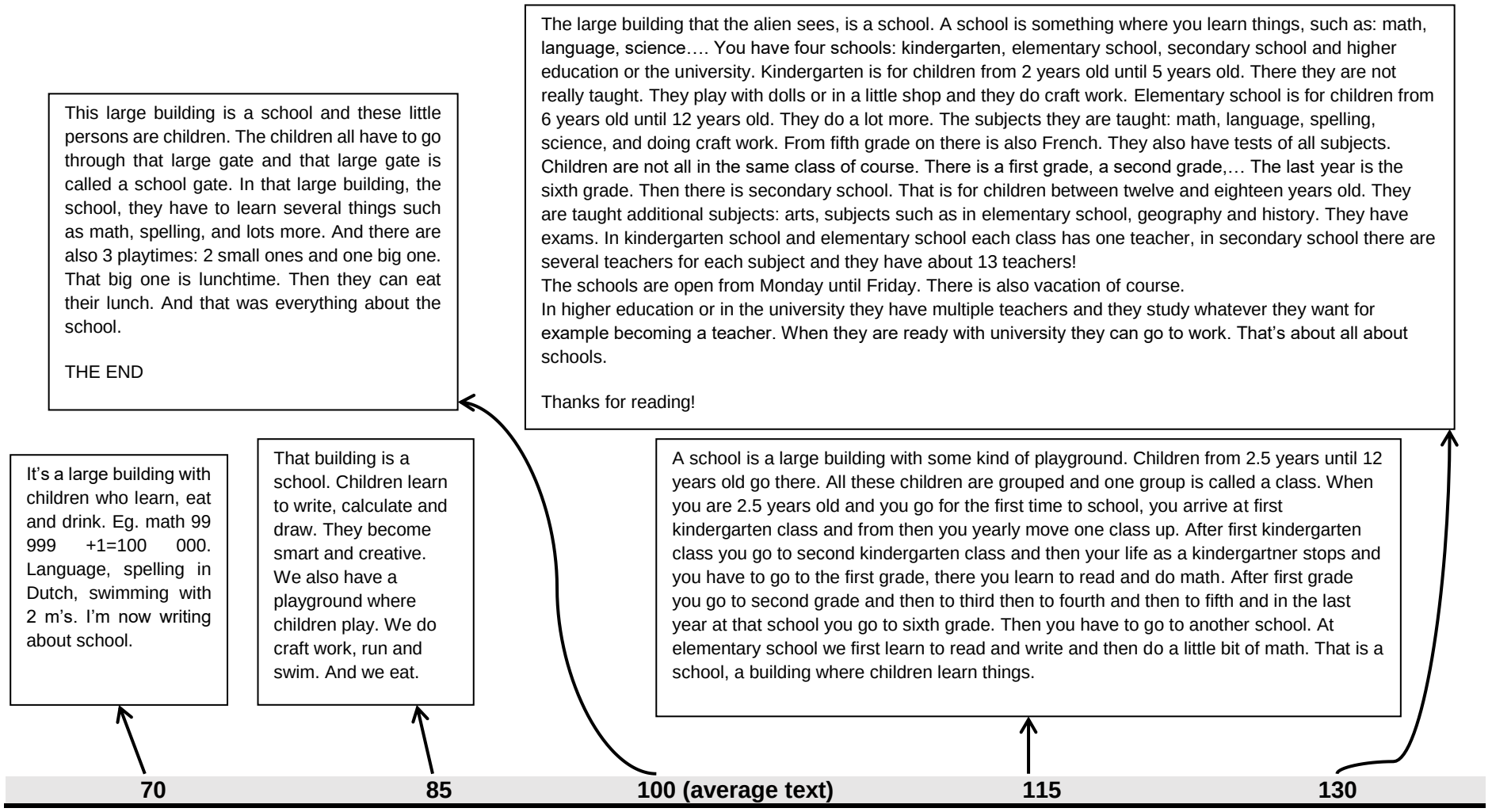
When you look at the picture, you definitely know what the alien sees. Explain it to the alien so he knows what the building is and what happens there.

Writing test assignment: narrative text

Yesterday an object washed ashore. Come up with a story about how and why this object washed ashore.

Appendix E*. English translations of the benchmark texts*

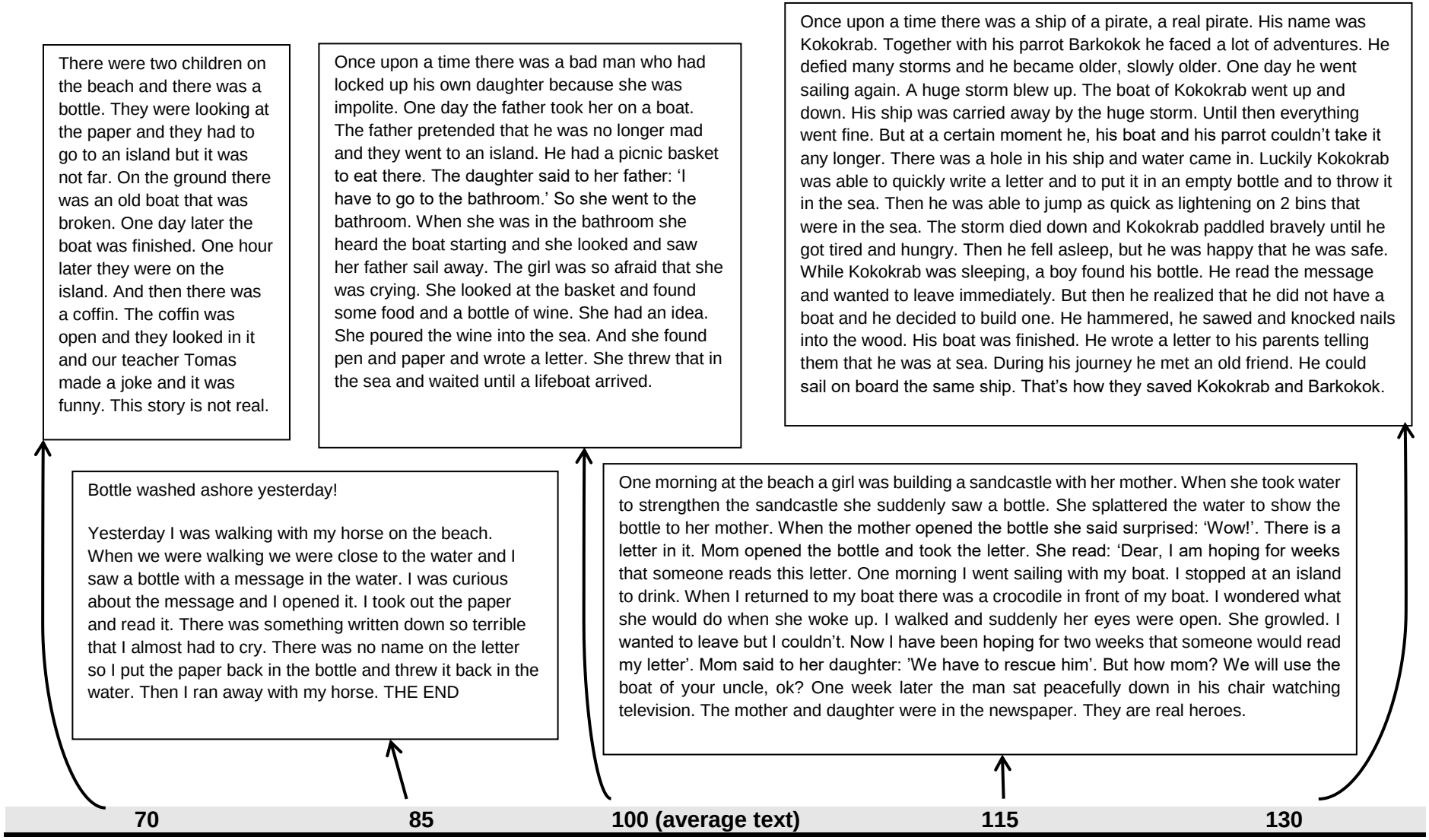
Descriptive benchmark texts



Description of each descriptive benchmark text

	Strong aspects	Weak aspects
Score 75	- **Text genre**: the writer provides information in the text. - **Assignment**: the text corresponds to the assignment: the writer describes what a school is. - **Idea development**: the ideas are factual and related to the writing topic.	- **Idea development:** the number of ideas is limited. The ideas are very general, there are no specific or remarkable ideas. - **Quality of information:** the quality of information is limited resulting in a very vague description of what a school is. There is a limited use of examples and details. - **Text structure:** the text is chaotic. It is difficult for a reader to follow the line of reasoning. - **Sentence structure and word choice:** word choice is not varied and the sentence structure is substandard.
Score 85	- **Text genre**: the writer provides information in the text. - **Assignment**: the text corresponds to the assignment: the writer describes what a school is. - **Idea development**: the ideas are factual and related to the writing topic. - **Text structure:** the structure is basic. As a reader you can follow the line of reasoning. - **Quality of information:** the text provides a minimum of information. The reader can read a very general description of what a school is.	- **Idea development:** the number of ideas is limited. The ideas are very general, there are no specific or remarkable ideas. - **Quality of information:** there is a limited use of examples and details. - **Sentence structure and word choice:** word choice and sentence structure is not varied.
Score 100	- **Text genre**: the writer provides information in the text. - **Assignment**: the text corresponds to the assignment: the writer describes what a school is. - **Idea development**: the ideas are factual and related to the writing topic. - **Text structure:** the structure is basic. As a reader you can follow the line of reasoning. - **Quality of information:** the text provides basic information. The reader can read a general description of what a school is.	- **Idea development:** the number of ideas is limited. The ideas are very general, there are no specific or remarkable ideas. - **Quality of information:** there is a limited use of examples and details. - **Sentence structure and word choice:** word choice and sentence structure is limitedly varied.
Score 115	- **Text genre**: the writer provides information in the text. - **Assignment**: the text corresponds to the assignment: the writer describes what a school is. - **Idea development**: the ideas are factual and related to the writing topic. At times, the writer provides remarkable ideas. - **Text structure:** the structure is basic. As a reader you can easily follow the line of reasoning.	- **Idea development:** the number of ideas is quite limited. - **Quality of information:** the number of examples is quite limited.

	- **Quality of information:** next to the basic information provided in the text, the reader can read more concrete and detailed information about a school. - **Sentence structure and word choice:** sentence structure is varied and word choice is a times remarkable.	
Score 130	- **Text genre**: the writer provides information in the text. - **Assignment**: the text corresponds to the assignment: the writer describes what a school is. - **Idea development**: there are a number of factual ideas that are related to the writing topic. There are also a number of remarkable ideas in the text. - **Text structure:** the text is logically structured. As a reader you can easily follow the line of reasoning. - **Quality of information:** next to the basic information provided in the text, the reader can read a lot of concrete and detailed information about a school. The writer also provides a lot of examples. - **Sentence structure and word choice:** sentence structure is varied and word choice is remarkable.	***I***



Narrative benchmark texts

Description of each narrative benchmark text

	Strong aspects	Weak aspects
Score 75	- **Text genre**: the writer tries to tell a story.	- **Assignment**: the text does not correspond to the assignment. The text does not tell a story how and why the bottle washed ashore. - **Story line:** the story line is unclear. - **Text structure:** the text is chaotic. It is difficult for a reader to follow text. - **Creativity:** the story is not creative. - **Sentence structure and word choice:** word choice is not varied and the sentence structure is substandard.
Score 85	- **Text genre**: the writer tells a story. - **Text structure:** the text is basic. As a reader you can follow the text.	- **Assignment**: the text does not correspond to the assignment. The text does not tell a story how and why the bottle washed ashore. - **Story line:** in the beginning of the text, the story line is basic and clear and it has a clear plot. However, the actions in the story don't lead to anything. As a reader you still have a lot of unanswered questions. - **Text structure:** the text structure is chaotic. It is difficult for a reader to follow text. - **Creativity:** the story is not really creative. - **Sentence structure and word choice:** word choice and sentence structure is not varied.
Score 100	- **Text genre**: the writer tells a story. - **Assignment**: the text corresponds to the assignment. - **Story line**: the story line is basic and clear and it has a clear plot. - **Text structure:** the text structure is basic. As a reader you can follow the text.	- **Story line:** the storyline is not really fascinating and vivacious. As a reader you still have some unanswered questions. - **Creativity:** the story is not really creative. - **Sentence structure and word choice:** word choice and sentence structure is not varied.
Score 115	- **Text genre**: the writer tells a story. - **Assignment**: the text corresponds to the assignment. - **Story line**: the story line is basic and clear and it has a clear plot. The storyline is also quite fascinating and vivacious. - **Text structure:** the text structure is clear. As a reader you can follow the text. - **Creativity:** the story is quite creative. - **Sentence structure and word choice: s**entence structure is varied and word choice is a times remarkable.	- **Story line**: as a reader you still have some unanswered questions.
Score 130	- **Text genre**: the writer tells a story. - **Assignment**: the text corresponds to the assignment.	- **Story line**: the story ends abruptly.

	- **Story line**: the story line is clear and it has a clear plot. The storyline is also very fascinating and vivacious. The story is very detailed: the reader has a clear view on the events and actions in the story. - **Text structure:** the text structure is clear. As a reader you can follow the text. - **Creativity:** the story is creative. - **Sentence structure and word choice: s**entence structure is varied and word choice is remarkable.	

Good writing isn't a science. It's an art, and the horizon is infinite. You can always get better.

David Foster Wallace

4

Fostering writing in upper-elementary grades: a study into the distinct and combined impact of explicit instruction and peer assistance

This chapter is based on:

De Smedt, F., & Van Keer, H. (2018). Fostering writing in upper primary grades: a study into the distinct and combined impact of explicit instruction and peer assistance. *Reading and Writing, 31*(2), 325-354. doi:10.1007/s11145-017-9787-4

Chapter 4

Fostering writing in upper-elementary grades: A study into the distinct and combined impact of explicit instruction and peer assistance

Abstract

As writing is a complex and resource demanding task, high-quality writing instruction is indispensable from elementary grades on to support beginning writers in developing effective writing skills. Writing research should therefore provide teachers and schools with evidence-based guidelines for teaching writing in daily practice. In this respect, the present study first investigates the distinct and combined effectiveness of two instructional writing practices (i.e., explicit writing instruction and writing with peer assistance). Second, the present study aims to examine differential effects for students with different background characteristics (i.e., gender and general achievement level). Eleven teachers and their 206 fifth and sixth-grade students participated in the study and were randomly assigned to either one of the four experimental conditions (i.e., EI+IND: explicit instruction + individual writing, EI+PA: explicit instruction + writing with peer assistance, IND: matched individual practice comparison condition, and PA: matched peer-assisted practice comparison condition) or the business as usual condition. Multilevel analyses showed that EI+IND, EI+PA, and PA students outperformed the business as usual students. As to the distinct impact of explicit writing instruction, EI+IND students outperformed IND students at posttest, revealing the effectiveness of explicit writing instruction. As to the effect of peer-assisted writing, there were no significant differences between the individual writing conditions (EI+IND and IND) and the peer-assisted conditions (EI+PA and PA respectively).

Introduction

Effective writing skills are an important part of everyday communication as these skills enable you to communicate your message with clarity. These skills are essential both in professional and private life. Writing researchers, however, pointed out the complex nature of the writing activity as it is a resource demanding task (Bereiter & Scardamalia, 1987; Flower & Hayes, 1981; Zimmerman & Risemberg, 1997). In this respect, Graham, Gillespie, and McKeown (2013) defined writing as "a goal directed and self-sustained cognitive activity" (p.4), whereby writers have to skilfully manage the writing environment, the restrictions imposed by the writing topic, the goals and intentions of the writer, and the necessary knowledge, skills, and strategies while writing (Graham et al., 2013). Managing this complex process of writing challenges writers' working memory capacity, especially when low-level transcription skills (e.g., spelling, handwriting) are not fully automatized (Bereiter & Scardamalia, 1987; Bourke & Adams, 2010). Due to these cognitive constraints, most elementary school students experience difficulties when asked to perform higher-order skills (Cameron & Moshenko, 1996; McCutchen, Covill, Hoyne, & Mildes, 1994; McCutchen, Francis, & Kerr, 1997), such as planning (i.e., producing and organizing ideas), generating texts (i.e., translating ideas into words and sentences), and revising texts (i.e., process of rewriting texts to improve the overall text quality) (Berninger, Fuller, & Whitaker 1996). In this respect, several national assessment reports on writing, for instance in the Netherlands (Inspectie van het Onderwijs, 2010), the USA (National Center for Education Statistics, 2012), and the UK (Ofsted, 2000), revealed alarming results on the writing proficiency in elementary school, thereby signalling the rather basic to substandard level of students' writing skills. Taking into account the complexity of writing and students' poor writing skills, high-quality writing instruction is indispensable from elementary grades on. In this respect, it is important to support not only struggling writers, but to assist all beginning writers in developing effective writing knowledge, skills, and strategies (Graham, Harris, & Chambers, 2016; Graham, McKeown, Kiuhara, & Harris, 2012; Koster, Tribushinina, de Jong, & van den Bergh, 2015).

In view of providing students with high-quality writing instruction, teachers play a significant role. Graham et al. (2016), however, pointed out that teachers should be supported, as the skilful teaching of writing is difficult and challenging. Therefore, writing research should provide teachers and schools with evidence-based guidelines (Graham et al., 2016). In view of providing these, several meta-analyses identified effective writing interventions in elementary schools (Graham et al., 2012; Koster et al., 2015). The present study focusses in particular on explicit writing instruction and peer-assisted writing because of their complementary nature (Ferretti & Lewis,

2013). Whereas explicit writing instruction is necessary for students to acquire writing knowledge and strategies (Graham, 2006), peer-assisted writing can foster the application of the knowledge and strategies taught (Daiute & Dalton, 1993). In what follows, both explicit writing instruction and peer-assisted writing are discussed by reviewing previous research on these evidence-based writing practices.

Explicit writing instruction

Explicitly teaching writing knowledge

In view of effective writing, students need to acquire essential writing knowledge, such as genre knowledge and knowledge about text structure (Graham et al., 2013). Students need to get acquainted, for instance, with the goal and content of a specific genre (e.g., the goal of a descriptive text is to describe something to the readers by providing definitions, facts, examples, …) and with text structures (e.g., a descriptive text consists of a title, introduction, main ideas and additional information, and a conclusion). Previous meta-analyses indeed pointed at the effectiveness of teaching elementary school students writing knowledge (Bean & Steenwyk, 1984; Fitzgerald & Teasley, 1986; Graham et al., 2012; Koster et al., 2015). Explicitly teaching writing knowledge, however, requires an important role for the teacher. In this respect, previous research showed that teachers can increase students' writing knowledge by offering them model texts to compare and contrast (Abbuhl, 2011; Charney & Carlson, 1995). Providing students opportunities to study these models is, however, insufficient to improve students' writing. Additionally, teachers have to explicitly explicate and describe the different aspects in the model texts in view of acquiring genre and text structure knowledge (Abbuhl, 2011).

Explicitly teaching writing strategies

Besides writing knowledge, students also have to master effective writing strategies (Graham et al., 2013). This includes, that students first need to learn strategies on how, when, and why to plan texts. Based on their planning, they need to learn to compose texts by generating and transcribing ideas. And finally, they need to get accustomed with revising the content, structure, and surface-level aspects, such as spelling, to improve the overall text quality (Berninger et al., 1996). Previous meta-analyses indeed provided abundant research evidence on the effectiveness of teaching students how to plan, write, and revise texts (Graham et al., 2012; Koster et al., 2015).

To teach students these writing strategies, the role of the teacher is key. Based on previous intervention research, different instructional guidelines related to explicit strategy instruction can be distinguished (e.g., Bouwer, Koster, & van den Bergh, 2018; Fidalgo, Torrance, Rijlaarsdam, van den Bergh, & Alvarez, 2015; Graham, Harris, & Troia, 2000; Limpo & Alves, 2013). First, teachers can introduce writing strategies by modelling (Fidalgo et al., 2015), implying that they explain, verbalize, and demonstrate their thoughts, actions, and reasons while writing (Schunk, 2003). Second, it is important that teachers explicitly elaborate on how, when, and why to apply the writing strategies. In this respect, they can, for instance, provide students mnemonics to support them in memorizing the different strategy steps (Graham et al., 2000). Third, teachers should offer ample and various practice opportunities while providing feedback and gradually releasing guidance (Graham et al., 2000). As the ultimate goal of strategy instruction is students' independent strategy use, teachers' guidance should gradually be diminished by encouraging and challenging students to internalize the strategy (Bouwer et al., 2018; Graham et al., 2000). Scaffolding is critical in releasing guidance: teachers have to constantly assess students' strategy use to provide tailored support and feedback (Puntambekar & Hübscher, 2005). In this respect, the teacher role shifts from model to coach (Larkin, 2009).

Peer-assisted writing

To apply and internalize the writing knowledge and strategies taught, it is essential that students can practice their writing in a supportive writing environment (Graham et al., 2016), stimulating students' strategy use by enabling them to actively engage in their learning process (Kistner et al., 2010). To create a supportive writing environment, teachers can, for instance, integrate peer-assisted writing, involving students working together to plan, write, and/or revise their texts (Graham & Perin, 2007). In this respect, reference is made to different applications of peer-assisted writing, such as peer tutoring (e.g., Yarrow & Topping, 2001), peer discussions and peer help (e.g., Harris, Graham, & Mason, 2006), or peer feedback (e.g., Holliway, 2004). Prior research revealed the effectiveness of students collaborating and assisting one another while writing (Harris et al., 2006; Holliway, 2004; Nixon & Topping, 2001; Paquette, 2009; Sutherland & Topping, 1999; Yarrow & Topping, 2001). However, in order to be effective, four important prerequisites of peer assistance should be taken into account: (a) group members have to be engaged with each other, the topic, and the writing process, (b) there needs to be a certain level of cognitive conflict in order to reach a consensus, (c) mutual trust between the group members

is needed, and (d) collaboration must be structured so students are able to coordinate their activities while writing together (Dale, 1994).

Student characteristics

Various influencing student characteristics might play a role in the effectiveness of explicit instruction and peer-assisted writing. The present study explicitly takes into account students' gender and general achievement. Previous research, more particularly, revealed gender and achievement-level differences in writing indicating that girls outperform boys (Babayigit, 2015; De Smedt et al., 2018; National Center for Education Statistics, 2012) and that high achievers outperform average and low achievers (De Smedt et al., 2018; Troia, Harbaugh, Shankland, Wolbers, & Lawrence, 2013). In this respect, it is interesting to investigate whether and how teachers can close this gender and achievement gap by applying specific writing practices, such as explicit writing instruction and peer-assisted writing. As to explicit writing instruction, previous research showed that girls and boys equally benefit from explicit instruction (Bouwer et al., 2018). Regarding students' general achievement, previous studies showed that explicit strategy instruction appears effective for struggling (e.g., Harris et al., 2006) as well as normal writers (e.g., Brunstein & Glaser, 2011) indicating that students of different achievement levels might benefit from explicit writing instruction. To our knowledge, no studies investigated differential effects of peer-assisted writing for boys and girls and for students of different achievement levels.

The present study

Several prominent researchers on explicit strategy instruction (Graham, 2006; Graham et al., 2000) argued to combine this with other instructional writing practices such as peer assistance. As to the *distinct* impact of both practices, the present study builds on former research indicating the effectiveness of explicit writing instruction and peer-assisted writing in elementary education (see meta-analyses: Graham et al., 2012; Koster et al., 2015). Research on the *combined* impact of both writing practices in elementary grades is, however, rather scarce (e.g., Harris et al., 2006). In this respect, this study goes beyond previous research by (a) investigating both the distinct and the combined impact of explicit writing instruction and writing with peer assistance within the same study, (b) studying the effectiveness of the distinct and combined effect of explicit instruction and peer-assisted writing in comparison to a traditional writing program, (c) examining the differential

effects of explicit writing instruction and peer-assisted writing for students with different background characteristics, and (d) applying multilevel modelling to allow for the hierarchical nesting of students within classes. More particularly, the present study focusses on the following research questions:

1. Does the instructional approach (i.e., explicit writing instruction versus matched practice without instruction) influences students' writing performance (RQ1)?
2. Does the mode of delivery (i.e., writing individually versus with peer assistance) influences students' writing performance (RQ2)?
3. Which combination of instructional approach (i.e., explicit writing instruction versus matched practice without instruction) and mode of delivery (i.e., writing individually versus with peer assistance) is most effective as compared to a traditional writing program (RQ3)?
4. To what extent are there differential effects of the instructional approach and/or mode of delivery according to students' gender and general achievement (RQ4)?

To study these research questions, five research conditions were included in the study. Based on two instructional dimensions (i.e., instructional approach and mode of delivery), four experimental conditions were designed (see Table 1). According to the dimension 'explicit instruction', students received explicit writing instruction. The only difference between both explicit instruction conditions was the mode of delivery: students received either individual writing practice (EI+IND) or practice with peer assistance (EI+PA). The opposite conditions, according to the instructional approach, were matched practice comparison conditions without any kind of explicit or implicit writing instruction. The only difference between both matched practice conditions was again the mode of delivery: students practiced either individually (IND) or with peer assistance (PA). In addition to the experimental conditions, a business as usual condition was included in which teachers did not use writing materials offered by the researchers, but applied their traditional writing approach by means of their regular textbooks and manuals to teach language.

Table 1. *Overview of the design.*

		Instructional approach	
		Explicit instruction	**Matched practice without explicit or implicit instruction**
Mode of delivery	**Individual**	EI+IND	IND
	Peer assistance	EI+PA	PA
		Business as usual condition: teachers' traditional writing approach by means of their regular textbooks to teach language	

Concerning the first research question, it can be hypothesised that students receiving explicit writing instruction (EI+IND and EI+PA) will outperform students in the matched practice comparison groups (IND and PA respectively). This hypothesis is based on previous research indicating that explicitly teaching students (a) writing and text structure knowledge by means of comparing and contrasting model texts fosters students' writing (e.g., Bean & Steenwyk, 1984; Charney & Carlson, 1995), and (b) writing strategies (i.e., planning, writing, and revision) by teacher modelling and offering practice opportunities while providing feedback and gradually releasing guidance enhances students' writing performance (Bouwer et al., 2018; Fidalgo et al., 2015; Harris et al., 2006; Limpo & Alves, 2013).

As to the second research question, we hypothesize that students writing with peer assistance (EI+PA and PA) will outperform students writing individually (EI+IND and IND respectively). This hypothesis is based on prior research that revealed the effectiveness of peer-assisted writing whereby students can collaborate and assist one another while writing (e.g., Harris et al., 2006; Nixon & Topping, 2001; Paquette, 2009; Sutherland & Topping, 1999; Yarrow & Topping, 2001).

Concerning the third research question, we predict that explicit writing instruction and peer-assisted writing (EI+PA) will be the most effective instructional combination. This hypothesis is based on the study of Harris et al. (2006) who showed the advantage of adding peer support (i.e., students helping each other to apply taught writing knowledge and strategies) to explicit writing instruction.

Finally, taken previous intervention studies into account, we predict that boys and girls will equally benefit from explicit writing instruction (Bouwer et al., 2018) and that students of different achievement levels will benefit from the explicit writing instruction as well, since explicit strategy

instruction appears effective for struggling (e.g., Harris et al., 2006) and normal writers (e.g., Brunstein & Glaser, 2011). Due to a lack of research on differential effects of peer-assisted writing, no specific predictions are made concerning differential effects for boys and girls and students of different achievement levels.

Method

Participants

Teachers participating in the present study were recruited in two ways. First, a call for participation was announced in a popular teacher journal. Second, teachers attending a yearly teacher training day were informed on the study and those who were interested could sign up for participation. In total, 11 teachers and their 206 fifth and sixth graders from 8 different elementary schools in Flanders (Belgium) participated in the study. Regarding the teachers, 4 fifth-grade (2 fifth-grade teachers were co-teaching one class), 5 sixth-grade, and 2 multigrade teachers participated. As in all elementary schools in Flanders, the participating teachers were general teachers who teach all subjects (i.e., language, mathematics, …). The majority were female teachers (81.8%). Teachers' average age was 41.97 (*SD* = 9.80) and they had on average 18.36 years (*SD* = 9.33) of teaching experience. Average class size was 18.55 students (*SD* = 4.23) per class, which is representative for the Flemish situation in elementary education (De Smedt, Van Keer, & Merchie, 2016).

Regarding the students, 92 fifth (44.7%) and 114 sixth graders (55.3%) participated. Students' average age was 10.95 (*SD* = 0.70), with 57.8% boys and 42.2% girls. The majority of the students were native Dutch speakers (84.5%), 4.8% of the students had a foreign home language (e.g., Arabic, Turkish, or other), and 8.3% of the students were bilingual (Dutch and a foreign language). As teacher judgment is a fairly reliable and efficient assessment technique to assess students' achievement level (Südkamp, Kaiser, & Möller, 2012), all participating teachers were asked to classify their students individually based on their general academic achievement (i.e., students' general performance across subjects), distinguishing (a) below average achievers (i.e., performing below their current grade level), (b) average achievers (i.e., performing at their grade level), and (c) above average achievers (i.e., performing above their current grade level). Table 2 summarises students' characteristics in both the business as usual and experimental conditions.

Table 2. *Overview of student characteristics per research condition.*

	EI+IND		EI+PA		EI		PA		Business as usual	
	N	%	*N*	%	*N*	%	*N*	%	*N*	%
Gender										
Male	30	57.7	18	51.4	21	75	22	52.4	28	57.1
Female	22	42.3	17	48.6	7	25	20	47.6	21	42.9
Total	52	100	35	100	28	100	42	100	49	100
Home language										
Dutch	34	68	30	85.7	25	89.3	40	97.6	45	95.7
Other language	6	12	2	5.7	1	3.6	1	2.4	0	0
Dutch + other language	10	20	3	8.6	2	7.1	0	0	2	4.3
Total	50	100	35	100	28	100	41	100	47	100
Grade										
Fifth grade	32	61.5	0	0	15	53.6	22	52.4	23	46.9
Sixth grade	20	38.5	35	100	13	46.4	20	47.6	26	53.1
Total	52	100	35	100	28	100	42	100	49	100
Achievement level										
Low achiever	18	35.3	9	25.7	6	21.4	9	22	15	31.2
Average achiever	15	29.4	19	54.3	11	39.3	19	46.3	25	52.1
High achiever	18	35.3	7	20	11	39.3	13	31.7	8	16.7
Total	51	100	35	100	28	100	41	100	48	100

Note. EI+IND = Explicit instruction + individual writing; EI+PA = Explicit instruction + writing with peer assistance; IND: Matched individual practice comparison condition; PA: Matched peer-assisted practice comparison condition

Conditions

Four experimental conditions (EI+IND, EI+PA, EI, and PA) and one business as usual condition were included. Ten participating classes with eleven teachers (i.e., two teachers were co-teaching one class) were randomly assigned to one of the five conditions resulting in two classes per condition. To avoid design contamination effects (Rhoads, 2011), teachers from the same school were assigned to the same condition. As to the teachers, chi-square analyses revealed no significant differences in the distribution of gender ($\chi^2 = 6.52$, $df = 4$, $p = .16$) and grade ($\chi^2 = 12.3$, $df = 8$, $p = .14$) between the five research conditions. Furthermore, one-way analysis of variance indicated no significant differences concerning teachers' age ($F(4, 10) = 1.03$, $p = .47$) and experience ($F(4, 10) = 0.28$, $p = .88$). As to the students, chi-square analyses indicated no significant differences in the distribution of gender ($\chi^2 = 4.49$, $df = 4$, $p = .34$) and achievement levels ($\chi^2 = 11.93$, $df = 8$, $p = .16$) between the research conditions. However, significant differences were found as to the distribution of students with a non-native home language ($\chi^2 = 34.40$, $df = 16$, $p < .01$) as the EI+IND condition included more bilingual students and students with a foreign home language (see Table 2).

Procedure

The study took place between September and November 2015. First, pretest data were collected by the main researcher within the classroom context and during regularly scheduled class hours (September 2015). Before the onset of the intervention, all experimental teachers were individually visited to provide them with a researcher-directed and condition-specific 1.5-hour training (September 2015), consisting of (a) a detailed description of the rationale and the aim of the writing intervention, (b) an overview of the instructional materials, the lesson planning, and lesson phases, and (c) a thorough presentation of the instructional approaches. Each teacher was provided with a detailed teacher manual consisting of a comprehensive description of the background, aims, and organization of the intervention as well as with lesson scenarios in which the objectives, the materials, the content, and the instructional approaches of each lesson were described in detail. Teachers in the explicit instruction conditions (EI+IND and EI+PA) also received supplementary student materials, such as memory cards, strategy cards, planning schemes, and integration cards. All necessary materials were provided, so teachers were not required to develop and implement additional materials. After the teacher training, a 5-week intervention period started in which the teachers were prescribed to teach two lessons of 50 minutes each per week (October-November 2015). During the intervention period, the main researcher and two trainee researchers observed three lessons per teacher (see Fidelity of implementation). After the observed lessons, teachers were provided with an in-service training session in which they were coached in the implementation of the intervention. Finally, posttest data were again collected by the main researcher within the classroom context (November 2015).

Intervention

Based on two instructional dimensions (i.e., instructional approach and mode of delivery), four writing lesson programs were developed (i.e., one for each experimental intervention). Several aspects (e.g., writing topics, writing genre, …) were similar across writing lesson programs to ensure comparability between the experimental conditions, while aspects concerning instructional approach and mode of delivery were clearly distinguished (see Table 3). As to the similarities, each writing lesson program was prescribed in an elaborate teacher manual (i.e., EI+IND: 79 pages, EI+PA: 88 pages, IND: 32 pages, and PA: 39 pages) to support teachers in implementing the intervention. Furthermore, all four experimental conditions included ten writing lessons of 50 minutes each, spread over five consecutive weeks. In Flanders, the writing attainment targets for

elementary education state that elementary school students should be able to write descriptive texts (Flemish Ministry of Education and Training, 2005). Therefore, all lessons focused on writing descriptive texts in which writers had to describe/explain something to an audience. Additionally, students in all four experimental conditions worked on the same writing topics (e.g., describe your holiday, describe a missing person, …) (see Table 4 for an overview of the writing lessons in the experimental conditions). The lessons followed a fixed format: (a) an introduction in which teachers recapitulated the previous lesson and stated the goals of the present lesson, (b) a practice or instruction phase, and (c) a reflection/recapitulation phase in which students were asked to synthesize what they learned or read their texts aloud in front of the class. Besides these similarities, several aspects concerning the instructional approach and the mode of delivery were clearly distinguished between the experimental conditions (see Table 3).

Table 3. *Overview of the procedural features, writing lesson programs, instructional approaches, and modes of delivery for each research condition.*

	Condition				
	EI+IND	**EI+PA**	**IND**	**PA**	**Business as usual**
Procedural features					
Pretest	✓	✓	✓	✓	✓
Training – support to the teachers	✓	✓	✓	✓	
Posttest	✓	✓	✓	✓	✓
Writing lesson programs					
Lesson programs (cf., teacher manual) and writing materials provided by the researchers	✓	✓	✓	✓	
10 lessons of 50 minutes	✓	✓	✓	✓	
Extra lesson of 25 minutes (cf., rules of peer-assisted writing)		✓		✓	
Writing topics	✓	✓	✓	✓	
Descriptive texts	✓	✓	✓	✓	
Fixed lesson format	✓	✓	✓	✓	
Instructional approaches					
Explicit instruction of writing knowledge	✓	✓			
Explicit strategy instruction (i.e., planning, writing, and revising)	✓	✓			
Providing ample writing opportunities	✓	✓	✓	✓	
Gradually diminishing guidance	✓	✓			
Modes of delivery					
Individual writing	✓		✓		
Peer-assisted writing in fixed heterogeneous dyads		✓		✓	

Table 4. *Overview of the writing lessons in the four experimental conditions.*

	Writing topic	**Explicit instruction**		**Matched practice without explicit or implicit instruction**	
Lesson		**EI + IND**	**EI + PA**	**IND**	**PA**
1	The perfect age	Explicit instruction of writing knowledge		Practice	
1A			Discussing collaboration rules		Discussing collaboration rules
2	Finally, weekend!	Explicit instruction of the planning strategy		Practice	
3	If I was an animal, I would be…	Explicit instruction of the writing strategy		Practice	
4	Let's travel!	Practice: planning and writing strategy		Practice	
5	Missing!	Explicit instruction of the revising strategy		Practice	
6	Magic potion	Practice: revising strategy		Practice	
7	Party at school!	Guided instruction: planning, writing and revising		Practice	
8	Holiday	Practice: planning, writing, and revising a text		Practice	
9	A special event	Practice: planning, writing, and revising a text		Practice	
10	I wish…	Practice: planning, writing, and revising a text		Practice	

Instructional approach in both explicit writing conditions (EI+IND and EI+PA)

Both EI+IND and EI+PA interventions were characterized by three instructional writing practices: (a) explicit instruction of genre knowledge and text structure knowledge, (b) explicit strategy instruction, and (c) providing ample writing opportunities and gradually diminishing guidance so students can practice and internalize the writing knowledge and strategies taught.

As to the explicit instruction of writing knowledge, students were introduced to the writing genre by studying two varying model texts by means of a 'compare and contrast task'. In this way, students discovered the goal, the content, and the structure of the descriptive text genre. At the end of the first lesson, students received a memory card which summarized the important characteristics of the genre. Appendix A presents the memory card which summarizes the genre and text structure knowledge students were taught.

Regarding the explicit instruction of writing strategies, teachers explicitly taught students how to plan (cf., lesson 2), write (cf., lesson 3), and revise (cf., lesson 5) descriptive texts by applying the following instructional procedure: (a) pointing out the importance and value of a specific strategy, (b) discussing students' strategy use, (c) modelling the writing strategy by demonstrating and thinking aloud how, what, and why the teacher applied the writing strategy, so students gain insights into the teacher's thinking and writing process, and (e) introducing different strategy cards summarizing the steps in applying a strategy (i.e., planning, writing, and revision card) and a planning scheme. Appendix A presents an overview of the strategy cards which summarize the different steps students were taught to plan, write, and revise texts.

Finally, teachers aimed to increase the internalization of the writing knowledge and strategies by offering ample writing opportunities while gradually diminishing guidance. After the teacher modelled each writing strategy separately (i.e., lesson 2: planning, lesson 3: writing, lesson 5: revising), they offered students opportunities to practice the respective strategies using the different strategy cards (i.e., lesson 4: planning and writing, lesson 6: revising). In lesson 7, teachers guided students throughout the complete writing process by interactively planning, writing, and revising a text while again discussing the different steps and strategies. At the end of the lesson, the teacher introduced an integration card, summarizing all previous cards. In the final three lessons (i.e., lesson 8 to 10) students had to complete three writing assignments (i.e., one writing assignment for each lesson) by strategically planning, writing, and revising texts. During student practice, teachers (a) provided feedback concerning students' text (e.g., goal, content, and structure) and writing process (e.g., the applied planning, writing, and revising strategies) and (b) differentiated guidance by offering weak writers the help they needed (e.g., separate cards) and challenging

stronger writers to gradually diminish the use of the supporting materials (e.g., integration card or writing without supportive materials).

Instructional approach in both matched practice comparison conditions (IND and PA)

Both IND and PA experimental interventions were characterized by the instructional writing practice in which teachers provide ample writing opportunities to practice writing. Each lesson, students were offered a challenging and communicative writing task, parallel to the writing topics in the EI+IND and EI+PA condition resulting in a total of ten writing assignments (see Table 4). During training, teachers were explicitly asked not to instruct writing strategies nor to provide feedback on students' writing process. Teachers were told that the main aim of the intervention was that students practiced their writing. While students were practicing, teachers were asked to provide feedback concerning students' texts (i.e., spelling, structure, and content of the text).

Mode of delivery in both individual writing conditions (EI+IND and IND)

During practice lessons, EI+IND and IND students worked individually, writing texts without peer support. In this respect, students kept individual writing portfolios in which they gathered their completed writing assignments.

Mode of delivery in both peer assistance conditions (EI+PA and PA)

Teachers in the peer assistance conditions were asked to group their students into heterogeneous dyads by taking into account students' writing performance level (i.e., pairing poor and good writers) on the one hand and their personalities (i.e., matching students' temperament) on the other hand. More specifically, teachers were asked to list all their students starting with the 'strongest' and ending with the 'weakest writer'. Then, they split the ranking in half, so they were able to pair the strongest writer in the first half to the strongest writer in the second half and so on until all students had a writing partner. The teachers adjusted this pairing procedure when a group consisted of students' with clashing temperaments endangering optimal collaboration. If the number of students in the class was uneven, the teacher exceptionally put together three students in one group. The

heterogeneous dyads were fixed for the duration of the intervention so they could get used to each other's abilities and limitations. To let students get acquainted with their writing partner, teachers implemented an additional lesson of 25 min in which rules on peer-assisted writing were discussed and agreed upon (cf., lesson 1A, see Table 4). Students had to sign the rules to show their engagement to collaborate with their writing partner. During the practice lessons, EI+PA and PA students wrote together with their fixed writing partner, always resulting in a shared writing document (e.g., shared planning or shared text). In this respect, the writing partners kept a shared writing portfolio in which they gathered their writing assignments.

Fidelity of implementation

In line with previous research (Bouwer et al., 2018), three methods were applied to ensure fidelity of implementation (Dumas, Lynch, Laughlin, Smith, & Prinz, 2001; O'Donnell, 2008): (a) researchers checked the individual writing portfolios in which the students kept their texts, (b) experimental teachers completed logbooks, and (c) three researchers conducted observations in all experimental classes to ensure intervention fidelity. Finally, researchers also conducted observations in the business as usual condition to analyse the instructional writing practices and mode of delivery and to determine whether there was any contamination of instruction in the business as usual classes.

Students' writing portfolios

To assess the number of completed lessons, we verified the number of texts in students' writing portfolios. On average, 90.96% of the experimental students completed the ten writing lessons.

Teacher logbooks

Throughout the complete intervention, experimental teachers were asked to complete logbooks with structured protocols for each lesson (based on Merchie & Van Keer, 2016), providing information on the date, hour, and total time spent on each lesson. The protocols showed that teachers reported that they spent on average 55 minutes on each lesson (SD = 6.70). In this respect, some teachers exceeded the prescribed time of 50 minutes per lesson. There were no significant differences between conditions ($F(3, 7) = 3.08$, $p = .15$).

Observations

Three trained researchers conducted preannounced observations during three lessons of each experimental teacher (i.e., 24 observations in total). As only one researcher observed each class, we were unable to compute an inter-observer agreement. The EI+IND and EI+PA teachers were observed during two lessons in which they taught a strategy (e.g., planning, writing, or revising) and one student practice lesson. The IND and PA teachers were observed during three practice lessons. Table 5 shows teachers spent on average 49.40 minutes (*SD* = 13.82) on the observed lessons, which closely approximates the time teachers reported in the logbooks (i.e., 55 minutes) and prescribed time in the teacher manual (i.e., 50 minutes). Based on the observation instrument of Bouwer et al. (2018), the researchers measured teachers' time on task (i.e., plenary instruction, classroom interaction, and monitoring students' progress and providing feedback) and time off task. Second, they assessed the global quality of the observed lesson on a 5-point scale, ranging from 'very low quality' to 'very high quality': (a) the quality of instruction, (b) class management, and (c) student engagement (based on Vaughn et al., 2011). Finally, they checked the quality of implementation of the intervention. In this respect, the observers more particularly assessed the quality of implementation concerning: (a) the introduction, practice, and reflection phase in all experimental conditions, (b) the explicit strategy instruction in the explicit instruction conditions, and (c) the mode of delivery in all experimental conditions. To assess the quality of implementation, a 5-point scale ranging from 'not observed' to 'observed with high alignment with the teacher manual' was opted for instead of assessing whether a specific element was or was not observed. In this way, more detailed information on the quality of implementation was obtained instead of merely checking whether or how often a critical element was included during the observed lesson (based on Vaughn et al., 2011).

The observational results showed that experimental teachers were on task on average 88.56% of the total lesson time (see Table 5). About half of the time (on average 51.56%), teachers in all conditions were monitoring students' progress, while students were writing/practicing. As expected, teachers in the explicit instruction conditions devoted proportionally more time on plenary instruction than teachers in the conditions without explicit instruction. Furthermore, the observational results indicate that the global quality of the observed lessons was high in all experimental conditions (see Table 5). More specifically, the quality of instruction was high (M = 4.53, SD = 0.58), teachers were able to manage their class (M = 4.25, SD = 1.04), and students were engaged (M = 4.57, SD = 0.70) and this without significant differences between conditions ($F(3, 24) = 0.94$, $p = .44$; $F(3, 24) = 0.30$, $p = .83$; and $F(3, 24) = 0.20$, $p = .90$, respectively). Finally, the observational data showed that the

experimental teachers followed the instructions in the teacher manual carefully, as most of the critical elements of the intervention were observed with high alignment with the teacher manual (see Table 6). More particularly, almost all experimental teachers followed the teacher manual by starting the observed lessons with an introduction (*M* = 4.58, *SD* = 0.73) followed by a practice phase (*M* = 4.60, *SD* = 0.60). Surprisingly, however, teachers across all experimental conditions often abruptly finished their writing lesson (*M* = 2.30, *SD* = 1.63), consequently failing to conclude their lessons with a reflection phase as prescribed in the manual. As to the lessons in which the EI+IND and EI+PA teachers explicitly taught a writing strategy, observational data showed that they followed the instructional approach as prescribed in the teacher manual (i.e., pointing out the value of the strategy, discussing students' strategy use, modelling the strategy, introducing the strategy card, and challenging students to internalize the strategy) (see Table 6). Regarding the mode of delivery, EI+IND (*M* = 4.67, *SD* = 0.58) and IND students wrote individually (*M* = 5.00, *SD* = 0.00), while EI+PA (*M* = 4.50, *SD* = 0.71) and PA students (*M* = 4.83, *SD* = 0.71) wrote in heterogeneous dyads (see Table 6).

Table 5. *Average time spent on the observed lessons, teachers' time on/off task, and the global quality of the observed writing lessons.*

	EI+IND	**EI+PA**	**IND**	**PA**	**All experimental conditions**
Average time spent on observed lesson[a]	55.57 (7.23)	46.67 (11.78)	46.67 (5.61)	48.67 (2.25)	49.40 (13.82)
Teachers' time on/off task					
Time on task	89.23%	94.88%	82.43%	87.70%	88.56%
Plenary instruction	34.99%	26.45%	12.12%	15.60%	22.29%
Classroom interaction	19.07%	28.71%	36.35%	20.26%	26.10%
Monitoring students' progress	45.94%	44.84%	51.30%	64.14%	51.56%
Time off task	10.77%	5.12%	28.82%	12.30%	14.25%
Global quality[b]					
Quality of instruction	4.29 (0.76)	4.50 (0.55)	4.83 (0.41)	4.50 (0.55)	4.53 (0.58)
Class management	4.00 (1.53)	4.50 (0.84)	4.33 (0.52)	4.17 (0.75)	4.25 (1.04)
Student engagement	4.43 (0.79)	4.50 (0.84)	4.67 (0.52)	4.67 (0.52)	4.57 (0.70)

Note. [a] Average time in minutes. Standard deviations are placed between brackets.

[b] Global quality was measured using a 5-point scale ranging from 'very low quality' to 'very high quality'

Table 6**.** *The quality of implementation[a]: Observational data assessing the critical elements of the intervention in the experimental conditions.*

	M (*SD*)				
	EI+IND	**EI+PA**	**IND**	**PA**	**All experimental conditions**
Fixed lesson format					
Introduction	4.79 (0.39)	4.91 (0.20)	4.79 (0.29)	3.79 (1.11)	4.58 (0.73)
Practice	4.92 (0.19)	4.42 (0.80)	4.58 (0.66)	4.42 (0.58)	4.60 (0.60)
Reflection	1.57 (1.51)	2.50 (1.76)	2.67 (1.89)	2.58 (1.50)	2.30 (1.63)
Explicit strategy instruction					
Pointing out the value of the strategy	4.75 (0.50)	5.00 (0.00)			
Discussing students' strategy use	4.50 (1.00)	5.00 (0.00)			
Modeling	4.25 (1.19)	3.25 (0.50)			
Introducing strategy cards	4.50 (1.00)	4.46 (0.71)			
Challenging students to internalize writing strategies	5.00 (0.00)	3.25 (2.83)			
Mode of delivery					
Students writing individually	4.67 (0.58)		5.00 (0.00)		
Students writing in heterogeneous dyads		4.50 (0.71)		4.83 (0.71)	

Note. [a] To assess the quality of implementation, the critical elements of the intervention concerning the fixed lesson format, the explicit strategy instruction, and the mode of delivery were measured using a 5-point scale ranging from 'not observed' to 'observed with high alignment with the teacher manual'.

Business as usual condition

Teachers in the business as usual condition were told that the purpose of the study was to investigate elementary school students' writing progress. Teachers were asked to conduct their writing lessons as they were used to by applying their traditional writing approach by means of regular textbooks and manuals to teach language. In other words, the researchers did not provide any writing materials or guidelines on how to teach writing (e.g., how many writing lessons that should be organized or what instructional writing practices should be implemented). To get more insight into these teachers' writing approach and lessons, the researchers also conducted observations in the business as usual classes. Both teachers organised only one writing lesson during the 5-week intervention period. Although they organised only one lesson, it was a longer writing lesson (i.e., on average 93 minutes, *SD* = 9.90) than the lessons in the experimental conditions. The business as usual teachers were

on task on average 89.20% of the total lesson time. They spent about half of their time on monitoring students' progress and giving them feedback while writing (56.45%). Additionally, they devoted a considerable amount of time to plenary instruction (33.27%) and to a lesser extent to classroom interaction (10.28%). Furthermore, observational data showed that the global quality (i.e., on a 5-point scale) of the observed business as usual lessons was high: the quality of instruction was high (M = 4.00, SD = 0.00), teachers were able to manage their class (M = 3.50, SD = 2.12), and students were engaged (M = 4.00, SD = 1.41).

The content, the instructional approach, and the mode of delivery in the business as usual lessons varied. As to the lesson of the first business as usual teacher, students had to write a story for a writing competition. First, the teacher and students interactively gathered ideas to write about. After that, students had to write their texts individually, while the teacher provided individual feedback. The teacher concluded the lesson with a reflection. Regarding the writing lesson of the other business as usual teacher, students first watched a movie in which a magic trick was explained. Then, the teacher grouped students in pairs and each pair received two descriptive texts in which a magic trick was clarified. Based on these texts, they tried to perform the magic trick. Afterwards, students had to sum up which aspects should be described when you want to explain a magic trick. In the final phase of the lesson, students had to individually write a descriptive text in which they explained their own magic trick. During this practice phase, the teacher provided individual feedback.

Social validity

Teachers' logbooks also provided information on the social validity of the study (Fawcett, 1991). In this way, we gathered insight into teachers' satisfaction with and acceptance of the intervention. More particularly, teachers evaluated their attainment regarding each lesson objective on a 5-point scale, ranging from 'not attained' to 'fully attained'. In addition, they evaluated the instructional materials on a five-point scale, ranging from 'very unclear' to 'very clear'. All experimental teachers reported high levels of attaining the lesson objectives (M = 4.09, SD = 0.59) (F(3, 7) = 1.77, p = .29) and they indicated that the instructional materials were very clear (M = 4.46, SD = 0.49). However, there was a significant difference between the conditions, revealing that EI+IND teachers were less positive about the materials (F(3, 7) = 10.65, p < .05). Furthermore, teachers were asked to evaluate each lesson on a ten-point scale regarding the degree to which: (a) they valued the lesson (i.e., ranging from 'very invaluable to stimulate students' writing' to 'very valuable to stimulate students' writing'), (b) they experienced difficulties in implementing the lesson (i.e., ranging from 'too difficult to implement in the class' to 'very easy to implement in the class'), and (c) students experienced

difficulties during the lesson (i.e., ranging from ‘students experienced a lot of difficulties’ to ‘students experienced no difficulties’). The protocols indicated that teachers valued the lessons (M = 8.05, SD = 0.58), which they also rated as quite easy to implement (M = 7.64, SD = 0.81) without significant differences between conditions (F(3, 7) = 1.43, p = .36 and F(3, 7) = 1.10, p = .45 respectively). Teachers across all experimental conditions also reported that the writing lessons were not too difficult, nor too easy for the students (M = 7.08, SD = 1.16) (F(3, 7) = 1.02, p = .62).

Measures

Writing performance

To assess students’ writing performance both at pretest and posttest, a writing test which was developed and tested in a prior large-scale study (De Smedt et al., 2016) was administered. More particularly, students were asked to write a descriptive text based on a visual prompt: an alien standing before a large building ignorant what the building is and what is happening there. Based on this prompt, students were asked to describe respectively a school (i.e., pretest) and a supermarket (i.e., posttest) to the visiting alien. To assess text quality, a stepwise procedure was applied (De Smedt et al., 2016). First, students’ handwritten texts were typed and corrected (i.e., spelling, punctuation, and capitalization errors) to reduce presentation effects (Graham, Harris, & Hebert, 2011). Second, following the benchmark rating procedure (Bouwer et al., 2018; De Smedt et al., 2016; Tillema, van den Bergh, Rijlaarsdam, & Sanders, 2012), two experts randomly selected 70 pretests and ranked these texts ranging from the text with the lowest quality to the text with the highest quality (i.e., the writer describes the building in detail, text and sentences are well structured, word choice is varied, …). Based on this ranking, five target texts were selected (i.e., 1st, 25th, 50th, 75th, and 100th percentile) and were put forward as benchmarks representing the baseline range in text quality from low, medium, and high levels (Schoonen, 2005; Tillema et al., 2012). The benchmark score for the average text quality was 100, with an interval of 15 between target texts. Finally, all texts were randomly assigned to two independent trained raters who assessed the text quality using the continuous scale of benchmark texts. In total, 22% of the texts were double-scored resulting in an acceptable interrater reliability (Pearson r = .76, p < .01 and Krippendorff’s α = .63).

Student characteristics

We registered information on students' gender (0 = boy, 1 = girl) by means of a student questionnaire. As teacher judgment is a fairly reliable and efficient assessment technique to assess students' general achievement level (Südkamp et al., 2012), all participating teachers were asked to classify their students individually based on their general academic achievement (i.e., students' general performance across subjects), distinguishing (a) below average achievers (i.e., performing below their current grade level), (b) average achievers (i.e., performing at their grade level), and (c) above average achievers (i.e., performing above their current grade level). Based on previous research on achievement-level differences in writing, this indication was used as a categorical variable for grouping low, average, and high achievers (De Smedt et al., 2018).

Data analysis

The data under investigation have a clear hierarchical two-level structure, with students (level 1) nested within classes (level 2) (Hox, 2002). Multilevel analyses were conducted using MLwiN 2.29 (Rasbash, Charlton, Browne, Healy, & Cameron, 2009). Four main steps were taken into the analyses. First, the fully unconditional two-level null model was computed (i.e., students at level 1 and classes at level 2). Second, students' writing pretest score was included as a covariate to control for baseline performance (Model 1). Third, the experimental conditions were included into the model (Model 2) to investigate differential posttest scores comparing: (a) the explicit writing conditions (EI+IND and EI+PA) to the matched practice conditions (IND and PA) (RQ1), (b) the individual writing conditions (EI+IND and IND) to the peer-assisted conditions (IND+PA and PA) (RQ2), and (c) the experimental conditions (EI+IND, EI+PA, IND, and PA) to the business as usual condition (RQ3). To obtain a better understanding of the relative impact of the significant parameters, standardised regression coefficients (*SD*) were calculated (Cohen, 1977). As these can be interpreted as effect sizes, we followed Cohen's benchmarks for interpretation (i.e., small effect size: *SD* = 0.2, medium effect size: *SD* = 0.5, and large effect size: *SD* = 0.8) (Cohen, 1977). Finally, individual learner characteristics (i.e., gender and general achievement level) were added as explanatory variables in the fixed part of the model and interaction effects with the conditions were included (RQ4) (Model 3).

Results

Multilevel results

The random part of the two-level null model showed that the variances at class level were significantly different from zero ($\chi^2 = 4.57$, df = 1, $p < .05$), justifying the application of multilevel modeling (see Table 7). More particularly, respectively 53.82% and 46.18% of the overall variability in students' text quality was due to differences between classes and between individual students within classes. The intercept of 97.37 in this null model represents the overall mean posttest score. Adding the pretest scores as covariates (Model 1) revealed that students' pretest scores were positively related to their posttest scores ($\chi^2 = 10.05$, df = 1, $p < .01$).

Table 7. *Summary of the model estimates for the two-level analysis of students' writing performance at posttest.*

	Model 0	**Model 1**	**Model 2[a]**	**Model 3**
Fixed part				
CONS	97.37 (4.00)***	97.48 (3.97)***	80.69 (4.69)***	75.46 (5.24)***
(Pretest score -96.6)		0.14 (0.04)**	0.14 (0.04)**	0.12 (0.04)**
EI+IND			28.69 (6.65)***	31.79 (7.63)***
EI+PA			26.03 (6.72)***	31.69 (7.71)***
IND			9.92 (6.80)	12.13 (7.95)
PA			19.08 (6.65)**	22.41 (7.60)**
Gender (girl)				7.42 (3.16)*
General achievement (low)				-0.88 (3.48)
General achievement (high)				13.55 (4.29)**
Gender (girl).EI+IND				-6.28 (4.38)
Gender (girl).EI+PA				-4.96 (5.04)
Gender (girl).IND				-4.31 (5.64)
Gender (girl).PA				-4.28 (4.55)
General achievement (low).EI+IND				-0.12 (5.10)
General achievement (low).EI+PA				-6.08 (6.12)
General achievement (low).IND				1.76 (6.48)
General achievement (low).PA				-3.51 (5.48)
General achievement (high).EI+IND				-8.41 (5.67)
General achievement (high).EI+PA				-12.47 (6.16)
General achievement (high).IND				-8.66 (6.38)
General achievement (high).PA				-8.85 (5.67)
Random part				
Level: Class				
CONS/CONS	153.07 (71.63)*	150.71 (70.56)*	38.54 (20.26)	43.28 (21.92)*
R^2	53.82%	54.94%	23.78%	29.28%
Level: Student				
CONS/CONS	131.34 (13.58)***	123.59 (12.89)***	123.52 (12.89)***	104.54 (10.93)***
R^2	46.18%	45.06%	76.22%	70.72%
Loglikelihood	1551.41	1516.80	1504.23	1466.79
Reference Model		Model 0	Model 1	Model 2

Note. Standard error estimates are placed between brackets. ***p < .001. **p < .01. *p < .05.

[a]Model equation with business as usual condition as reference condition as an example:

$y \sim N(X\beta, \Omega)$

$y_{ij} = \beta 0_{ij}\ \text{CONS} + \beta 1\ \text{Pretest}(-96.6)_{ij} + \beta 2\ \text{EI+IND}_j + \beta 3\ \text{EI+PA}_j + \beta 4\ \text{IND}_j + \beta 5\ \text{PA}_j$

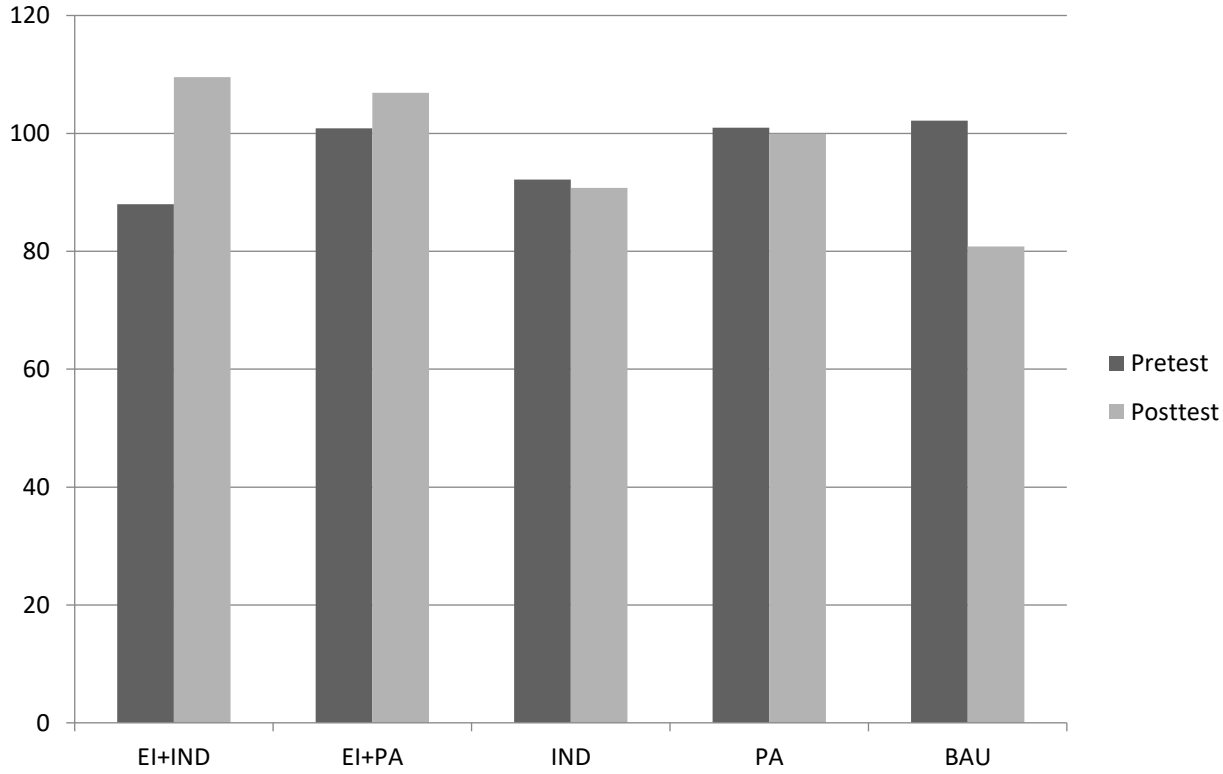
$\beta 0_{ij} = \beta 0 + u0_j + e0_{ij}$

$[u0_j] \sim N(0, \Omega u)$: $\Omega u = [\sigma^2 u0]$

$[e0_{ij}] \sim N(0, \Omega e)$: $\Omega e = [\sigma^2 e0]$

Effect of instructional approach (RQ1), mode of delivery (RQ2), and combinations (RQ3)

By including the experimental conditions into Model 2 (see Table 7), it was possible to investigate RQ1, RQ2, and RQ3. Concerning RQ1, students in the explicit instruction conditions were compared to students in the matched practice conditions. In this respect, Figure 1 visualises students' pretest scores and posttest scores corrected for baseline performance. Results showed that, when taking into account students' pretest score as covariate, EI+IND students (M = 109.52, SD = 12.7) performed significantly better on the posttest than IND students (M = 90.75, SD = 10.7) (χ^2 = 7.67, df = 1, p <.01) with a large effect size of 1.40 SD. Further, no significant difference between EI+PA and PA students was found (χ^2 = 1.06, df = 1, p =.30).



Pretest	88.01 (17.1)	100.88 (22.1)	92.14 (25.6)	100.97 (22.7)	102.17 (12.3)
Posttest	109.52 (12.7)	106.86 (9.9)	90.75 (10.7)	99.91 (17.2)	80.83 (13.9)

Figure 1. *Students' mean pretest and posttest scores corrected for baseline performance. Standard deviations are placed between brackets.*

As to RQ2, students in the individual writing conditions were compared to students in the peer assistance conditions (see Figure 1). Results showed no significant differences between EI+IND (*M* = 109.52*, SD* = 12.7) and EI+PA students (*M* = 106.86*, SD* = 9.9) (χ^2 = 0.16, *df* = 1, *p* =.69), nor between IND (*M* = 90.75*, SD* = 10.7) and PA students (*M* = 99.91*, SD* = 17.2) (χ^2 = 1.81, *df* = 1, *p* =.18) on the posttest scores, after taking into account students' pretest scores.

Regarding RQ3, experimental students were compared to business as usual students (see Figure 1). Results showed that EI+IND (*M* = 109.52, *SD* = 12.7), EI+PA (*M* = 106.86*, SD* = 9.9), and PA students (*M* = 99.91*, SD* = 17.2) outperformed business as usual students (*M* = 80.83*, SD* = 13.9) on the posttests (EI+IND: χ^2 = 18.63, *df* = 1, *p* <.001, 2.14 *SD*; EI+PA: χ^2 = 15.00, *df* = 1, *p* <.001, 1.94 *SD*; and PA: χ^2 = 8.23, *df* = 1, *p* <.01, 1.43 *SD*), after taking into account their prestest scores. No significant differences were found as to IND (*M* = 90.75*, SD* = 10.7) and business as usual students' posttest scores (*M* = 80.83*, SD* = 13.9) (χ^2 = 2.13, *df* = 1, *p* =.14).

Differential effects according to gender and general achievement (RQ4)

As to RQ4, individual learner characteristics (i.e., gender and general achievement level) were added as explanatory variables in the fixed part of the model and interaction effects with the research conditions were included in Model 3 (see Table 7). As to the main effects, results showed that girls (*M* = 99.85*, SD* = 16.3) outperformed boys (*M* = 96.06*, SD* = 17.4) (χ^2 = 5.50, *df* = 1, *p* <.05) and that high achievers (*M* = 102.48*, SD* = 14.3) outperformed average achievers (*M* = 96.54*, SD* = 17.7) (χ^2 = 9.99, *df* = 1, *p* <.01) on the posttests across conditions. As to the interaction effects, no differential effects according to gender nor general achievement were found.

Discussion

This study's primary purpose was to examine the distinct and combined impact of explicit writing instruction and writing with peer assistance. Second, we examined whether the effectiveness of these writing practices are dependent on student characteristics.

Distinct and combined impact of explicit writing instruction and peer-assisted writing

Comparison of the experimental conditions with the business as usual condition revealed that students working with the experimental writing programs focusing on explicit writing instruction (EI+IND and EI+PA) and students writing with peer assistance in the matched practice comparison condition (PA) outperformed the business as usual students. These results confirmed that the experimental writing programs in the EI+IND, EI+PA, and the PA conditions are promising writing programs to foster elementary school students' writing performance compared to the writing lessons implemented by the business as usual teachers while applying their traditional writing approach (i.e., by means of their regular manuals and textbooks to teach language). These findings are in line with previous research pointing out the effectiveness of explicit writing instruction and peer-assisted writing (Graham et al., 2012; Koster et al., 2015). Based on the research of Harris et al. (2006), it was anticipated that blending explicit writing instruction and peer-assisted writing (EI+PA) would be the most effective instructional combination. In this respect, however, the effect sizes reported in the present study revealed strong effects of the EI+IND (*SD* = 2.14), EI+PA (*SD* = 1.94), and PA writing programs (*SD* = 1.43) compared to the traditional writing program in the business as usual condition, without any significant differences between the experimental writing programs. As such, the results of the present study were not in line with the study of Harris et al. (2006) who showed the advantage of adding peer support to explicit writing instruction.

Further, no significant differences were found between students writing individually in the matched practice comparison condition (IND) and students in the business as usual condition. Based on the teacher logbooks in the IND condition and our observations in the business as usual condition, we found that the IND students completed ten writing lessons of on average 55 minutes each, while business as usual conditions received in the same period only one lesson of on average 93 minutes. Although prior research pointed out the effectiveness of additional writing time (Gomez, Parker, Lara-Alecio, & Gomez, 1996), the present study revealed that solely increasing students' writing time appears insufficient to foster their writing.

The present study also revealed more in-depth insight into both writing practices by investigating the distinct impact of explicit writing instruction on the one hand and peer-assisted writing on the other hand. As to the distinct impact of *explicit writing instruction*, comparison of the explicit instruction conditions (EI+IND and EI+PA) with the matched practice conditions (IND and PA) showed that students who were explicitly taught writing knowledge and strategies performed significantly better at posttest. This large effect (i.e., effect size 1.40 *SD*) was, however, only found in the individual and not in the peer-assisted writing condition.

The findings in the individual writing conditions corroborate the extensive body of evidence on the effectiveness of explicit writing instruction in elementary grades (Graham et al., 2012; Koster et al., 2015). More particularly, these results underline the importance of explicitly teaching students writing knowledge (i.e., goals, content, and structure of a specific genre) (Bean & Steenwyk, 1984; Fitzgerald & Teasley, 1986) and strategies (i.e., planning, writing, and revising) to foster students' writing (Bouwer et al., 2018; Fidalgo et al., 2015; Limpo & Alves, 2013).

The success of the individual writing program on explicit instruction might be explained by several instructional approaches enclosed in the program. Although we did not investigate these components separately in the present study, insights based on previous research enable us to presume possible explanations concerning the overall effectiveness of the program. First, students were offered 'compare and contrast tasks' to discover important genre characteristics concerning the goal, the text structure, and the content of descriptive texts, since it is known that providing students with opportunities to study model texts is essential to acquire necessary writing knowledge (Abbuhl, 2011; Charney & Carlson, 1995). Second, teachers explicitly taught students how to plan, write, and revise descriptive texts by pointing out the importance and value of a specific strategy, discussing students' strategy use, modelling the writing strategy by demonstrating and thinking aloud, and elaborating on the steps in applying strategies. In this respect, the present approach incorporated modelling writing strategies (Fidalgo et al., 2015) and supporting students in applying and memorizing strategies by means of strategy cards (Graham et al., 2000) as evidence-based effective approaches. Third, teachers aimed at establishing students' independent strategy use as well, by providing feedback and gradually diminishing guidance during individual writing practice, since prior research provided evidence on the shifting teacher role from model to coach (Graham et al., 2000; Larkin, 2009).

As to the distinct impact of *peer-assisted writing*, no significant differences were found comparing the individual writing conditions (EI+IND and IND) with the peer-assisted writing conditions (EI+PA and PA). These findings contrast previous research on the effectiveness of peer-assisted writing in elementary education (Graham et al., 2012; Koster et al., 2015). More specifically, previous research showed that various forms of writing with peer assistance are effective, for instance peer tutoring (e.g., Yarrow & Topping, 2001), peer discussions, peer help (e.g., Harris et al., 2006), and providing peer feedback (e.g., Holliway, 2004). A possible explanation for the present findings might be related to the specific operationalization of peer assistance in the present study. In comparison to previous studies in which students' interaction and roles were clearly structured (e.g., Yarrow & Topping, 2001), our operationalization of peer assistance was less structured. More particularly, previous research pointed out four important prerequisites of peer assistance in order to be effective (Dale,

1994). First, group members have to be engaged with each other, the topic, and the writing process. In the present study, this was reflected by asking students to agree on, write down, and sign collaboration rules to show their engagement to write in groups. Second, mutual trust between the group members is needed. To establish this mutual trust, teachers in the present study were asked to create heterogeneous groups but explicitly had to take into account whether students got along. The writing groups were also fixed for the duration of the intervention, so students could get used to and respect each other's abilities and limitations. Third, a certain level of cognitive conflict is required in order to reach a consensus. In this respect, the writing assignments in the present study were challenging, but not too complex so students were able to reach consensus. Finally, collaboration must be structured so students are able to coordinate their activities while writing together. As to this final prerequisite, students in the present study were given the opportunity to spontaneously collaborate with each other without providing them with a set of structures, routines, and understandings to support them in how exactly to approach the collaboration (Schultz, 1997). Future studies should therefore implement a more structured application of peer assistance in writing and investigate its impact on students' writing. To establish a structured application of peer assistance teachers, for instance, can assign different roles (e.g., writer, editor, reviewer, …) to enable group members to explore and experience the writing process from different viewpoints (Lowry, Curtis, & Lowry, 2004) or opt for paired writing (Yarrow & Topping, 2001) in which helper (tutor) and writer (tutee) roles and behaviours are identified during each step of the writing process. In this respect, it will be interesting in future studies to analyse students' interactions while writing collaboratively to gain in-depth insights into how elementary school students interact and collaborate during writing.

Differential effects according to student characteristics

As anticipated, results revealed no significant differential effects of the conditions for boys and girls or for low, average, and high achievers, indicating that they equally benefitted from the different writing programs. As there is a lack on research investigating differential effects of peer-assisted writing for different types of students, future research should examine more in detail which particular peer-assisted writing practices (e.g., peer tutoring, peer feedback, peer discussions, …) are especially effective for boys and girls and for students with different achievement levels and what the optimal conditions are to implement peer-assisted writing practices in view of fostering all students' writing (e.g., heterogeneous versus homogeneous groups, fixed versus flexible groups, role assignment versus spontaneous collaboration, …).

Limitations and suggestions for future research

Besides the limitations and suggestions already put forward when discussing the results above, we conclude with acknowledging some additional limitations and presenting suggestions for future research. First, we want to point at the rather small sample size with only two classes per condition. Therefore, we suggest to further investigate the effectiveness of explicit writing instruction and a structured application of peer assistance with a larger sample. In addition, the present study examined differential effects of the interventions according to student characteristics. It would be interesting to study differential effects related to other learner characteristics, such as socio-economic status, reading achievement, …, as well. Second, the present study applied a pretest-posttest design. As long-term effects to analyse whether the effects of the writing practices were maintained over time were not investigated, future studies should include a retention test. For instance, Bouwer et al., (2017) highlighted the added value of a switching replication design, including two groups and three measurement occasions (i.e., pretest, posttest, and retention test). Applying such a design can be interesting, for instance, to investigate whether peer assistance fosters maintenance in explicit writing programs. Third, as the instructional writing program in the four experimental conditions focused on only one text genre (i.e., descriptive texts), the present results cannot as a matter of course be transferred to other genres. In this respect, it will be interesting to investigate generalization effects as well to examine whether students are able to generalise the taught strategies to other genres. Further, it will also be worthwhile to investigate whether peer assistance embedded in explicit writing programs can foster generalization of the learned strategies to other text genres. Fourth, at each measurement occasion students' writing performance was measured by only one task in one genre. Based on recent research on the generalizability of writing scores, Bouwer et al. (2015) highlighted the need for different tasks within one genre (or preferably, different tasks within different genres) to measure writing performance. Fifth, students' general academic achievement was assessed by teacher judgement. Although previous research showed that teacher judgement is a fairly reliable assessment technique (Südkamp et al., 2012), future research should include a more objective measure to assess students' academic achievement. Finally, as to the measures regarding treatment fidelity, the lessons of the teachers were observed by only one researcher. To obtain reliable observational data, future studies should therefore focus on observing multiple lessons by two or more observers. In this way, inter-observer agreement can be calculated.

Educational implications

As the skilful teaching of writing is difficult and challenging, teachers should be supported. Therefore, writing research should provide teachers and schools with evidence-based guidelines (Graham et al., 2016). Based on the present findings, several educational implications can be formulated. First, it appears important for teachers to review and assess their own writing practices in terms of the quality of their instruction and not solely in terms of the quantity of writing instruction. In this respect, teachers should be aware of the fact that students do not learn to write automatically; they need explicit instruction and guidance. The present study more specifically showed the effectiveness of explicitly teaching students writing knowledge (by means of compare-and-contrast tasks) and strategies (by means of explicit strategy instruction). Further, it appears essential to create supportive writing environments in which students can apply what they have learned. Such an environment in which students practice individually or collaboratively enables them to actively engage in their writing process.

References

Abbuhl, R. (2011). Using models in writing instruction: A comparison with native and nonnative speakers of English. *SAGE Open, 1*(3), 1-12. doi:10.1177/2158244011426295

Babayigit, S. (2015). The dimensions of written expression: Language group and gender differences. *Learning and Instruction, 35*, 33-41. doi:10.1016/j.learninstruc.2014.08.006

Bean, T., & Steenwyk, F. (1984). The effect of three forms of summarization instruction on sixth graders' summary writing and comprehension. *Journal of Reading Behavior, 16*(4), 297-306. doi:10.1080/10862968409547523

Bereiter, C., & Scardamalia, M. (1987). *The psychology of written composition*. Hillsdale, N.J.: L. Erlbaum Associates.

Berninger, V., Fuller, F., & Whitaker , D. (1996). A process model of writing development across the life span. *Educational Psychology Review, 8*(3), 193-218. doi:10.1007/BF01464073

Bourke, L., & Adams, A. (2010). Cognitive constraints and the early learning goals in writing. *Journal of Research in Reading, 33*(1), 94-110. doi:10.1111/j.1467-9817.2009.01434.x

Bouwer, R., Béguin, A., Sanders, T., & van den Bergh, H. (2015). Effect of genre on the generalizability of writing scores. *Language Testing, 32*(1), 83-100. doi:10.1177/0265532214542994

Bouwer, R., Koster, M., & van den Bergh, H. (2018). Effects of a strategy-focused instructional program on the writing quality of upper elementary students in the Netherlands. *Journal of Educational Psychology, 110*(1), 58-71. doi:10.1037/edu0000206

Brunstein, J., & Glaser, C. (2011). Testing a path-analytic mediation model of how self-regulated writing strategies improve fourth graders' composition skills: A randomized controlled trial. *Journal of Educational Psychology, 103*(4), 922-938. doi:10.1037/a0024622

Cameron, C., & Moshenko, B. (1996). Elicitation of knowledge transformational reports while children write narratives. *Canadian Journal of Behavioural Science, 28*(4), 271-280. doi:10.1037/0008-400X.28.4.271

Charney, D., & Carlson, R. (1995). Learning to write in a genre: What student writers take from model texts. *Research in the Teaching of English, 29*(1), 88-125.

Cohen, J. (1977). *Statistical power analysis for the behavioral sciences*. New York: Academic Press.

Daiute, C., & Dalton, B. (1993). Collaboration between children learning to write. Can novices be masters? *Cognition and Instruction, 10*(4), 281-333. doi:10.1207/s1532690xci1004_1

Dale, H. (1994). Collaborative writing interactions in one ninth-grade classroom. *Journal of Educational Research, 87*(6), 334-344. doi:10.1080/00220671.1994.9941264

De Smedt, F., Merchie, E., Barendse, M., Rosseel, Y., De Naeghel, J., & Van Keer, H. (2018). Cognitive and motivational challenges in writing: Studying the relationship with writing performance across students' gender and achievement level. *Reading Research Quarterly, 53*(2), 249-272. doi:10.1002/rrq.193

De Smedt, F., Van Keer, H., & Merchie, E. (2016). Student, teacher, and class-level correlates of Flemish late elementary school children's writing performance. *Reading and Writing, 29*(5), 833-868. doi:10.1007/s11145-015-9590-z

Dumas, J., Lynch, A., Laughlin, J., Smith, E., & Prinz, R. (2001). Promoting intervention fidelity: Conceptual issues, methods and preliminary results form the EARLY ALLIANCE

prevention trial. *American Journal of Preventive Medicine, 20*(1), 38-47. doi:10.1016/S0749-3797(00)00272-5

Fawcett, S. (1991). Social validity: A note on methodology. *Journal of Applied Behavior Analysis, 24*(2), 235-239. doi:10.1901/jaba.1991.24-235

Ferretti, R., & Lewis, W. (2013). Best practices in teaching argumentative writing. In S. Graham, C. A. MacArthur, & J. Fitzgerald (Eds.), *Best practices in writing instruction* (Second Edition ed., pp. 113-140). New York: The Guilford Press.

Fidalgo, R., Torrance, M., Rijlaarsdam, G., van den Bergh, H., & Alvarez, M. (2015). Strategy-focused writing instruction: just observing and reflecting on a model benefits 6th grade students. *Contemporary Educational Psychology, 41*, 37-50. doi:10.1016/j.cedpsych.2014.11.004

Fitzgerald, J., & Teasley, A. (1986). Effects of instruction in narrative structure on children's writing. *Journal of Educational Psychology, 78*(6), 424-432. doi:10.1037/0022-0663.78.6.424

Flemish Ministry of Education and Training. (2005). *Education in Flanders. The Flemish educational landscape in a nutshell.* Retrieved from http://planipolis.iiep.unesco.org/sites/planipolis/files/ressources/belgium_flanders_education_nutshell.pdf.

Flower, L., & Hayes, J. (1981). A cognitive process theory of writing. *College Composition and Communication, 32*(4), 365-387. doi:10.2307/356600

Gomez, R., Parker, R., Lara-Alecio, R., & Gomez, L. (1996). Process versus product writing with limited English proficient students. *Bilingual Research Journal, 20*(2), 209-233. doi:10.1080/15235882.1996.10668645

Graham, S. (2006). Strategy instruction and the teaching of writing. In C. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of writing research* (pp. 187-207). New York: The Guilford Press.

Graham, S., Gillespie, A., & McKeown, D. (2013). Writing: importance, development, and instruction. *Reading and Writing, 26*(1), 1-15. doi:10.1007/s11145-012-9395-2

Graham, S., Harris, K., & Chambers, A. (2016). Evidence-based practice and writing instruction: A review of reviews. In C. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of Writing Research* (pp. 211-226). New York: The Guilford Press.

Graham, S., Harris, K., & Hebert, M. (2011). It is more than just the message: Analysis of presentation effects in scoring writing. *Focus on Exceptional Children, 44*(4), 1-12.

Graham, S., Harris, K., & Troia, G. (2000). Self-regulated strategy development revisited: Teaching writing strategies to struggling writers. *Topics in Language Disorders, 20*(4), 1-14. doi:10.1097/00011363-200020040-00003

Graham, S., McKeown, D., Kiuhara, S., & Harris, K. (2012). A meta-analysis of writing instruction for students in the elementary grades. *Journal of Educational Psychology, 104*(3), 879-896. doi:10.1037/A0029185

Graham, S., & Perin, D. (2007). A meta-analysis of writing instruction for adolescent students. *Journal of Educational Psychology, 99*(3), 445-476. doi:10.1037/0022-0663.99.3.445

Harris, K., Graham, S., & Mason, L. (2006). Improving the writing, knowledge, and motivation of struggling young writers: Effects of self-regulated strategy development with and without peer support. *American Educational Research Journal, 43*(2), 295-340. doi:10.3102/00028312043002295

Holliway, D. (2004). Through the eyes of my reader: A strategy for improving audience perspective in children's descriptive writing. *Journal of Research in Childhood Education, 18*(4), 334-349. doi:10.1080/02568540409595045

Hox, J. (2002). *Multilevel analysis: Techniques and applications*. London: Psychology Press.

Inspectie van het Onderwijs. (2010). *Het onderwijs in het schrijven van teksten. De kwaliteit van het schrijfonderwijs in het basisonderwijs.* Utrecht: Ministerie van Onderwijs, Cultuur en Wetenschap.

Kistner, S., Rakoczy, K., Otto, B., Dignath-van Ewijk, C., Buttner, G., & Klieme, E. (2010). Promotion of self-regulated learning in classrooms: investigating frequency, quality, and consequences for student performance. *Metacognition and Learning, 5*(2), 157-171. doi:10.1007/s11409-010-9055-3

Koster, M., Tribushinina, E., de Jong, P., & van den Bergh, H. (2015). Teaching children to write: A meta-analysis of writing intervention research. *Journal of Writing Research, 7*(2), 299-324. doi:10.17239/jowr-2015.07.02.2

Larkin, S. (2009). *Metacognition in young children*. London: Routledge.

Limpo, T., & Alves, R. (2013). Teaching planning or sentence-combining strategies: Effective SRSD interventions at different levels of written composition. *Contemporary Educational Psychology, 38*(4), 328-341. doi:10.1016/j.cedpsych.2013.07.004

Lowry, P., Curtis, A., & Lowry, M. (2004). Building a taxonomy and nomenclature of collaborative writing to improve interdisciplinary research and practice. *Journal of Business Communication, 41*(1), 66-99. doi:10.1177/0021943603259363

McCutchen, D., Covill, A., Hoyne, S., & Mildes, K. (1994). Individual differences in writing: Implications of translating fluency. *Journal of Educational Psychology, 86*(2), 256-266. doi:10.1037/0022-0663.86.2.256

McCutchen, D., Francis, M., & Kerr, S. (1997). Revising for meaning, effects of knowledge and strategy. *Journal of Educational Psychology, 89*(4), 667-676. doi:0.1037/0022-0663.89.4.667

Merchie, E., & Van Keer, H. (2016). Stimulating graphical summarization in late elementary education: The relationship between two instructional mind map approaches and student characteristics. *Elementary School Journal, 116*(3), 487-522. doi:10.1086/684939

National Center for Education Statistics. (2012). *The nation's report card: Writing 2011*. Washington, D.C.: Institute of Education Sciences, U.S. Department of Education.

Nixon, J., & Topping, K. (2001). Emergent writing: the impact of structured peer interaction. *Educational Psychology, 21*(1), 41-58. doi:10.1080/01443410020019821

O'Donnell. (2008). Defining, conceptualizing, and measuring fidelity of implementation and its relationship to outcomes in K-12 curriculum intervention research. *Review of Educational Research, 78*(1), 33-48. doi:10.3102/0034654307313793

Ofsted. (2000). *Teaching of writing in primary schools: could do better*. Manchester: Ofsted.

Paquette, K. (2009). Integrating the 6+1 writing traits model with cross-age tutoring: An investigation of elementary students' writing development. *Literacy Research and Instruction, 48*(1), 28-38. doi:10.1080/19388070802226261

Puntambekar, S., & Hübscher, R. (2005). Tools for scaffolding students in a complex learning environment: What have we gained and what have we missed? *Educational Pyschologist, 40*(1), 1-12. doi:10.1207/s15326985ep4001_1

Rasbash, J., Charlton, C., Browne, W., Healy, M., & Cameron, B. (2009). MLwiN Version 2.1. Centre for Multilevel Modelling: University of Bristol.

Rhoads, C. (2011). The implications of "contamination" for experimental design in education. *Journal of Educational and Behavioral Studies, 36*(1), 76-104. doi:10.3102/1076998610379133

Schoonen, R. (2005). Generalizability of writing scores: An application of structural equation modeling. *Language Testing, 22*(1), 1-30. doi:10.1191/0265532205lt295oa

Schultz, K. (1997). 'Do you want to be in my story?': Collaborative writing in an urban elementary classroom. *Journal of Literacy Research, 29*(2), 253-287. doi:10.1080/10862969709547958

Schunk, D. (2003). Self-efficacy for reading and writing: Influence of modeling, goal setting, and self-evaluation. *Reading and Writing Quarterly, 19*(159-172). doi:10.1080/10573560308219

Südkamp, A., Kaiser, J., & Möller, J. (2012). Accuracy of teachers' judgements of students' academic achievement: A meta-analysis. *Journal of Educational Psychology, 104*(3), 743-762. doi:10.1037/a0027627

Sutherland, J., & Topping, K. (1999). Collaborative creative writing in eight-year-olds: comparing cross-ability fixed role and same-ability reciprocal role pairing. *Journal of Research in Reading, 22*(2), 154-179. doi:10.1111/1467-9817.00080

Tillema, M., van den Bergh, H., Rijlaarsdam, G., & Sanders, T. (2012). Quantifying the quality difference between L1 and L2 essays: A rating procedure with bilingual raters and L1 and L2 benchmark essays. *Language Testing, 30*(1), 71-97. doi:10.1177/0265532212442647

Troia, G., Harbaugh, A., Shankland, R., Wolbers, K., & Lawrence, A. (2013). Relationships between writing motivation, writing activity, and writing performance: Effects of grade, sex, and ability. *Reading and Writing, 26*(1), 17-44. doi:10.1007/s11145-012-9379-2

Vaughn, S., Klingner, J., Swanson, E., Boardman, A., Roberts, R., Mohammed, S., & Stillman-Spisak, S. (2011). Efficacy of collaborative strategic reading with middel school students. *American Educational Research Journal, 48*(4), 938-964. doi:10.3102/0002831211410305

Yarrow, F., & Topping, K. (2001). Collaborative writing: The effects of metacognitive prompting and structured peer interaction. *British Journal of Educational Psychology, 71*, 261-282. doi:10.1348/000709901158514

Zimmerman, B., & Risemberg, R. (1997). Becoming a self-regulated writers: A social cognitive perspective. *Contemporary Educational Psychology, 22*, 73-101. doi:10.1006/ceps.1997.0919

Appendices

Appendix A. *Overview of the memory and strategy cards explaining the writing knowledge and writing strategies taught.*

Memory card (= writing knowledge)	1. **Goal!:** When you want to explain something to someone, you provide information on a certain topic so the reader is able to understand the information related to the topic 2. **How?** ✓ **Content**: You provide facts, examples, and details about the topic so the reader understands the topic ✓ **Structure**: your texts consists of 4 large parts 1)**Title** 2) **Introduction**: provides information so the reader knows the topic of the text 3) **Middle**: describes all important information related to the topic by means of examples, details, … 4) **Conclusion**: summarizes the text or provides a conclusion
Planning strategy card	1. **Read the assignment carefully** ✓ What should I write about? Write the writing topic in the planning scheme. ✓ What does the assignment tell me? Write down in the planning scheme what you need to do according to the assignment 2. **Collect main ideas** ✓ What do I know about the topic and what do I want to write about the topic? These are your main ideas. Write your main ideas in the planning scheme 3. **Add additional information** ✓ What do I know about the main ideas? This additional information could be details or examples. Write the additional information in the planning scheme. 4. **Organise your main ideas**

<table>
<tr><td></td><td>✓ What is the order of my main ideas? Number each main idea in the planning scheme</td></tr>
<tr><td>Writing strategy card</td><td>
1. Use the planning scheme to write down your text. The planning scheme helps you with: the structure and the content of your text!
2. Construct your text as follows:
a. Title
b. Introduction
<table>
<tr><td rowspan="2">Paragraph 1</td><td>Write down the writing topic</td></tr>
<tr><td>Write down what you are going to tell about the topic. Summarize your main ideas</td></tr>
</table>
c. Middle
<table>
<tr><td>Paragraph 2</td><td>Write down you first main idea and additional information</td></tr>
<tr><td>Paragraph 3</td><td>Write down you second main idea and additional information</td></tr>
<tr><td>Paragraph 4</td><td>Write down you third main idea and additional information</td></tr>
<tr><td>Paragraph …</td><td>…</td></tr>
</table>
d. Conclusion
<table>
<tr><td>Final paragraph</td><td>Summarize your text or provide a conclusion</td></tr>
</table>
Keep in mind:
✓ Correct spelling and sentence construction
✓ Varied word choice
</td></tr>
<tr><td>Revision strategy card</td><td>
1. Reread your text and check the following:
✓ <u>The goal</u>
- Do you provide information on the writing topic?
- Are you sure you are not telling a story?
✓ <u>The content</u>
- Do you provide facts, examples, and details about the topic?
</td></tr>
</table>

	- Will the reader understand the topic based on the information? ✓ <u>The structure</u> - Does your text consist of: a title, an introduction, a middle, and a conclusion? - Does your text consists of paragraphs? - Is each main idea described in a paragraph? ✓ <u>Spelling and sentence construction</u> **2. Rewrite the highlighted words/sentences: Choose the correct action to rewrite: ADC** ✓ <u>A</u>DD: - More information, details, examples, … - Correct punctuation and capitalization - Paragraph(s) ✓ <u>D</u>ELETE - Word(s) - (Part of) sentence(s) - Paragraph(s) ✓ <u>C</u>HANGE - Spelling errors - Words using other words - Sentences by rewriting them (other words, other structure) - Structure of the text **3. Rewrite the text so you can hand in the final text version**

Je n'écris pas des romans pour les vendre,
mais pour obtenir une unité dans ma vie;
l'écriture est pour moi une colonne vertébrale.

Michel Butor

I know I'm not going to write as well as I used to. I no longer have the stamina to endure the frustration. Writing is frustration – it's daily frustration, not to mention humiliation.

Philip Roth

---

5 The bright and dark side of writing motivation: Effects of explicit instruction and peer assistance

This chapter is based on:

De Smedt, F., Graham, S., Van Keer, H. (2018). The bright and dark side of writing motivation: Effects of explicit instruction and peer assistance. *The Journal of Educational Research*. doi:10.1080/00220671.2018.1461598

Chapter 5

The bright and dark side of writing motivation: Effects of explicit instruction and peer assistance

Abstract

The present study investigated the impact of explicit instruction and peer-assisted writing on students' writing motivation and self-efficacy for writing. Eleven teachers and their 206 fifth and sixth-grade students participated in a 2 (i.e.; explicit instruction versus writing opportunities without explicit instruction) x 2 (i.e.; peer-assisted writing versus writing individually) experimental intervention study with a pretest-posttest design. The four experimental conditions were compared with a business as usual (BAU) condition. The 5-week interventions were implemented in authentic classes by regular class teachers, who received a prior professional development training. Multilevel analyses showed that students who wrote with a peer were more autonomously motivated at posttest than BAU-students. Additionally, BAU-students and students receiving explicit instruction were more controlled motivated than students who were offered ample writing opportunities while practicing individually. Theoretical and educational implications are discussed in view of realizing a 'bright' pathway towards autonomous writing motivation.

Introduction

Writing has mainly been studied from a cognitive perspective (e.g., MacArthur & Graham, 2016; Pajares, 2003), by primarily focusing on understanding how writers compose texts (Bereiter & Scardamalia, 1987; Flower & Hayes, 1981). The importance of motivational factors related to writing are, however, increasingly acknowledged in theoretical models of writing (e.g., Graham, 2018; Zimmerman & Risemberg, 1997). The increasing attention for motivational factors in these theoretical writing models goes hand in hand with empirical findings consistently showing that writing motivation and self-efficacy for writing are positively related to students' writing performance (De Smedt et al., 2018; De Smedt, Van Keer, & Merchie, 2016; Graham, Berninger, & Fan, 2007; Pajares, 2003; Pajares & Valiante, 1997;

Troia, Harbaugh, Shankland, Wolbers, & Lawrence, 2013). This implies that in light of improving students' performance, educational practice should actively foster students' motivation for writing next to teaching the necessary writing knowledge, skills, and strategies. Unfortunately, translating this recommendation into practice remains challenging. Today's writing education primarily focuses on writing for evaluative purposes and to a lesser extent on sharing knowledge and feelings. Students experience such writing as not engaging, difficult, and hard to concentrate on (Bruning & Horn, 2000; Cleary, 1991; Hidi & Boscolo, 2006). These negative feelings towards writing are more likely to appear in boys than in girls. In this respect, prior research revealed a gender gap indicating that girls generally feel more self-efficacious and motivated to write compared to boys (De Smedt et al., 2018).

As a result of the lack of motivating writing experiences, a pattern of decreasing writing motivation and self-efficacy for writing emerges, resulting in a growing dislike of school writing as students progress through school (Cleary, 1991; Pajares, 2003). In this respect, attention for motivating students to write is especially relevant during the transition from elementary to secondary education, where students have to meet more complex academic task demands (Wolters, Denton, York, & Francis, 2014). To break down this negative spiral, teachers need guidelines on how to create optimal writing experiences so they can foster not only students' writing performance, but also their motivation to write (Bruning & Kauffman, 2016). While the writing literature already contains a rich evidence base of effective instructional practices (Graham, Harris, & Chambers, 2016; Graham, McKeown, Kiuhara, & Harris, 2012; Koster, Tribushinina, de Jong, & van den Bergh, 2015). This literature is primarily focused on cognitive outcome measures (i.e., students' writing performance). Research on motivational outcomes remains extremely scarce. More research is therefore needed on interventions aiming at fostering students' writing motivation to provide teachers evidence-based guidelines on effective instructional practices creating motivational writing experiences for their students. The present intervention study focusses on fostering the motivational component of students' writing, which theoretically includes several related concepts, namely self-efficacy beliefs, interest, motives for writing, perceived task value, attitudes, goal orientations, and attributions for writing success and failure (Troia et al., 2013). The present study focuses on students' motives for engaging in writing (i.e., writing motivation) and their writing self-efficacy, since these concepts are currently the most prominent in theoretical models of writing (e.g., Graham, 2018; Zimmerman & Risemberg, 1997). According to the social cognitive theory of writing, Zimmerman and Risemberg (1997), for example, state that writers must be motivated to devote sustained effort in writing texts. Graham (2018) identified a set of motivational beliefs (e.g., self-efficacy beliefs) in his writer(s) within community model, as these beliefs determine the engagement and effort students bring to the writing task. Writing motivation and self-efficacy for writing are rooted respectively in the Self-Determination Theory (SDT) (Ryan &

Deci, 2000b) and in the Self-Efficacy Theory (SET) (Bandura, 1977, 1997), which can be considered compatible theoretical frameworks since they share the assumption that humans are agents of their behavior (Sweet, Fortier, Strachan, & Blanchard, 2012).

Writing motivation within the Self-Determination Theory

An interesting and coherent theoretical framework to study students' writing motivation is the Self-Determination Theory (SDT) (Ryan & Deci, 2000b). Attention to this motivational theory is increasing in research on education in general (e.g., Vansteenkiste, Simons, Lens, Soenens, & Matos, 2005), but also in literacy education in particular (e.g., De Naeghel, Van Keer, Vansteenkiste, & Rosseel, 2012). SDT is especially appealing to educational researchers because of the innovative conceptualization of motivation by redefining the classic distinction between intrinsic and extrinsic motivation. More particularly, SDT distinguishes qualitatively different subtypes of motivation: (a) external regulation (e.g., writing because you experience external pressure, such as punishment), (b) introjected regulation (e.g., writing because you experience internal pressure, such as guilt), (c) identified regulation (e.g., writing for personal value), and (d) intrinsic regulation (e.g., writing for inherent fulfillment) (Ryan & Deci, 2000b). Within SDT, the primary focus has shifted to two main types of motivation, namely autonomous and controlled motivation. Autonomous motivation consists of intrinsic and internalized motivation, while controlled motivation consists of introjected and external regulation. In this way, SDT not only takes into account the quantity of one's motivation (i.e., level or amount of motivation), but also the quality of motivation (i.e., the orientation of motivation defined by the underlying reasons for it). Previous SDT-research revealed numerous cognitive and affective advantages of autonomous motivation (Guay, Ratelle, & Chanal, 2008), such as more self-regulated learning (e.g., Vansteenkiste, Zhou, Lens, & Soenens, 2005), enhanced conceptual knowledge (e.g., Benware & Deci, 1984), better performance (De Naeghel et al., 2012), more persistence (e.g., Pelletier, Fortier, Vallerand, & Briere, 2001), and more positive emotions at school (Levesque, Zuehlke, Stanek, & Ryan, 2004). Similarly in the context of writing research, De Smedt et al. (2016) showed that autonomously motivated students wrote qualitatively better texts compared to controlled motivated students. Furthermore, SDT research in the context of writing also confirms the gender gap in students' writing motivation, indicating that boys are less autonomously motivated to write, and in this respect also derived less of the positive effects of autonomous forms of motivation (De Smedt et al., 2018). Contrary to autonomous motivation consistently being associated with positive outcomes, controlled motivation has been associated with more

negative outcomes, such as for example more superficial learning (Vansteenkiste, Simons, et al., 2005) and increased dropout (Vallerand, Fortier, & Guay, 1997).

Considering the advantages related to autonomous motivation, SDT points to the importance of fostering this type of motivation in students by nurturing their inherent psychological need for autonomy (i.e., feeling psychologically free), competence (i.e., feeling confident and effective), and relatedness (i.e., feeling related to significant others) (Ryan & Deci, 2000b). To ensure the facilitation of these needs, and consequently fostering autonomous motivation, teachers can adopt a qualitatively supportive teaching style characterized by autonomy-supportive, structured, and involved teacher behavior (Soenens & Vansteenkiste, 2005). Translated to the context of writing, teachers can, for instance, provide students with choice between different writing assignments (cf., need for autonomy), provide clear guidelines on how to approach complex writing tasks (cf., need for competence), and create opportunities in which students can share their writing with others (cf., the need for relatedness). In this way, teachers create supportive learning environments nurturing students' basic needs, thereby creating a 'bright' pathway towards autonomous motivation, positive learning outcomes, and well-being (Haerens, Vansteenkiste, Aelterman, & Van den Berghe, 2016).

In contrast, learning environments can actively hamper students' innate psychological needs as well, thereby creating experiences of need frustration, such as autonomy frustration (cf., feelings of pressure), competence frustration (cf., feelings of failure), and relatedness frustration (cf., feelings of isolation) (Haerens et al., 2016). According to SDT, need frustration is provoked by controlled teaching, which is characterized by externally (e.g., punishments) or internally controlling teaching strategies (e.g., appealing to students' feelings of guilt) (Vansteenkiste, Simons, et al., 2005). In this respect, research has demonstrated that a more controlled teaching style is related to less optimal motivational functioning of students (i.e., controlled motivation) (Haerens, Aelterman, Vansteenkiste, Soenens, & Van Petegem, 2015) which, in turn, is associated with more negative learning outcomes (Vansteenkiste, Simons, et al., 2005). Hence, learning environments activating students' need frustration can create a 'dark' pathway towards maladaptive motivational and cognitive functioning (Haerens et al., 2016; Ryan & Deci, 2000a).

Self-efficacy for writing within the Self-Efficacy Theory

To study students' self-efficacy for writing, we specifically opted for the Self-Efficacy Theory (SET) as the underlying and integrative theoretical framework (Bandura, 1977, 1997). SET explains and predicts how one's expectations of perceived capability influences a person's

choice of activities, effort, and persistence (Bandura, 1977, 1997). According to SET, self-efficacy beliefs are domain-specific (Bandura, 2006) and multifaceted, implying that self-efficacy should not be assessed globally as a static construct (Bandura, 1977, 2006). In line with SET (Bandura, 1977), Bruning, Dempsey, Kauffman, McKim, and Zumbrunn (2013) acknowledged the domain-specific and multidimensional nature of self-efficacy also in the context of writing, by specifying multiple types of self-efficacy for writing according to domain-related cognitive, procedural, and self-regulatory subskills underlying successful writing performance. More specifically, they distinguish: (a) self-efficacy for ideation (i.e., self-beliefs about the ability to generate ideas), (b) self-efficacy for conventions (i.e., self-beliefs about adhering to language rules), and (c) self-efficacy for regulation (i.e., self-beliefs about regulating writing behavior). In this respect, the writing self-efficacy framework of Bruning et al. (2013) is domain-specifically rooted in theoretical writing process models (e.g., Flower & Hayes, 1981) and other theoretical accounts of writing (e.g., Zimmerman & Risemberg, 1997).

Similar to the abovementioned relationship between students' writing motivation and academic writing outcomes and the observed gender gap in this respect (De Smedt et al., 2018; De Smedt et al., 2016), also self-efficacy for writing appears to be related to various writing outcomes in school (e.g., De Smedt et al., 2018; De Smedt et al., 2016; Pajares & Valiante, 1997) and again boys reported significantly lower levels of self-efficacy (i.e., more specifically self-efficacy for regulation) compared to girls (De Smedt et al., 2018). Taking into account the strong relationship between students' self-efficacy beliefs and their performance, Bruning and Kauffman (2016) advocated in favor of fostering these beliefs by modeling writing and offering students chances to practice. In this way, they can acquire writing knowledge, skills, and strategies and learn to recognize self-regulated strategies to cope with the complexity of writing.

The present study

In view of fostering students' writing motivation and self-efficacy for writing, we particularly focus on studying the effectiveness of explicit instruction (i.e., explicitly teaching students writing knowledge and strategies to plan, write, and revise texts) and peer-assisted writing (i.e., students working together to write texts) in the present study for an empirical as well as a theoretical reason. First, both instructional writing practices have been studied widely as to their effectiveness in improving writing performance (see meta-analyses: Graham et al., 2012; Koster et al., 2015). Empirical findings in this respect consistently showed positive effects for explicitly teaching students knowledge, skills, and strategies (e.g., Bouwer, Koster, & van den Bergh, 2018; De Smedt & Van Keer, 2018; Graham, Harris, & Troia, 2000; Limpo & Alves,

2013) and using peer-assisted writing approaches (e.g., Harris, Graham, & Mason, 2006; Paquette, 2009; Yarrow & Topping, 2001). However, notwithstanding the demonstrated direct relationship between students' writing motivation and self-efficacy for writing on the one hand and their writing performance on the other hand, as noted above, the empirical writing literature to date suffers from a lack of intervention studies focused on the added value of these writing practices on motivational outcomes. Moreover, the limited number of studies on explicit instruction conducted to date revealed no significant effects on writing motivation (Harris et al., 2006), while results regarding self-efficacy were inconclusive (Graham & Harris, 1989; Graham, Harris, & Mason, 2005), strengthening the call for more research in this respect. As to the effectiveness of peer-assisted writing, studies showed more consistent significant effects on both writing motivation and self-efficacy for writing (e.g., De Bernardi & Antolini, 2007; Paquette, 2009). However, also in this regard, the number of prior studies is very limited and more studies are needed to replicate the findings.

Second, investigating the effectiveness of both writing practices was applied in this investigation because of their alignment with the underlying motivational theories central to the present study, namely SDT (Ryan & Deci, 2000b) and SET (Bandura, 1977, 1997). In line with the writing literature, *explicit instruction* in the present study covered providing model texts so students can study these and acquire essential writing knowledge (e.g., Abbuhl, 2011); explicitly explaining, modeling, and teaching students how, why, and when to plan, write, and revise texts (e.g., Bouwer et al., 2018; Graham et al., 2000); and offering students ample and various writing opportunities to practice writing (e.g., Bouwer et al., 2018; Graham et al., 2000). These instructional practices concord with SDT guidelines on how to foster students' autonomous motivation. More particularly, providing students' with rationales (i.e., why apply a specific strategy) is an important aspect of autonomy-supportive teaching behavior (Ryan & Deci, 2000b; Soenens & Vansteenkiste, 2005), as explaining and elaborating on the added value of applying writing strategies is thought to contribute to students' need for autonomy. Likewise, explicitly teaching writing knowledge and strategies and offering students opportunities to practice is believed to nurture students' need for competence (Ryan & Deci, 2000b; Soenens & Vansteenkiste, 2005). Additionally, the instructional practices included in the explicit instruction in the present study accord with SET as well, because of the prominent role of modeling in our study, which is thought to elicit vicarious experiences, which, in turn foster students' self-efficacy (Bandura, 1977, 1997).

Peer-assisted writing also shows concordances with both motivational theories. According to the SDT-framework, students' writing with a peer can foster their need for relatedness, which in turn, promotes students' autonomous motivation (Ryan & Deci, 2000b; Soenens & Vansteenkiste, 2005). Following SET, peers can function as social models and when other

students observe their writing behaviors this can influence these students' self-efficacy (Bandura, 1977, 1997).

Taking into account all of the above, the present study takes an innovative angle on studying motivational components of writing and therefore extends previous research, (a) by going beyond a sole focus on the quantity of motivation - as merely adopted in prior writing motivation research - through differentiating between qualitatively different types of motivation (i.e. autonomous and controlled motivation, (Ryan & Deci, 2000b); (b) by acknowledging self-efficacy for writing as a multidimensional construct (Bruning et al., 2013), which was not the approach taken in previous writing intervention studies; and (c) by evaluating the impact of theoretically grounded interventions on both students' writing motivation and self-efficacy for writing within the same experimental intervention study.

Based on the theoretical models underlying the present study, the following hypotheses were put forward. As to students' *writing motivation*, we hypothesize that both explicit instruction and peer-assisted writing nurture one or more of students' basic psychological needs, thereby creating a 'bright' pathway towards autonomous writing motivation (Ryan & Deci, 2000a, 2000b; Soenens & Vansteenkiste, 2005). Given the complementary nature of both instructional strategies for nurturing students' innate needs (i.e., explicit instruction fostering students' need for autonomy and competence and peer-assisted writing fostering their need for relatedness, Ryan & Deci, 2000a, 2000b; Soenens & Vansteenkiste, 2005), we further predict that a combination of both practices will be most effective in stimulating students' writing motivation because of their complementary nature to nurture students' innate needs. In terms of *self-efficacy for writing*, we hypothesize that both writing practices will have a positive impact given the prominent role of modeling in explicit instruction and given the role of peers as social models in peer-assisted writing (Bandura, 1977, 1997). Again, we envisage the combination of both practices as most effective for self-efficacy because of the presence of two types of models: the teacher as a model in explicit instruction and the peer as a model in peer-assisted writing. Finally, as the interventions are implemented in the same way for boys and girls, we correspondingly hypothesize a similar impact on boys' and girls' writing motivation and self-efficacy for writing as well.

Method

Educational context

In Flanders (Belgium), elementary education comprises six consecutive years of study, starting at the age of 6. To ensure the quality of its elementary education, the Flemish

government imposes attainment targets. Attainment targets are minimum objectives found necessary and attainable for elementary school children and encompass knowledge, attitudes, and skills (Flemish Ministry of Education and Training, 2005). The attainment targets for elementary students' writing focus on both cognitive and motivational aspects. Concerning the cognitive aspects, the attainment targets state that elementary students should be able to copy and write different text types such as notes, announcements, letters, reports, stories, and informational texts. In addition, students should develop a legible handwriting and apply spelling conventions and rules. Concerning the motivational aspects, the attainment targets state that students should develop attitudes such as writing readiness and writing pleasure.

Participants

The present study is part of a larger research project on fostering elementary students' writing. In this project, one study focused on cognitive outcome measures (De Smedt & Van Keer, 2018), while the present study focused on motivational outcomes. Teachers in the present study participated voluntarily to avoid differences between the experimental and the control conditions concerning teachers' motivation to participate. They were recruited by means of a call for participation in a popular teacher journal or they could sign up for participation during a yearly teacher training day. In total, 11 teachers and their 206 fifth and sixth graders from 8 different elementary schools in Flanders volunteered to participate in the study. As to the teachers, 4 fifth-grade, 5 sixth-grade, and 2 multiple-grade teachers were involved. The majority of teachers were female (81.8%). Teachers' average age was 41.97 years (*SD* = 9.80), and they had an average 18.36 years (*SD* = 9.33) of teaching experience in elementary grades. The participating teachers were also asked to evaluate their education and training for writing instruction (cf., five-point Likert scale ranging from 'very low quality' to 'very high quality'). The teachers reported they felt rather unprepared to teach elementary students to write as they evaluated the quality of their training in writing instruction rather low (*M* = 2.64, *SD* = 0.81). Finally, questionnaires on attitudes towards writing and writing instruction and teacher efficacy for writing were administered (All questionnaires used a five-point Likert scale, for more information see De Smedt et al., 2016). Teachers reported rather positive attitudes towards writing (*M* = 3.48, *SD* = 0.83) and writing instruction (*M* = 3.80, *SD* = 0.52). They also indicated to be self-efficacious in teaching struggling writers (*M* = 3.57, *SD* = 0.23).

As to the students, 92 fifth (44.7%) and 114 sixth-graders (55.3%) participated. In total, 57.8% were boys and 42.2% were girls with an average age of 10.95 (*SD* = 0.70). The majority of the students were native Dutch speakers (84.5%), 8.3% of the students were bilingual

(Dutch and a foreign language), and only 4.8% of the students had a foreign home language (Arabic, Turkish, or other).

Conditions

A 2 (i.e.; explicit instruction versus matched practice writing opportunities without explicit instruction) x 2 (i.e.; peer-assisted writing versus writing individually) experimental design was applied in the present study. In addition to the four experimental conditions, a business as usual condition was included. In this condition, teachers applied their traditional writing approach by means of their regular textbooks and manuals to teach language (see Table 1). Students who received explicit instruction (EI) did so while either practicing individually (EI+IND) or with peer assistance (EI+PA). Students in the matched practice comparison conditions did not receive any kind of explicit or implicit writing instruction while practicing either individually (IND) or with peer assistance (PA). The inclusion of these five conditions allowed us to study: (a) the effect of the four experimental conditions as compared to a business as usual condition (EI+IND, EI+PA, IND, and PA compared to BAU), (b) the distinct effect of explicit instruction (EI+IND compared to IND and EI+PA compared to PA), and (c) the distinct effect of peer-assisted writing (EI+IND compared to EI+PA and IND compared to PA).

Table 1. *Overview of the conditions.*

	Explicit instruction	**Matched practice without explicit or implicit instruction**
Individual	EI+IND	IND
Peer assistance	EI+PA	PA
	Business as usual condition (BAU): teachers' traditional writing approach by means of their regular textbooks to teach language	

Ten participating classes with eleven teachers (i.e., two teachers were co-teaching one class) were randomly assigned to one of the five conditions resulting in two classes per condition. To check the comparability of the conditions regarding teacher and student characteristics, ANOVA analyses and chi-square analyses were performed. Regarding the teachers, chi-square analyses revealed no significant differences in the distribution of gender ($\chi^2 = 6.52$, $df = 4$, $p = .16$) and grade ($\chi^2 = 12.3$, $df = 8$, $p = .14$) across conditions. Furthermore,

there were no significant differences between conditions in terms of teachers' mean age (F(4, 10) = 1.03, p = .47), teaching experience (F(4, 10) = 0.28, p = .88), teachers' evaluation of their education and training in writing instruction (F(4, 10) = 1.60, p = .29), teachers' attitudes towards writing (F(4, 9) = 0.15, p = .96), and writing instruction (F(4, 9) = 2.56, p = .17), and teacher self-efficacy for teaching struggling writers (F(4, 10) = 1.23, p = .39). Information on the characteristics of the participating students by conditions is presented in Table 2. Chi-square analyses showed that the distribution of gender was similar across conditions (χ^2 = 4.49, df = 4, p = .34). Because EI+IND included more bilingual students and students with a foreign home language, chi-square analyses revealed significant differences between conditions in terms of home language (χ^2 = 34.40, df = 16, p < .01). There were no significant differences between students speaking Dutch, bilingual students and students with a foreign home language at pretest in terms of autonomous motivation (F(4, 193) = 2.37, p = .05), controlled motivation (F(4, 192) = 0.25, p = .91), self-efficacy for ideation (F(4, 196) = 0.57, p = .68), self-efficacy for conventions (F(4, 196) = 1.98, p = .10), and self-efficacy for regulation (F(4, 196) = 2.31, p = .06). Furthermore, differences between conditions were found concerning grade (χ^2 = 36.26, df = 4, p < .001), as EI+PA (i.e., explicit instruction while writing with peer assistance) included no fifth graders. There were no significant differences between fifth and sixth graders at pretest in terms of autonomous motivation (F(1, 189) = 0.73, p = .40), controlled motivation (F(1, 195) = 0.02, p = .90), self-efficacy for ideation (F(1, 199) = 0.74, p = .39), self-efficacy for conventions (F(1, 199) = 0.03, p = .85), and self-efficacy for regulation (F(1, 199) = 2.42, p = .12).

Table 2*. Overview of student characteristics per research condition.*

	EI+IND		**EI+PA**		**EI**		**PA**		**Business as usual**	
	N	%	*N*	%	*N*	%	*N*	%	*N*	%
Gender										
Male	30	57.7	18	51.4	21	75	22	52.4	28	57.1
Female	22	42.3	17	48.6	7	25	20	47.6	21	42.9
Total	52	100	35	100	28	100	42	100	49	100
Home language										
Dutch	34	68	30	85.7	25	89.3	40	97.6	45	95.7
Other language	6	12	2	5.7	1	3.6	1	2.4	0	0
Dutch + other language	10	20	3	8.6	2	7.1	0	0	2	4.3
Total	50	100	35	100	28	100	41	100	47	100
Grade										
Fifth grade	32	61.5	0	0	15	53.6	22	52.4	23	46.9
Sixth grade	20	38.5	35	100	13	46.4	20	47.6	26	53.1
Total	52	100	35	100	28	100	42	100	49	100

Note. EI+IND = Explicit instruction + individual writing; EI+PA = Explicit instruction + writing with peer assistance; IND: Matched individual practice comparison condition; PA: Matched peer-assisted practice comparison condition

Design and procedure

A randomized control design was applied following a stepwise procedure: (a) pretest administration, (b) a researcher-directed and condition-specific 1.5-hour training for the experimental teachers, (c) a 5-week intervention period with two lessons per week, and (d) posttest administration.

Intervention

Four experimental writing lesson programs were developed (i.e., one per experimental condition). To ensure comparability between the conditions, several aspects were similar across the programs, while other characteristics of the instructional approach and mode of delivery were clearly distinguished (see Table 3).

Instructional approach in the experimental conditions

As to the instructional approach in both explicit instruction conditions, EI+IND and EI+PA interventions were characterized by three instructional writing practices: (a) explicit instruction of genre knowledge and text structure knowledge, (b) explicit strategy instruction, and (c) providing ample writing opportunities and gradually diminishing guidance so students can practice and internalize the writing knowledge and strategies taught. As to the instructional approach in both matched practice comparison conditions, students in the IND and PA interventions were provided with ample writing opportunities to practice. Students in these conditions received a challenging and communicative writing task each lesson, parallel to the writing topics of EI+IND and EI+PA, resulting in a total of ten writing assignments. See Table 4 for more information on the implementation of these instructional writing practices.

Mode of delivery in the experimental conditions

While EI+IND and IND students worked individually during practice lessons, EI+PA and PA students wrote texts together with a peer. See Table 5 for more information on how individual and peer-assisted writing were implemented.

Table 3. *Overview of the procedural features, writing lesson programs, instructional approaches, and modes of delivery for each research condition.*

	Condition				
	EI+IND	**EI+PA**	**IND**	**PA**	**Business as usual**
Procedural features					
Pretest	✓	✓	✓	✓	✓
Training – support to the teachers	✓	✓	✓	✓	
Posttest	✓	✓	✓	✓	✓
Writing lesson programs					
Lesson programs (cf., teacher manual) and writing materials provided by the researchers	✓	✓	✓	✓	
10 lessons of 50 minutes	✓	✓	✓	✓	
Extra lesson of 25 minutes (cf., rules of peer-assisted writing)		✓		✓	
Writing topics	✓	✓	✓	✓	
Descriptive texts	✓	✓	✓	✓	
Fixed lesson format	✓	✓	✓	✓	
Instructional approaches					
Explicit instruction of writing knowledge	✓	✓			
Explicit strategy instruction (i.e., planning, writing, and revising)	✓	✓			
Providing ample writing opportunities	✓	✓	✓	✓	
Gradually diminishing guidance	✓	✓			
Modes of delivery					
Individual writing	✓		✓		
Peer-assisted writing in fixed heterogeneous dyads		✓		✓	

Table 4. *Instructional approach in the experimental conditions.*

Experimental conditions	Instructional writing practices	Implementation
EI+IND and EI+PA	Explicit instruction of writing knowledge	To introduce students to the writing genre they had to study two varying model texts by means of a 'compare and contrast task'. In this way, students discovered the goal, the content, and the structure of the descriptive text genre. Finally, they received a memory card which summarized the important characteristics of the genre.
	Explicit instruction of writing strategies	Teachers explicitly taught students how to plan, write, and revise descriptive texts by applying the following instructional procedure: (1) pointing out the importance and value of a specific strategy, (2) discussing students' strategy use, (3) modelling the writing strategy by demonstrating and thinking aloud how, what, and why the teacher applied the writing strategy, so students gain insights into the teacher's thinking and writing process, and (4) introducing different strategy cards summarizing the steps in applying a strategy (i.e., planning, writing, and revision card).
	Providing ample writing opportunities and gradually diminish guidance	During student practice, teachers (1) provided feedback concerning students' text (e.g., goal, content, and structure) and writing process (e.g., the applied planning, writing, and revising strategies) and (2) differentiated guidance by offering weak writers the help they needed (e.g., separate cards) and challenging stronger writers to gradually diminish the use of the supporting materials (i.e., diminishing the use of the strategy cards)
IND and PA	Providing ample writing opportunities	During student practice, teachers provided feedback concerning students' texts (i.e., spelling, structure, and content of the text).

Table 5. *Mode of delivery in the experimental conditions.*

Experimental conditions	Model of delivery	Implementation
EI+IND and IND	Individual writing	Students worked individually and kept an individual writing portfolio in which they gathered their completed writing assignments.
EI+PA and PA	Writing with peer assistance	Teachers in the peer assistance conditions were asked to group their students into heterogeneous dyads by taking into account students' writing performance level (i.e., pairing poor and good writers) on the one hand and their personalities (i.e., matching students' temperament) on the other hand. The heterogeneous dyads were fixed for the duration of the intervention so they could get used to each other's abilities and limitations. To let students get acquainted with their writing partner, teachers implemented an additional lesson of 25 min in which rules on peer-assisted writing were discussed and agreed upon. Students had to sign the rules to show their engagement to collaborate with their writing partner. During the practice lessons, students wrote together with their fixed writing partner, always resulting in a shared writing document (e.g., shared planning or shared text). In this respect, the writing partners kept a shared writing portfolio in which they gathered their writing assignments.

Fidelity of implementation

To ensure fidelity of implementation of the intervention (Dumas, Lynch, Laughlin, Smith, & Prinz, 2001; O'Donnell, 2008), three safeguards were implemented. First, the number of completed lessons was assessed by analyzing the number of texts collected in students' writing portfolios. On average, 90.96% of the students in the experimental conditions completed all ten writing lessons.

Second, teachers in the experimental conditions completed logbooks with structured protocols for each lesson (based on Merchie & Van Keer, 2016). The logbooks revealed that teachers spent on average 55 minutes on each lesson (SD = 6.70), without significant condition differences ($F(3, 7) = 3.08$, $p = .15$).

Third, three trained researchers conducted preannounced observations during three lessons of each experimental teacher. The researchers used an observation instrument to

assess teachers' time on task (based on Bouwer et al., 2018), the global quality of the lessons on a 5-point scale ranging from 'very low quality' to 'very high quality' (based on Vaughn et al., 2011), and the quality of implementation of the intervention on a 5-point scale ranging from 'not observed' to 'observed with high alignment with the teacher manual' (based on Vaughn et al., 2011). The observational data indicate that teachers were on task on average 86.29% of the total lesson time (see Table 6). As intended, proportionately more time was devoted to plenary instruction in the explicit instruction conditions (i.e., EI+IND and EI+PA) compared to the matched practice comparison conditions (i.e., IND and PA). Furthermore, the global quality of the observed lessons was high across conditions (see Table 6) and most of the crucial intervention elements were observed indicating that the experimental teachers followed the instructions in the teacher manual carefully (see Table 7).

Finally, the researchers also conducted observations in the BAU classes to map the instructional writing practices and mode of delivery and to determine whether there was any contamination of instruction. The teachers followed a traditional writing approach by using regular textbooks and manuals to teach writing. Observational data showed that during the 5-week intervention period both BAU teachers organized only one writing lesson of on average 96 minutes (*SD* = 9.90). BAU teachers were on task on average 89.20% of the total lesson time. They spent about half of their time on monitoring students' progress and providing feedback while writing (56.45%). Additionally, they devoted a considerable amount of time to plenary instruction (33.27%) and to a lesser extent to classroom interaction (10.28%). Furthermore, the observational data showed that the global quality (i.e., on a 5-point scale) of the observed BAU lessons was high: the quality of instruction was high (*M* = 4.00, *SD* = 0.00), teachers were able to manage their class quite effectively (*M* = 3.50, *SD* = 2.12), and students were engaged (*M* = 4.00, *SD* = 1.41). The content, instructional approach, and mode of delivery in BAU lessons varied. As to the lesson of the first BAU teacher, students had to write a story individually. Regarding the lesson of the other BAU teacher, students had to read a descriptive text with a peer. Afterwards they had to write a descriptive text individually.

Table 6. *Average time spent on the observed lessons, teachers' time on/off task, and the global quality of the observed writing lessons.*

	EI+IND	**EI+PA**	**IND**	**PA**	**All experimental conditions**
Average time spent on observed lesson[a]	55.57 (7.23)	46.67 (11.78)	46.67 (5.61)	48.67 (2.25)	49.40 (13.82)
Teachers' time on/off task					
Time on task	89.23%	94.88%	82.43%	87.70%	88.56%
Plenary instruction	34.99%	26.45%	12.12%	15.60%	22.29%
Classroom interaction	19.07%	28.71%	36.35%	20.26%	26.10%
Monitoring students' progress	45.94%	44.84%	51.30%	64.14%	51.56%
Time off task	10.77%	5.12%	28.82%	12.30%	14.25%
Global quality[b]					
Quality of instruction	4.29 (0.76)	4.50 (0.55)	4.83 (0.41)	4.50 (0.55)	4.53 (0.58)
Class management	4.00 (1.53)	4.50 (0.84)	4.33 (0.52)	4.17 (0.75)	4.25 (1.04)
Student engagement	4.43 (0.79)	4.50 (0.84)	4.67 (0.52)	4.67 (0.52)	4.57 (0.70)

Note. [a] Average time in minutes. Standard deviations are placed between brackets.
[b] Global quality was measured using a 5-point scale ranging from 'very low quality' to 'very high quality'

Table 7. *The quality of implementation[a]: Observational data assessing the critical elements of the intervention in the experimental conditions.*

	M (*SD*)				
	EI+IND	**EI+PA**	**IND**	**PA**	**All experimental conditions**
Fixed lesson format					
Introduction	4.79 (0.39)	4.91 (0.20)	4.79 (0.29)	3.79 (1.11)	4.58 (0.73)
Practice	4.92 (0.19)	4.42 (0.80)	4.58 (0.66)	4.42 (0.58)	4.60 (0.60)
Reflection	1.57 (1.51)	2.50 (1.76)	2.67 (1.89)	2.58 (1.50)	2.30 (1.63)
Explicit strategy instruction					
Pointing out the value of the strategy	4.75 (0.50)	5.00 (0.00)			
Discussing students' strategy use	4.50 (1.00)	5.00 (0.00)			
Modeling	4.25 (1.19)	3.25 (0.50)			
Introducing strategy cards	4.50 (1.00)	4.46 (0.71)			
Challenging students to internalize writing strategies	5.00 (0.00)	3.25 (2.83)			
Mode of delivery					
Students writing individually	4.67 (0.58)		5.00 (0.00)		
Students writing in heterogeneous dyads		4.50 (0.71)		4.83 (0.71)	

Note. [a] To assess the quality of implementation, the critical elements of the intervention concerning the fixed lesson format, the explicit strategy instruction, and the mode of delivery were measured using a 5-point scale ranging from 'not observed' to 'observed with high alignment with the teacher manual'.

Measures

Writing motivation

Students' writing motivation was measured by means of the SRQ-Writing motivation, which was tested in prior research with upper-elementary students in Flanders (For more information on the structure and the fit of the scales, see De Smedt et al., 2018). The SRQ-Writing Motivation measures two types of writing motivation: (a) autonomous writing motivation (e.g., "I write a text because I enjoy writing" or "I write a text because I think it is very useful for me to write") and (b) controlled writing motivation (e.g., "I write a text because I will feel guilty if I don't do it" or "I write a text because others will only reward me if I write") (Ryan & Deci, 2000b). The instrument comprises of 17 items to be scored on a five-point Likert scale, ranging from

1 (disagree a lot) to 5 (agree a lot). Internal consistency for both subscales was high at both pretest and posttest (see Table 8).

Self-efficacy for writing

To measure self-efficacy as a multidimensional construct, the Self-Efficacy for Writing Scale was used (SEWS) (Bruning et al., 2013). This questionnaire was tested previously in upper-elementary classes in Flanders as well (For more information on the structure of the scales, see De Smedt et al., 2018). The SEWS measures (a) self-efficacy for ideation (e.g., "I can think of many ideas for my writing"), (b) self-efficacy for conventions (e.g., "I can spell my words correctly"), and (c) self-efficacy for regulation (e.g., "I can concentrate for at least one hour when I write") (Bruning et al., 2013) by means of 12 items on a 100-point scale. Internal consistency for all subscales was moderate to high at both measurement occasions (see Table 8).

Table 8. *Internal consistency coefficients of the SRQ-Writing motivation and the Self-Efficacy for Writing Scale.*

	Cronbach's *α*	
Scale	**Pretest**	**Posttest**
SRQ-Writing Motivation		
Autonomous writing motivation	.92	.82
Controlled writing motivation	.83	.85
Self-Efficacy for Writing Scale		
Self-efficacy for ideation	.83	.82
Self-efficacy for conventions	.80	.80
Self-efficacy for regulation	.75	.72

Data analysis

The effect of explicit instruction and peer-assisted writing was investigated by means of multilevel analyses using MLwiN 2.29 (Rasbash, Charlton, Browne, Healy, & Cameron, 2009). In this way, the two-level structure of students clustered within classes was taken into account (Hox, 2002). A stepwise procedure was used to conduct multilevel analyses on the following posttest response variables: (a) autonomous writing motivation, (b) controlled writing motivation, (c) self-efficacy for ideation, (d) self-efficacy for conventions, and (e) self-efficacy for regulation. First, the fully unconditional two-level null models were computed (i.e., students at level 1 and classes at level 2). Second, the pretest scores of the response variable was

included as a covariate in the respective models (cf., models 1). Third, the experimental conditions were added to the models (cf., models 2) to compare: (a) the experimental conditions to BAU, (b) the explicit instruction conditions (EI+IND and EI+PA) to the matched practice conditions (IND and PA), and (c) the individual conditions (EI+IND and IND) to the peer-assisted conditions (EI+PA and PA). Regression coefficients were standardized (*SD*) and interpreted as effect sizes for all statistical significant effects (Cohen, 1977). Finally, students' gender was added as an explanatory variable in the fixed part of the models and interaction effects with the conditions were included (RQ4) (cf., models 3).

Results

Multilevel results

Tables 9 to 13 present the summaries of the model estimates for the two-level analysis of students' autonomous writing motivation, controlled writing motivation, self-efficacy for ideation, self-efficacy for conventions, and self-efficacy for regulation, respectively. The random part of the null models showed that the variances at class level were not significantly different from zero, indicating that the variability in the response variables cannot be attributed to differences between classes (i.e., autonomous writing motivation: $\chi^2 = 1.22$, $df = 1$, $p = .27$; controlled writing motivation: $\chi^2 = 0.00$, $df = 1$, $p = 1.00$; self-efficacy for ideation: $\chi^2 = 1.25$, $df = 1$, $p = .26$; self-efficacy for conventions: $\chi^2 = 0.00$, $df = 1$, $p = 1.00$; and self-efficacy for regulation: $\chi^2 = 0.75$, $df = 1$, $p = .39$). The intercepts in the null models represent the overall mean posttest scores on each response variable. Adding the pretest scores of each response variable as covariates (cf., model 1) revealed that students' pretest scores were positively related to their posttest scores (i.e., autonomous writing motivation: $\chi^2 = 193.22$, $df = 1$, $p < .001$; controlled writing motivation: $\chi^2 = 146.33$, $df = 1$, $p < .001$; self-efficacy for ideation: $\chi^2 = 55.99$, $df = 1$, $p < .001$; self-efficacy for conventions: $\chi^2 = 108.28$, $df = 1$, $p < .001$; and self-efficacy for regulation: $\chi^2 = 109.51$, $df = 1$, $p < .001$).

Table 9. *Summary of the model estimates for the two-level analysis of students' autonomous writing motivation at posttest.*

	Model 0	**Model 1**	**Model 2[a]**	**Model 3**
Fixed part				
CONS	3.32 (0.10)***	3.32 (0.06)***	3.18 (0.10)***	2.96 (0.13)***
(Pretest score -3.2)		0.70 (0.05)***	0.70 (0.05)***	0.64 (0.05)***
EI+IND			-0.01 (0.14)	0.08 (0.18)
EI+PA			0.20 (0.16)	0.33 (0.21)
IND			0.25 (0.16)	0.51 (0.20)*
PA			0.30 (0.15)*	0.42 (0.19)*
Gender (girl)				0.51 (0.20)*
Gender (girl).EI+IND				-0.20 (0.28)
Gender (girl).EI+PA				-0.31 (0.31)
Gender (girl).IND				-0.60 (0.35)
Gender (girl).PA				-0.30 (0.28)
Random part				
Level: Class				
CONS/CONS	0.05 (0.04)	0.01 (0.02)	0.00 (0.00)	0.00 (0.00)
R^2	4.93%	2.18%	0.00%	0.00%
Level: Student				
CONS/CONS	0.87 (0.09)***	0.45 (0.05)	0.44 (0.05)***	0.42 (0.04)***
R^2	95.07%	97.82%	100.00%	100%
Loglikelihood	529.91	388.01	381.36	371.92
Reference Model		Model 0	Model 1	Model 2

Note. Standard error estimates are placed between brackets. ***p < .001. **p < .01. *p < .05.

[a]Model equation with business as usual condition as reference condition as an example:
$y \sim N(XB, \Omega)$
$y_{ij} = \beta 0_{ij}\,\text{CONS} + \beta 1\,\text{Pretest}(-96.6)_{ij} + \beta 2\,\text{EI+IND}_j + \beta 3\,\text{EI+PA}_j + \beta 4\,\text{IND}_j + \beta 5\,\text{PA}_j$

$\beta 0_{ij} = \beta 0 + u0_j + e0_{ij}$
$[u0_j] \sim N(0, \Omega u)$: $\Omega u = [\sigma^2 u0]$
$[e0_{ij}] \sim N(0, \Omega e)$: $\Omega e = [\sigma^2 e0]$

Table 10. *Summary of the model estimates for the two-level analysis of students' controlled writing motivation at posttest.*

	Model 0	**Model 1**	**Model 2[a]**	**Model 3**
Fixed part				
CONS	2.72 (0.06)***	2.71 (0.05)***	2.80 (0.09)***	2.75 (0.12)***
(Pretest score -2.86)		0.70 (0.06)***	0.71 (0.06)***	0.68 (0.06)***
EI+IND			-0.02 (0.13)	0.08 (0.16)
EI+PA			-0.08 (0.14)	-0.00 (0.19)
IND			-0.32 (0.15)*	-0.30 (0.18)
PA			-0.14 (0.13)	0.20 (0.17)
Gender (girl)				0.14 (0.18)
Gender (girl).EI+IND				-0.23 (0.25)
Gender (girl).EI+PA				-0.18 (0.28)
Gender (girl).IND				0.02 (0.32)
Gender (girl).PA				-0.72 (0.26)**
Random part				
Level: Class				
CONS/CONS	0.00 (0.00)	0.01 (0.01)	0.00 (0.00)	0.00 (0.00)
R^2	0.00%	1.88%	0.00%	0.00%
Level: Student				
CONS/CONS	0.66 (0.07)***	0.37 (0.04)***	0.36 (0.04)***	0.34 (0.04)***
R^2	100.00%	98.12%	100.00%	100.00%
Loglikelihood	463.70	342.28	337.15	326.53
Reference Model		Model 0	Model 1	Model 2

Note. Standard error estimates are placed between brackets. ***p < .001. **p < .01. *p < .05.

[a]Model equation with business as usual condition as reference condition as an example:
$y \sim N(XB, \Omega)$
$y_{ij} = \beta 0_{ij}\ \text{CONS} + \beta 1\ \text{Pretest}(-96.6)_{ij} + \beta 2\ \text{EI+IND}_j + \beta 3\ \text{EI+PA}_j + \beta 4\ \text{IND}_j + \beta 5\ \text{PA}_j$

$\beta 0_{ij} = \beta 0 + u0_j + e0_{ij}$
$[u0_j] \sim N(0, \Omega u)$: $\Omega u = [\sigma^2 u0]$
$[e0_{ij}] \sim N(0, \Omega e)$: $\Omega e = [\sigma^2 e0]$

Table 11. *Summary of the model estimates for the two-level analysis of students' self-efficacy for ideation at posttest.*

	Model 0	**Model 1**	**Model 2[a]**	**Model 3**
Fixed part				
CONS	73.90 (1.90)***	73.83 (1.82)***	70.69 (3.50)***	68.51 (3.87)***
(Pretest score -66.5)		0.43 (0.06)***	0.44 (0.06)***	0.42 (0.06)***
EI+IND			3.06 (4.93)	3.97 (5.44)
EI+PA			0.68 (5.21)	0.72 (5.98)
IND			6.97 (5.37)	7.38 (5.78)
PA			5.46 (5.03)	3.09 (5.76)
Gender (girl)				5.33 (4.85)
Gender (girl).EI+IND				-2.26 (6.77)
Gender (girl).EI+PA				-0.42 (7.60)
Gender (girl).IND				0.98 (8.64)
Gender (girl).PA				3.79 (7.06)
Random part				
Level: Class				
CONS/CONS	17.96 (16.08)	18.75 (14.76)	12.83 (12.07)	10.52 (10.82)
R^2	4.94%	6.51%	4.56%	3.87%
Level: Student				
CONS/CONS	345.74 (35.65)***	269.23 (27.99)***	268.80 (27.94)***	261.63 (27.19)***
R^2	95.06%	93.49%	95.44%	96.13%
Loglikelihood	1726.34	1653.00	1650.72	1644.67
Reference Model		Model 0	Model 1	Model 2

Note. Standard error estimates are placed between brackets. ***p < .001. **p < .01. *p < .05.

[a]Model equation with business as usual condition as reference condition as an example:
$y \sim N(XB, \Omega)$
$y_{ij} = \beta 0_{ij}$ CONS + β1 Pretest(-96.6)$_{ij}$ + β2 EI+IND$_j$ + β3 EI+PA$_j$ + β4 IND$_j$ + β5 PA$_j$

$\beta 0_{ij} = \beta 0 + u0_j + e0_{ij}$
$[u0_j] \sim N(0, \Omega u)$: $\Omega u = [\sigma^2 u0]$
$[e0_{ij}] \sim N(0, \Omega e)$: $\Omega e = [\sigma^2 e0]$

Table 12. *Summary of the model estimates for the two-level analysis of students' self-efficacy for conventions at posttest.*

	Model 0	**Model 1**	**Model 2[a]**	**Model 3**
Fixed part				
CONS	80.66 (1.06)***	80.30 (0.94)***	81.88 (1.76)***	79.89 (2.27)***
(Pretest score -82.5)		0.66 (0.06)***	0.66 (0.06)***	00.65 (0.06)***
EI+IND			-1.68 (2.13)	0.40 (3.16)
EI+PA			-2.55 (2.73)	-2.34 (3.64)
IND			-5.11 (2.87)	-3.74 (3.46)
PA			0.01 (2.57)	1.06 (3.45)
Gender (girl)				4.89 (3.50)
Gender (girl).EI+IND				-5.10 (4.87)
Gender (girl).EI+PA				-1.10 (5.43)
Gender (girl).IND				-2.52 (6.22)
Gender (girl).PA				-3.01 (5.07)
Random part				
Level: Class				
CONS/CONS	0.02 (4.96)	1.46 (3.90)	0.00 (0.00)	0.00 (0.00)
R^2	0.01%	1.03%	0.00%	0.00%
Level: Student				
CONS/CONS	220.74 (22.73)***	140.69 (14.61)***	139.12 (14.12)***	136.83 (13.89)***
R^2	99.99%	98.97%	100.00%	100.00%
Loglikelihood	1630.53	1519.80	1515.78	1512.55
Reference Model		Model 0	Model 1	Model 2

Note. Standard error estimates are placed between brackets. ***p < .001. **p < .01. *p < .05.

[a]Model equation with business as usual condition as reference condition as an example:
$y \sim N(X\beta, \Omega)$
$y_{ij} = \beta 0_{ij}\,\text{CONS} + \beta 1\,\text{Pretest}(-96.6)_{ij} + \beta 2\,\text{EI+IND}_j + \beta 3\,\text{EI+PA}_j + \beta 4\,\text{IND}_j + \beta 5\,\text{PA}_j$

$\beta 0_{ij} = \beta 0 + u0_j + e0_{ij}$
$[u0_j] \sim N(0, \Omega u)$: $\Omega u = [\sigma^2 u0]$
$[e0_{ij}] \sim N(0, \Omega e)$: $\Omega e = [\sigma^2 e0]$

Table 13. *Summary of the model estimates for the two-level analysis of students' self-efficacy for regulation at posttest.*

	Model 0	**Model 1**	**Model 2[a]**	**Model 3**
Fixed part				
CONS	70.23 (1.95)***	69.84 (1.44)***	68.94 (2.58)***	67.17 (3.56)***
(Pretest score -70.8)		0.60 (0.06)***	0.61 (0.06)***	0.60 (0.06)***
EI+IND			-2.48 (3.59)	-5.07 (4.99)
EI+PA			2.34 (1.00)	2.33 (5.59)
IND			1.63 (4.22)	0.87 (5.36)
PA			3.58 (3.76)	5.96 (5.40)
Gender (girl)				4.45(5.00)
Gender (girl).EI+IND				6.39 (6.78)
Gender (girl).EI+PA				-0.57 (7.82)
Gender (girl).IND				5.22 (8.93)
Gender (girl).PA				-5.66 (7.35)
Random part				
Level: Class				
CONS/CONS	14.78 (17.03)	5.57 (9.27)	0.48 (6.93)	4.45 (8.46)
R^2	3.19%	1.87%	0.16%	1.57%
Level: Student				
CONS/CONS	449.262 (46.30)***	292.91 (30.43)***	293.30 (30.45)***	278.77 (28.96)***
R^2	96.81%	98.13%	99.84%	98.43%
Loglikelihood	1776.17	1664.09	1661.53	1654.01
Reference Model		Model 0	Model 1	Model 2

Note. Standard error estimates are placed between brackets. ***p < .001. **p < .01. *p < .05.

[a]Model equation with business as usual condition as reference condition as an example:
$y \sim N(X\beta, \Omega)$
$y_{ij} = \beta 0_{ij}\ \text{CONS} + \beta 1\ \text{Pretest}(-96.6)_{ij} + \beta 2\ \text{EI+IND}_j + \beta 3\ \text{EI+PA}_j + \beta 4\ \text{IND}_j + \beta 5\ \text{PA}_j$

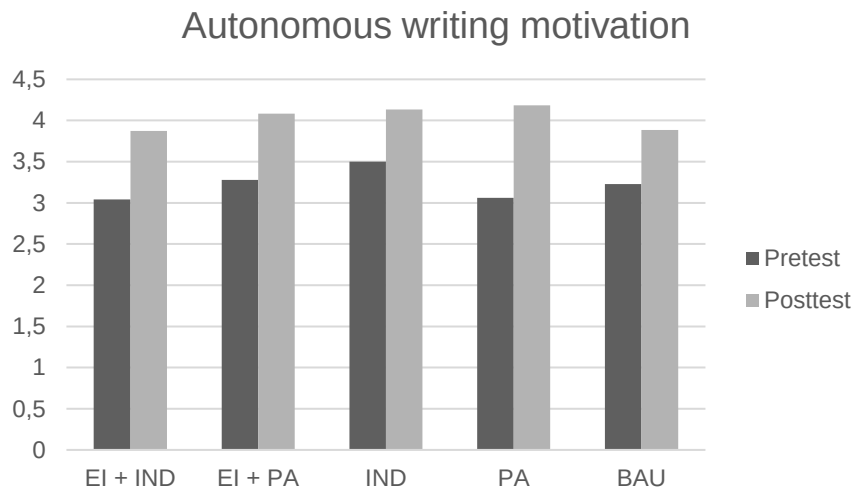
$\beta 0_{ij} = \beta 0 + u0_j + e0_{ij}$
$[u0_j] \sim N(0, \Omega u)$: $\Omega u = [\sigma^2 u0]$
$[e0_{ij}] \sim N(0, \Omega e)$: $\Omega e = [\sigma^2 e0]$

Effect of the experimental intervention programs

To compare the effectiveness of the experimental programs, the conditions were included in model 2 (see Tables 9 to 13). Figures 1 to 5 visualize students' pretest scores and their posttest scores corrected for baseline motivation and self-efficacy. First, experimental students' posttests were compared with BAU students. Results showed that PA students (*M* = 4.19, *SD* = 1.04) were more autonomously motivated than BAU students (*M* = 3.89, *SD* = 1.04) (χ^2 = 4.31, *df* = 1, *p* < .05, 0.32 *SD*), while IND students (*M* = 3.19, *SD* = 0.75) were less controlled motivated than BAU students (*M* = 3.51, *SD* = 0.81) (χ^2 = 4.62, *df* = 1, *p* < .05, 0.40 *SD*). No significant differences were found for the different types of self-efficacy (see models 2 in Tables 9 to 13).

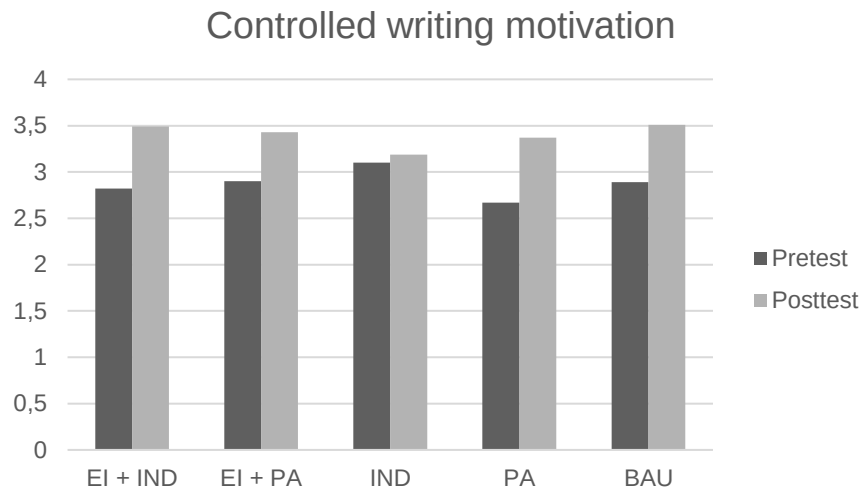
Second, to study the distinct effect of explicit instruction, EI+IND and EI+PA students were compared to IND and PA students, respectively. Results showed that, when taking into account students' pretest score as covariate, EI+IND students (*M* = 3.49, *SD* = 0.74) reported higher levels of controlled writing motivation at posttest compared to IND students (*M* = 3.19, *SD* = 0.75) (χ^2 = 4.19, *df* = 1, *p* < .05, 0.37 *SD*). No significant differences were found for autonomous writing motivation (χ^2 = 2.54, *df* = 1, *p* = 0.11; χ^2 = 0.42, *df* = 1, *p* = 0.52), self-efficacy for ideation (χ^2 = 0.54, *df* = 1, *p* = 0.46; χ^2 = 0.82, *df* = 1, *p* = 0.37), for conventions (χ^2 = 1.47, *df* = 1, *p* = 0.23; χ^2 = 0.84, *df* = 1, *p* = 0.36), and for regulation (χ^2 = 0.97, *df* = 1, *p* = 0.32; χ^2 = 0.10, *df* = 1, *p* = 0.76).

Finally, to study the distinct effect of peer-assisted writing, EI+IND and IND students were compared to EI+PA and PA students, respectively. Results showed no significant differences for autonomous writing motivation (χ^2 = 1.85, *df* = 1, *p* = 0.17; χ^2 = 0.11, *df* = 1, *p* = 0.74), controlled writing motivation (χ^2 = 0.21, *df* = 1, *p* = 0.65; χ^2 = 1.47, *df* = 1, *p* = 0.23), self-efficacy for ideation (χ^2 = 0.21, *df* = 1, *p* = 0.65; χ^2 = 0.08, *df* = 1, *p* = 0.78), for conventions (χ^2 = 0.10, *df* = 1, *p* = 0.75; χ^2 = 3.06, *df* = 1, *p* = 0.08), and for regulation (χ^2 = 1.47, *df* = 1, *p* = 0.23; χ^2 = 0.21, *df* = 1, *p* = 0.65).



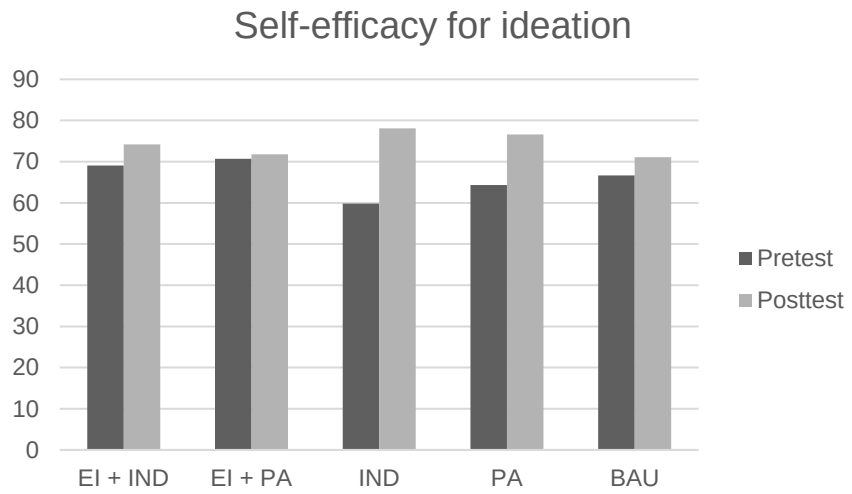
	EI + IND	EI + PA	IND	PA	BAU
Pretest	3.04 (0.76)	3.28 (0.94)	3.50 (1.04)	3.06 (1.19)	3.23 (0.99)
Posttest	3.88 (0.87)	4.08 (0.92)	4.13 (0.84)	4.19 (1.04)	3.89 (1.04)

Figure 1. *Students' mean pretest and posttest autonomous writing motivation corrected for baseline motivation. Standard deviations between brackets.*



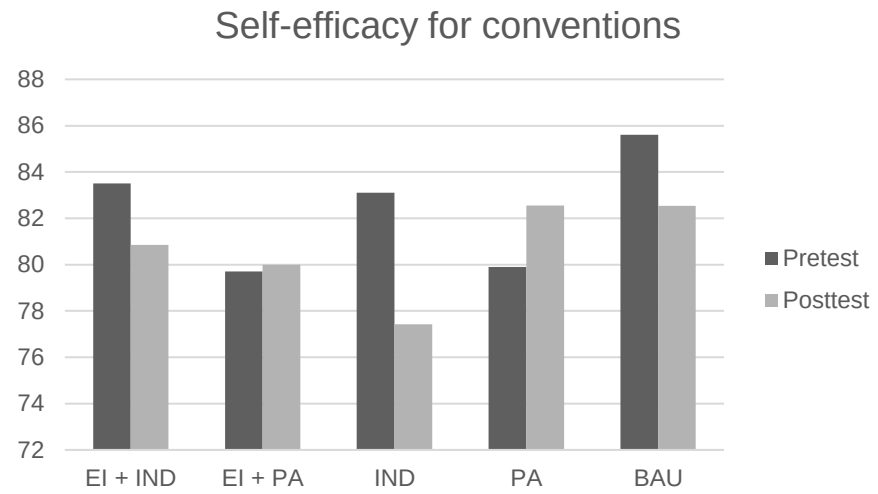
	EI + IND	EI + PA	IND	PA	BAU
Pretest	2.82 (0.70)	2.90 (0.68)	3.10 (0.80)	2.67 (0.88)	2.89 (0.81)
Posttest	3.49 (0.74)	3.43 (0.60)	3.19 (0.75)	3.37 (0.95)	3.51 (0.81)

Figure 2. *Students' mean pretest and posttest controlled writing motivation corrected for baseline motivation. Standard deviations between brackets.*



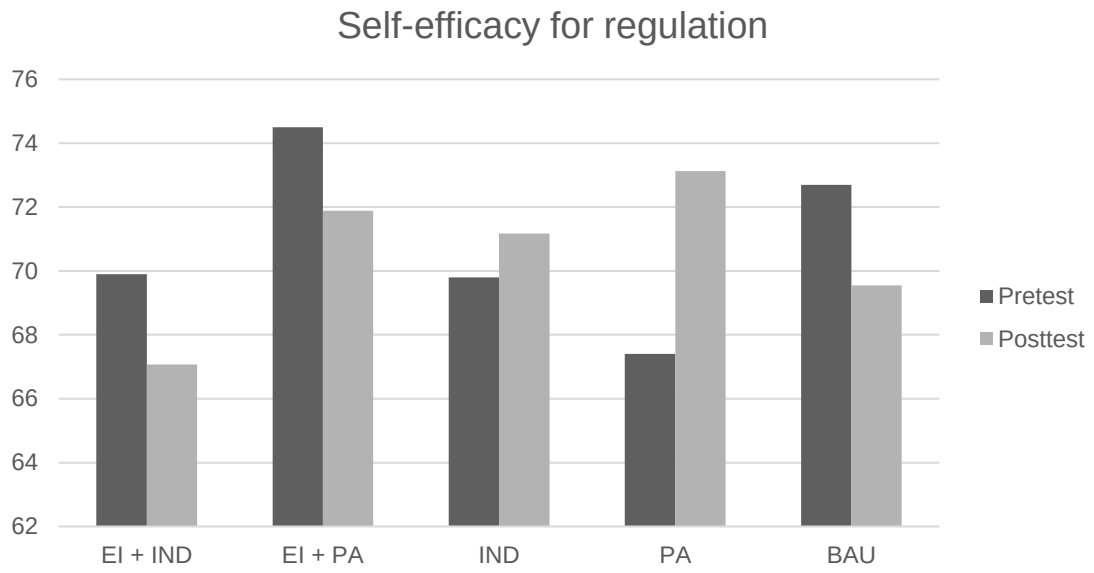
Pretest	69.1 (20.1)	70.7 (16.0)	59.8 (26.8)	64.3 (23.2)	66.7 (20.1)
Posttest	74.2 (17.2)	71.8 (16.2)	78.1 (21.0)	76.6 (22.2)	71.1 (19.4)

Figure 3. *Students' mean pretest and posttest self-efficacy for ideation corrected for baseline self-efficacy. Standard deviations between brackets.*



Pretest	83.5 (13.5)	79.7 (16.1)	83.1 (15.1)	79.9 (14.6)	85.6 (15.0)
Posttest	80.9 (13.6)	80.0 (12.8)	77.4 (16.8)	82.5 (16.7)	82.5 (14.5)

Figure 4. *Students' mean pretest and posttest self-efficacy for conventions corrected for baseline self-efficacy. Standard deviations between brackets.*

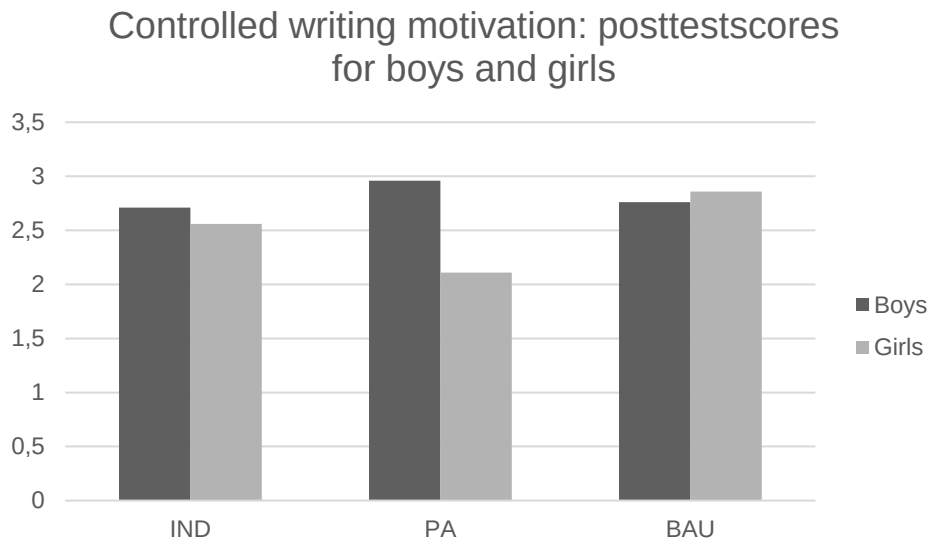


Pretest	69.9 (21.7)	74.5 (17.8)	69.8 (22.4)	67.4 (25.1)	72.7 (21.8)
Posttest	67.1 (25.9)	71.9 (19.2)	71.2 (20.4)	73.1 (20.9)	69.5 (19.7)

Figure 5. *Students' mean pretest and posttest self-efficacy for regulation corrected for baseline self-efficacy. Standard deviations between brackets.*

Differential effects according to gender

To investigate differential effects according to students' gender, gender was added as an explanatory variable in the fixed part of the model and interaction effects with the research conditions were included in model 3 (see Tables 9 to 13). As to the main effects, results showed that girls (M = 3.70, SD = 0.65) were more autonomously motivated at posttest than boys (M = 2.99, SD = 1.04) across conditions (χ^2 = 3.26, df = 1, p < .05). No significant gender differences were found, however, for controlled writing motivation (χ^2 = 0.62, df = 1, p = 0.43), self-efficacy for ideation (χ^2 = 1.21, df = 1, p = 0.27), for conventions (χ^2 = 1.95, df = 1, p = 0.16), and for regulation (χ^2 = 0.79, df = 1, p = 0.37). As to the interaction effects between gender and condition, pointing at the potentially differential effectiveness of experimental interventions for boys versus girls, the results showed that PA girls (M = 2.11, SD = 0.60) were less controlled motivated than BAU girls (M = 2.86, SD = 0.89) (χ^2 = 7.76, df = 1, p < 0.01) and IND girls (M = 2.56, SD = 0.33) (χ^2 = 5.38, df = 1, p < 0.05) (see Figure 6).



Boys	2.71 (0.86)	2.96 (1.04)	2.76 (0.97)
Girls	2.56 (0.33)	2.11 (0.60)	2.86 (0.89)

Figure 6. *Boys' and girls' mean posttest controlled writing motivation corrected for baseline motivation. Standard deviations between brackets.*

Discussion

Effectiveness of explicit instruction and/or peer-assisted writing

Comparison of the four experimental conditions with the BAU condition revealed beneficial effects of the experimental writing programs for PA and IND students. First, PA students were more autonomously motivated at posttest, confirming previous research pointing out the positive impact of peer-assisted writing on students' writing motivation (De Bernardi & Antolini, 2007). The present findings, however, go beyond the prior results and provide more in-depth insight into the effect on students' motivation as qualitatively different types of motivation were taken into account (Ryan & Deci, 2000b), particularly revealing that peer-assisted writing appears to nurture students' innate needs, thereby creating a 'bright' pathway to the most favorable type of motivation, namely autonomous writing motivation (Ryan & Deci, 2000a). In other words, providing ample writing opportunities in which students can write together with a peer enhances their motivation to write out of inherent satisfaction, pleasure, or recognition of the value of the writing activity. This finding corroborates SDT's theoretical assumption that

autonomous motivation is fostered by supporting students' need for relatedness (Ryan & Deci, 2000b) also in the context of writing education. In the PA intervention, we focused on fostering students' needs for relatedness by stimulating peer collaboration and constructive peer interaction (a) by asking students to agree on collaboration rules to show their engagement while working with their writing partner, (b) by creating heterogeneous groups, thereby explicitly taking into account that writing partners should get along, and (c) by opting for stable writing group composition so students could get acquainted with and respect each other's abilities and limitations.

Second, the present findings showed that IND students were less controlled motivated than BAU students at posttest. In other words, offering students ample individual writing opportunities without explicit or implicit instruction appears to be a possible way to prevent the 'dark' pathway towards the less favorable type of affect: controlled writing motivation. More particularly, after the 10 writing lessons, IND students reported they felt less inclined to write out of external or internal pressure, compared to BAU students. This might be due to the amount of writing opportunities students received. Based on the IND teacher logbooks and the observational data in the BAU condition, we found that IND teachers completed ten writing lessons, while BAU teachers only provided one lesson in the same period. In this respect, BAU teachers might actively hamper students' innate need of competence by failing to provide opportunities for students to practice writing, thereby activating competence frustration. In this way, a lack of writing opportunities might create a 'dark' pathway towards controlled writing motivation, while providing students ample challenging and communicative individual writing tasks might withhold this 'dark' pathway (Haerens et al., 2016; Ryan & Deci, 2000a).

The present study also provided insight into the impact of explicit instruction on the one hand and further insight into peer-assisted writing on the other hand. As to explicit instruction, comparison of EI+IND and IND showed that EI+IND students had higher controlled motivation at posttest. Although previous research consistently supported the effectiveness of explicit instruction to improve students' writing performance (Graham et al., 2016; Graham et al., 2012; Koster et al., 2015), the present study revealed that explicitly teaching students writing knowledge and strategies might in one way or another simultaneously be an impetus to the 'dark' pathway to the less favorable type of writing motivation (Haerens et al., 2016; Ryan & Deci, 2000a).

A possible explanation for these results might be that the explicit instruction of writing possibly hinders students' spontaneous writing (cf., autonomy frustration) and reinforces the impression that to write effectively and to succeed in writing they must apply the writing knowledge and strategies taught (cf., feelings of pressure). Consequently, students might have reported more writing because of internal pressure (e.g., students feeling guilty when not writing as taught by the teacher) or external pressure (e.g., students wanting to get good

grades by following the taught writing strategies in detail). Although the value and effectiveness of explicit instruction to improve students' writing performance has been widely acknowledged (Graham, 2006; Graham et al., 2012; Koster et al., 2015), more research is needed to get more in-depth insights into the effect of explicit instruction on students' motivation (Graham et al., 2005) from the angle of the SDT-framework. More particularly, research is needed on: (a) whether and to what extent students experience autonomy, competence, and/or relatedness frustrations during explicit instruction, (b) whether and to what extent they experience teachers' behavior during explicit instruction as controlling, and (c) if different types of explicit instruction yield different motivational outcomes.

Based on such research, we should have a better understanding of how explicit instruction can be implemented without internally or externally pressuring students, which in turn can decrease students' need frustration. In this way, we can contribute to explicit instruction interventions leading to positive effects on both student' writing performance and motivation to write. This is especially important as theoretical models of writing (e.g., Graham, 2018; Zimmerman & Risemberg, 1997) underline both cognitive and motivational aspects of writing on the one hand, and as writing motivation is key to improving students' writing performance on the other hand (De Smedt et al., 2018; De Smedt et al., 2016; Graham et al., 2007; Troia et al., 2013). Indeed, if we aim to improve students' writing performance in the long term, fostering and maintaining students' autonomous writing motivation is essential (Cleary, 1991). However, to investigate properly such effects, we need to invest in longitudinal investigations to study: (a) how teachers can foster students' innate needs for autonomy, competence, and relatedness within explicit instruction practices, (b) how autonomous writing motivation can be maintained over a longer period of time, and (c) how autonomous writing motivation can enhance students' writing performance, which, in turn, can further foster later autonomous motivation.

As to the impact of peer-assisted writing, no significant differences were found comparing the individual writing conditions with the peer-assisted conditions. Contrary to previous research (De Bernardi & Antolini, 2007; Paquette, 2009; Ryan & Deci, 2000b), peer-assisted writing revealed no effect on students' motivation nor on self-efficacy for writing. As discussed above, we did find an effect of peer-assisted writing compared to the business as usual writing program on students' autonomous motivation. These findings reveal the importance of providing ample writing opportunities for students to write either individually or collaboratively.

Contrary to the hypotheses based on SET (Bandura, 1977, 1997), no significant effects of explicit instruction nor peer-assisted writing were found for students' self-efficacy for writing. Similarly to previous studies (e.g., Graham et al., 2005), the participating students reported high levels of self-efficacy before and after the intervention period. A possible explanation for these results might be that the phrasing in the self-report questionnaire elicited socially

desirable responses from students, as this is a major drawback of self-report instruments (Schellings & Van Hout-Wolters, 2011). Another possible explanation, however, might be that students have difficulties assessing their ability, leading to overestimation (Klassen, 2002). The fact that students have difficulties assessing their writing capabilities has implications for educational practice. An sich, optimistic self-beliefs are positive as these protect a person from losing faith in his or her capability to write (Bandura, 1997). However, it is important for teachers to deal with students' overconfidence in writing by improving students' calibration skills (Pajares, 1996).

Differential effects according to students' gender

Similarly to previous research (De Smedt et al., 2018), the results revealed that girls in all conditions were more autonomously motivated at posttest than boys. As to the differential effects according to students' gender, results revealed that PA girls benefitted significantly more from the PA writing program compared to both IND and BAU girls. More specifically, PA girls were less controlled motivated at posttest, which leads us to the hypothesis that peer-assisted writing was particularly effective in preventing girls' need frustration for autonomy, relatedness, and/or competence (Ryan & Deci, 2000a, 2000b).

Future research should focus on exploring which need frustrations (cf., autonomy, relatedness, and/or competence frustration) of girls were particularly prevented by peer-assisted writing and which needs are potentially frustrated for boys when writing together with peers. Furthermore, future research should be designed to gain a clearer understanding of which elements of the peer-assisted writing practices, such as the one described in the present study, are especially effective in decreasing girls' controlled writing motivation. In this respect, different peer-assisted writing practices (e.g., peer tutoring, peer discussion) and different implementations of these practices (e.g., heterogeneous versus homogeneous groups) might be experienced differently by boys and girls. Additionally, future studies should try to identify favorable conditions for implementing peer-assistance to foster students' innate psychological needs for autonomy, competence, and relatedness of both girls and boys in view of creating a 'bright' pathway towards autonomous writing motivation.

Limitations and suggestions for future research

In addition, to the suggestions for future research presented above, we conclude with additional research suggestions and also acknowledge the limitations of the present study. First, we must note the relatively short intervention period (i.e., 5 weeks). This period was

necessitated by two factors. We wanted to investigate in an intervention which: (a) was implemented in authentic classes by the regular class teachers who received intensive training and (b) was followed up closely by regularly observing the teachers implementing the intervention lessons (cf., fidelity of implementation). In this way, participating in this study required a large investment for the teachers, especially as they did not typically spend a lot of time on writing (De Smedt et al., 2016). However, in view of fostering motivational outcomes such as writing motivation and self-efficacy, future studies should study similar interventions spread over a longer time period (e.g., Meece & Miller, 1999). In addition, it would be worthwhile to investigate long-term effects by examining both short and long-term maintenance to determine whether explicit instruction and peer-assisted writing can foster long-lasting writing motivation and self-efficacy effects.

Second, in the present study we examined differential effects of the interventions according to students' gender. It would be interesting to study differential effects related to other learner characteristics, such as language proficiency.

As to the motivational outcome measures, we focused in particular on writing motivation and self-efficacy for writing. The motivational aspect of writing, however, comprises several related concepts such as, interest or writing apprehension (Troia et al., 2013). It would be interesting to investigate the impact of explicit instruction and peer-assisted writing on other motivational constructs. Furthermore, the experimental writing programs in the present study focused on one text genre (i.e., descriptive text). Consequently, the present findings cannot necessarily be transferred to other genres (e.g., narrative or argumentative texts). In this respect, it would be interesting to investigate whether similar writing programs focusing on other or more text genres in combination influence students' writing motivation and self-efficacy for writing differently.

Finally, we assessed motivation and self-efficacy within the domain of writing. However, we did not use genre-specific measures to assess students' motivation and self-efficacy, for instance, in the context of writing a descriptive text. In this respect, results might differ when applying genre-specific measures instead of general measures for writing motivation and self-efficacy for writing.

Theoretical and educational implications

As to the theoretical implications, the present study underlines the need to further study students' motivation for writing. In light of the present findings demonstrating different effects for autonomous and controlled writing motivation, we especially think it is important to distinguish between the quality of students' motives to engage in writing next to studying the

quantity of students' motivation. In this respect, SDT is considered as a valuable theoretical framework (Ryan & Deci, 2000b). Although no effects were found on the different types of self-efficacy for writing, we do acknowledge the need to conceptualize self-efficacy for writing as a multidimensional construct. In this respect, the theoretical framework of Bruning et al. (2013) provides a promising approach to study students' self-efficacy for meeting cognitive, linguistic, and self-regulatory aspects of writing.

As to the educational implications, the present study underlines the need to enhance students' autonomous writing motivation. In realizing this, it appears important for teachers to implement peer-assisted writing practices in which students are offered ample writing opportunities to write together. Next to fostering students' needs for relatedness, teachers should nurture their students' need for competence and autonomy to create motivational writing experiences for all students, thereby creating a 'bright' pathway towards autonomous motivation, positive learning outcomes, and well-being (Haerens et al., 2016).

References

Abbuhl, R. (2011). Using models in writing instruction: A comparison with native and nonnative speakers of English. *SAGE Open, 1*(3), 1-12. doi:10.1177/2158244011426295

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84*(2), 191-125. doi:10.1037/0033-295X.84.2.191

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York, NY: Freeman.

Bandura, A. (2006). Guide to constructing self-efficacy scales. In F. Pajares & T. Urdan (Eds.), *Self-efficacy beliefs of adolescents* (pp. 307-337). Greenwich: Information Age Publishing.

Benware, C., & Deci, E. (1984). Quality of learning with an active versus passive motivational set. *American Educational Research Journal, 21*(4), 755-765. doi:10.3102/00028312021004755

Bereiter, C., & Scardamalia, M. (1987). *The psychology of written composition*. Hillsdale, N.J.: L. Erlbaum Associates.

Bouwer, R., Koster, M., & van den Bergh, H. (2018). Effects of a strategy-focused instructional program on the writing quality of upper elementary students in the Netherlands. *Journal of Educational Psychology, 110*(1), 58-71. doi:10.1037/edu0000206

Bruning, R., Dempsey, M., Kauffman, D., McKim, C., & Zumbrunn, S. (2013). Examining dimensions of self-efficacy for writing. *Journal of Educational Psychology, 105*(1), 25-38. doi:10.1037/a0029692

Bruning, R., & Horn, C. (2000). Developing motivation to write. *Educational Psychologist, 35*(1), 25-37. doi:10.1207/S15326985ep3501_4

Bruning, R., & Kauffman, D. (2016). Self-efficacy beliefs and motivation in writing development. In C. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of Writing Research* (pp. 160-173). New York: The Guilford Press.

Cleary, M. (1991). Affect and cognition in the writing processes of eleventh graders: A study of concentration and motivation. *Written Communication, 8*(4), 473-508. doi:10.1177/0741088391008004003

Cohen, J. (1977). *Statistical power analysis for the behavioral sciences*. New York: Academic Press.

De Bernardi, B., & Antolini, E. (2007). Fostering students'willingness and interest in argumentative writing: An intervention study. In S. Hidi & P. Boscolo (Eds.), *Writing and Motivation* (pp. 183-202). Oxford: Elsevier.

De Naeghel, J., Van Keer, H., Vansteenkiste, M., & Rosseel, Y. (2012). The relation between elementary students' recreational and academic reading motivation, reading frequency, engagement, and comprehension: A self-determination theory perspective. *Journal of Educational Psychology, 104*(4), 1006-1021. doi:10.1037/a0027800

De Smedt, F., Merchie, E., Barendse, M., Rosseel, Y., De Naeghel, J., & Van Keer, H. (2018). Cognitive and motivational challenges in writing: Studying the relationship with writing performance across students' gender and achievement level. *Reading Research Quarterly, 53*(2), 249-272. doi:10.1002/rrq.193

De Smedt, F., & Van Keer, H. (2018). Fostering writing in upper primary grades: a study into the distinct and combined impact of explicit instruction and peer assistance. *Reading and Writing, 31*(2), 325-354. doi:10.1007/s11145-017-9787-4

De Smedt, F., Van Keer, H., & Merchie, E. (2016). Student, teacher, and class-level correlates of Flemish late elementary school children's writing performance. *Reading and Writing, 29*(5), 833-868. doi:10.1007/s11145-015-9590-z

Dumas, J., Lynch, A., Laughlin, J., Smith, E., & Prinz, R. (2001). Promoting intervention fidelity: Conceptual issues, methods and preliminary results form the EARLY ALLIANCE prevention trial. *American Journal of Preventive Medicine, 20*(1), 38-47. doi:10.1016/S0749-3797(00)00272-5

Flemish Ministry of Education and Training. (2005). *Education in Flanders. The Flemish educational landscape in a nutshell.* Retrieved from http://planipolis.iiep.unesco.org/sites/planipolis/files/ressources/belgium_flanders_education_nutshell.pdf.

Flower, L., & Hayes, J. (1981). A cognitive process theory of writing. *College Composition and Communication, 32*(4), 365-387. doi:10.2307/356600

Graham, S. (2006). Strategy instruction and the teaching of writing. In C. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of writing research* (pp. 187-207). New York: The Guilford Press.

Graham, S. (2018). A writer(s) within community model of writing. In C. Bazerman, V. Berninger, D. Brandt, S. Graham, J. Langer, S. Murphy, P. Matsuda, D. Rowe, & M. Schleppegrell (Eds.), *The lifespan development of writing* (pp. 271-325). Urbana, IL: National Council of English.

Graham, S., Berninger, V., & Fan, W. (2007). The structural relationship between writing attitude and writing achievement in first and third grade students. *Contemporary Educational Psychology, 32*(3), 516-536. doi:10.1016/j.cedpsych.2007.01.002

Graham, S., & Harris, K. (1989). Components analysis of cognitive strategy instruction: Effects on learning-disabled students' compositions and self-efficacy. *Journal of Educational Psychology, 81*(3), 353-361. doi:10.1037/0022-0663.81.3.353

Graham, S., Harris, K., & Chambers, A. (2016). Evidence-based practice and writing instruction: A review of reviews. In C. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of Writing Research* (pp. 211-226). New York: The Guilford Press.

Graham, S., Harris, K., & Mason, L. (2005). Improving the writing performance, knowledge, and self-efficacy of struggling young writers: The effects of self-regulated strategy development. *Contemporary Educational Psychology, 30*(2), 207-241. doi:10.1016/j.cedpsych.2004.08.001

Graham, S., Harris, K., & Troia, G. (2000). Self-regulated strategy development revisited: Teaching writing strategies to struggling writers. *Topics in Language Disorders, 20*(4), 1-14. doi:10.1097/00011363-200020040-00003

Graham, S., McKeown, D., Kiuhara, S., & Harris, K. (2012). A meta-analysis of writing instruction for students in the elementary grades. *Journal of Educational Psychology, 104*(3), 879-896. doi:10.1037/A0029185

Guay, F., Ratelle, C., & Chanal, J. (2008). Optimal learning in optimal contexts: The role of self-determination in education. *Canadian Psychology, 49*(3), 233-240. doi:10.1037/a0012758

Haerens, L., Aelterman, N., Vansteenkiste, M., Soenens, B., & Van Petegem, S. (2015). Do perceived autonomy-supportive and controlling teaching relate to physical education students' motivational experiences through unique pathways? Distinguishing between the bright and dark side of motivation. *Psychology of Sport and Exercise, 16*(3), 26-36. doi:10.1016/j.psychsport.2014.08.013

Haerens, L., Vansteenkiste, M., Aelterman, N., & Van den Berghe, L. (2016). Towards a systematic study of the dark side of student motivation: antecedents and consequences of teachers' controlling behaviors. In W. Liu, J. Wang, & R. Ryan (Eds.), *Building autonomous learners : perspectives from research and practice using self-determination theory* (pp. 59-81). Singapore: Springer.

Harris, K., Graham, S., & Mason, L. (2006). Improving the writing, knowledge, and motivation of struggling young writers: Effects of self-regulated strategy development with and without peer support. *American Educational Research Journal, 43*(2), 295-340. doi:10.3102/00028312043002295

Hidi, S., & Boscolo, P. (2006). Motivation and writing. In C. A. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of writing research* (pp. 144-157). New York: The Guilford Press.

Hox, J. (2002). *Multilevel analysis: Techniques and applications*. London: Psychology Press.

Klassen, R. (2002). A question of calibration: A review of the self-efficacy beliefs of students with learning disabilities. *Learning Disability Quarterly, 25*(2), 88-102. doi:10.2307/1511276

Koster, M., Tribushinina, E., de Jong, P., & van den Bergh, H. (2015). Teaching children to write: A meta-analysis of writing intervention research. *Journal of Writing Research, 7*(2), 299-324. doi:10.17239/jowr-2015.07.02.2

Levesque, C., Zuehlke, A., Stanek, L., & Ryan, R. (2004). Autonomy and competence in German and American university students: A comparative study based on self-determination theory. *Journal of Educational Psychology, 96*(1), 68-84. doi:10.1037/0022-0663.96.1.68

Limpo, T., & Alves, R. (2013). Teaching planning or sentence-combining strategies: Effective SRSD interventions at different levels of written composition. *Contemporary Educational Psychology, 38*(4), 328-341. doi:10.1016/j.cedpsych.2013.07.004

MacArthur, C., & Graham, S. (2016). Writing research from a cognitive perspective. In C. A. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of writing research*. New York: The Guilford Press.

Meece, J., & Miller, S. (1999). Changes in elementary school children's achievement goals for reading and writing: Results of a longitudinal and an intervention study. *Scientific Studies of Reading, 3*(3), 207-229. doi:10.1207/s1532799xssr0303_2

Merchie, E., & Van Keer, H. (2016). Stimulating graphical summarization in late elementary education: The relationship between two instructional mind map approaches and student characteristics. *Elementary School Journal, 116*(3), 487-522. doi:10.1086/684939

O'Donnell. (2008). Defining, conceptualizing, and measuring fidelity of implementation and its relationship to outcomes in K-12 curriculum intervention research. *Review of Educational Research, 78*(1), 33-48. doi:10.3102/0034654307313793

Pajares, F. (1996). Self-efficacy beliefs in academic settings. *Review of Educational Research, 66*(4), 543-578. doi:10.3102/00346543066004543

Pajares, F. (2003). Self-efficacy beliefs, motivation, and achievement in writing: A review of the literature. *Reading & Writing Quarterly: Overcoming Learning Difficulties, 19*(2), 139-158. doi:10.1080/10573560390143085

Pajares, F., & Valiante, G. (1997). Influence of self-efficacy on elementary students' writing. *The Journal of Educational Research, 90*(6), 353-360. doi:10.1080/00220671.1997.10544593

Paquette, K. (2009). Integrating the 6+1 writing traits model with cross-age tutoring: An investigation of elementary students' writing development. *Literacy Research and Instruction, 48*(1), 28-38. doi:10.1080/19388070802226261

Pelletier, L., Fortier, M., Vallerand, R., & Briere, N. (2001). Associations among perceived autonomy support, forms of self-regulation, and persistence: A prospective study. *Motivation and Emotion, 25*(4), 279-306. doi:10.1023/A:1014805132406

Rasbash, J., Charlton, C., Browne, W., Healy, M., & Cameron, B. (2009). MLwiN Version 2.1. Centre for Multilevel Modelling: University of Bristol.

Ryan, R., & Deci, E. (2000a). The darker and brighter sides of human existence: Basic psychological needs as a unifying concept. *Psychological Inquiry, 11*(4), 319-338. doi:10.1207/S15327965PLI1104_03

Ryan, R., & Deci, E. (2000b). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology, 25*(1), 54-67. doi:10.1006/ceps.1999.1020

Schellings, G., & Van Hout-Wolters, B. (2011). Measuring strategy use with self-report instruments: theoretical and empirical considerations. *Metacognition Learning, 6*(2), 83-90. doi:10.1007/s11409-011-9081-9

Soenens, B., & Vansteenkiste, M. (2005). Antecedents and outcomes of self-determination in 3 life domains: The role of parents' and teachers' autonomy support. *Journal of Youth and Adolescence, 34*(6), 589-604. doi:10.1007/s10964-005-8948-y

Sweet, S., Fortier, M., Strachan, S., & Blanchard, C. (2012). Testing and integrating Self-Determination Theory and Self-Efficacy Theory in a physical activity context. *Canadian Psychology, 53*(4), 319-327. doi:10.1037/a0030280

Troia, G., Harbaugh, A., Shankland, R., Wolbers, K., & Lawrence, A. (2013). Relationships between writing motivation, writing activity, and writing performance: Effects of grade, sex, and ability. *Reading and Writing, 26*(1), 17-44. doi:10.1007/s11145-012-9379-2

Vallerand, R., Fortier, M., & Guay, F. (1997). Self-determination and persistence in a real-life setting: Toward a motivational model of high school dropout. *Journal of Personality and Social Psychology, 72*(5), 1161-1176. doi:10.1037/0022-3514.72.5.1161

Vansteenkiste, M., Simons, J., Lens, W., Soenens, B., & Matos, L. (2005). Examining the motivational impact of intrinsic versus extrinsic goal framing and autonomy-supportive

versus internally controlling communication style on early adolescents' academic achievement. *Child Development, 76*(2), 483-501. doi:10.1111/j.1467-8624.2005.00858.x

Vansteenkiste, M., Zhou, M., Lens, W., & Soenens, B. (2005). Experiences of autonomy and control amon Chinese learners: Vitalizing or immobilizing? *Journal of Educational Psychology, 97*(3), 468-483. doi:10.1037/0022-0663.97.3.468

Vaughn, S., Klingner, J., Swanson, E., Boardman, A., Roberts, R., Mohammed, S., & Stillman-Spisak, S. (2011). Efficacy of collaborative strategic reading with middel school students. *American Educational Research Journal, 48*(4), 938-964. doi:10.3102/0002831211410305

Wolters, C., Denton, C., York, M., & Francis, D. (2014). Adolescents' motivation for reading: group differences and relation to standardized achievement. *Reading and Writing, 27*(3), 503-533. doi:10.1007/s11145-013-9454-3

Yarrow, F., & Topping, K. (2001). Collaborative writing: The effects of metacognitive prompting and structured peer interaction. *British Journal of Educational Psychology, 71*, 261-282. doi:10.1348/000709901158514

Zimmerman, B., & Risemberg, R. (1997). Becoming a self-regulated writers: A social cognitive perspective. *Contemporary Educational Psychology, 22*, 73-101. doi:10.1006/ceps.1997.0919

I often have to write a hundred pages or more before there's a paragraph that's alive.

Philip Roth

6 An analytic description of an instructional writing program combining explicit writing instruction and peer-assisted writing

This chapter is based on:

De Smedt, F., & Van Keer, H. (2018). An analytic description of an instructional writing program combining explicit writing instruction and peer-assisted writing. *Journal of Writing Research, 10*(2), 227-279. doi:10.17239/jowr-2018.10.01.04

Chapter 6

An analytic description of an instructional writing program combining explicit writing instruction and peer-assisted writing

Abstract

There is abundant research evidence on the effectiveness of explicit writing instruction and peer-assisted writing. However, most of the research articles investigating these evidence-based writing practices fail to include clear and detailed descriptions of the interventions. Consequently, researchers and educational practitioners have no perception of the crucial ingredients underlying these interventions, hindering replication, dissemination, and implementation of evidence-based writing practices. In the present study, we provide in-depth insight into two instructional writing programs via an analytic description of both programs. More particularly, EI+PA students received explicit writing instruction and practiced their writing collaboratively, while EI+IND students received the same explicit writing instruction; however, they practiced by writing individually. Both interventions were analytically described by means of a reporting system. Following this procedure, the writing lesson programs were more particularly described by defining design principles, instructional teaching activities, and student learning activities.

Introduction

Alarming results concerning students' writing proficiency level have consistently been reported in different national assessment reports across the world (Inspectie van het Onderwijs, 2010; National Center for Education Statistics, 2012; Ofsted, 2000). More particularly, these reports reveal that students' writing performance is below par. The findings are cause for concern as poor writing skills can have a serious impact on students' educational performance as well as on their job performance in later life (Graham & Harris, 2014). To support students in developing effective writing skills, we need to provide high-quality writing instruction by including evidence-based writing practices in everyday classroom settings.

Recently, Graham, Harris, and Chambers (2016) argued that writing researchers should translate evidence-based writing practices into concrete teaching guidelines for teachers. In this way, evidence-based writing practices can effectively be translated and implemented in everyday writing education. To provide such guidelines, Rijlaarsdam, Janssen, Rietdijk, and van Weijen (2018) pointed out the need for analytic descriptions of writing interventions. Currently, however, clear and detailed descriptions of writing interventions are missing in research articles. In this respect, Rijlaarsdam et al. (2018) criticized the lack of a standard to report upon the independent variable, namely the intervention. Without clear and analytic descriptions of intervention programs, researchers do not only run the risk of hindering implementation of evidence-based writing practices in daily educational practice, but also of complicating theory building and replication in the scientific field of writing interventions (Fidalgo, Harris, & Braaksma, 2018; Rijlaarsdam et al., 2018). To move the field of research on writing instruction forward at this point, Rijlaarsdam et al. (2018) recently developed a reporting system for interventions in writing research. More particularly, in this reporting system interventions are seen as complex and hierarchical programs consisting of teaching and learning activities. Following this reporting system, an intervention is analytically described by defining *design principles* (i.e., means-end-relations defining the intervention), *teaching activities* (i.e., instructional activities to stimulate certain learning activities), and *learning activities* (i.e., with the goal to improve students' writing) (Rijlaarsdam et al., 2018). The main aim of the present manuscript is twofold. First, we apply the reporting system of Rijlaarsdam et al. (2018) to analytically describe two instructional writing programs. Rijlaarsdam et al. (2018), however, did not provide any guidelines on how to report similarities and differences between different instructional writing programs. Therefore, the second aim of this manuscript is to provide such guidelines and, in this way, expand the reporting scheme of Rijlaarsdam et al. (2018). In what follows, we will shortly discuss the effectiveness of the two instructional writing programs and we will present the reporting system of Rijlaarsdam et al. (2018). Next, we will apply the reporting system to analytically describe both instructional writing programs and emphasize the need for describing overlapping and diverging design principles to report similarities and differences between both writing programs.

Improving elementary students' writing: the EI+PA and EI+IND writing program

Previous meta-analyses have identified several evidence-based writing practices to promote elementary school students' writing (e.g., Graham, McKeown, Kiuhara, & Harris, 2012; Koster, Tribushinina, de Jong, & van den Bergh, 2015). Based on these meta-analyses,

explicit instruction of writing knowledge and strategies and peer-assisted writing are promising practices to support developing writers. Recently, we developed, implemented, and evaluated an instructional writing program based on both evidence-based writing practices. The writing program was particularly designed for upper-elementary grades in Flanders (Belgium). The effectiveness of the writing program was tested in two randomized controlled trials. The results of the first trial (*N* = 206 fifth and sixth graders and *N* = 11 teachers) revealed the effectiveness of explicit instruction of writing knowledge and strategies to enhance upper-elementary students' writing (De Smedt, Graham, & Van Keer, 2018; De Smedt & Van Keer, 2018). Surprisingly, however, peer-assisted writing had no additional effect to the explicit writing instruction (De Smedt & Van Keer, 2018). Based on the results of this first trial, we optimized the instructional writing program and materials in general and we adapted the operationalization of peer-assisted writing in particular to maximize students' writing outcomes. We conducted a second larger-scale follow-up randomized controlled trial (*N* = 431 fifth and sixth graders and *N* = 20 teachers). In view of evaluating the impact of the adjusted writing program, three research conditions were included in the research design. Students in the first experimental research condition received explicit instruction regarding writing knowledge and strategies and practiced writing with a peer (EI+PA). To evaluate the added value of peer-assisted writing, a second experimental condition was included in the research design as a comparison condition (EI+IND). EI+IND students received the exact same type of explicit writing instruction, but they practiced by writing individually. Finally, a business as usual condition was also included. The teachers in the business as usual condition did not follow an experimental writing program, as they applied their traditional writing approach by means of the regular school manuals to teach language. The results of this second trial were promising concerning the combined effect of explicit writing instruction and peer-assisted writing. More particularly, the results showed that EI+PA students outperformed both EI+IND and BAU students. Moreover, EI+PA students were also less motivated to write because of internal (e.g., shame or guilt) or external pressure (e.g., grades or punishment) and were more confident in their ability to invent ideas to write as compared to their EI+IND counterparts. Because of the promising results of this second trial, the analytic description of both the EI+PA and the EI+IND program are central in the present study.

A reporting system for interventions in writing research

Rijlaarsdam et al. (2018) developed a reporting scheme to support researchers to analytically describe the content and structure of instructional writing programs. According to the reporting scheme, *design principles* lay the foundation for and define the intervention of

instructional writing programs. Design principles are theoretically and empirically-driven and describe a means-end-relationship by stating which instructional activities should be done to stimulate learning and which learning outcomes are expected (Rijlaarsdam et al., 2018). A design principle includes three essential elements: (a) *teaching activities* (i.e., instructional activities that stimulate certain learning activities), (b) *learning activities* (i.e., cognitive or metacognitive activities leading to certain learning outcomes), and (c) *learning outcomes or experiences.* Design principles are typically formulated as if-then statements: 'If you aim to increase a specific learning outcome, then you should apply the following teaching activities, so students can apply the following learning activities'. The reporting scheme of Rijlaarsdam et al. (2018) enables researchers to describe design principles, teaching, and learning activities. Because of the theoretical and empirical nature of design principles, researchers are encouraged to provide rationales explaining on the one hand the effectiveness of specific teaching activities to enhance students' learning and on the other hand the relation between certain learning activities and learning outcomes. For more detailed information, we refer to the work of Rijlaarsdam et al. (2018) and Bouwer and De Smedt (2018).

The reporting system applied: An analytic description of the EI+PA and EI+IND program

Context and focus of the EI+PA and EI+IND program

To fully understand the design principles that lay the foundation of the EI+PA and EI+IND writing program referred to above, some additional background information concerning the context and focus of the interventions is necessary, since the educational context plays a decisive role in the design process of interventions and leads to particular design choices (Graham & Harris, 2014). In view of enabling implementation or replication of the EI+PA and EI+IND interventions, it is therefore important that educational practitioners or researchers receive information regarding the particular context the interventions were developed in and for.

In Flanders, students start elementary education at the age of six and follow six consecutive years of study. To guarantee the quality of elementary education, the Flemish government lays down attainment targets. These targets are minimum objectives found necessary and attainable for elementary school children (Flemish Ministry of Education and Training, 2005). The attainment targets for writing state that students should be able to copy and write texts such as letters, reports, stories, and informational texts by the end of elementary education. Recently, a large-scale survey study was conducted with Flemish teachers and students in

fifth and sixth grade (De Smedt & Van Keer, 2017; De Smedt, Van Keer, & Merchie, 2016). The results showed that students at the end of elementary education have difficulties writing descriptive and narrative texts and that the instructional writing practice of teachers is not always in line with evidence-based writing practices (De Smedt & Van Keer, 2017; De Smedt et al., 2016). Based on these results, we decided to develop, implement, and evaluate an instructional writing intervention to increase fifth and sixth graders' writing performance. We specifically opted for teaching students to write descriptive instead of narrative texts as this text genre becomes especially relevant and increasingly important in secondary education. Furthermore, we consulted meta-analyses on effective writing instruction in elementary grades in which several evidence-based writing practices, such as explicit writing instruction and peer-assisted writing are identified (Graham et al., 2012; Koster et al., 2015).

Design principles

According to the reporting scheme of Rijlaarsdam et al. (2018), design principles lay the foundation for and define the intervention. Design principles are theoretically and empirically-driven and describe a means-end-relationship by stating what instructional activity should be done to stimulate learning (Rijlaarsdam et al., 2018). Because this theoretical and empirical nature of design principles is of vital importance, writing researchers are directed to test writing interventions that are well-founded and designed (Graham & Harris, 2014). As we aim to describe two experimental research conditions (EI+PA and EI+IND) in the present article, elaborating on the design principles for both instructional interventions is required. However, as Rijlaarsdam et al. (2018) did not provide any guidelines on how to report similarities and differences between different experimental conditions on the level of design principles, we created two categories of principles (see Figure 1). The first category refers to the *overlapping design* principles that are identical across both experimental conditions. These principles are overlapping as both conditions focused on explicit writing instruction and were therefore based on research evidence on explicit writing instruction. The second category referred to the *diverging design principles* that were different across experimental conditions. For the EI+PA condition, the diverging principles were based on research evidence on peer-assisted writing. Whereas for the EI+IND condition, the diverging principles were based on empirical research on the effectiveness of individual writing. The construction of overlapping and diverging design principles enabled us to clearly distinguish and control for similarities and differences between both experimental conditions. In what follows, we will describe and elaborate on the overlapping as well as the diverging design principles by elaborating on the empirical and/or theoretical base of each principle.

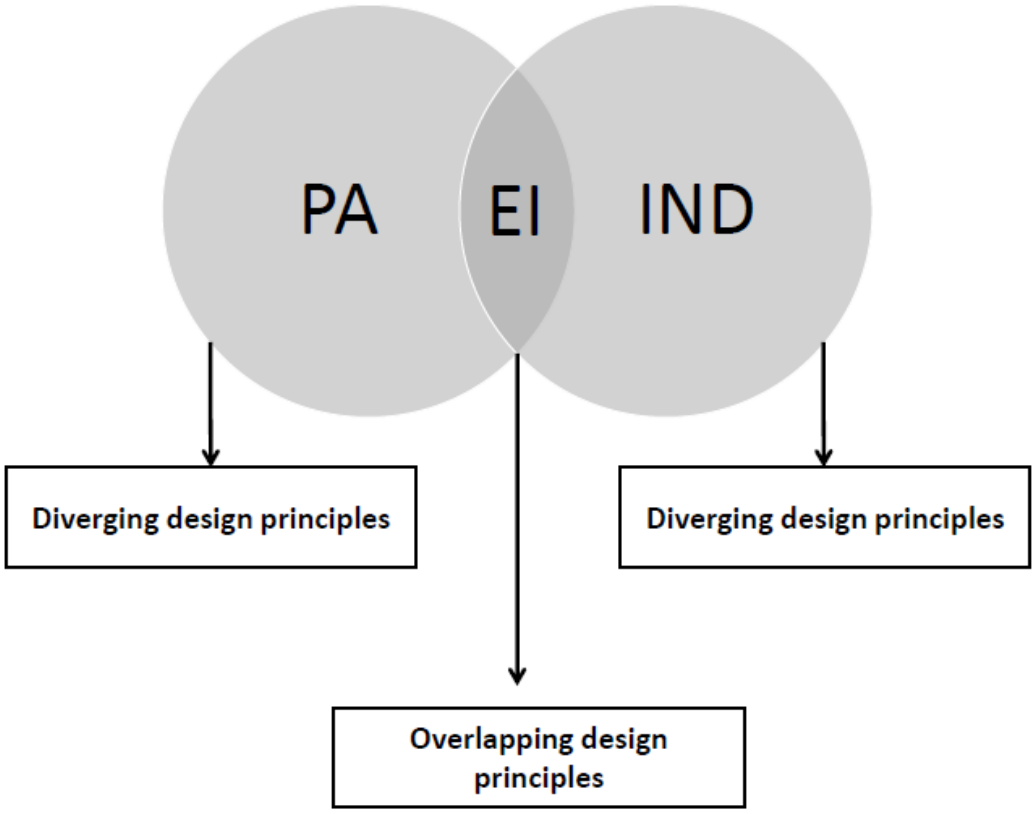


Figure 1. *Overlapping and diverging categories of design principles.*

Overlapping design principles

Design principle 1. Students have to acquire writing knowledge to write effectively (Flower & Hayes, 1981; Graham, Gillespie, & McKeown, 2013). More particularly, students need to learn genre-specific knowledge such as, the content and goal of a specific genre. Further, they need to acquire knowledge on text structures so they know how texts are composed (e.g., different parts in composition or different story elements in a narrative text). Previous research consistently pointed at the effectiveness of explicit writing instruction to teach students writing knowledge (e.g., Bean & Steenwyk, 1984; De Smedt & Van Keer, 2018; Fitzgerald & Teasley, 1986). In this respect, prior research revealed the effectiveness of providing students compare and contrast tasks (Abbuhl, 2011; Charney & Carlson, 1995). This implies, more particularly, that teachers provide students with model texts to enable them to compare and contrast these texts. Additionally, teachers also have to elaborate explicitly on the differences between the texts so students are able to discover and identify important characteristics of the genre and the text structure (Abbuhl, 2011). Based on the studies discussed above, the first design principle states: *"If you aim to increase writing knowledge, then offer students a variation of model texts so they can compare and contrast these texts".*

Design principle 2. Next to text structure knowledge and genre-specific knowledge, students also need to acquire writing strategies to write effectively (Flower & Hayes, 1981; Graham et al., 2013). In this respect, students need to learn how, when, and why to plan, write, and revise texts (Berninger, Fuller, & Whitaker 1996; Flower & Hayes, 1981; Graham et al., 2013). More particularly, students should be able to apply strategies to generate and organize ideas (i.e., planning). Further and based on their planning, students need to learn how to compose texts by transcribing their ideas into words and sentences (i.e., translation). Finally, they should be able to review their text by evaluating and revising the content, structure and surface-level aspects, such spelling (i.e., revision). Previous research studies consistently pointed at the effectiveness of explicit strategy instruction (e.g., Bouwer, Koster, & van den Bergh, 2018; De Smedt & Van Keer, 2018; Fidalgo, Torrance, Rijlaarsdam, van den Bergh, & Alvarez, 2015; Graham, 2006; Graham & Harris, 1993; Graham, Harris, & Troia, 2000; Limpo & Alves, 2013; Rietdijk, Janssen, van Weijen, van den Bergh, & Rijlaarsdam, 2017). Explicit strategy instruction requires a set of specific instructional activities implying that the teacher is key in promoting students' strategy use. Based on previous experimental research, several important teaching activities come to the fore. More particularly, several evidence-based writing programs provide similar instructional guidelines (e.g., Bouwer et al., 2018; De Smedt & Van Keer, 2018; Fidalgo & Torrance, 2018; Fidalgo et al., 2015; Graham et al., 2000; Limpo & Alves, 2013; Rietdijk et al., 2017). A first recurring instructional guideline is teachers modelling the writing strategies so students can learn by observing (e.g., Fidalgo et al., 2015). More particularly, teachers should explain, verbalize, and demonstrate their thoughts, actions, and reasons while planning, writing, revising, and editing texts (Schunk, 2003). Next to modelling, the need to support students in memorizing the different strategy steps by means of, for instance, mnemonics (e.g., Bouwer et al., 2018; Graham et al., 2000; Rietdijk et al., 2017) or strategy cards (e.g., De Smedt & Van Keer, 2018) is highlighted as well. Based on these theoretical and empirical insights, the second design principle states: *"If you aim to increase students' use of writing strategies (e.g., planning, writing, and revising), then explicitly teach and model how, when, and why they should use these strategies".*

Design principle 3. Once writing knowledge and strategies are taught, students should be able to internalize these. In this way, they can transfer the knowledge and strategies to new and unfamiliar writing tasks (Flower & Hayes, 1981; Graham et al., 2013). To stimulate internalization, previous research showed the effectiveness of creating supporting writing environments in which practice opportunities are central (e.g., De Smedt & Van Keer, 2018; Graham et al., 2000). During practice, teachers should provide feedback on both the writing product and process (e.g., Limpo & Alves, 2013). Additionally, teachers should gradually release responsibility from guided practice to independent performance by encouraging students to internalize the knowledge and strategies taught (e.g., Bouwer et al., 2018; De

Smedt & Van Keer, 2018; Graham, Harris, & Mason, 2005; Graham et al., 2000; Rietdijk et al., 2017). Based on these studies, the third design principle states: *"If you aim to increase the internalization of writing knowledge and the use of writing strategies, then provide optimal writing opportunities so students can practice while gradually diminishing guidance".*

Diverging design principles

Design principle 4A. Several meta-analyses provided evidence on the effectiveness of peer-assisted writing to stimulate elementary school students' writing performance (Graham et al., 2012; Koster et al., 2015). Peer-assisted writing is defined as "students working together to plan, draft, and/or revise their compositions" (Graham & Perin, 2007, p. 449). In the meta-analyses reference is made to the effectiveness of different applications of peer-assisted writing, such as peer discussions and peer help (e.g., Harris, Graham, & Mason, 2006), peer feedback (e.g., Holliway, 2004), and peer tutoring (e.g., Nixon & Topping, 2001; Sutherland & Topping, 1999; Yarrow & Topping, 2001). Previous research, more particularly, pointed at important conditions determining the effectiveness of peer-assisted writing (Dale, 1994), guiding teachers to align their instructional activities to these conditions. First, teachers should create a collaborative writing environment in which shared responsibility and engagement are central. This implies that students must be engaged with and feel responsible for each other, the topic, and the writing process. Second, when grouping students into collaborative groups, the teacher should take into account the internal dynamic between group members as mutual trust is required. Third, teachers should include challenging writing assignments to create a certain level of cognitive conflict so students can collaboratively reach a consensus. Finally, teachers should structure the collaboration so students are able to coordinate their activities while planning, writing, and revising collaboratively (Dale, 1994). Based on these empirical and theoretical insights, design principle 4A states: *"If you aim to increase students' writing, then provide peer-assisted writing opportunities to practice collaboratively with a peer".*

Design principle 4B. In a recent intervention study, De Smedt and Van Keer (2018) found no significant differences between individual writing practice and peer-assisted writing practice. These findings contrast previous research on the effectiveness of peer-assisted writing in elementary education (Graham et al., 2012; Koster et al., 2015) and led us to construct design principle 4B, which states: *"If you aim to increase students' writing, then provide individual writing opportunities to practice individually".*

Design principles translated into teaching and learning activities

Following Rijlaarsdam et al. (2018), we translated the abovementioned design principles into concrete teaching and learning activities. A learning activity is a (meta)cognitive activity, stimulated by an instructional teaching activity, that results in a certain learning outcome or experience (Rijlaarsdam et al., 2018). Consequently, teaching and learning activities are inherently connected and are therefore described simultaneously.

For a more concise description of the overlapping design principles and the translation thereof in teaching and learning activities in both the EI+PA and the EI+IND program, we refer to Table 1. Furthermore, Table 2 provides a description of the diverging design principle, teaching and learning activities solely connected to the EI+PA program, while Table 3 provides an overview of the design principle, teaching and learning activities of the EI+IND program. These three tables are constructed following the reporting scheme of Rijlaarsdam et al. (2018). In the first column, the design principles are listed as if-then statements clarifying the learning outcome (in black), the teaching activities (in green), and the learning activities (in blue). The rationale for each of these design principles was included by referring to previous empirical research. In this way, each design principle was provided with an evidence-based underpinning. Based on these design principles, concrete operationalisations of instructional teaching activities (column 2) and learning activities (column 3) were designed.

Overlapping design principles: Teaching and learning activities in the EI+PA and EI+IND program

Design principle 1: *If you aim to increase writing knowledge, then show students a variation of model texts so they can compare and contrast these texts* (see Table 1). Based on this design principle, teachers introduced the writing genre by offering students two varying descriptive model texts (see Appendix A and B). Both models included good and bad elements of the descriptive text genre (e.g., model text 1 included paragraphs but little information was included while model text 2 did not include paragraphs but ample information was provided). After reading both texts aloud in front of the class, the teacher guided students in how to compare and contrast them. More particularly, the teacher structured the compare and contrast task so students could analyse the goal, the content, and the structure of descriptive texts (see Appendix C). After completing the compare and contrast task, a class discussion about the goal, content, and structure of the descriptive genre was held. After the class discussion, the teacher showed a third model text which combined characteristics of previous model texts into one good example text (see Appendix D). Finally, the teacher offered students a memory card, summarizing all key features of the genre (see Appendix E). The teacher discussed the

memory card by referring to the specific examples in the compare and contrast task. By comparing and contrasting model texts and discussing these examples, students learned to discover, identify, and label important characteristics of the descriptive genre.

Design principle 2: If you aim to increase students' use of writing strategies (e.g., planning, writing, and revising), then explicitly teach and model why, when, and how to use these strategies (see Table 1). Based on this design principle teachers explicitly taught students how to plan, write, and revise descriptive texts. More particularly, teachers applied the following instructional procedure.

First, they pointed out the importance and value of a writing strategy by referring to everyday activities and discussing the value of such strategies while writing. In this way, students had to actively think about the usefulness and importance of using strategies in everyday life and they had to reflect on how these strategies could be helpful when writing texts.

Second, teachers explored students' strategy use by discussing whether, when, and how students already used planning, writing, and/or revising strategies while writing. In this way, students' background knowledge on writing strategies was activated. More particularly, they were able to share previous experiences on applying writing strategies and to recapitulate what they specifically did while applying a writing strategy.

Third, each writing strategy (i.e., planning, writing, and revising strategy) was modelled by the teacher. More particularly, the teacher demonstrated the strategy in front of the class while visualizing the writing strategy on the black board or smartboard. While demonstrating, the teacher thought aloud what he/she was thinking and doing and how and why he/she applied the strategy. By modelling the strategies, students were able to observe and gain insights into the application of a specific strategy and into the thinking process of the teacher. Additionally, the teacher also modelled writing behaviour by intentionally making and correcting errors or by explicitly showing he/she struggled with the writing task. In this way, students became aware of the fact that writing is a complex task, even for experienced writers. While modelling, the teacher involved students to actively participate by asking for help to come up with ideas to write, construct sentences, or correct errors in the text. By including interactive modelling, student were actively involved in the modelling process.

After the teacher modelled each writing strategy separately, they offered students strategy cards, summarizing the important steps of the different writing strategies. In total, students received three strategy cards: (a) a planning card accompanied with a planning scheme, (b) a writing card, and (c) a revision card (see Appendix F, G, and H, respectively). The teacher explained and discussed the strategy cards with the students by referring to the steps and processes modelled. In this way, students were able to comprehend and remember the different strategies and relate these to the strategy steps modelled by the teacher.

As a final step in the instructional procedure to explicitly teach students writing strategies, the teacher provided students short writing tasks so they could practice each strategy separately, immediately after the strategy was modelled and discussed. While practicing, teachers provided feedback concerning students' strategy use and text. The students used the memory card and depending on which strategy they were practicing, they also used the strategy card to guide them through the different steps of the strategy.

Design principle 3: If you aim to increase the internalization of writing knowledge and the use of writing strategies, then provide optimal writing opportunities so students can practice while gradually diminishing guidance (see Table 1). After explicitly teaching each strategy separately, the teacher introduced and discussed the integration card, summarizing the previous cards in a nutshell (see Appendix I). Next to information on genre and text structure knowledge, the integration card also contained information on the different steps of each strategy (i.e., planning, writing, and revision strategy). In this way, the integration card guided the students through the whole writing process. After the integration card was introduced and discussed, the teacher guided the students through the complete writing process by interactively planning, writing, and revising a descriptive text together. In this respect, students recapitulated important key features of the genre and discussed together with the teachers and peers the different steps of the strategies.

After receiving the integration card and practicing all writing strategies together, the teacher offered students challenging and communicative writing tasks in view of practicing all writing strategies. Students could use the memory card, strategy cards, and integration card for additional help while writing. During practice, teachers provided feedback concerning students' texts (e.g., goal, content, and structure) and writing process (e.g., planning, writing, and revision strategies). Additionally, they challenged students to internalize the writing process by gradually diminishing guidance taking into account students' individual or group writing level. More particularly, teachers differentiated between less proficient and more skilled (groups of) writers: less proficient writers or less proficient groups of writers could use the different strategy cards as additional help, while more skilled writers or more skilled groups of writers could work with the integration card or without any supporting materials. Finally, before handing in their writing assignment, students were encouraged to check either their own work (i.e., EI+IND) or work of another writing group (i.e., EI+PA). If needed, they had to revise their writing document (i.e., planning scheme or text) before handing in. Concerning the planning scheme, students had to place a question mark next to the idea(s) they wanted more information on. Concerning the text itself, students had to make notes in the text according the revision strategy (cf., Appendix H).

Table 1. *Overview of the overlapping design principles, instructional teaching activities, and learning activities in both the EI+PA and the EI+IND program.*

EI+PA and EI+IND program		
Overlapping design principles	**Instructional teaching activities**	**Learning activities**
1. If you aim to **increase writing knowledge**, then offer students **a variation of model texts** so they can **compare and contrast** these texts (e.g., Abbuhl, 2011; Charney & Carlson, 1995).	**Offer a variation of model texts** - Offer students two varying model texts within the descriptive genre *(cf., Appendix A and B)* - Provide students with the 'compare and contrast task' *(cf., Appendix C)* - Discuss the goal, the content, and the structure of the texts with the students - Provide students with a third model text which combines characteristics of the previous model texts into one good example *(cf., Appendix D)* - Offer students a memory card, summarizing the key features of the genre and discuss the card *(cf., Appendix E)*	**Compare and contrast** - Compare and contrast the model texts to discover, identify, and label important characteristics of the genre - Discuss the goal, the content, and the structure of the texts with the teacher and peers - Read and comprehend the memory card - Try to remember all the important characteristics of the genre

2. If you aim to **increase students' use of writing strategies** (e.g., planning, writing, and revising), then **explicitly teach and model why, when, and how they should use these strategies** (e.g., Bouwer et al., 2018; De Smedt & Van Keer, 2018; Fidalgo et al., 2015; Graham, 2006; Graham & Harris, 1993; Graham et al., 2000; Limpo & Alves, 2013; Rietdijk et al., 2017).	**Explicitly teach and model**
	
	- Point out the importance and value of a specific strategy
	- Activate students' background knowledge on writing strategies
	- Model the writing strategy:
	  ○ Demonstrate the strategy in front of the class
	  ○ Model the writing strategy by thinking aloud what you are thinking and doing, and how and why you apply the writing strategy
	  ○ Visualize the writing strategy on the black board or smartboard
	  ○ Model your writing behaviour by intentionally making and correcting errors or by showing you have difficulties with the task
	  ○ Involve students while you are modelling a writing strategy so they can actively participate
	- Offer students strategy cards, summarizing the important steps of the different writing strategies and discuss the strategy cards (planning card, writing card, and the revision card) *(cf., Appendix F, G, and H)*
		Why, when, and how to use these strategies
		
		- Notice why writing strategies are useful and important
		- Think of writing strategies you already used when writing
		- During teacher modeling:
		  ○ Observe how the teacher demonstrates and models the strategy on the (smart)board
		  ○ Listen and try to comprehend what the teacher is thinking and doing
		  ○ Help the teacher while he/she is planning, writing, or revising a text by providing ideas to write about, by offering suggestions to optimize the text, …
		- Read and try to comprehend the strategy cards
		- Practice the writing strategy by planning, writing, or revising a text
		- Use the memory card and strategy cards to guide you through the writing process and try to remember all the important steps of the strategy

	- Offer students challenging and communicative writing tasks that focus on practicing a specific writing strategy and provide feedback concerning students' writing process and text	- Take teachers' feedback concerning your writing process and text into account while planning, writing or revising a text
3. If you aim to **increase the internalization of writing knowledge and the use of writing strategies**, then **provide optimal writing opportunities and practices** so students can **practice while gradually diminishing guidance** (e.g., Bouwer et al., 2018; De Smedt & Van Keer, 2018; Graham, Harris, & Mason, 2005; Rietdijk et al., 2017)	**Provide optimal writing opportunities and practices while gradually diminishing guidance** - Introduce and discuss the integration card, summarizing all previous cards *(cf., Appendix I)* - Offer and introduce challenging and communicative writing tasks - Provide feedback concerning students' text and writing process - Challenge students to internalize the writing process by gradually diminishing guidance - Differentiate: offer less proficient writers or groups of writers the help they need (e.g., memory card, strategy cards, planning scheme) and challenge more skilled writers or groups of writers to gradually diminish the use of the supporting materials: Memory card, strategy cards, planning scheme ↓ Integration card and planning scheme ↓ Integration card ↓ No supporting materials - Encourage (groups of) students to check either their own work or work of another group of students before handing in	**Practice** - Read and try to comprehend the integration card - Practice by planning, writing, and revising a text - Use the memory card, strategy cards, planning scheme, and integration card if you need additional support when planning, writing, and revising the text - Ask the teacher for additional help if you have difficulties with planning, writing, and revising the text - Internalize the writing process and the genre knowledge - Try to systematically write without the supporting materials - Check your work or the work of another writing group before handing in

Diverging design principle: Teaching and learning activities in the EI+PA program

Design principle 4A: If you aim to increase students' writing, then provide peer-assisted writing opportunities to practice collaboratively with a peer (see Table 2). To ensure optimal collaboration, teachers first had to create engagement and mutual trust between writing partners. In this respect, they grouped students into heterogeneous dyads by taking into account students' writing level (i.e., pairing less proficient and more skilled writers) on the one hand and the relation between the students (i.e., matching personalities) on the other hand. More specifically, teachers ranked all their students ranging from 'the most skilful writer' to the 'the most struggling writer'. Subsequently, they split the ranking in half, so they were able to pair the most skilful writer in the first half to the most skilful writer in the second half. They followed this procedure until all students had a writing partner. If a dyad consisted of students with clashing personalities, the teacher adjusted the pairing procedure. In case of an uneven number of students in the class, the teacher exceptionally created one group of three students. To ensure engagement and mutual trust, the groups remained stable for the duration of the intervention. In this way, students could get used to each other's abilities and limitations. Additionally, the teacher discussed the importance and added value of writing together and organized a class discussion so students could agree on some collaboration rules to write together (e.g., listening to each other, negotiating, compromising, respecting each other's input, …). The students had to summarize and agree on these collaboration rules by writing the rules on a collaboration card. Finally, they had to sign the card to show their engagement (see Appendix J).

Second, the teacher structured the collaboration between students by introducing three roles. The first role, labelled 'the thinker', applied to both students in the pairs, implying that in each writing lesson and at all times all students were thinkers. As a thinker, students had to think of good ideas to write about, keep the goal of the text in mind, think about the content and structure of the text, think about words and sentences, and think about how to improve the text. The second and third assigned role, labelled as 'the strategy card reader' and 'the reporter', respectively, were exchangeable. Each lesson, the dyads switched these roles. The strategy card reader had to read the strategy card(s), explain the different steps of the strategy to the reporter, guide the reporter in planning, writing, and/or revising the text, and monitor their strategy use to make sure they were following all the steps as prescribed on the strategy card. The reporter on the other hand had to take notes of the ideas they were inventing collaboratively, fill in the planning scheme, write down the text they constructed in pairs, and correct and revise the shared text if they collaboratively decided to make adjustments. The teacher supported students' role-taking by providing them role badges (see Appendix K). In

this way, students could visualise their role by pinning their role badge. Next to the roles, the teacher structured the collaboration by providing one writing portfolio per dyad. In this way, students had to work on a shared writing document (e.g., shared planning scheme or shared text).

Third, the teacher modelled how students could collaborate while writing. More particularly, when the teacher modelled the writing strategies (cf., design principle 2), he/she also demonstrated how students could work together in pairs. First, the teacher invited one student to accompany him/herself during modelling. Then, he/she demonstrated the assignment of the roles and role badges as follows: the whole class (including the teacher and accompanying student) was assigned the role of thinker, the teacher was the strategy card reader, while the accompanying student performed the reporter role. The teacher modelled the role of the strategy card reader by guiding the reporter and the other students through the different steps of a specific strategy. The accompanying student modelled the role of the reporter by filling in the planning scheme (cf., planning strategy), writing a text (cf., writing strategy), and revising the text (cf., revision strategy). Next to modelling a specific strategy and the role of strategy card reader, the teacher also modelled appropriate collaboration and interaction skills, such as listening to each other's ideas, negotiating, compromising, and respecting each other's input.

Finally, the teacher created collaboration opportunities across the different writing groups. More particularly, before handing in their written work, each pair of students had to exchange their work (e.g., planning scheme or text) with another pair of students. They had to read each other's work and provide concrete feedback on the written products. The teacher guided the students in providing peer feedback by offering them specific guidelines on how to do this (cf., design principle 3).

Table 2. *Overview of the differing design principle, instructional teaching activities, and learning activities within the EI+PA program.*

EI+PA program		
Differing design principle	**Instructional teaching activities**	**Learning activities**

4. A. If you aim to **increase students' writing**, then **provide peer-assisted writing opportunities to practice collaboratively with a peer** (e.g., De Smedt & Van Keer, 2018; Harris et al., 2006; Nixon & Topping, 2001; Sutherland & Topping, 1999; Yarrow & Topping, 2001).	**Provide peer-assisted writing opportunities**
	
	- Create engagement and mutual trust:
	  ○ Group students into fixed heterogeneous dyads by taking into account their writing level and matching personalities
	  ○ Discuss the importance and added value of writing together
	  ○ Organize a class discussion so students can agree on some collaboration rules *(cf., Appendix J)*
	- Structure the collaboration:
	  ○ Introduce three roles: (1) the thinker, (2) the strategy card reader, and (3) the reporter
	  ○ Support students in role-taking by providing them role badges *(cf., Appendix K)*
	  ○ Provide one writing portfolio per group so students work on a shared writing document
	- Model collaboration:
	  ○ Demonstrate how the roles are assigned
	  ○ Model your role as strategy card reader by guiding the reporter and the other students through the different steps of a specific strategy
	  ○ Model appropriate collaboration and interaction skills
	- Create opportunities for collaboration across different writing groups by including peer feedback
		Practice collaboratively with a peer
		
		- Agree on collaboration rules
		- Collaborate with your writing partner by fulfilling your role as thinker and strategy card reader or reporter. Depending on your role, do the following:
		
		Thinker:
		  ○ Think of good ideas to write about
		  ○ Keep the goal of your text in mind
		  ○ Think about the content of your text
		  ○ Think about the structure of your text
		  ○ Think about words and sentences you want to write in your text
		  ○ Think of how you can improve your text
		
		Strategy card reader:
		  ○ Read the strategy card(s)
		  ○ Explain the different steps of the strategy to the reporter
		  ○ Guide the reporter in planning, writing, and/or revising the text
		  ○ Monitor your strategy use: are you following each step as prescribed on your strategy card?
		
		Reporter:
		  ○ Take notes of the ideas you and your writing partner are thinking about and fill in the planning scheme
		  ○ Write down the text you and your partner are constructing
		  ○ Correct and revise the text if you and your partner want to change something in your text
		
		- Work together with your partner in your shared writing portfolio
		- Read the work of another writing group and provide concrete feedback
		- Use the received feedback to improve your writing

Diverging design principle: Teaching and learning activities in the EI+IND program

Design principle 4B: *If you aim to increase students' writing, then provide individual writing opportunities to practice individually* (see Table 3). Based on this design principle, the teacher first had to create a writing environment in which students can practice writing individually. More particularly, he/she discussed the importance and added value of independent and individual work during writing. Additionally, the teacher organized a class discussion so students could agree on some rules to create a writing environment that fosters individual and independent writing (e.g., work quietly, do not disturb your classmates, address your questions to the teacher and not to a classmate, …). Once students agreed on the rules, they had to write the rules on an individual writing card and they had to sign the card to show they would respect the rules (see Appendix L). Next to creating a safe writing environment fostering individual writing, the teacher also structured individual writing. More particularly, he/she offered each student an individual writing portfolio. In this way, students worked individually in their personal writing portfolio.

Table 3. *Overview of the differing design principle, instructional teaching activities, and learning activities within the EI+IND program.*

EI+IND program		
Differing design principle	**Instructional teaching activities**	**Learning activities**
4. B. If you aim to **increase students' writing**, then **provide individual writing opportunities to practice individually** (e.g., De Smedt & Van Keer, 2018)	**Provide individual writing opportunities** - Discuss the importance and added value of independent and individual work during writing - Organize a class discussion so students can agree on some rules to create a writing environment that fosters individual writing *(cf., Appendix L)* - Structure individual writing by offering each student an individual writing portfolio	**Practice individually** - Agree on rules you think are important when writing individually - Work individually in your personal writing portfolio

Writing lesson programs and instructional materials

The teaching and learning activities were translated into two concrete writing lesson programs: the EI+PA and the EI+IND program. Both writing programs were identical (cf., overlapping design principles) with the exception that the EI+PA program integrated peer-assisted writing (cf., diverging design principle 4A) whereas the EI+IND program integrated

individual writing (cf., diverging design principle 4B). Both writing programs consisted of 11 writing lessons, spread over ten consecutive weeks resulting in one lesson per week (with the exception of the first week in which the teacher had to teach two lessons). We opted for this time-based approach as the sequence of the writing lessons had to fit within the trimestral system in Flemish school. Table 4 presents an overview of both lesson programs by showing the focus of each lesson, the design principle(s) on which the lesson was based, the instructional materials introduced during the lesson, and the writing assignments used for modelling and/or practicing. Additionally, Table 4 clearly indicates which lessons were included in both writing programs and which lessons were included in either the EI+PA condition or in the EI+IND condition. As can be seen in Table 4, lesson 1 was identical in both conditions while lesson 2A and 2B were only included in either the EI+PA (lesson 2A) or the EI+IND condition (lesson 2B). All other lessons (i.e., lesson 3 to 11) were included in both conditions but they slightly differed depending on design principle 4A (EI+PA: students writing with a peer) or 4B (EI+IND: students writing individually).

To increase clarity, transparency, and continuity throughout the writing program, each writing lesson followed a fixed format with three lesson phases. First, the teacher recapitulated the previous lesson and stated the goals of the present lesson during an introduction phase. After the introduction, an instruction or practice phase was included. During instruction, the teacher introduced, modelled, and explicitly taught writing knowledge or strategies. During practice, students practiced writing while the teacher provided feedback. After instruction or practice, the teacher concluded the lesson with a reflection/recapitulation phase in which students had to synthesize what they learned or publicly share their written text.

Next to the writing lesson programs, supplementary instructional materials, such as writing portfolios, memory cards (cf., appendix E), strategy cards (cf., appendix F, G, and H), and integration cards (cf., appendix I) were provided in both experimental conditions. While the EI+PA students received collaboration cards (cf., appendix J) and role badges (cf., appendix K), the EI+IND students received individual writing cards (cf., appendix L).

Table 4. *Overview of the writing lesson programs.*

Lesson	Focus of the lesson	Design principle(s)	Instructional materials	Writing assignment	EI+PA	EI+IND
1	**Explicitly teaching students writing knowledge**	1	✓ Model texts (cf., Appendix A, B, C, and D) ✓ Memory card (cf., Appendix E)		✓	✓
2A	**Rules on writing collaboratively**	4A	✓ Collaboration card (cf., Appendix J) ✓ Role badges (cf., Appendix K)		✓	
2B	**Rules on writing individually**	4B	✓ Individual writing card (cf., Appendix L)			✓
3	**Explicitly teaching students the planning strategy**	2 and 4A or 4B	✓ Planning card and scheme (cf., Appendix F)	Appendix M and N	✓	✓
4	**Explicitly teaching students the writing strategy**	2 and 4A or 4B	✓ Writing card (cf., Appendix G)	Appendix M and N	✓	✓
5	**Practice lesson: planning and writing a text**	2 and 4A or 4B		Appendix O	✓	✓
6	**Explicitly teaching students the revising strategy**	2 and 4A or 4B	✓ Revision card (cf., Appendix H)	Appendix O and P	✓	✓
7	**Practice lesson: revising a text**	2 and 4A or 4B		Appendix Q	✓	✓
8	**Guided instruction: integrating the strategies**	3 and 4A or 4B	✓ Integration card (cf., Appendix I)	Appendix R	✓	✓
9	**Practice lesson: planning, writing, and revising a text**	3 and 4A or 4B		Appendix S	✓	✓
10	**Practice lesson: planning, writing, and revising a text**	3 and 4A or 4B		Appendix T	✓	✓
11	**Practice lesson: planning, writing, and revising a text**	3 and 4A or 4B		Appendix U	✓	✓

Teacher training

To support teachers in implementing the writing program, two researcher-directed training sessions were organized. The first session was intended for EI+PA teachers while the second one was organized for EI+IND teachers. Both sessions contained a 3-h group training in which teachers were guided through the detailed teacher manuals (EI+PA: 92 pages and EI+IND: 81 pages). Next to a comprehensive description of the background, aims, and organization of the intervention, the teacher manuals provided detailed lesson scenarios. Each lesson scenario described the objectives, the materials, the content, and the instructional approaches of a specific lesson. In addition, all teachers were trained on how to explicitly teach writing knowledge and strategies during hands-on practices and the EI+PA teachers were provided with specific guidelines on how to implement and structure peer-assisted writing. During the intervention period, teachers were also provided with an in-service training session in which they were coached in the implementation of the writing program.

Discussion

The present study aimed to meet a major shortcoming in reporting writing interventions, namely the lack of clear and detailed descriptions of writing interventions in the majority of the writing research articles. This hinders theory building, replication, dissemination, and implementation of evidence-based writing practices (Rijlaarsdam et al., 2018). Additionally, the present study provides clear guidelines on how to report similarities and differences between different instructional writing programs by means of overlapping and diverging design principles. In the present article we specifically focused on analytically describing two writing programs: EI+PA students received explicit instruction of writing knowledge and strategies while practicing writing with a peer, while EI+IND students received the exact same type of explicit writing instruction but they practiced writing individually. Both programs were analytically described by means of the reporting system of Rijlaarsdam et al. (2018). Following this reporting scheme, the programs were described by defining overlapping and differing design principles, instructional teaching activities, and learning activities. Below, we first elaborate on the scientific significance of the EI+PA and EI+IND writing program by situating them in the current research base on explicit instruction of writing knowledge and strategies and on peer-assisted writing. More specifically, on the one hand we highlight key aspects of the writing programs that are in line with existing evidence-based writing programs. On the other hand, we also point out key aspects in which our writing programs differ from existing research and thus expand our current knowledge base on explicit writing instruction and peer-

assisted writing. Furthermore, we present some hypotheses on which differential features of the EI+PA program might explain the additional effect of peer-assisted writing. Second, we provide suggestions on how to report design principles when different experimental writing programs need to be described. In this respect, we underline the need for reporting overlapping and diverging design principles. To conclude, we discuss the value and usability of the reporting scheme of Rijlaarsdam et al. (2018) to analytically describe writing interventions.

Scientific significance of the EI+PA and EI+IND writing program

Based on several meta-analyses, it can be stated that the explicit instruction of writing knowledge and strategies in elementary grades is well-researched (Graham, 2006; Graham et al., 2012; Koster et al., 2015). Consequently, quite a few evidence-based writing programs have been developed in which explicit writing instruction is key. The Self-Regulated Strategy Development (SRSD), in this respect, is by far the most studied instructional writing program and has been acknowledged as a very powerful and evidence-based program to enhance students' writing (Graham & Harris, 2018; Graham et al., 2012; Harris & Graham, 2016, 2018). Next to SRSD, other writing programs such as, for instance, the Cognitive Self-Regulation Instruction (CSRI) (Fidalgo & Torrance, 2018), Tekster (Bouwer et al., 2018; Koster & Bouwer, 2018), and a comprehensive writing program focused on communicative writing (Rietdijk et al., 2017) have also been proven to be very effective in improving students' writing. The EI+PA and EI+IND programs described in the present article, are in line with these previous programs. More particularly, all the evidence-based writing programs referred to are comprehensive and multifaceted programs containing several key writing practices. The key practice which is central in each of these programs is identical, namely the explicit instruction of writing strategies. Based on this key practice of explicit strategy instruction, instructional activities such as modelling, supporting memorization of the writing strategy, scaffolding, and guided practice with gradual release of responsibility are present in all writing programs discussed (Bouwer et al., 2018; Fidalgo & Torrance, 2018; Harris & Graham, 2016, 2018; Rietdijk et al., 2017). However, each program operationalized these instructional activities differently according to the different educational contexts in which the programs were implemented. The EI+PA and EI+IND program, for instance, was the only program that does not apply mnemonics to support students in memorizing the (steps of the) strategies. For the EI+PA and EI+IND programs we developed strategy cards for each writing strategy (i.e., planning, writing, and revising) and an integration card summarizing the strategy cards to support memorization. In this respect, the EI+PA and EI+IND program differed from prior evidence-based writing

programs and in this way research on the effectiveness of the EI+PA and EI+IND program expands our current knowledge base on explicit writing instruction.

In contrast to research on explicit writing instruction, research on peer-assisted writing in elementary grades is rather limited (Graham et al., 2012; Koster et al., 2015). The majority of the studies focus on a specific application of peer-assisted writing, for instance peer discussions and peer help (Harris et al., 2006), or peer feedback (Holliway, 2004). Contrary to these specific peer-assisted writing applications, Paired Writing is the most structured system of peer-assisted writing because tutor and tutee roles and behaviours are identified at each step of the writing process (i.e., generating ideas, drafting, reading, editing, producing a best copy, and evaluating) (Nixon & Topping, 2001; Sutherland & Topping, 1999; Yarrow & Topping, 2001). Although Paired Writing is primarily designed for peer tutoring in which one member is more skilful at writing, the program can also be used for co-composition with reciprocal roles (Yarrow & Topping, 2001). In accordance to Paired Writing, the EI+PA program can also be considered as a structured system of peer-assisted writing as the roles and behaviours of the strategy card reader, the reporter, and the thinker are embedded throughout the complete writing process (i.e., planning, writing, and revising). The EI+PA program, however, also significantly differs from Paired Writing as it not designed for peer tutoring but exclusively focusses on co-composition with reciprocal roles. Furthermore, the EI+PA program goes beyond Paired Writing as collaboration between writing pairs is also facilitated (e.g., writing pairs provide peer feedback on each other's planning scheme and text).

To conclude, the EI+PA program discussed in the present article is the first evidence-based writing program which successfully combines explicit writing instruction and a structured system of peer-assisted writing. The effectiveness of this program largely depends on the complementary nature of explicit writing instruction on the one hand and peer-assisted writing on the other hand (Ferretti & Lewis, 2013). More particularly, explicit instruction can foster students' acquisition of writing knowledge and strategies (Graham, 2006), while a structured system of peer-assisted writing can offer students opportunities to practice and apply the knowledge and strategies taught (Daiute & Dalton, 1993). The effectiveness of the EI+PA program was also highlighted when EI+PA students significantly outperformed their EI+IND counterparts. Based on the deep analysis of both writing programs by means of overlapping and differing design principles, we can put forward some hypotheses on which differential features of the EI+PA program might explain the additional effect of peer-assisted writing. First, the EI+PA students were writing in heterogeneous dyads in which less proficient writers were matched with more skilful writers. Based on previous research in which cross-ability groups were compared to same-ability groups (Sutherland & Topping, 1999), the effect of the EI+PA program might depend on the group composition in which more skilful writers support less proficient writers'. Second, the EI+PA program structured the collaboration between students.

More particularly, students were assigned roles which helped them identify different types of behaviour during the writing process. Additionally, the roles were also modelled by the teacher and peers so students could learn appropriate collaboration and interaction skills by observing. Finally, by providing students shared writing documents, students felt a kind of shared responsibility to complete their writing assignments collaboratively. By structuring peer-assisted writing in this way, students were provided specific guidelines and routines on how to collaborate and interact. Such structuring is essential for peer-assisted writing in order to be successful (Dale, 1994; De Smedt & Van Keer, 2018). A final feature that might explain the additional effect of peer assistance in the EI+PA program is the inclusion of collaboration opportunities between writing groups. More particularly, each pair of students had to exchange their written work with another pair of students. They had to read each other's work and provide concrete feedback on the written products. This type of peer feedback has also been proven to be effective (Holliway, 2004).

The need for overlapping and diverging design principles

Based on the results of the present study and our experiences with the reporting system of Rijlaarsdam et al. (2018) we want to propose some additional guidelines on analytically describing writing interventions. A lot of writing intervention studies include more than one experimental condition in order to compare these to each other. In realising this, researchers have to meticulously distinguish condition-specific intervention elements from intervention elements that are identical across the different experimental conditions. In this way, they can control for similarities and differences between the experimental conditions enabling them to make valid claims on possible significant intervention effects. In the present study, we particularly wanted to compare the EI+PA condition with the EI+IND condition. The explicit writing instruction was identical in both experimental writing programs. The only difference between both conditions was the fact that EI+PA students practiced writing collaboratively, while EI+IND students practiced individually. In this way, we would be able to attribute possible significant differences concerning the impact of both interventions to the impact of either peer-assisted writing or individual writing. Based on our experiences with the reporting system, we argue that it is essential for writing researchers to explicitly take into account the similarities and differences between different experimental writing conditions. In this respect, researchers should design and report on the one hand condition-specific design principles, teaching activities, and learning activities to control for differences between the experimental conditions. On the other hand, they should also design and report design principles, teaching activities, and learning activities that are present across experimental conditions to control for the

similarities between conditions. In the present study, we specifically reported these similarities and differences by means of overlapping and diverging design principles. In this way, writing researchers and educational practitioners can gain insight into the crucial intervention elements and the underlying empirical and theoretical principles that are on the one hand identical across interventions and on the other hand distinguish the different interventions from each other.

The adoption of overlapping and diverging design principles when describing intervention programs becomes increasingly important in the light of the growing need for response to intervention studies (RTI). The RTI-framework provides a multi-tiered problem-solving process to support and monitor all students' writing and to intervene as soon as possible if students do not respond to a specific writing program (Mesmer & Mesmer, 2008; Saddler & Asaro-Saddler, 2012). In tier 1, all students receive the same educational writing program. Students who are not responding as anticipated are provided with more intense interventions in tier 2. Students who fail to succeed in tier 2 receive more intense specialized and individualized writing instruction in tier 3 (Saddler & Asaro-Saddler, 2012). In order to efficiently implement scientifically based interventions in schools according the RTI-framework, writing researchers have to translate their evidence-based writing programs into specific teaching guidelines. In this respect, we would recommend the use of overlapping and diverging design principles to identify the teaching and learning activities that are similar across tiers and to distinguish the teaching and learning activities that are tier specific.

Value and usability of a reporting system to analytically describe writing interventions

To conclude, we underline the value of a reporting system such as the scheme of Rijlaarsdam et al. (2018) as it stimulates and explicitly prompts writing researchers to be more aware of the designing process of writing interventions. The reporting scheme of Rijlaarsdam et al. (2018) is particularly helpful and serves the purpose as it requires researchers to explicitly define and share design principles, teaching activities, and learning activities. Following this scheme, researchers are first encouraged to actively think of design principles that underlie the intervention. As these design principles are grounded in empirical and/or theoretical research, researchers can demonstrate and ensure the empirical and theoretical value of the different ingredients of their intervention. Based on these design principles, researchers not only consider instructional teaching activities, but they also reflect on what kind of learning activities they want students to perform in order to foster their writing. By doing so, the researcher provides clear instructional guidelines to other researchers who want to gain insight

into the critical elements of the intervention (cf., theory building and replication) and to educational practitioners who want to implement the intervention in everyday classroom settings (cf., dissemination and implementation).

References

Abbuhl, R. (2011). Using models in writing instruction: A comparison with native and nonnative speakers of English. *SAGE Open, 1*(3), 1-12. doi:10.1177/2158244011426295

Bean, T., & Steenwyk, F. (1984). The effect of three forms of summarization instruction on sixth graders' summary writing and comprehension. *Journal of Reading Behavior, 16*(4), 297-306. doi:10.1080/10862968409547523

Berninger, V., Fuller, F., & Whitaker , D. (1996). A process model of writing development across the life span. *Educational Psychology Review, 8*(3), 193-218. doi:10.1007/BF01464073

Bouwer, R., & De Smedt, F. (2018). Introduction special issue: Considerations and recommendations for reporting writing interventions in research publications. *Journal of Writing Research, 10*(2), 115-137. doi:10.17239/jowr-2018.10.02.01

Bouwer, R., Koster, M., & van den Bergh, H. (2018). Effects of a strategy-focused instructional program on the writing quality of upper elementary students in the Netherlands. *Journal of Educational Psychology, 110*(1), 58-71. doi:10.1037/edu0000206

Charney, D., & Carlson, R. (1995). Learning to write in a genre: What student writers take from model texts. *Research in the Teaching of English, 29*(1), 88-125.

Daiute, C., & Dalton, B. (1993). Collaboration between children learning to write. Can novices be masters? *Cognition and Instruction, 10*(4), 281-333. doi:10.1207/s1532690xci1004_1

Dale, H. (1994). Collaborative writing interactions in one ninth-grade classroom. *Journal of Educational Research, 87*(6), 334-344. doi:10.1080/00220671.1994.9941264

De Smedt, F., Graham, S., & Van Keer, H. (2018). The bright and dark side of writing motivation: Effects of explicit instruction and peer assistance. *The Journal of Educational Research*. doi:10.1080/00220671.2018.1461598

De Smedt, F., & Van Keer, H. (2017). Het openbreken van een black box : schrijven en schrijfinstructie in het Vlaamse lager onderwijs. *Pedagogische Studiën, 94*(4), 254-282.

De Smedt, F., & Van Keer, H. (2018). Fostering writing in upper primary grades: a study into the distinct and combined impact of explicit instruction and peer assistance. *Reading and Writing, 31*(2), 325-354. doi:10.1007/s11145-017-9787-4

De Smedt, F., Van Keer, H., & Merchie, E. (2016). Student, teacher, and class-level correlates of Flemish late elementary school children's writing performance. *Reading and Writing, 29*(5), 833-868. doi:10.1007/s11145-015-9590-z

Ferretti, R., & Lewis, W. (2013). Best practices in teaching argumentative writing. In S. Graham, C. A. MacArthur, & J. Fitzgerald (Eds.), *Best practices in writing instruction* (Second Edition ed., pp. 113-140). New York: The Guilford Press.

Fidalgo, R., Harris, K., & Braaksma, M. (2018). *Design Principles for Teaching Effective Writing* (Vol. 34). Leiden; Boston: Brill.

Fidalgo, R., & Torrance, M. (2018). Developing writing skills through cognitive self-regulation instruction. In R. Fidalgo, K. Harris, & M. Braaksma (Eds.), *Design Principles for Teaching Effective Writing* (Vol. 34, pp. 89-118). Leiden; Boston: Brill.

Fidalgo, R., Torrance, M., Rijlaarsdam, G., van den Bergh, H., & Alvarez, M. (2015). Strategy-focused writing instruction: just observing and reflecting on a model benefits 6th grade students. *Contemporary Educational Psychology, 41*, 37-50. doi:10.1016/j.cedpsych.2014.11.004

Fitzgerald, J., & Teasley, A. (1986). Effects of instruction in narrative structure on children's writing. *Journal of Educational Psychology, 78*(6), 424-432. doi:10.1037/0022-0663.78.6.424

Flemish Ministry of Education and Training. (2005). *Education in Flanders. The Flemish educational landscape in a nutshell.* Retrieved from http://planipolis.iiep.unesco.org/sites/planipolis/files/ressources/belgium_flanders_education_nutshell.pdf.

Flower, L., & Hayes, J. (1981). A cognitive process theory of writing. *College Composition and Communication, 32*(4), 365-387. doi:10.2307/356600

Graham, S. (2006). Strategy instruction and the teaching of writing. In C. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of writing research* (pp. 187-207). New York: The Guilford Press.

Graham, S., Gillespie, A., & McKeown, D. (2013). Writing: importance, development, and instruction. *Reading and Writing, 26*(1), 1-15. doi:10.1007/s11145-012-9395-2

Graham, S., & Harris, K. (1993). Self-regulated strategy development: Helping students with learning problems develop as writers. *Elementary School Journal 94*(2), 169-181. doi:10.1086/461758

Graham, S., & Harris, K. (2014). Conducting high quality writing intervention research: Twelve recommendations. *Journal of Writing Research, 62*(2), 89-123. doi:0.17239/jowr-2014.06.02.1

Graham, S., & Harris, K. (2018). An examination of the design principles underlying a Self-Regulated Strategy Development study. *Journal of Writing Research, 10*(2). doi:10.17239/jowr-2018.10.02.02

Graham, S., Harris, K., & Chambers, A. (2016). Evidence-based practice and writing instruction: A review of reviews. In C. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of Writing Research* (pp. 211-226). New York: The Guilford Press.

Graham, S., Harris, K., & Mason, L. (2005). Improving the writing performance, knowledge, and self-efficacy of struggling young writers: The effects of self-regulated strategy development. *Contemporary Educational Psychology, 30*(2), 207-241. doi:10.1016/j.cedpsych.2004.08.001

Graham, S., Harris, K., & Troia, G. (2000). Self-regulated strategy development revisited: Teaching writing strategies to struggling writers. *Topics in Language Disorders, 20*(4), 1-14. doi:10.1097/00011363-200020040-00003

Graham, S., McKeown, D., Kiuhara, S., & Harris, K. (2012). A meta-analysis of writing instruction for students in the elementary grades. *Journal of Educational Psychology, 104*(3), 879-896. doi:10.1037/A0029185

Graham, S., & Perin, D. (2007). A meta-analysis of writing instruction for adolescent students. *Journal of Educational Psychology, 99*(3), 445-476. doi:10.1037/0022-0663.99.3.445

Harris, K., & Graham, S. (2016). Self-Regulated Strategy Development in writing: Policy implications of an evidence-based practice. *Policy Insights from the Behavioral and Brain Sciences, 3*(1), 77-84. doi:10.1177/2372732215624216

Harris, K., & Graham, S. (2018). Self-Regulated Strategy Development: Theoretical bases, critical instructional elements, and future research. In R. Fidalgo, K. Harris, & M.

Braaksma (Eds.), *Design Principles for Teaching Effective Writing* (Vol. 34, pp. 119-151). Leiden; Boston: Brill

Harris, K., Graham, S., & Mason, L. (2006). Improving the writing, knowledge, and motivation of struggling young writers: Effects of self-regulated strategy development with and without peer support. *American Educational Research Journal, 43*(2), 295-340. doi:10.3102/00028312043002295

Holliway, D. (2004). Through the eyes of my reader: A strategy for improving audience perspective in children's descriptive writing. *Journal of Research in Childhood Education, 18*(4), 334-349. doi:10.1080/02568540409595045

Inspectie van het Onderwijs. (2010). *Het onderwijs in het schrijven van teksten. De kwaliteit van het schrijfonderwijs in het basisonderwijs.* Utrecht: Ministerie van Onderwijs, Cultuur en Wetenschap.

Koster, M., & Bouwer, R. (2018). Describing multifaceted writing interventions: From design principles for the focus and mode of instruction to student and teacher activities. *Journal of Writing Research, 10*(2). doi:10.17239/jowr-2018.10.02.03

Koster, M., Tribushinina, E., de Jong, P., & van den Bergh, H. (2015). Teaching children to write: A meta-analysis of writing intervention research. *Journal of Writing Research, 7*(2), 299-324. doi:10.17239/jowr-2015.07.02.2

Limpo, T., & Alves, R. (2013). Teaching planning or sentence-combining strategies: Effective SRSD interventions at different levels of written composition. *Contemporary Educational Psychology, 38*(4), 328-341. doi:10.1016/j.cedpsych.2013.07.004

Mesmer, E., & Mesmer, H. (2008). Response to intervention (RTI): What teachers of reading need to know. *Reading Teacher, 62*(4), 280-290. doi:10.1598/RT.62.4.1

National Center for Education Statistics. (2012). *The nation's report card: Writing 2011*. Washington, D.C.: Institute of Education Sciences, U.S. Department of Education.

Nixon, J., & Topping, K. (2001). Emergent writing: the impact of structured peer interaction. *Educational Psychology, 21*(1), 41-58. doi:10.1080/01443410020019821

Ofsted. (2000). *Teaching of writing in primary schools: could do better*. Manchester: Ofsted.

Rietdijk, S., Janssen, T., van Weijen, D., van den Bergh, H., & Rijlaarsdam, G. (2017). Improving writing in primary schools through a comprehensive writing program. *Journal of Writing Research, 9*(5), 173-225. doi:10.17239/jowr-2017.09.02.04

Rijlaarsdam, G., Janssen, T., Rietdijk, S., & van Weijen, D. (2018). Reporting design principles for effective instruction of writing: Interventions as constructs. In R. Fidalgo, K. Harris, & M. Braaksma (Eds.), *Design Principles for Teaching Effective Writing* (Vol. 34, pp. 280-313). Leiden; Boston: Brill.

Saddler, B., & Asaro-Saddler, K. (2012). Response to intervention in writing: A suggested framework for screening, intervention, and progress monitoring. *Reading & Writing Quarterly: Overcoming Learning Difficulties, 29*(1), 20-43. doi:10.1080/10573569.2013.741945

Schunk, D. (2003). Self-efficacy for reading and writing: Influence of modeling, goal setting, and self-evaluation. *Reading and Writing Quarterly, 19*(159-172). doi:10.1080/10573560308219

Sutherland, J., & Topping, K. (1999). Collaborative creative writing in eight-year-olds: comparing cross-ability fixed role and same-ability reciprocal role pairing. *Journal of Research in Reading, 22*(2), 154-179. doi:10.1111/1467-9817.00080

Yarrow, F., & Topping, K. (2001). Collaborative writing: The effects of metacognitive prompting and structured peer interaction. *British Journal of Educational Psychology, 71*, 261-282. doi:10.1348/000709901158514

Appendices

Appendix A. *Model text 1.*

Model text 1

Welcome in my house!

Have you ever watched the houses in you street or city? If you did, did you notice that there are a lot of different houses: apartments, villas, bungalows, cottages, … There are houses of different sizes, colours and shapes. Are you curious to know how my house looks like? In this text, I am going to tell you a bit more about the size of my house, my bedroom and my garden.

My house is big as I live in a three-storey house!

The most cosy spot in my house is definitely my bedroom. There you can find my bed and my computer.

Outside we have a large garden where I often play with my sister.

It does not really matter in what kind of house you live. The most important thing is that you feel at home in your own house.

Appendix B. *Model text 2.*

First of all, my house has two storeys. On the ground floor, you can find the entrance, the living room, the kitchen and the storage room. On the first floor, we have three bedrooms (my parents' bedroom, my sisters bedroom and my bedroom) and a bathroom. My house is not small, but it is not a villa. Second, my bedrooms is the nicest place in the entire house. My room is blue and there are posters on the walls. At night, you can find me in my bedroom to finish my homework or to play a computer game. But there is one very special thing in my bedroom: my bunkbed! Now and then I can invite a friend to sleep over in my bunkbed. Furthermore, I have a large garden with a lot of trees and a pond with colourful fishes. During the summer, I often play in the garden with my sister. We play hide-and-seek or we build a camp in the garden. This summer we even build a treehouse and we were allowed to sleep in the treehouse for one night! Finally, my house is big enough, my room is the nicest place in the house and I often play in my big garden.

Appendix C. *Compare and contrast task.*

1. **What does the writer wants to achieve with these texts? What is the <u>goal</u> of both texts?**

.....
.....
.....

2. Compare both texts. Analyse the <u>content</u> and the <u>structure</u> of both texts.					
Text 1 			**Text 2** 		
CONTENT	👍	👎	**CONTENT**	👍	👎
• Do you have **enough information** about the house?			• Do you have **enough information** about the house?		
• Are there **images**?			• Are there **images**?		
STRUCTURE	👍	👎	**STRUCTURE**	👍	👎
• Is there a **title**?			• Is there a **title**? •		
• Is there an **introduction**?			• Is there an **introduction**?		
• Is there a **middle**?			• Is there a **middle**?		
• Is there a **conclusion**?			• Is there a **conclusion**?		
• Are there **paragraphs**?			• Are there **paragraphs**?		

Appendix D. *Model text 3.*

Welcome in my house!

Have you ever watched the houses in you street or city? If you did, did you notice that there are a lot of different houses: apartments, villas, bungalows, cottages, … There are houses of different sizes, colours and shapes. Are you curious to know how my house looks like? In this text, I am going to tell you a bit more about the size of my house, my bedroom and my garden.

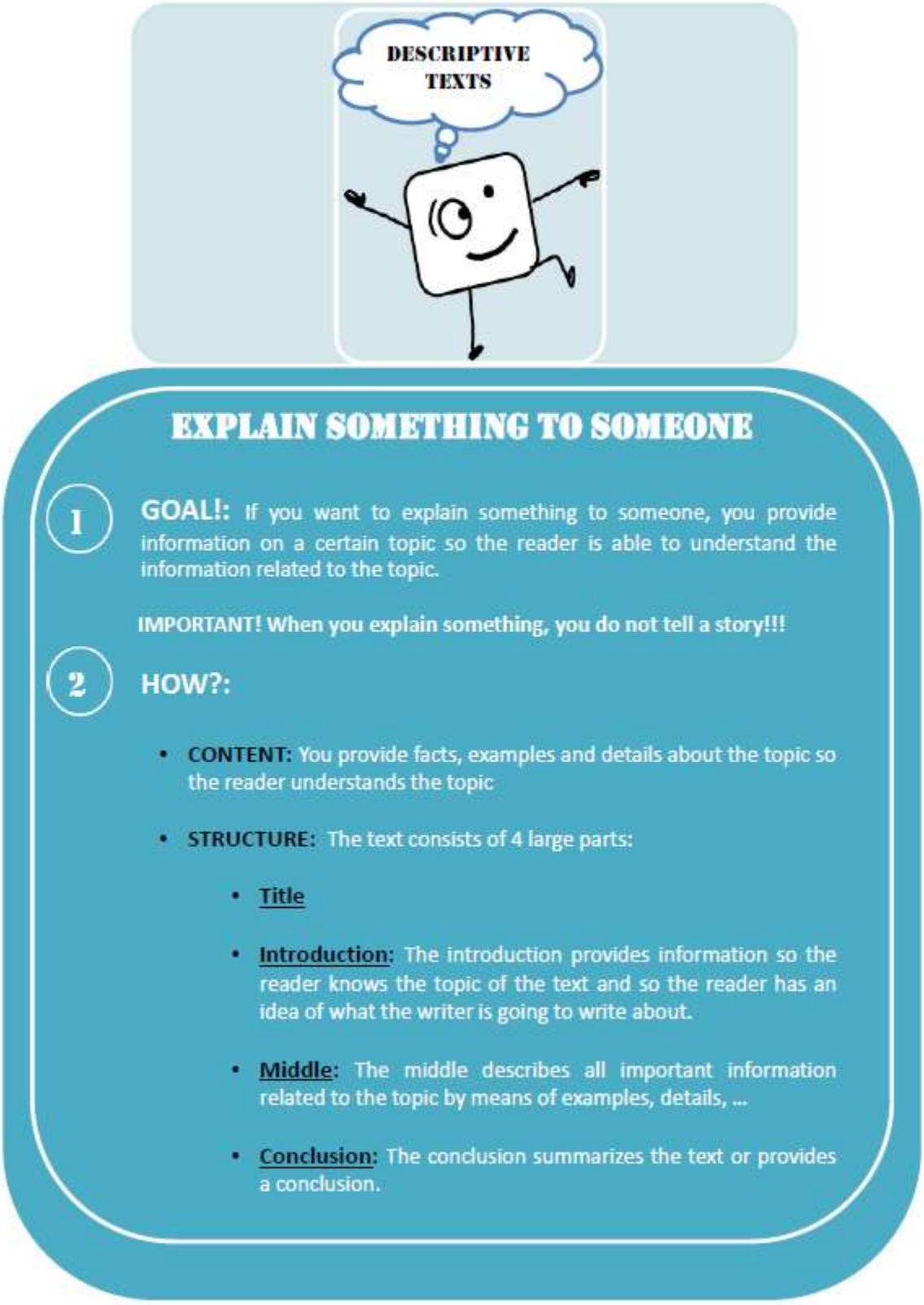
First of all, my house has two storeys. On the ground floor, you can find the entrance, the living room, the kitchen and the storage room. On the first floor, we have three bedrooms (my parents' bedroom, my sisters bedroom and my bedroom) and a bathroom. My house is not small, but it is not a villa.

Second, my bedrooms is the nicest place in the entire house. My room is blue and there are posters on the walls. At night, you can find me in my bedroom to finish my homework or to play a computer game. But there is one very special thing in my bedroom: my bunkbed! Now and then I can invite a friend to sleep over in my bunkbed.

Furthermore, I have a large garden with a lot of trees and a pond with colourful fishes. During the summer, I often play in the garden with my sister. We play hide-and-seek or we build a camp in the garden. This summer we even build a treehouse and we were allowed to sleep in the treehouse for one night!

It does not really matter in what kind of house you live. The most important thing is that you feel at home in your own house.

Appendix E. *Memory card.*



Appendix F. *Planning card and planning scheme.*

1 Read the assignment carefully

- WHAT should I write about?

Write the topic in the planning scheme.

2 Collect main ideas

- WHAT do I know about the topic and what do I want to write about this topic? These are your main ideas.

Write your main ideas in the planning scheme.

3 Add additional information

- WHAT do I know about each main idea? Think of details and examples. Provide enough information to your reader!

Write the additional information in the planning scheme.

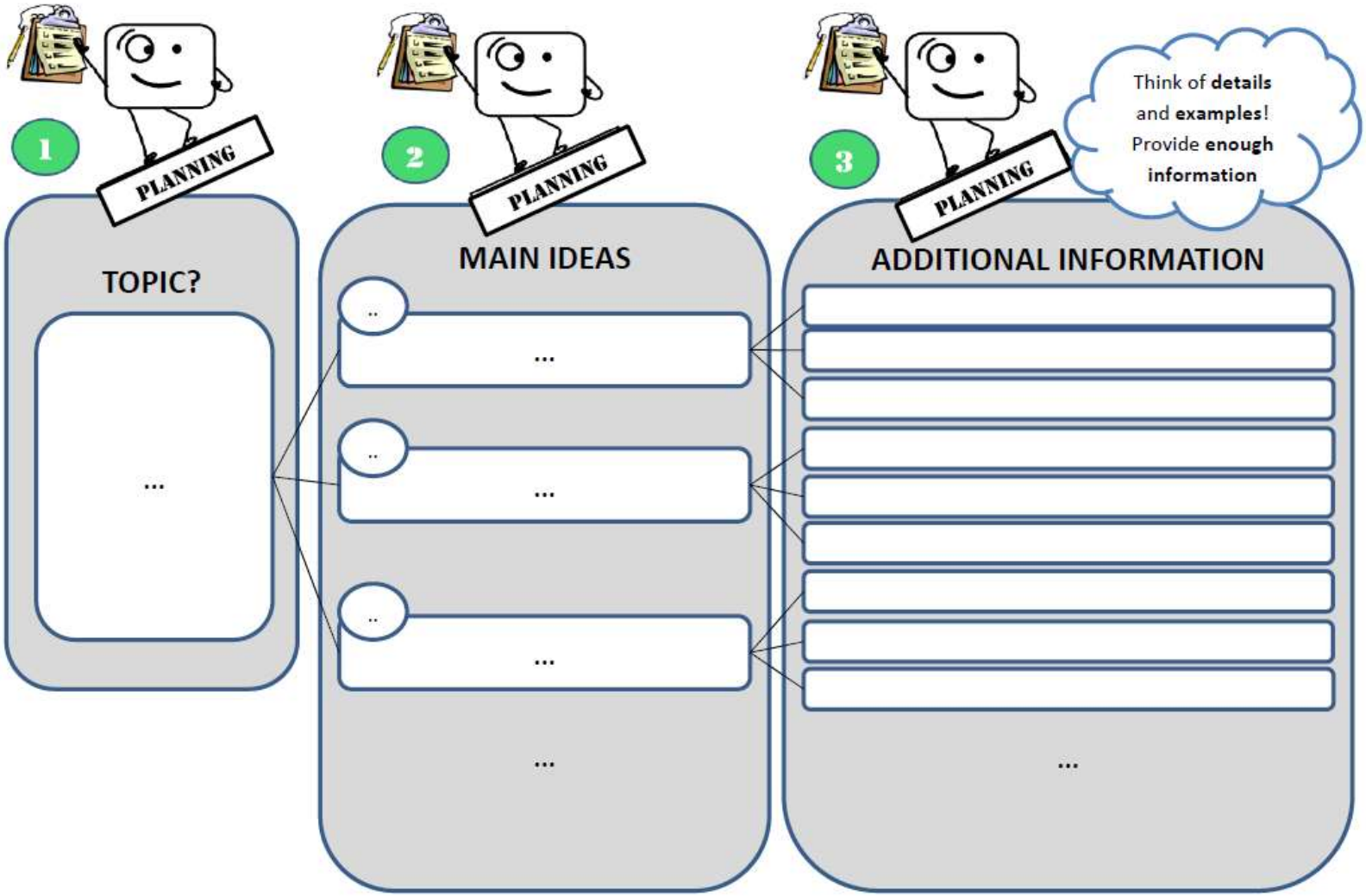
4 Organise the main ideas

- WHAT is the order of my main ideas?

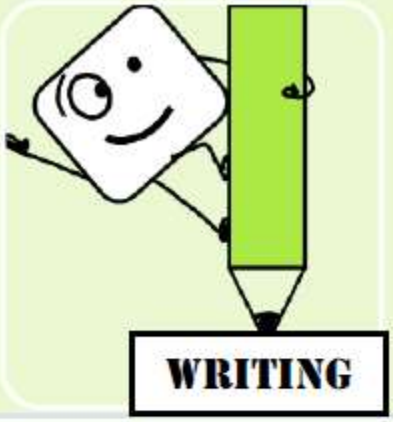
Number each main idea in the planning scheme.

5 Check your planning scheme

- Need more information? Write a question mark.


1
PLANNING
TOPIC?
...
2
PLANNING
MAIN IDEAS
..
...
..
...
..
...
...
3
PLANNING
Think of details and examples! Provide enough information
ADDITIONAL INFORMATION
...

Appendix G. *Writing card.*



1. Use the planning scheme to write down your text. The planning scheme helps you with **the structure** and **the content** of your text.

2. Construct your text as follows:

- **Title**
- **Introduction**

Alinea 1	Write down the **writing topic**
	Write down what you are going to tell about this topic. Summarize your **main ideas**

- **Middle**

Alinea 2	Write out **main idea 1**: use the **additional information**
Alinea 3	Write out **main idea 2**: use the **additional information**
Alinea 4	Write out **main idea 3**: use the **additional information**
Alinea .	...

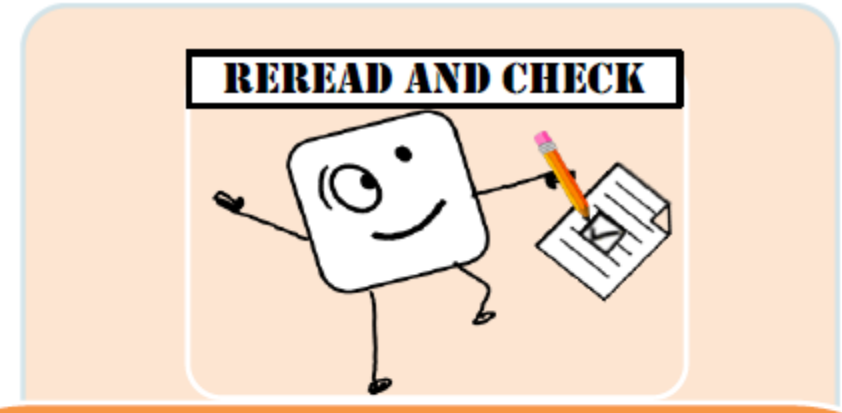
- **Conclusion**

Final alinea	**Summarize** your text or Provide a **conclusion**

Keep in mind:

- Correct spelling and sentence construction
- Use a variation of words

Appendix H. *Revision card.*



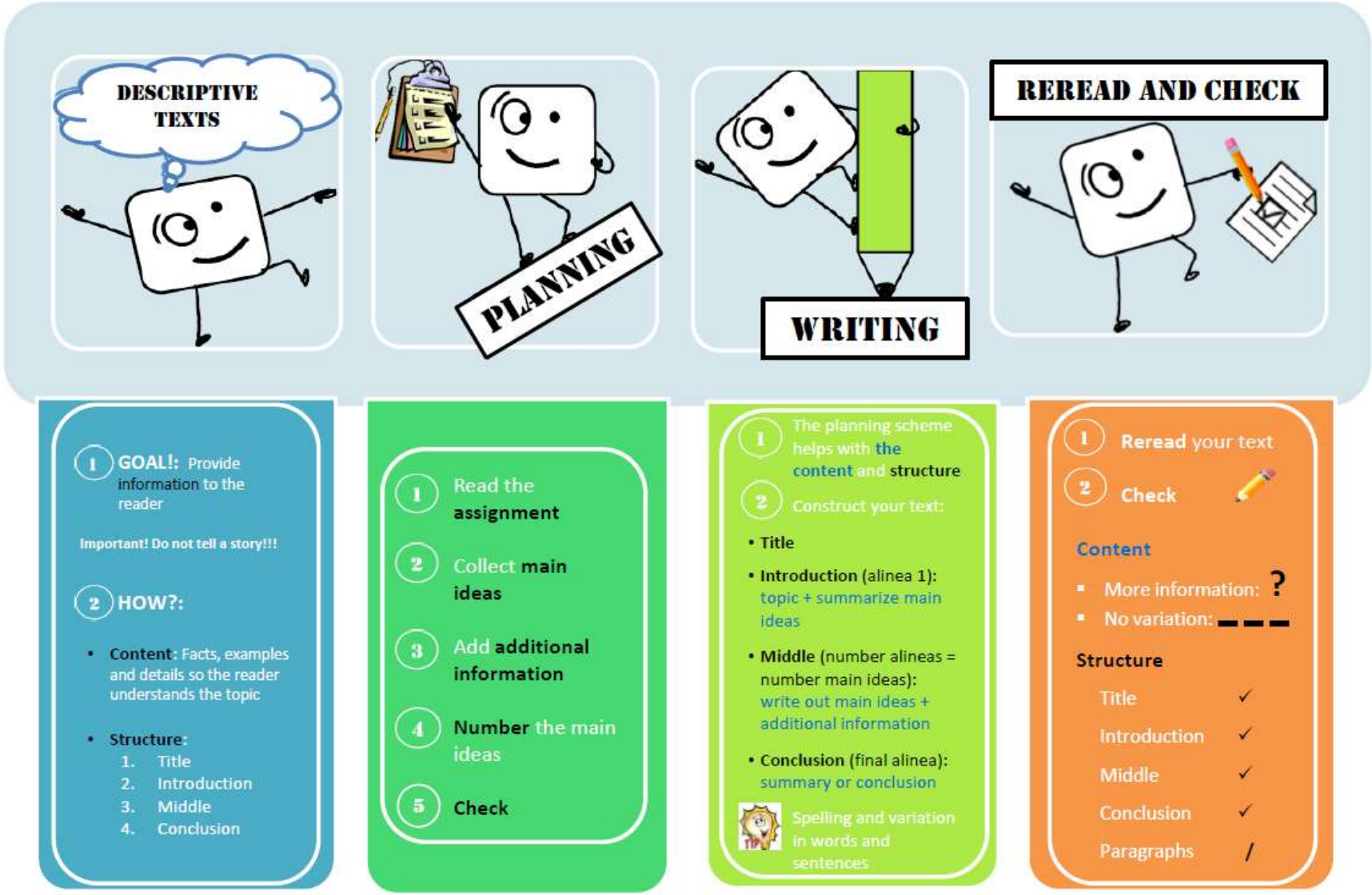
1 **Reread** your text

2 **Check** the **content** and the **structure** of your text as follows:

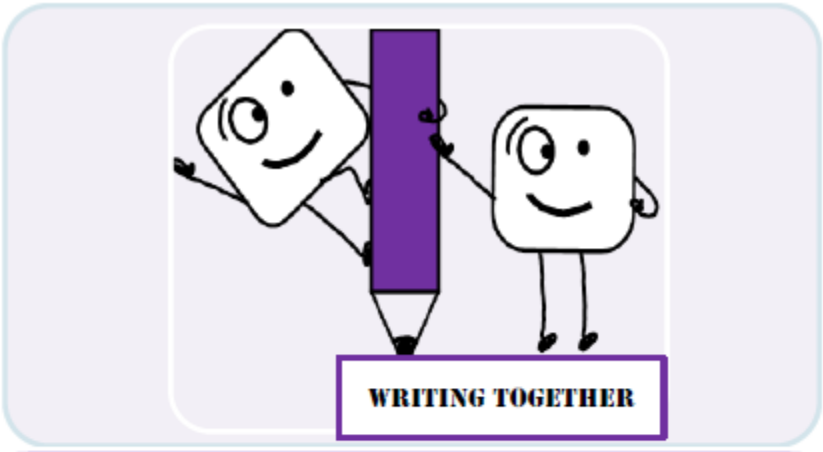
Check:	Mark:
Where do you need more **information**?	?
Where do you see **a lack of variation?**	And... And... And...
Does the text have a **title**?	✓
Does the text have an **introduction**?	✓
Does the text have a **middle**?	✓
Does the text have a **conclusion**?	✓
Does the text have **paragraphs**?	/

3 **Revise** the text

Appendix I. *Integration card.*



Appendix J. *Collaboration card.*



COLLABORATION RULES

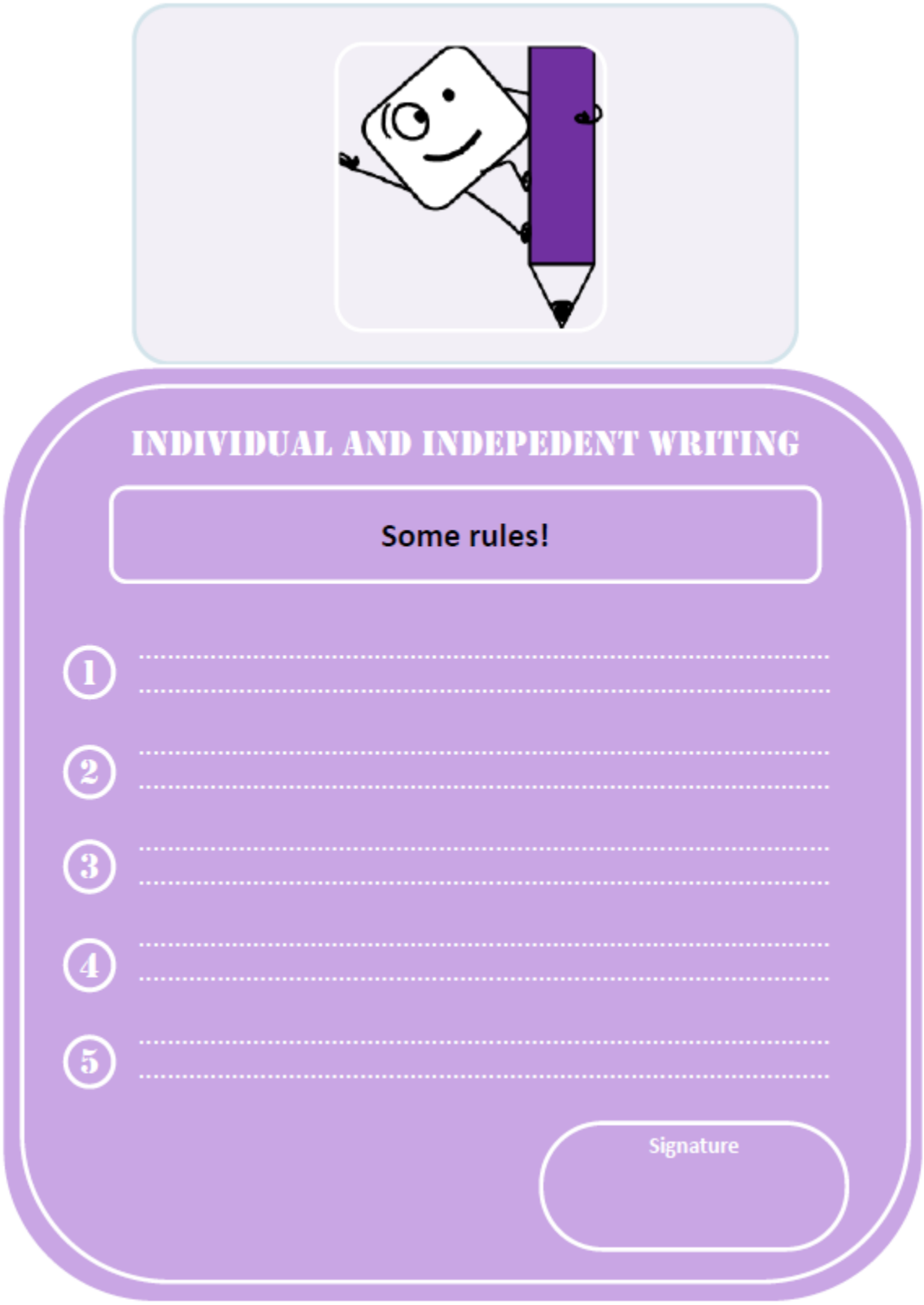
Basic principle:
Writing together = together **responsible**!

1. .....
2. .....
3. .....
4. .....
5. .....

Signature

Appendix K. *Role badges.*

Appendix L. *Individual writing card.*



Appendix M. *Modelling the planning and writing strategy (lesson 3 and 4).*

In lesson 3, the teacher modelled the planning strategy based on the writing assignment below. In lesson 4, the teacher modelled the writing strategy based on the planning he/she modelled during lesson 3.

This schoolyear, the headmister/headmistress decided that your class can organise the **school trip**. Explain to the headmister/headmistress which **three activities** you are planning for the school trip.

Appendix N. *Writing assignments lesson 3 and lesson 4.*

In lesson 3 students had to choose between the following writing assignments to plan their text. In lesson 4 students could write the text based on the planning they made in lesson 3.

CARNAVAL is approaching! Write a text for the schoolpaper in which you describe **what happens during carnaval**.

Today, the lessons finish earlier so we can play a game. You are responsible to explain the rules of the game. Pick one of the games below and explain to your classmates **how you should play the game**.

Appendix O. *Writing assignment lesson 5 and 6.*

In lesson 5, students had to plan and write a text based on the assignment below. In lesson 6, students had to revise their text.

Today we play **'Who is it'**? Pick a classmate and **explain in your text who this classmate is without giving away his/her name**. Do not only consider appearance, but also think about character, hobbies, …

Can your classmates guess who you are writing about?

Appendix P. *Modelling the revision strategy (lesson 6).*

In lesson 6, the teacher modelled the revision strategy based on the writing assignment below.

Previous week there was a **burglary in the school**. the burglar got away but you saw him running away. Explain to the police **how the burglar looked like, what he was holding in his hands, and his escape route.**

Read and check this text. The revision card will help you!

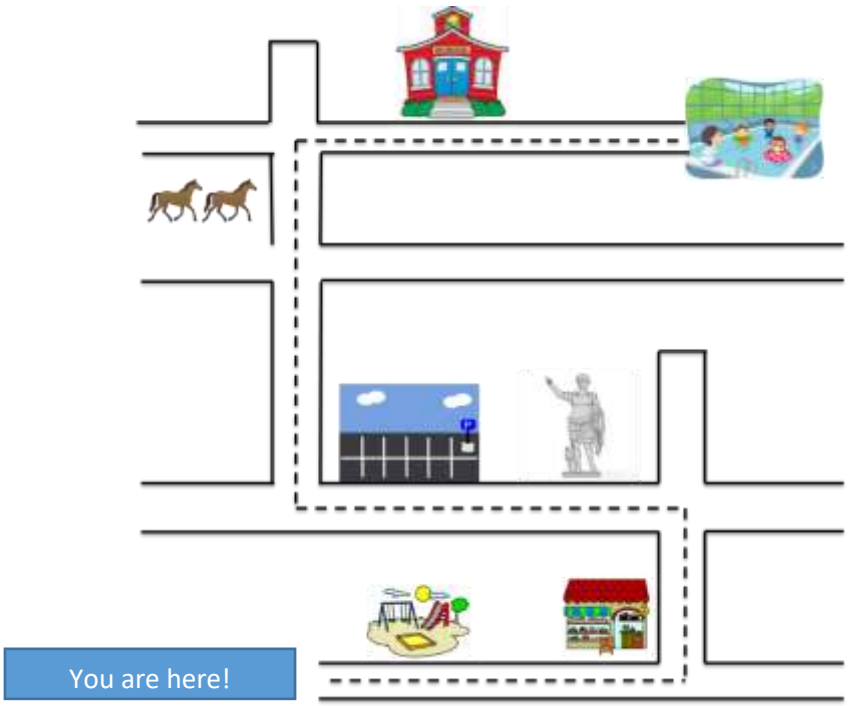
The burglar was wearing a sweater with long sleeves and a dark pants. And he was smoking a cigar and he was almost bald and had a wicked sneer.

In his one hand he was wearing a bag and in his other hand he had a crowbar. He probably used this crowbar to break in. When he saw me, he escaped.

Hopefully I provided you enough information so you can quickly find and arrest him!

Appendix Q. *Writing assignment lesson 7.*

Somebody asks you **to show the way to the swimming pool**. **Give directions and explain what he/she will see during the walk.**



Read and check this text. The revision card will help you!

The road to the swimming pool

I will explain the route to the swimming pool and tell you what you will see during your walk. First, you walk straight ahead until you reach the bakery. Then you turn of left and walk towards the intersection. Then you turn left again. Then you walk until you see a parking lot. If you passed the parking lot, you turn right. At that moment, you will be halfway.

Now, walk straight ahead. If you approach the next intersection, you cross it. You will see a meadow. At the next intersection, you turn.

You are almost at the end. Keep walking and at the end of the road you will find the swimming pool.

Appendix R. *Guided instruction (lesson 8).*

In lesson 8, the teacher and students interactively plan, write, and revise a text based on the writing assignment below.

Good news: it is almost the birthday of the headmaster/headmistress. Your class is responsible for the surprise party! **Explain which activities you will organize, what food you will serve and which birthday present you will give**. Do not forget to mention the time and place of the party!

Appendix S. *Writing assignment lesson 9.*

This weekend you are going on **a camping trip**! Before you pack your suitcase, you read the weather forecast. **Explain to your parents which clothes and objects you will pack for each day.**

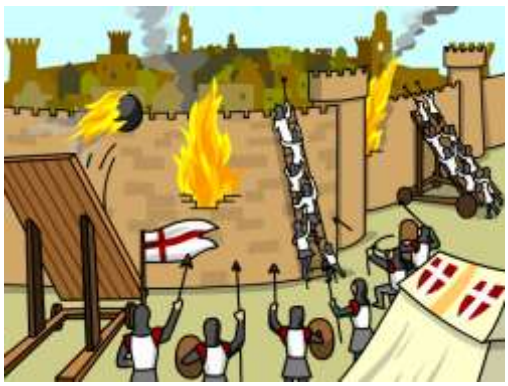
Friday	**Saturday**	**Sunday**
		
Temperature: 15°C Rainfall: 0% No wind	Temperature: 10°C Rainfall: 100% Windy	Temperature: 8°C Rainfall: 100% Stormy

Appendix T. *Writing assignment lesson 10.*

Imagine you are stuck on a desert island with your best friend. **Explain to your friend what you should do to survive on this island.**

Appendix U. *Writing assignment lesson 11.*

Imagine a professor made it possible for you to travel back in time… back to the **Middle Ages**. The images below show what you saw during your time traveling. Explain to the professor **how people lived back then.**



Writing a book of poetry is like dropping a rose petal down the Grand Canyon and waiting for the echo.

Don Marquis

7 “It takes two”: The added value of peer-assisted writing in explicit writing instruction

This chapter is based on:

De Smedt, F., Graham, S., & Van Keer, H. (2019). “It takes two”: The added value of peer-assisted writing in explicit writing instruction. *Revised and resubmitted to Reading Research Quarterly.*

Chapter 7

“It takes two”: The added value of peer-assisted writing in explicit writing instruction

Abstract

High-quality writing instruction is vital to supporting developing writers as they learn to plan, compose, and revise text. It is equally important that such instruction enhances students’ motivation to write as well as their self-efficacy for writing. The main aim of the present study was to investigate the incremental effect of peer-assisted writing in an explicit writing instruction program on student’s writing performance, writing motivation, and self-efficacy for writing. A randomized control design, using multilevel analyses, was conducted to determine the differential effectiveness of two experimental writing treatments compared to a business as usual control condition (BAU). The two experimental writing treatments both involved explicit instruction in writing, with students in one condition writing with a peer (EI+PA) and students in the other condition writing individually (EI+IND). Participating classes (*N*=431 students, *N*=20 teachers) were randomly assigned to the three conditions and students were assessed before and after instruction. EI+PA students outperformed both EI+IND and BAU students on the writing measure. Additionally, EI+PA students were less motivated to write than EI+IND students because of internal or external pressure, but they were more confident as to their capability (self-efficacy) to invent ideas when compared to their EI+IND counterparts. The findings of the present study corroborate and extend the limited number of prior studies illustrating the surplus value of peer-assisted writing in explicit writing instruction programs.

Introduction

Several large-scale writing assessments have documented alarming results on students’ poor writing, revealing that students throughout the world often and consistently show difficulties with writing (Inspectie van het Onderwijs, 2010; National Center for Education Statistics, 2012). This is especially true for students in upper-elementary grades, as they are just learning how to carry out the complex processes involved in planning, composing, and revising texts (Bereiter & Scardamalia, 1987; Flower & Hayes, 1981; McCutchen, 2008).

Compared to students in the lower grades, upper-elementary students are able to engage in higher-order writing skills and strategies (e.g., planning) because the automatization of lower-order writing skills is increased (e.g., handwriting). However, applying these higher-order writing strategies remain cognitively challenging for this age group (Cameron & Moshenko, 1996; McCutchen, Covill, Hoyne, & Mildes, 1994; McCutchen, Francis, & Kerr, 1997).

In addition to the concern regarding cognitive writing processes and outcomes, motivational challenges are equally important to consider as these are critical predictors of students' writing performance (De Smedt, Merchie, et al., 2018; Graham, Berninger, & Fan, 2007; Pajares & Valiante, 1997; Troia, Harbaugh, Shankland, Wolbers, & Lawrence, 2013). In this respect, Bruning and Kauffman (2016) argued that the challenges writers face, are at least as much related to motivational factors as they are to cognitive and linguistic factors. Educational writing practices, however, prioritize writing for evaluative purposes over writing to communicate thoughts, knowledge, and feelings. Consequently, students often experience writing as a difficult, effortful, and uninteresting activity (Hidi & Boscolo, 2006) and their motivation declines as they progress through school (Cleary, 1991; De Smedt et al., 2019).

As a result, a critical issue in instruction for these young students is how to support them instructionally so that they acquire needed writing processes, strategies, and skills as well as positive motivations for writing and confidence as a writer. Numerous meta-analyses on effective instructional writing practices have been conducted over the past years identifying multiple evidence-based writing practices (e.g., Graham, McKeown, Kiuhara, & Harris, 2012; Koster, Tribushinina, de Jong, & van den Bergh, 2015; Rogers & Graham, 2008). Recently, Graham and Harris (2018a) provided an overview of these evidence-based writing practices based on a meta-analysis of meta-analyses. In this study, Graham and Harris (2018a) identified explicit writing instruction and peer-assistance as two very promising evidence-based practices to foster students' writing. *Explicit writing instruction* refers to the explicit and systematic teaching of writing knowledge and strategies (Graham & Perin, 2007). As to writing knowledge, students acquire genre knowledge (i.e., knowledge on the aim, content, and structure of specific text genres) (Martin, 2009). As to writing strategies, students learn strategies for planning, revising, and/or editing texts. *Peer-assisted writing* involves students working together to plan, draft, and/or revise texts (Graham & Perin, 2007). The main aim of the present study was to investigate the added value of peer-assisted writing in an explicit writing instruction program in view of fostering students' writing performance, writing motivation, and self-efficacy for writing. This involved comparing students who received (a) explicit writing instruction with peer practice (EI+PA), (b) explicit instruction with individual practice (EI+IND), and (c) business as usual writing instruction (BAU). As the Flemish attainment targets state that students should be able to copy and write descriptive texts by the end of elementary education (Flemish Ministry of Education and Training, 2005) and

considering that at this educational level, this text genre becomes increasingly important (Alexander & Jetton, 2000), the descriptive text, which is classified within the genre of reports (Martin & Rose, 2008), is specifically focused upon in the present study.

Theories of writing: cognitive and motivational challenges involved in writing

The social cognitive model of writing by Zimmerman and Risemberg (1997) serves as the overarching theoretical framework to address both cognitive and motivational challenges discussed in the present study. According to this model, writing is a self-regulated activity involving *cognitive processes* such as covert self-regulation strategies (e.g., cognitive writing strategies), behavioural self-regulation strategies (e.g., self-monitoring), and environmental self-regulation strategies (e.g., environmental structuring and self-selected models). In the present study, we particularly focus on teaching students cognitive writing strategies, classified under the covert self-regulation strategies. Furthermore, Zimmerman and Risemberg (1997) theorize that *motivational aspects* such as writing motivation and self-efficacy for writing are inherently connected to students' writing as these predict the level of effort students will invest in the covert, behavioural, and environmental self-regulation strategies. In the present study, writing motivation was conceptualized from the theoretical framework of Self-Determination Theory (SDT) (Ryan & Deci, 2000a, 2000b) and self-efficacy for writing was rooted in the Self-Efficacy Theory (SET) (Bandura, 1977, 1997). We opted for these well-aligned motivational frameworks as both share the assumption that humans are agents of their behaviour (Sweet, Fortier, Strachan, & Blanchard, 2012).

SDT is a well-valued and innovative theory of human motivation (Ryan & Deci, 2000b) which is also applied in the field of learning in general and of language learning in particular. Concerning the latter, SDT provides in-depth insight into children's reasons for getting involved in a literacy activity (e.g., De Naeghel, Van Keer, Vansteenkiste, & Rosseel, 2012; De Smedt, Merchie, et al., 2018). The major strength of this motivational framework lies in the differentiation between qualitatively different types of motivation. More particularly, SDT distinguishes autonomous from controlled writing motivation. The former more particularly refers to motives such as writing because of intrinsic pleasure or because of the identified value of writing, while the latter refers to motives such as writing because of external (e.g., good grades) or internal pressure (e.g., guilt) (Ryan & Deci, 2000b). Previous research highlighted autonomous motivation as the most preferable type of motivation because it is related to positive affective and cognitive outcomes like more positive emotions at school (Levesque, Zuehlke, Stanek, & Ryan, 2004) and better performance (De Naeghel et al., 2012;

De Smedt, Van Keer, & Merchie, 2016). In view of creating the most optimal conditions to foster students' autonomous motivation, SDT points to the need of nurturing students' inherent psychological need for autonomy (i.e., feeling of agency), competence (i.e., feeling confident and competent), and relatedness (i.e., feeling related to significant others) (Ryan & Deci, 2000b).

SET (Bandura, 1977, 1997) served as the underlying and integrative theoretical framework in our investigation to study students' self-efficacy for writing and its interaction with the instructional conditions. Following SET in the context of writing, a writer's choice to put effort and persistence into a writing task depends on his/her perceived capability (Bandura, 1977, 1997). Based on SET, Bruning, Dempsey, Kauffman, McKim, and Zumbrunn (2013) acknowledged the multifaceted nature of self-efficacy by identifying three types of self-efficacy for writing: (a) self-efficacy for ideation (i.e., believing in one's capabilities to generate ideas), (b) self-efficacy for convention (i.e., believing in one's capabilities to apply language and writing conventions), and (c) self-efficacy for regulation (i.e., believing in one's self-regulation capabilities during writing). According to Bruning and Kauffman (2016), modeling writing and providing students practice opportunities is effective to foster students' self-efficacy beliefs. More particularly, by observing a model, students can acquire both writing strategies and self-regulatory strategies to cope with the complex writing process.

Explicit writing instruction and peer-assisted writing: Fostering students' writing performance, writing motivation, and self-efficacy for writing

An extensive body of evidence supports the effectiveness of *explicit instruction of writing knowledge and strategies* to promote elementary students' writing (see meta-analyses: Graham et al., 2012; Koster et al., 2015). More particularly, past research demonstrated that students who are explicitly taught how to write become better writers (e.g., Bean & Steenwyk, 1984; De Smedt & Van Keer, 2018b; Fitzgerald & Teasley, 1986). Additionally, prior research also revealed that explicitly teaching students when, how, and why to plan and revise texts had a positive impact on students' overall writing performance (e.g., Bouwer, Koster, & van den Bergh, 2018; De Smedt & Van Keer, 2018b; Fidalgo, Torrance, Rijlaarsdam, van den Bergh, & Alvarez, 2015; Limpo & Alves, 2013; McKeown et al., 2016; Rietdijk, Janssen, van Weijen, van den Bergh, & Rijlaarsdam, 2017). As to the effect on motivational outcomes, there is only a small number of available studies which resulted in inconclusive findings. More particularly, some studies did not find an effect for explicit instruction on students' motivation (e.g., Harris,

Graham, & Mason, 2006), whereas a recent study showed that students who received explicit instruction evidenced more controlled motivated beliefs (De Smedt, Graham, & Van Keer, 2018). Similarly, some studies found a positive effect of explicit instruction on students' self-efficacy (e.g., Graham & Harris, 1989), while others did not (e.g., De Smedt, Graham, et al., 2018; Graham, Harris, & Mason, 2005). Although research on the impact of *peer-assisted writing* in elementary grades is scarce, the existing research in this area supports the contention that student collaboration during planning, composing, and/or revising text is effective (see meta-analyses: Graham et al., 2012; Koster et al., 2015). Peer-assisted writing is in this respect used as an overarching concept entailing different applications, such as peer tutoring (e.g., Grünke, Wilbert, Tsiriotakis, & Agirregoikoa, 2017; Yarrow & Topping, 2001), peer discussion and support (e.g., Graham et al., 2005; Harris et al., 2006), and peer review and feedback (e.g., Holliway, 2004; Hoogeveen & van Gelderen, 2018; Philippakos, 2017). These different peer-assisted writing applications have been effective in promoting elementary students' writing (Graham et al., 2005; Harris et al., 2006; Holliway, 2004; Yarrow & Topping, 2001). It must be noted, however, that most of the empirical studies conducted to date (see Graham et al., 2012; Koster et al., 2015) focus on peer revising and only a few studies involve students engaging in all writing processes together. As to the effect on motivational outcomes, research showed that peer-assistance can foster students' motivation (e.g., De Bernardi & Antolini, 2007; De Smedt, Graham, et al., 2018) and self-efficacy (e.g., Paquette, 2009).

Integrating explicit writing instruction and peer-assisted writing

Given the effectiveness of both writing practices, integrating peer-assisted writing in explicit writing instruction programs should be beneficial. This combination may be especially fruitful due to their complementary nature (De Smedt & Van Keer, 2018b; Ferretti & Lewis, 2013), with explicit writing instruction focusing on teaching students writing knowledge and skills (Graham, 2006) and peer-assisted writing providing students with the opportunity to apply the knowledge and strategies taught (Daiute & Dalton, 1993) as well as providing students the opportunity to learn from each other (Graham, 2018). Notwithstanding the promising nature of this combination, prior research merging these two evidence-based writing practices is scarce.

To our knowledge, only five previous studies investigated the combined effect of explicit writing instruction and peer-assisted writing on students' writing. First, Graham et al. (2005) studied the effect of Self-Regulated Strategy Development (SRSD) with and without peer support (N = 73 third-grade struggling writers). SRSD is the most extensively tested explicit writing instruction program and its effectiveness has been validated in numerous studies

(Graham, 2006; Graham et al., 2012). Graham et al. (2005) particularly studied whether peer assistance had an incremental effect in terms of (a) maintenance and generalization of planning and composing strategies taught during SRSD instruction and (b) students' writing motivation. Revising strategies as a third important writing process and self-efficacy for writing as a motivational factor were, however, not addressed in this investigation. Peer support was operationalized in terms of two peers working together to identify and discuss other contexts in which they could apply the strategies taught and consequently promote strategy use outside SRSD-lessons. The results confirmed the effectiveness of SRSD to support students' writing knowledge and performance and additionally showed that peer support augmented SRSD instruction by fostering students' knowledge and by facilitating generalization to two uninstructed genres. However, no incremental effect of peer-assistance was found for students' writing motivation

Harris et al. (2006) conducted a follow-up study to Graham et al. (2005) with 63 second-grade struggling writers. In line with the earlier study, this second investigation did not address revising strategies, but focused solely on teaching students planning and composing strategies. In contrast with the earlier study, this investigation focused on students' self-efficacy for writing instead of on writing motivation. The operationalization of peer support was slightly different when compared to the earlier investigation, as the instructor was also involved in promoting strategy use outside SRSD-lessons. The results from this second investigation by Harris and colleagues were consistent with the earlier study by Graham et al. (2005) confirming the effectiveness of SRSD and the incremental effect of peer help to support generalization. Finally, no additional effect of peer-assistance was found for students' self-efficacy for writing.

The third and fourth study reported on a recent randomized controlled trial (*N* = 206 fifth and sixth graders), studying the distinct and combined impact of explicit writing instruction and peer-assisted writing on students' writing performance (De Smedt & Van Keer, 2018b) and students' writing motivation and self-efficacy for writing (De Smedt, Graham, et al., 2018). In contrast to the studies by Graham et al. (2005) and Harris et al. (2006), peer assistance was operationalized as an unprescribed form of collaboration, implying that students were not provided with specific guidelines, routines, and structures to coordinate their activities while planning, composing, and revising together. More particularly, students were grouped into fixed dyads and after the instructional phase (i.e., students were explicitly taught planning, composing, and revising strategies) they were given the assignment to collaborate during practice. Students were free on how to approach the collaboration, there were no fixed formats (e.g., peer feedback) nor guidelines or routines on how to write together. As to the effectiveness of explicit instruction of writing knowledge and strategies, the results were in line with the two previous studies just described. In contrast to these studies, however, no additional additive effect was found for peer-assisted writing on students' writing performance.

Finally, no additional effect of peer-assistance was found for students' writing motivation nor for students' self-efficacy for writing.

The final study focused on the combined effect of peer assistance and explicit instruction of genre knowledge involving functions of linguistic indicators of time and place (*N* = 140 sixth graders) (Hoogeveen & van Gelderen, 2018). In contrast to the previous studies, this study exclusively focused on teaching students genre knowledge without providing them explicit strategy instruction. Furthermore, this study did not include any motivational outcome measures. In line with the previous studies, results showed that peer-assisted writing combined with instruction in genre knowledge resulted in better writing.

The present study

Based on the literature overview on the effectiveness of integrating peer-assisted writing and explicit writing instruction, several scientific gaps or unresolved issues remain, warranting attention in the present study. First, the number of prior studies focusing on both cognitive (i.e., writing performance) and motivational outcome measures (i.e., writing motivation and self-efficacy for writing) are limited. Additionally, as the results on motivational outcome measures are inconclusive, no firm conclusions on the effect on students' motivation and self-efficacy for writing can be drawn. Second, although prior studies provided useful insights on the incremental effect of peer-assisted writing, these studies involved a relatively small number of students in comparison to the present investigation, and half of the available studies focused just on struggling writers (Graham et al., 2005; Harris et al., 2006). Third, the operationalization of peer assistance in previous studies was at a rather basic level (i.e., peer support to promote transfer of writing strategies or unprescribed peer collaboration) not taking into account the integration of peer-assisted writing during each phase of the writing process (e.g., focussing on planning and composing but not on revising). The present investigation is the first to report on the effectiveness of integrating a structured system of peer-assisted writing during planning, composing, and revising processes. This application of peer-assisted writing is referred to as 'a structured system' as writers' roles were identified during each step of the writing process and collaboration between writing groups was created (De Smedt & Van Keer, 2018a). Finally, in line with previous studies (Graham et al., 2005; Harris et al., 2006), we also study possible transfer effects to an uninstructed genre. More particularly, this intervention study focused on providing explicit instruction of descriptive writing knowledge and on teaching students general planning, composing, and revising strategies. Because the strategies were general and not genre-specific, we aimed to examine whether students were able to spontaneously transfer these strategies to an uninstructed genre, namely narrative texts. In contrast to previous

research in which transfer was stimulated (Graham et al., 2005; Harris et al., 2006), this study is the first to investigate spontaneous transfer of writing strategies.

By taking into account the abovementioned issues, the present study moves the field forward by (a) focusing on both cognitive and motivational outcome measures, (b) conducting a larger-scale study with average achieving writers at the end of elementary education, (c) designing, implementing, and evaluating a structured system of peer-assisted writing systematically integrated in the explicit instruction of each writing process (i.e., planning, composing, and revising), and (d) studying spontaneous transfer of writing strategies to an uninstructed genre.

Based on both theory and prior empirical research, the following hypotheses are put forward. As to students' *writing performance*, we hypothesized that the experimental students (EI+PA and EI+IND) would outperform the BAU students because the experimental interventions included effective instructional components, such as explicit instruction of genre knowledge (e.g., Abbuhl, 2011; De Smedt & Van Keer, 2018b), explicit strategy instruction (e.g., Bouwer et al., 2018; Graham et al., 2005; Zimmerman & Risemberg, 1997), and ample writing opportunities to practice the knowledge and strategies taught while gradually diminishing guidance (e.g., De Smedt & Van Keer, 2018b; Rietdijk et al., 2017). Furthermore, we expect that EI+PA students would perform significantly better after the intervention compared to the EI+IND students because of the inclusion of the structured system of peer-assistance in which EI+PA students worked together and learned from each other during each step of the complete writing process (De Smedt & Van Keer, 2018b). Finally, as the explicit writing program focusses on general writing strategies, namely planning, composing, and revising, instead of on genre-specific writing strategies, we additionally expected a transfer effect to writing performance in an uninstructed genre. In contrast to the studies of Graham et al. (2005) and Harris et al. (2006), we did not expect this transfer effect to be larger in the peer-assistance group, as the collaboration in the current study was not focused on transferring the knowledge and strategies to other genres or contexts.

As to students' *writing motivation*, we hypothesized that the experimental students would report higher levels of autonomous writing motivation after the intervention compared to BAU students (Zimmerman & Risemberg, 1997). As both experimental writing programs direct students towards effective strategy use and genre knowledge, students' innate need for competence should be nurtured and, in turn, their autonomous motivation should increase (Ryan & Deci, 2000a, 2000b). Furthermore, we predicted that EI+PA students would be more autonomously motivated, compared to their individual writing counterparts, as students' innate need for relatedness should be nurtured by creating joint writing opportunities throughout the entire writing process in which students can plan, compose, and revise their texts with a peer (De Smedt, Graham, et al., 2018; Ryan & Deci, 2000a, 2000b). As to students' controlled

writing motivation, we expected that experimental students would report higher levels of controlled writing motivation compared to BAU students. Previous research showed that explicit writing instruction possibly hinders students' spontaneous writing (cf., autonomy frustration) and they might feel pressured to apply the writing knowledge and strategies taught to write effectively (cf., feelings of pressure) (De Smedt, Graham, et al., 2018).

Finally, as to students' *self-efficacy for writing,* we hypothesized that EI+PA and EI+IND students would report higher levels of self-efficacy for ideation compared to BAU students because of the inclusion of explicit instruction and modeling of a planning strategy in which ideation is central (Zimmerman & Risemberg, 1997). We did not expect statistical differences between experimental students and BAU students regarding their self-efficacy for conventions or self-regulation because the EI+PA and EI+IND programs did not focus on teaching students writing conventions, such as punctuation, nor strategies for self-regulation, such as positive self-talk. Finally, we predicted that EI+PA students would feel more self-efficacious because of the prominent role of two types of modeling, namely teacher modeling and peer modeling (Bandura, 1977, 1997) instead of only one type of modeling in the individual writing group (i.e., teacher modeling).

Method

Participants

Teachers participating in the present study were recruited via an open call for participation in a wide-spread teacher journal. Teachers who were interested could sign up for participation. In total, 20 teachers and their 431 fifth and sixth graders from 10 Flemish schools (Belgium) volunteered to participate in the study. As to the participating teachers, the majority were female (75%) and they taught writing in either fifth grade (n = 7), sixth grade (n = 9), or in a multigrade fifth and sixth grade class (n = 4). Teachers' average age was 37.79 years (SD = 8.98) and they had on average 16.45 years of teaching experience in elementary education (SD = 8.81). Prior to the intervention, teachers' attitudes towards writing and writing instruction, their teacher self-efficacy for writing, the quality of their teacher preparation concerning writing, and the extent to which they already integrate peer-assisted writing into their everyday classroom practice was investigated by means of 5-point Likert scales (for more information on the scales, see De Smedt et al., 2016). Generally, the participating teachers indicated that they were positive towards writing (M = 3.11, SD = 0.69) and teaching writing (M = 3.61, SD = 0.83). Although teachers were dissatisfied with their teacher preparation concerning the teaching of writing (M = 2.45, SD = 0.83), they on average felt self-efficacious to teach

struggling writers (*M* = 3.57, *SD* = 0.49) and attributed students' successful writing to their own instructional efforts (*M* = 3.35, *SD* = 0.58). Finally, teachers reported they infrequently applied peer-assisted writing in their everyday classroom practice (*M* = 2.72, *SD* = 0.76).

As to the students, 198 fifth graders (*M* age = 10.86, *SD* = 0.56) and 232 sixth graders (*M* age = 11.76, *SD* = 0.59) participated. Boys (50.1%) and girls (49.9%) were equally represented in the sample. The majority of the students were Dutch-speaking (which is the language of instruction in Flanders, Belgium) (73.3%), while 13.0% of the students were bilingual (i.e., speaking Dutch and a foreign language at home) and 13.7% of the students spoke solely a foreign language at home (e.g., Turkish).

Design of the study

Conditions

A randomized control design with two measurement occasions (i.e., pretest and posttest) and three research conditions was applied (i.e., two experimental conditions: EI+IND and EI+PA and one business as usual condition: BAU). EI+IND and EI+PA students received explicit instruction regarding writing knowledge and strategies and either practiced writing individually (EI+IND) or with a peer (EI+PA). BAU students followed regular writing lessons presented by their teachers who applied their traditional writing approach by means of their regular textbooks and manuals to teach writing. The participating classes were randomly assigned to one of the three conditions resulting in 8 EI+IND classes, 8 EI+PA classes, and 4 BAU classes. Concerning the randomization of the classes, two criteria were taken into account. First, we used the percentage of students being identified as an 'SES-student'[3] as an indicator to assign classes to one of the three conditions, thereby taking into account that classes with lower-class, middle-class, and upper-class students were equally represented in each condition. Second, teachers from the same school were assigned to the same condition to avoid possible design contamination effects (Rhoads, 2011).

To check the comparability between the conditions regarding teacher and student characteristics, chi-square and ANOVA analyses were performed. As to the teachers, chi-square analyses showed no significant differences in the distribution of grade ($\chi^2(4) = 8.01$, $p = .08$) and gender ($\chi^2(2) = 1.33$, $p = .51$) across conditions. Based on the ANOVA analyses,

[3] In Flemish elementary education this indicates that a student receives a school allowance, or that the student is a non-native speaker, or that the student's mother has not obtained a certificate of secondary education. In light of privacy, these data are only available at school level.

there was a statistically significant difference between the conditions regarding teachers' attitudes towards writing ($F(2, 18) = 4.54$, $p < .05$, $\eta^2 = .36$) indicating that BAU teachers ($M = 2.38$, $SD = 0.32$) were significantly less positive towards writing compared to EI+PA ($M = 3.47$, $SD = 0.56$) and EI+IND teachers ($M = 3.13$, $SD = 0.68$). Based on previous research (De Smedt et al., 2016; Graham, Harris, Fink, & MacArthur, 2001; Rietdijk, Van Weijen, Janssen, van den Bergh, & Rijlaarsdam, 2018; Tschannen-Moran, Hoy, & Hoy, 1998), teachers' attitudes towards writing are less likely to influence their instruction compared to teachers' self-efficacy for teaching writing. There were no significant differences between conditions in terms of teachers' attitudes towards writing instruction ($F(2, 18) = .69$, $p = .52$), age ($F(2, 18) = .24$, $p = .79$), teaching experience ($F(2, 18) = .55$, $p = .59$), evaluation of their education in writing instruction ($F(2, 18) = .01$, $p = .99$), self-efficacy for teaching struggling writers ($F(2, 18) = .40$, $p = .68$), self-efficacy for attributing students' successful writing to their own instruction ($F(2, 18) = 1.00$, $p = .39$), and the extent to which they already implemented peer-assisted writing into everyday writing activities ($F(2, 18) = 1.53$, $p = .25$).

As to the students, chi-square analyses revealed significant differences in the distribution of grade ($\chi^2(2) = 11.20$, $p < .01$), gender ($\chi^2(2) = 6.82$, $p < .05$), and home language ($\chi^2(4) = 41.36$, $p < .001$). More particularly, the percentage of sixth graders was higher in the EI+PA condition, more female students were included in the EI+IND condition, and a higher percentage of students speaking either a foreign language or Dutch in combination with a foreign language was represented in the EI+IND condition. Table 1 contains a summary of student information per research condition. In our main analyses, we verified whether students' gender, grade, and home language was significantly related to students' pretest scores. In case of significant relationships, gender, grade, and/or home language were included in the models to control for the initial student differences at pretest (see data analysis).

Table 1. *Overview of the student characteristics per research condition.*

	EI+IND		EI+PA		Business as usual	
	N	%	*N*	%	*N*	%
Grade						
Fifth grade	72	49.7	70	37.4	56	57.1
Sixth grade	73	50.3	117	62.6	42	42.9
Total	145	100	187	100	98	100
Gender						
Male	60	41.4	101	53.7	55	56.1
Female	85	58.6	87	46.3	43	43.9
Total	145	100	188	100	98	100
Home language						
Dutch	83	58.9	140	75.7	87	89.8
Other language	38	27.0	15	8.1	5	5.1
Dutch + other language	20	14.1	30	16.2	5	5.1
Total	141	100	185	100	97	100

Note. EI+IND = Explicit writing instruction + individual writing; EI+PA = Explicit writing instruction + peer-assisted writing

Procedure

To study the effectiveness of both the experimental and BAU writing programs, a stepwise procedure was applied: (a) an information session for all participating teachers, (b) a training session for the experimental teachers, (c) pretest administration, (d) a 10-week intervention period, and (e) posttest administration.

First, EI+IND, EI+PA, and BAU teachers were invited by the lead author at the university for an information session on how to administer the pretest and posttest (i.e., three identical information sessions were held for each group of teachers). Immediately after this information session, EI+IND and EI+PA teachers also received a training session. Regarding the information session, experimental and BAU teachers participated in a 30-min informational session in which the lead author explained the protocol for administering the writing tests and questionnaires during pretest and posttest. Additionally, all teachers received a document outlining the administering protocol in detail and all writing tests and questionnaires were delivered to the teachers. Second, to support the teachers in implementing the experimental writing program, EI+IND and EI+PA teachers followed a researcher-directed and condition-specific training session. More particularly, two training sessions were organized: one session was intended for the EI+IND teachers while the other session was organized for the EI+PA teachers. Both sessions contained a 3-h group training in which the teacher manuals (EI+PA: 92 pages and EI+IND: 81 pages), containing a comprehensive description of the background, aims, organization of the intervention, and detailed lesson scenarios, were discussed.

Additionally, during hands-on practices all experimental teachers learned how to explicitly teach writing knowledge and strategies using the explicit instruction procedures. EI+PA teachers were also provided with specific guidelines on how to implement and structure peer-assisted writing while the EI+IND teachers were instructed on how to implement individual practice. Third, pretest data were collected by the teachers, following a detailed protocol, within the classroom context and during regularly scheduled class hours. To avoid testing overload for students, teachers administered the writing tests on two different days. Fourth, a 10-week intervention period took place during which each teacher was observed once by the main researcher (see Fidelity of implementation). After the observed lesson, the teachers received individual coaching if needed in implementing the intervention. We opted for this time-based approach as the sequence of the writing lessons had to fit within the trimestral system in Flemish schools. Finally, posttest data were again collected by the teachers, following a detailed protocol, within the classroom context and during regularly scheduled class hours. Similarly to prestest data collection, the tests were administered on two different days.

Intervention

Two experimental writing lesson programs were developed: the EI+IND and EI+PA program. Both programs focussed on explicitly teaching students writing knowledge (i.e., genre knowledge and text structure knowledge) and how to plan, compose, and revise descriptive texts. The difference between both experimental programs was in the mode of delivery: EI+IND students practiced writing individually, while EI+PA students practiced writing with a peer. For more information on the design principles, instructional teaching activities, learning activities, and concrete writing lesson programs and instructional materials, see the systematic and analytic description of the instructional writing programs by De Smedt and Van Keer (2018a).

Overview of the writing lessons

Both EI+IND and EI+PA writing programs consisted of 11 writing lessons, spread over ten consecutive weeks. The experimental teachers taught one lesson of 50 minutes per week, with the exception of the first week in which they taught two lessons (i.e., EI+PA teachers taught lesson 2A while EI+IND teacher taught lesson 2B) (see Table 2 for an overview of the writing lessons).

Table 2. *Overview of the writing lesson programs.*

Week	Lesson (50 min/lesson)	Focus of the lesson	EI+IND	EI+PA
1	1	**Instruction lesson**: Explicitly teaching students **writing knowledge** by comparing and contrasting two model texts	✓	✓
	2A	**Agree on rules on writing collaboratively**		✓
	2B	**Agree on rules on writing individually**	✓	
2	3	**Instruction lesson**: Explicitly teaching students the **planning strategy**	✓	✓
3	4	**Instruction lesson**: Explicitly teaching students the **composing strategy**	✓	✓
4	5	**Practice lesson:** Planning and writing a text	✓	✓
5	6	**Instruction lesson**: Explicitly teaching students the **revising strategy**	✓	✓
6	7	**Practice lesson:** Revising a text	✓	✓
7	8	**Instruction lesson**: **Integrating the strategies**	✓	✓
8	9	**Practice lesson:** Planning, composing, and revising a text	✓	✓
9	10	**Practice lesson:** Planning, composing, and revising a text	✓	✓
10	11	**Practice lesson:** Planning, composing, and revising a text	✓	✓

Explicit writing instruction (EI+IND and EI+PA)

Both the EI+IND and EI+PA program were characterized by three instructional writing practices: (a) explicit instruction of writing knowledge, (b) explicit strategy instruction, and (c) providing optimal writing opportunities so students can practice while gradually diminishing guidance.

As to the *explicit instruction of writing knowledge*, the intervention consisted of one instruction lesson in which students were taught genre-specific knowledge such as, the content, goal, and text structure of the descriptive genre so students get acquainted with how such texts are composed (cf., lesson 1). The teachers introduced the descriptive writing genre by offering students two varying descriptive model texts (Martin, 2009). Students had to compare and contrast these models to discover, identify, and label the goal, content, and structure of descriptive texts. Afterwards, students received a memory card summarizing the important characteristics of the genre.

As to the *explicit strategy instruction*, the intervention consisted of four instruction lessons in which students were explicitly taught how to plan (cf., lesson 3), write (cf., lesson 4), and revise (cf., lesson 6) descriptive texts and how to apply and integrate all writing processes

together (i.e., planning, composing, and revising; cf., lesson 7). More particularly, students were taught strategies for: (a) gathering and organizing main ideas and additional information by means of a planning card and scheme, (b) composing their text based on their planning taking into account the structure and content of descriptive texts, and (c) revising the content and structure of their text. These strategies are explicitly taught using a stepwise instructional procedure. First, the teachers pointed out the value of a specific strategy (i.e., planning, composing, revising). Second, the teachers activated students' background knowledge by discussing whether, when, and how students already applied specific planning, composing, or revising strategies. Third, the teacher modelled each strategy in front of the class by visualizing the strategy on the board and by thinking aloud. While modelling, the teacher encouraged students to actively participate in the planning, composing, or revising process. After teacher modelling, students received strategy cards, summarizing the important steps of the different writing strategies. Immediately after each strategy was modelled and discussed, teachers provided short writing tasks so students could practice the writing strategies separately. During lesson 7, the teacher guided students throughout the entire writing process (i.e., planning, composing, and revising) and offered students an integration card, summarizing the previous cards (i.e., memory card and strategy cards) in a nutshell.

Regarding the final instructional practice, teachers provided *optimal writing opportunities for students to practice while gradually diminishing guidance* during four practice lessons (i.e., lesson 5, 8, 9, 10). More particularly, the teacher offered students challenging writing tasks in view of practicing the writing strategies taught. During practice, the teacher provided feedback concerning students' texts and writing process. If teachers identified (groups of) writers who were struggling with the writing assignment, the teacher supported these (groups of) writers by providing additional instruction and by offering the help they needed (e.g., using the separate strategy cards). Furthermore, the teacher challenged (groups of) writers who became more proficient in approaching the writing assignments to gradually diminish the use of the supporting materials (e.g., diminishing the use of the strategy cards).

Individual writing (EI+IND)

During lesson 2A, the EI+IND teacher created an individual writing environment by: (a) discussing the importance and added value of independent and individual work during writing, (b) organizing a class discussion in which students could agree on rules that foster individual and independent writing (e.g., work quietly), and (c) offering students individual writing portfolios.

Peer-assisted writing (EI+PA)

During lesson 2B, the EI+PA teachers first tried to create engagement and mutual trust between writing partners by: (a) grouping their students into heterogeneous dyads taking into account students' writing proficiency level on the one hand and matching students' personalities on the other hand[4], (b) keeping the dyads fixed for the duration of the intervention, and (c) organizing a class discussion in which students could agree on rules that foster peer-assisted writing (e.g., listening to each other). Second, the teacher structured the collaboration by introducing three roles. The role of 'the thinker' applied to both students in the dyads implying that each student always had to think of and invent good ideas to write about, think about the content and structure of the text, think about ways to improve the text, … The second and third role were exchangeable implying that the dyads switched these roles each lesson. 'The strategy card reader' was responsible for reading and following the strategy cards and monitoring the writing process, while 'the reporter' was responsible for writing notes, writing down the text they constructed in pairs, and revising the text if they jointly decided to make adjustments. Next to these roles, the teacher also structured the collaboration by offering a shared writing portfolio to each dyad. Third, the teachers also modelled how students could write in pairs by demonstrating the role of the strategy card reader and by modelling appropriate collaboration and interactions skills (e.g., negotiating or compromising). Finally, the teacher also created collaboration opportunities across the different dyads. More particularly, each dyad had to exchange their written work with another dyad so they were able to provide peer feedback on each other's work.

Fidelity of implementation

Students' writing portfolios

Based on the number of completed writing tasks in the students' writing portfolio, we verified that on average, 99.20% of the experimental students completed the eleven writing lessons.

[4] Teachers ranked all their students ranging from 'the most skilful writer' to the 'the most struggling writer'. Subsequently, they split the ranking in half, so they were able to pair the most skilful writer in the first half to the most skilful writer in the second half. They followed this procedure until all students had a writing partner. If a dyad consisted of students with clashing personalities, the teacher adjusted the pairing procedure. In case of an uneven number of students in the class, the teacher exceptionally created one group of three students.

Teacher logbooks

The experimental teachers provided information on the date, hour, and total time spent on each lesson via logbooks with structured protocols (De Smedt & Van Keer, 2018b). Teachers reported spending on average 47.67 minutes on each writing lesson (*SD* = 6.90) which approximates the prescribed time of 50 minutes per lesson. There were no significant differences between both experimental conditions in this respect ($t(12) = 0.71$, $p = .49$).

Observations in experimental classes

The lead author observed one lesson of each experimental teacher, resulting in 16 observations in total. First, teachers' time on/off task was measured (Bouwer et al., 2018; De Smedt & Van Keer, 2018b). Observational results showed that teachers spent on average 48.12 minutes on the observed lessons (*SD* = 4.75), which approximates the prescribed time of 50 minutes per lesson. There were no significant differences between EI+IND and EI+PA teachers ($t(14) = 1.17$, $p = 0.26$). Teachers were on task on average 97.94% of the total observed lesson time. Almost half of their time was devoted to classroom interaction (43.08%) while 31.91% was spent on plenary instruction and 25.01% on monitoring students' writing progress during student practice.

Second, the observer assessed the global quality (i.e., the quality of instruction, class management, and student engagement) of each observed lesson on a 5-point Likert scale (based on Vaughn et al., 2011). Observational data showed that the quality of instruction was high (EI+IND: *M* = 3.75, *SD* = 0.50; EI+PA: *M* = 4.88, *SD* = 0.35), that the experimental teachers managed their class effectively (EI+IND: *M* = 4.25, *SD* = 0.71; EI+PA: *M* = 4.50, *SD* = 0.53), and that students were actively engaged during the observed lessons (EI+IND: *M* = 4.38, *SD* = 0.52; EI+PA: *M* = 4.75, *SD* = 0.46) in both experimental conditions.

Finally, the observer evaluated the quality of implementation by assessing whether the critical elements of the interventions concerning explicit strategy instruction and mode of delivery were implemented as intended. More particularly, the quality of implementation was assessed by means of a 5-point Likert scale ranging from 'not observed' to 'observed with high alignment with the teacher manual' (De Smedt & Van Keer, 2018b; Vaughn et al., 2011). Table 3 shows that both EI+IND and EI+PA teachers implemented the intervention in high alignment with the teacher manual.

Table 3. *The quality of implementation: Observational data assessing the critical elements of the intervention.*

	M (SD)	
	EI+IND	**EI+PA**
Explicit strategy instruction		
Pointing out the value of the strategy	4.00 (2.00)	5.00 (0.00)
Discussing students' strategy use	4.00 (2.00)	4.00 (1.85)
Modeling	4.38 (0.43)	4.75 (0.46)
Introducing strategy cards	3.75 (1.04)	2.06 (1.82)
Individual writing	4.63 (0.58)	
Peer-assisted writing		5.00 (0.00)

Note. To assess the quality of implementation, the critical elements of the intervention concerning the explicit strategy instruction and the mode of delivery were measured using a 5-point Likert scale ranging from 'not observed' to 'observed with high alignment with the teacher manual'.

Observations in BAU classes

The lead author also observed one lesson of each BAU teacher, with the exception of one teacher who did not give his permission. This resulted in a total of 3 observations in the BAU classes. BAU teachers spent on average 50.00 minutes (*SD* = 7.55) on the observed lessons and were 94.39% of the total observed lesson time on task. About half of their time was devoted to monitoring students' progress during practice (47.31%) while 34.41% was spent on interacting with students. BAU teachers spent only 18.28% of their time on plenary instruction. As to the overall quality of instruction, BAU teachers' instruction was of high quality (*M* = 4.67, *SD* = 0.58), they managed their class effectively (*M* = 4.67, *SD* = 0.58), and BAU students were engaged (*M* = 4.67, *SD* = 0.58). The observer also assessed the instructional writing practices and mode of delivery to determine whether there was any contamination of instruction in the BAU classes. More particularly, the observer checked whether critical ingredients of the interventions were also implemented in the BAU conditions by assessing each critical aspect of the EI+IND or EI+PA interventions as follows: 0 = 'not observed', 1 = 'observed but not in alignment with the EI+IND or EI+PA intervention', or 2 = 'observed with high alignment with the EI+IND or EI+PA intervention'. Table 4 shows that none of the critical aspects of the EI+IND or EI+PA were identically implemented in the BAU classes. Observational data did indicate that 66.7% of the BAU teachers implemented individual writing in their writing lessons. This is, however, not surprising as individual practice is more common during writing instruction compared to peer-assisted writing (De Smedt et al., 2016). Although the majority of BAU students practiced individually, the text genre and writing assignments differed from the EI+IND students. More particularly, 2 BAU teachers focused on writing stories

(i.e., inventing a story based on pictures and writing a fairy tale) while one BAU teacher focused on how to write an e-mail to express your interest in participating in a competition.

Table 4**.** *The quality of implementation: Observational data assessing contamination of instruction in the BAU classes.*

	Not observed	Observed but not in alignment with EI+IND or EI+PA	Observed and in high alignment with EI+IND or EI+PA
Explicit instruction of writing knowledge	33.3%	66.7%	0.0%
Explicit strategy instruction			
Pointing out the value of a strategy	100.0%	0.0%	0.0%
Discussing students' strategy use	100.0%	0.0%	0.0%
Modeling	100.0%	0.0%	0.0%
Other operationalizations of explicit strategy instruction	100.0%	0.0%	0.0%
Individual writing	33.3%	0.0%	66.7%
Peer-assisted writing	33.3%	66.7%	0.0%

Measures

Writing performance

Writing tests

In total, students had to complete four writing tests focusing on two writing genres. More particularly, students wrote one descriptive and one narrative text at pretest and one descriptive and one narrative text at posttest. The writing assignments were similar to ensure a stable level of complexity across measurement occasions. As for the descriptive texts, students were asked to present themselves to a new classmate (i.e., pretest) and to present one of their family members (i.e., posttest). As for the narrative texts, students were asked to write a story on how and why a bottle washed ashore (i.e., pretest) and on how and why a treasure ended up in a forest (i.e., posttest). To avoid additional variance in the study design and as the aim of the study was to compare conditions instead of measurement occasions, the writing topics were not counterbalanced.

Assessing text quality

To minimize presentation effects, students' handwritten texts were typed and spelling, punctuation, and capitalization errors were corrected (Graham, Harris, & Hebert, 2011). The texts were assessed by combining two comparative rating procedures, namely (a) comparative judgement (Lesterhuis, Verhavert, Coertjens, Donche, & De Maeyer, 2017; Pollitt, 2012) and (b) a benchmark rating procedure (Bouwer, Koster, & van den Bergh, 2016; De Smedt & Van Keer, 2018b; Tillema, van den Bergh, Rijlaarsdam, & Sanders, 2012). Following the comparative judgement procedure, pairs of texts are compared and the best text of each pair is chosen by multiple raters. In this way, the quality of the texts can be ranked on a scale ranging from very low to very high text quality. As to the benchmark rating procedure, experts construct a continuous scale with benchmark texts that represent different levels of writing quality. Following this procedure, texts are not compared pairwise, but texts are compared to the set of benchmark texts. Previous research has shown that both rating procedures are, in terms of reliability and validity, promising for the assessment of writing (Bouwer, Lesterhuis, De Smedt, Van Keer, & De Maeyer, 2019).

Recently, the value of integrating both procedures has been pointed out in writing assessment research (Bouwer et al., 2019; Lesterhuis et al., 2017). More particularly, experts recommend that a (sub)set of texts should first be assessed by means of comparative judgement to calibrate and select the benchmark texts for the rating scale. Second, this benchmark rating scale can then be used for the assessment of the full set of texts. Following this two-stage process, we first randomly selected a subset of texts written during pretest (i.e., 150 descriptive texts and 150 narrative texts). These subsets were assessed by 64 undergraduate students who were trained at rating texts written by upper-elementary school students. More particularly, 32 raters made the pairwise comparisons for the descriptive texts, while the other 32 raters made the pairwise comparisons for the narrative texts. The Digital Platform for the Assessment of Competences (www.dpac.be) was used for the comparative judgement. As to the descriptive texts, an average of 22.1 comparisons per text were made, resulting in a reliable rank order (SSR = .84). As to the narrative texts, an average of 18.9 comparisons per text were made, also resulting in a reliable rank order (SSR = .80). Based on these rank orders, we selected the benchmark texts by transforming the logitscores on the rank orders to standardized scores and by selecting texts with a standardized *z*-score of -2, -1, 0, 1, 2 that represented the baseline range in text quality (Schoonen, 2005). The five benchmark texts were placed on a continuous scale in which the score for the benchmark text with an average text quality was 100 and the interval between the benchmark texts was 15. Finally, all pretests and posttests were randomly assigned to two independent trained raters who assessed text quality using the benchmark rating scale. In total, 17.95% of the texts were

double-scored and interrater reliability was high (descriptive text quality: Pearson r = .84, p < .001 and Krippendorff's α = .83; narrative text quality: Pearson r = .79, p < .001 and Krippendorff's α = .80)

Writing motivation

Students' autonomous and controlled writing motivation were measured by means of the SRQ-Writing motivation scale (De Smedt, Merchie, et al., 2018), which is based on the SRQ-Reading motivation scale (De Naeghel et al., 2012) and is rooted in SDT (Ryan & Deci, 2000b). The structure and the fit of the scales has been tested in prior research with upper-elementary students in Flanders (De Smedt, Merchie, et al., 2018) and the scales have also been used in previous intervention research studying writing motivation as outcome measure (De Smedt, Graham, et al., 2018). The SRQ-Writing motivation contains seventeen items on a five-point Likert scale, ranging from 1 (disagree a lot) to 5 (agree a lot). Eight items measure students' autonomous writing motivation (e.g., "I write a text because it's fun to write" or "I write a text because it is important to me to write") and nine items measure students' controlled writing motivation (e.g., "I write a text because I will feel ashamed of myself if I don't write" or "I write a text because others will punish me if I don't write"). Internal consistency for both subscales was high at both pretest (i.e., autonomous writing motivation: α = .92 and controlled writing motivation: α = 82) and posttest (i.e., autonomous writing motivation: α = .92 and controlled writing motivation: α = 84).

Self-efficacy for writing

Based on the writing self-efficacy framework of Bruning et al. (2013), students' self-efficacy for ideation, convention, and regulation was measured by means of the Self-Efficacy for Writing Scale (SEWS) (Bruning et al., 2013). The structure and the fit of the scales has been tested in prior research with upper-elementary students in Flanders (De Smedt, Merchie, et al., 2018) and the scales have also been used in previous intervention research studying self-efficacy for writing as an outcome measure (De Smedt, Graham, et al., 2018). The SEWS consists of twelve items on a 100-point scale. More particularly, four items measure self-efficacy for ideation (e.g., "I can put my ideas into writing"), four items measure self-efficacy for conventions (e.g., "I can punctuate my sentences correctly"), and four items measure self-efficacy for regulation (e.g., "I can punctuate my sentences correctly"). Internal consistency for both subscales was high at both pretest (i.e., ideation: α = .89; conventions: α = 80, and regulation: α = 77) and posttest (ideation: α = .87; conventions: α = 84, and regulation: α = 83).

Data analysis

Due to the nested data structure (i.e., students at level 1, classes at level 2), multilevel analyses were conducted using MLwiN 2.29 (Rasbash, Charlton, Browne, Healy, & Cameron, 2009). More particularly, a four-step procedure was implemented. First, the fully unconditional two-level null model was computed for each posttest response variable: (a) quality of the descriptive text, (b) quality of the narrative text, (c) autonomous writing motivation, (d) controlled writing motivation, (e) self-efficacy for ideation, (f) self-efficacy for convention, and (g) self-efficacy for regulation. Second, we verified whether students' gender, grade, and home language was significantly related to students' pretest scores. In case of significant relationships, gender, grade, and/or home language were included in the models to control for the initial student differences at pretest. Additionally, students' pretest scores on each of the response variables (centered around the mean score) was included as a respective covariate to control for baseline performance, motivation, and self-efficacy. Third, the research conditions were included in the models to compare the experimental conditions with the BAU condition and to compare the EI+IND and EI+PA condition to each other. Finally, standardized regression coefficients (*SD*) were calculated to interpret the effect sizes for all significant effects (Cohen, 1977).

Results

Tables 5 to 11 (included in Appendix as supporting information) present the summaries of the model estimates for the two-level analysis of students' descriptive text quality (Table 5), narrative text quality (Table 6), autonomous writing motivation (Table 7), controlled writing motivation (Table 8), self-efficacy for ideation (Table 9), self-efficacy for convention (Table 10), and self-efficacy for regulation (Table 11). The random part in the null models revealed that the variances at class level were either significantly different from zero (i.e., descriptive text quality: $\chi^2(1) = 7.44$, $p < .01$; controlled writing motivation: $\chi^2(1) = 4.90$, $p < .05$; self-efficacy for ideation: $\chi^2(1) = 5.11$, $p < .05$; self-efficacy for convention: $\chi^2(1) = 4.77$, $p < .05$; self-efficacy for regulation $\chi^2(1) = 4.27$, $p < .05$) or marginally significantly different from zero (students' narrative text quality: $\chi^2(1) = 3.56$, $p = .06$ and autonomous writing motivation: $\chi^2(1) = 3.47$, $p = .06$). Based on these results, it can be concluded that the variability in all response variables could partly be attributed to differences between classes.

Quality of the descriptive text

After controlling for students' gender and pretest score, the results showed that EI+PA students statistically outperformed both EI+IND ($\chi^2(1) = 4.80$, $p < .05$, 0.51 *SD*) and BAU students ($\chi^2(1) = 4.44$, $p < .05$, 0.60 *SD*) at posttest. No significant differences were found between EI+IND and BAU students ($\chi^2(1) = 0.08$, $p = .78$).

Quality of the narrative text

After including students' gender, grade, home language, and pretest score as covariates, the results revealed no statistical differences between EI+PA and EI+IND students ($\chi^2(1) = 0.00$, $p = 1.00$), nor between the experimental students and the BAU students (EI+PA: $\chi^2(1) = 1.48$, $p = .22$ and EI+IND: $\chi^2(1) = 1.34$, $p = .25$).

Autonomous writing motivation

After controlling for students' gender, home language, and pretest score, no statistically significant differences between EI+PA and EI+IND students ($\chi^2(1) = 0.18$, $p = .67$), nor between the experimental students and the BAU students (EI+PA: $\chi^2(1) = 0.60$, $p = .44$ and EI+IND: $\chi^2(1) = 1.18$, $p = .28$) were found.

Controlled writing motivation

After including students' pretest score as covariates, the results indicated that EI+PA students had statistically lower scores for controlled motivation at posttest compared to EI+IND students ($\chi^2(1) = 7.50$, $p < .01$, -0.30 *SD*). No statistical differences were found between experimental students and BAU students (EI+PA: $\chi^2(1) = 1.44$, $p = .23$ and EI+IND: $\chi^2(1) = 1.39$, $p = .24$, respectively).

Self-efficacy for ideation

After controlling for students' gender and pretest score, the multilevel results showed that EI+PA students were statistically more self-efficacious to come up with good ideas to write at posttest compared to their EI+IND counterparts ($\chi^2(1) = 4.20$, $p < .05$, 0.28 *SD*). No significant

differences were found between the experimental and the BAU students (EI+PA: $\chi^2(1) = 0.88$, $p = .35$ and EI+IND: $\chi^2(1) = 0.62$, $p = .43$, respectively).

Self-efficacy for convention

After including students' gender and pretest score as covariates, no statistical differences between EI+PA and EI+IND students ($\chi^2(1) = 2.19$, $p = .14$), nor between the experimental and the BAU students (EI+PA: $\chi^2(1) = 0.00$, $p = .97$ and EI+IND: $\chi^2(1) = 1.43$, $p = .23$) were found.

Self-efficacy for regulation

After controlling for students' gender, home language, and pretest score, no statistical differences between EI+PA and EI+IND students ($\chi^2(1) = 0.08$, $p = .78$), nor between the experimental and the BAU students (EI+PA: $\chi^2(1) = 2.30$, $p = .13$ and EI+IND: $\chi^2(1) = 1.43$, $p = .23$) were found.

Discussion

The impact of the EI+PA and EI+IND program on students' writing performance

The impact on descriptive text quality

As predicted, the results showed that students writing with a peer outperformed both students practicing individually and the business as usual students in terms of the quality of their descriptive text. These findings corroborate previous studies that revealed the incremental effect of peer-assistance in explicit writing instruction programs (Graham et al., 2005; Harris et al., 2006). The present study, however, goes beyond these prior studies by investigating the effect of 'a structured system of peer-assisted writing'. Whereas the operationalization of peer assistance in previous studies was at a rather basic level, such as peer support to promote transfer of writing strategies (Graham et al., 2005; Harris et al., 2006), peer assistance to support the acquisition of gene knowledge (Hoogeveen & van Gelderen, 2018), or unprescribed peer collaboration (De Smedt & Van Keer, 2018b), the present study provides more in-depth insight into possible essential prerequisites for 'a structured system of peer assistance' to be powerful and effective (Daiute & Dalton, 1993).

Our findings and approach provide support for the importance of promoting mutual engagement between writing partners (Daiute & Dalton, 1993). In the present study, this was done by taking into account students' matching personalities when grouping them into dyads and by including a discussion on collaboration rules that the dyad had to agree to. Second, in line with research results on more unprescribed applications of peer collaboration (De Smedt & Van Keer, 2018b), the present study highlights the need to structure the collaboration to support students in how to approach this collaboration (Yarrow & Topping, 2001). In the current EI+PA program, peer assistance was more directly structured by means of role assignment and the use of shared writing portfolios. The inclusion of the roles (i.e., the thinker, the strategy card reader, and the reporter) supported students in their strategic writing behaviour, as they learned what kind of behaviours were expected during each step of the writing process (Yarrow & Topping, 2001). Moreover, the use of shared writing portfolios clearly directed students to work on shared documents instead of merging individual texts. Third, the need to model the collaboration was emphasized, as EI+PA teachers and students modelled how to approach the collaboration by demonstrating the use of the roles and by modeling appropriate collaboration and interaction skills, such as negotiating, compromising, or active listening. Finally, the present study emphasizes the need to create a 'share-your-writing-culture' in the writing classroom. In view of this final prerequisite for effective collaboration, the EI+PA teachers provided collaboration opportunities between the dyads by sharing their texts with other dyads, who provided feedback, which in turn helped students to improve their work.

Although this study provided in-depth insights into possible crucial components of a powerful and structured application of peer-assisted writing, the present research design did not enable us to identify which component(s) account for the overall effectiveness of the EI+PA program. In this respect, future studies should conduct component analyses to determine the differential effectiveness of these and other aspects of the intervention to uncover the most powerful ingredients of peer-assisted writing (e.g., Fidalgo et al., 2015; López, Torrance, Rijlaarsdam, & Fidalgo, 2017).

Contrary to our hypotheses, EI+IND students did not outperform BAU students at posttest. Previous research, however, repeatedly revealed the effectiveness of explicitly teaching students writing knowledge and strategies (Graham et al., 2012; Koster et al., 2015). These rather unexpected results, however, confirm the added value of peer-assistance in time-based explicit writing instruction programs. More particularly, in time-based approaches students are required to develop knowledge and skills within a fixed timeframe (e.g., Koster & Bouwer, 2018). On the contrary, in mastery-based approaches teachers provide instruction until students master the required knowledge and skills (e.g., Graham & Harris, 2018b). In the current time-based approach of the EI+PA and EI+IND interventions (i.e., 11 lessons within 10 weeks), EI+IND students perhaps struggled to internalize all the knowledge and strategies

taught during individual practice. Consequently, as EI+IND students potentially could not fully benefit from the knowledge and strategies taught within these ten weeks, they did not outperform BAU students. EI+PA students, however, might had the advantage of being supported by their peer in internalizing the knowledge and strategies within this limited timeframe, resulting in an overall better performance at posttest.

The impact on narrative text quality

Contrary to our hypotheses regarding a positive transfer effect of the experimental interventions to an uninstructed writing genre, there were no significant differences between EI+PA, EI+IND, and BAU students on the quality of students' narrative writing. Consistent, with predictions, however, there was no augmented effect of peer-assistance on students' ability to transfer the knowledge and strategies taught to narrative writing. Two possible explanations can be put forward to clarify these findings. First, contrary to the prior studies of Graham et al. (2005) and Harris et al. (2006) in which peer support was specifically designed to promote and facilitate the transfer of strategies to other situations and contexts, the present study examined whether spontaneous transfer of the strategies occurred. In this respect, the EI+PA and EI+IND teachers focused solely on the descriptive text genre without making any references to other writing genres or without discussing how the general writing strategies could be applied in other contexts. Based on the results of the previous studies of Graham et al. (2005) and Harris et al. (2006) on the one hand and the present study on the other hand, it is reasonable to argue that to successfully transfer writing knowledge and strategies to uninstructed genres, students need explicit support on how to do so. Teachers can, for instance, discuss or model how to apply or adapt the writing strategies in uninstructed genres and provide students opportunities to practice these (adjusted) strategies. Additional research is needed to test our assertion.

A second possible explanation is related to the type of writing strategies taught in the EI+PA and EI+IND program. Although the programs solely focused on the descriptive genre, students were taught general planning, composing, and revising strategies instead of genre-specific writing strategies. The results, revealing that the EI+PA and EI+IND students were not able to transfer these general writing strategies to the narrative text genre, might indicate that teaching students general writing strategies does not suffice to enhance students' writing irrespective of text genre. In this respect, the present study underlines the need to explicitly teach genre-specific writing strategies to improve students' overall writing performance across genres (e.g., Rietdijk et al., 2017).

The impact of the EI+PA and EI+IND program on motivational aspects

The impact on writing motivation

Contrary to our hypotheses, the results showed no significant differences between EI+PA, EI+IND, and BAU students' autonomous writing motivation nor an augmented effect of peer-assistance in the experimental conditions. Moreover, EI+PA students evidenced significantly less controlled motivation at posttest compared to EI+IND students, whereas no significant differences were found between EI+PA and BAU students. These results indicated that EI+IND students' motives for writing, compared to EI+PA students' motives, were significantly more controlled because of feelings of external or internal pressure. In a previous study of De Smedt, Graham, et al. (2018), EI+IND students reported higher controlled writing motivation as compared to students in an individual matched practice condition who did not receive any type of explicit or implicit instruction.

As a possible explanation for these results, De Smedt, Graham, et al. (2018) indicated that explicit writing instruction might reinforce students' impression that to succeed in writing, they are required to apply the writing knowledge and strategies taught. Consequently, students might feel pressured to write because of the urge to get good grades or to please the teacher for instance (Ryan & Deci, 2000a). The findings from the present study extend the De Smedt, Graham, et al. (2018) study by revealing that integrating peer-assisted writing in explicit writing instruction programs might diminish students' feelings of pressure, and in turn, reduce this less favourable type of writing motivation. Even so, research focusing on the combined effect of explicit instruction and peer-assisted writing on students' autonomous and controlled writing motivation is still far too limited for any firm and valid claims to be made (i.e., there are only two studies available, including the present study).

Future studies should investigate to what extent students experience feelings of pressure (i.e., autonomy, competence, and/or relatedness frustrations) during explicit writing instruction and to what extent peer-assisted writing can possibly diminish these frustrations. An interesting way to do so is to tap teachers' self-reports as well as students' reports concerning student-teacher-interactions during EI+IND and EI+PA lessons. The Teacher as Social Context Questionnaire (TASCQ), for instance, was specifically designed to capture the extent to which teachers support students' innate need for autonomy, competence, and relatedness from the perspective of both the teacher and the students (Belmont, Skinner, Wellborn, & Connell, 1988; Sierens, Vansteenkiste, Goossens, Soenens, & Dochy, 2009).

The impact on self-efficacy for writing

As expected, the results revealed that EI+PA students felt more self-efficacious to invent ideas compared to their EI+IND counterparts, whereas no significant differences were found between EI+PA and BAU students. These findings support our contention that peer assistance augments learning in an explicit writing programs in terms of fostering students' perceived competence to come up with ideas. A possible explanation for our finding might be related to the inclusion of the 'thinker-role' which was a fixed role for every writing member during each lesson. According to this role, each student received responsibility to gather ideas and thereby provide input for the planning, composition, and revision of the text. During modeling, the teacher also reminded the students of their responsibility as 'a thinker' by encouraging all students to actively think about ideas and thereby contributing to the shared writing product. Next to teacher modeling, the 'thinker role' was also modeled by the group members during writing practice. In this respect, peer modeling might also play an important role in fostering students' self-efficacy for ideation (Bandura, 1977, 1997).

Although previous research on peer-assisted writing in elementary grades focused on structuring peer collaboration by means of tutor and tutee roles (e.g., Sutherland & Topping, 1999; Yarrow & Topping, 2001), the present study is the first to investigate how these roles can augment explicit writing instruction. Future research should study more in-depth to what extent the inclusion and explicit modeling of roles in peer-assisted writing can possibly affect students' interactions within writing groups. More particularly, how do these roles manifest during students' interactions and do these roles possibly create more in-depth interactions on the writing process and product between writing partners? By studying students' interactions, we can gain a deeper understanding of the effectiveness of peer-assisted writing by uncovering (in)effective interaction or learning processes that cannot be revealed by solely studying students' writing products (e.g., Allal, 2018; Herder, Berenst, de Glopper, & Koole, 2018).

In line with our hypotheses, we did not find any significant differences between EI+PA, EI+IND, and BAU students on their self-efficacy for conventions and regulation. These results suggest that there was no distinct nor combined effect of explicit writing instruction and peer-assisted writing on students' perceived capabilities to adhere to language and writing rules nor to regulate their behaviour during writing practice. Both EI+PA and EI+IND programs focused on explicitly teaching students writing knowledge (i.e., text structure and genre knowledge) and writing strategies (i.e., planning, composing, and revising strategies). In this respect, the non-significant results for students' self-efficacy for conventions can be explained by the fact that teaching students basic writing skills, such as spelling or handwriting, was not the focus of both programs. EI+PA and EI+IND teachers primarily focused on correct strategy use and writing knowledge instead of stressing the need to apply writing rules accurately. This might have

affected students' impression that during EI+PA or EI+IND lessons their knowledge and capabilities on applying correct language and writing rules did not increase.

With regards to students' self-efficacy for regulation, in contrast to for instance SRSD (Graham et al., 2005; Harris et al., 2006), the EI+PA and EI+IND programs did not focus on explicitly teaching students strategies for regulating their behaviour during writing. EI+PA and EI+IND students were not explicitly taught strategies, for example, to assess their own writing process or to motivate themselves to persist during writing. The lack hereof might have influenced EI+PA and EI+IND students' impression that they did not move forward regarding these self-regulation skills.

Overall, the present findings are inconsistent with the results of earlier studies showing no augmented effect of peer-assistance on students' self-efficacy for writing (i.e., De Smedt, Graham, et al., 2018; Graham et al., 2005; Harris et al., 2006). Within this limited number of previous studies, however, only the study of De Smedt, Graham, et al. (2018) also examined self-efficacy for writing as a multidimensional construct (Bruning et al., 2013). Again, due to the limited research base, no valid conclusions can be drawn regarding the added value of peer-assistance in explicit writing instruction programs on the different dimensions of students' self-efficacy (i.e., ideation, conventions, regulation). Future studies should replicate the current study by taking into account the multidimensional character of self-efficacy for writing and extend the current study by: (a) investigating the effect of other writing programs, such as for instance SRSD, on students self-efficacy for ideation, conventions, and regulation, and (b) including genre-specific measures on self-efficacy for writing instead of a general measure across writing genres.

Limitations and suggestions for future research

In addition to the limitations and suggestions for future research already discussed above, we conclude with some final thoughts on limitations related to measurement issues and how these can be addressed in future research. First, students' writing performance in both writing genres was measured using only one test per genre. Such a test indicates students' writing performance at a given moment in time. To assess students' writing proficiency in a more valid and reliable way, multiple writing tests per genre should be administered (Bouwer, Béguin, Sanders, & van den Bergh, 2015). Such large data collections are, however, very labor-intensive as all texts need to be corrected and typed to avoid presentation effects (Graham et al., 2011), genre-specific benchmark scales need to be developed (Bouwer et al., 2015), and different panels of raters are required to assess the large number of texts (Bouwer et al., 2018).

Within the scope of the present study, such large data collections were unfortunately not feasible.

In addition to the writing measurement issues noted above, we also want to draw attention to the limitations of using questionnaires to measure students' writing motivation and self-efficacy for writing. A well-known drawback related to self-report is the elicitation of socially desirable responses from students (Schellings & Van Hout-Wolters, 2011). Additionally, young students also might overestimate their capabilities when completing the self-efficacy questionnaire (Klassen, 2002). As a result, students' self-reported mean scores on writing motivation and self-efficacy for writing tend to be higher than expected at pretest. In this respect, it is particularly challenging to uncover a significant growth from pretest to posttest regarding students' self-reported writing motivation and self-efficacy. This can be especially difficult when taking into account that experimental students, in contrast to BAU students, might assess their writing capabilities more realistically at posttest due to the EI+PA or EI+IND program possibly affecting students' self-reflection and awareness regarding their writing capacities. Based on these limitations, we recommend that self-report data be complimented with other data, such as observational data or data retrieved from conversational interviews in which the researcher tries to reveal students' motives when writing particular tasks (e.g., Dowson & McInerney, 2003).

Finally, we need to acknowledge the following issues related to the current procedure. As teachers administered the writing tests (after training in the intervention was already provided), there might be some variance in how tests were administered. However, this variance is deemed limited as teachers were instructed in and provided by a strict and detailed protocol for test administration.

References

Abbuhl, R. (2011). Using models in writing instruction: A comparison with native and nonnative speakers of English. *SAGE Open, 1*(3), 1-12. doi:10.1177/2158244011426295

Alexander, P., & Jetton, T. (2000). Learning from text: A multidimensional and developmental perspective. In M. Kamil, P. Mosenthal, P. Pearson, & R. Barr (Eds.), *Handbook of reading research* (pp. 285-310). Mahwah, New Jersey: Lawrence Erlbaum Associates, Inc.

Allal, L. (2018). The co-regulation of writing activities in the classroom. *Journal of Writing Research, 10*(1), 25-60. doi:10.17239/jowr-2018.10.01.02

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84*(2), 191-125. doi:10.1037/0033-295X.84.2.191

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York, NY: Freeman.

Bean, T., & Steenwyk, F. (1984). The effect of three forms of summarization instruction on sixth graders' summary writing and comprehension. *Journal of Reading Behavior, 16*(4), 297-306. doi:10.1080/10862968409547523

Belmont, M., Skinner, E., Wellborn, J., & Connell, J. (1988). *Teacher as a social context: A measure of student perceptions of teacher provision of involvement, structure, and autonomy support* Retrieved from (Tech. Rep. No. 102). Rochester, NY: University of Rochester:

Bereiter, C., & Scardamalia, M. (1987). *The psychology of written composition*. Hillsdale, N.J.: L. Erlbaum Associates.

Bouwer, R., Béguin, A., Sanders, T., & van den Bergh, H. (2015). Effect of genre on the generalizability of writing scores. *Language Testing, 32*(1), 83-100. doi:10.1177/0265532214542994

Bouwer, R., Koster, M., & van den Bergh, H. (2016). *Benchmark rating procedure, best of both worlds? Comparing procedures to rate text quality in a reliable and valid manner*. Bringing writing research into the classroom. The effectiveness of Tekster, a newly developed writing program for elementary students (Doctoral Dissertation). Utrecht University. Utrecht, the Netherlands.

Bouwer, R., Koster, M., & van den Bergh, H. (2018). Effects of a strategy-focused instructional program on the writing quality of upper elementary students in the Netherlands. *Journal of Educational Psychology, 110*(1), 58-71. doi:10.1037/edu0000206

Bouwer, R., Lesterhuis, M., De Smedt, F., Van Keer, H., & De Maeyer, S. (2019). A comparative approach to the assessment of writing: Benefits of benchmark ratings and comparative judgement. *Manuscript submitted for publication*.

Bruning, R., Dempsey, M., Kauffman, D., McKim, C., & Zumbrunn, S. (2013). Examining dimensions of self-efficacy for writing. *Journal of Educational Psychology, 105*(1), 25-38. doi:10.1037/a0029692

Bruning, R., & Kauffman, D. (2016). Self-efficacy beliefs and motivation in writing development. In C. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of Writing Research* (pp. 160-173). New York: The Guilford Press.

Cameron, C., & Moshenko, B. (1996). Elicitation of knowledge transformational reports while children write narratives. *Canadian Journal of Behavioural Science, 28*(4), 271-280. doi:10.1037/0008-400X.28.4.271

Cleary, M. (1991). Affect and cognition in the writing processes of eleventh graders: A study of concentration and motivation. *Written Communication, 8*(4), 473-508. doi:10.1177/0741088391008004003

Cohen, J. (1977). *Statistical power analysis for the behavioral sciences*. New York: Academic Press.

Daiute, C., & Dalton, B. (1993). Collaboration between children learning to write. Can novices be masters? *Cognition and Instruction, 10*(4), 281-333. doi:10.1207/s1532690xci1004_1

De Bernardi, B., & Antolini, E. (2007). Fostering students'willingness and interest in argumentative writing: An intervention study. In S. Hidi & P. Boscolo (Eds.), *Writing and Motivation* (pp. 183-202). Oxford: Elsevier.

De Naeghel, J., Van Keer, H., Vansteenkiste, M., & Rosseel, Y. (2012). The relation between elementary students' recreational and academic reading motivation, reading frequency, engagement, and comprehension: A self-determination theory perspective. *Journal of Educational Psychology, 104*(4), 1006-1021. doi:10.1037/a0027800

De Smedt, F., Graham, S., & Van Keer, H. (2018). The bright and dark side of writing motivation: Effects of explicit instruction and peer assistance. *The Journal of Educational Research*. doi:10.1080/00220671.2018.1461598

De Smedt, F., Merchie, E., Barendse, M., Rosseel, Y., De Naeghel, J., & Van Keer, H. (2018). Cognitive and motivational challenges in writing: Studying the relationship with writing performance across students' gender and achievement level. *Reading Research Quarterly, 53*(2), 249-272. doi:10.1002/rrq.193

De Smedt, F., Rogiers, A., Heirweg, S., Vandamme, S., Merchie, E., & Van Keer, H. (2019). Reading and writing motivation across grades in primary and secondary education: A self-determination theory perspective. *Submitted for publication*.

De Smedt, F., & Van Keer, H. (2018a). An analytic description of an instructional writing program combining explicit writing instruction and peer-assisted writing. *Journal of Writing Research, 10*(2), 227-279. doi:10.17239/jowr-2018.10.01.04

De Smedt, F., & Van Keer, H. (2018b). Fostering writing in upper primary grades: a study into the distinct and combined impact of explicit instruction and peer assistance. *Reading and Writing, 31*(2), 325-354. doi:10.1007/s11145-017-9787-4

De Smedt, F., Van Keer, H., & Merchie, E. (2016). Student, teacher, and class-level correlates of Flemish late elementary school children's writing performance. *Reading and Writing, 29*(5), 833-868. doi:10.1007/s11145-015-9590-z

Dowson, M., & McInerney, D. (2003). What do students say about their motivational goals?: Towards a more complex and dynamic perspective on student motivation. *Contemporary Educational Psychology, 28*(1), 91-113. doi:10.1016/S0361-476X(02)00010-3

Ferretti, R., & Lewis, W. (2013). Best practices in teaching argumentative writing. In S. Graham, C. A. MacArthur, & J. Fitzgerald (Eds.), *Best practices in writing instruction* (Second Edition ed., pp. 113-140). New York: The Guilford Press.

Fidalgo, R., Torrance, M., Rijlaarsdam, G., van den Bergh, H., & Alvarez, M. (2015). Strategy-focused writing instruction: just observing and reflecting on a model benefits 6th grade students. *Contemporary Educational Psychology, 41*, 37-50. doi:10.1016/j.cedpsych.2014.11.004

Fitzgerald, J., & Teasley, A. (1986). Effects of instruction in narrative structure on children's writing. *Journal of Educational Psychology, 78*(6), 424-432. doi:10.1037/0022-0663.78.6.424

Flemish Ministry of Education and Training. (2005). *Education in Flanders. The Flemish educational landscape in a nutshell.* Retrieved from http://planipolis.iiep.unesco.org/sites/planipolis/files/ressources/belgium_flanders_education_nutshell.pdf.

Flower, L., & Hayes, J. (1981). A cognitive process theory of writing. *College Composition and Communication, 32*(4), 365-387. doi:10.2307/356600

Graham, S. (2006). Strategy instruction and the teaching of writing. In C. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of writing research* (pp. 187-207). New York: The Guilford Press.

Graham, S. (2018). A writer(s) within community model of writing. In C. Bazerman, V. Berninger, D. Brandt, S. Graham, J. Langer, S. Murphy, P. Matsuda, D. Rowe, & M. Schleppegrell (Eds.), *The lifespan development of writing* (pp. 271-325). Urbana, IL: National Council of English.

Graham, S., Berninger, V., & Fan, W. (2007). The structural relationship between writing attitude and writing achievement in first and third grade students. *Contemporary Educational Psychology, 32*(3), 516-536. doi:10.1016/j.cedpsych.2007.01.002

Graham, S., & Harris, K. (1989). Components analysis of cognitive strategy instruction: Effects on learning-disabled students' compositions and self-efficacy. *Journal of Educational Psychology, 81*(3), 353-361. doi:10.1037/0022-0663.81.3.353

Graham, S., & Harris, K. (2018a). Evidence-based writing practices: A meta-analysis of existing meta-analyses. In R. Fidalgo, K. Harris, & M. Braaksma (Eds.), *Design Principles for Teaching Effective Writing* (pp. 13-37). Leiden: Brill.

Graham, S., & Harris, K. (2018b). An examination of the design principles underlying a Self-Regulated Strategy Development study. *Journal of Writing Research, 10*(2). doi:10.17239/jowr-2018.10.02.02

Graham, S., Harris, K., Fink, B., & MacArthur, C. (2001). Teacher efficacy in writing: A construct validation with primary grade teachers. *Scientific Studies of Reading, 5*(2), 177-202. doi:10.1207/S1532799Xssr0502_3

Graham, S., Harris, K., & Hebert, M. (2011). It is more than just the message: Analysis of presentation effects in scoring writing. *Focus on Exceptional Children, 44*(4), 1-12.

Graham, S., Harris, K., & Mason, L. (2005). Improving the writing performance, knowledge, and self-efficacy of struggling young writers: The effects of self-regulated strategy development. *Contemporary Educational Psychology, 30*(2), 207-241. doi:10.1016/j.cedpsych.2004.08.001

Graham, S., McKeown, D., Kiuhara, S., & Harris, K. (2012). A meta-analysis of writing instruction for students in the elementary grades. *Journal of Educational Psychology, 104*(3), 879-896. doi:10.1037/A0029185

Graham, S., & Perin, D. (2007). A meta-analysis of writing instruction for adolescent students. *Journal of Educational Psychology, 99*(3), 445-476. doi:10.1037/0022-0663.99.3.445

Grünke, M., Wilbert, J., Tsiriotakis, I., & Agirregoikoa, A. (2017). Improving the length and quality of texts written by fourth graders with learning dissabilities through a peer-tutoring graphic organizing strategy. *Insights into Learning Disabilities, 14*(2), 167-188.

Harris, K., Graham, S., & Mason, L. (2006). Improving the writing, knowledge, and motivation of struggling young writers: Effects of self-regulated strategy development with and without peer support. *American Educational Research Journal, 43*(2), 295-340. doi:10.3102/00028312043002295

Herder, A., Berenst, J., de Glopper, K., & Koole, T. (2018). Nature and function of proposals in collaborative writing of primary school students. *Linguistics and Education, 46*, 1-11. doi:10.1016/j.linged.2018.04.005

Hidi, S., & Boscolo, P. (2006). Motivation and writing. In C. A. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of writing research* (pp. 144-157). New York: The Guilford Press.

Holliway, D. (2004). Through the eyes of my reader: A strategy for improving audience perspective in children's descriptive writing. *Journal of Research in Childhood Education, 18*(4), 334-349. doi:10.1080/02568540409595045

Hoogeveen, M., & van Gelderen, A. (2018). Writing with peer response using different types of genre knowledge: Effects on linguistic features and revisions of sixth-grade writers. *The Journal of Educational Research, 111*(1), 66-80. doi:10.1080/00220671.2016.1190913

Inspectie van het Onderwijs. (2010). *Het onderwijs in het schrijven van teksten. De kwaliteit van het schrijfonderwijs in het basisonderwijs.* Utrecht: Ministerie van Onderwijs, Cultuur en Wetenschap.

Klassen, R. (2002). A question of calibration: A review of the self-efficacy beliefs of students with learning disabilities. *Learning Disability Quarterly, 25*(2), 88-102. doi:10.2307/1511276

Koster, M., & Bouwer, R. (2018). Describing multifaceted writing interventions: From design principles for the focus and mode of instruction to student and teacher activities. *Journal of Writing Research, 10*(2). doi:10.17239/jowr-2018.10.02.03

Koster, M., Tribushinina, E., de Jong, P., & van den Bergh, H. (2015). Teaching children to write: A meta-analysis of writing intervention research. *Journal of Writing Research, 7*(2), 299-324. doi:10.17239/jowr-2015.07.02.2

Lesterhuis, M., Verhavert, S., Coertjens, L., Donche, V., & De Maeyer, S. (2017). Comparative judgement as a promising alternative to score competences In E. Cano & G.Ion (Eds.), *Innovative Practices for Higher Education Assessment and Measurement*. Hershey: PA: IGI Global.

Levesque, C., Zuehlke, A., Stanek, L., & Ryan, R. (2004). Autonomy and competence in German and American university students: A comparative study based on self-determination theory. *Journal of Educational Psychology, 96*(1), 68-84. doi:10.1037/0022-0663.96.1.68

Limpo, T., & Alves, R. (2013). Teaching planning or sentence-combining strategies: Effective SRSD interventions at different levels of written composition. *Contemporary Educational Psychology, 38*(4), 328-341. doi:10.1016/j.cedpsych.2013.07.004

López, P., Torrance, M., Rijlaarsdam, G., & Fidalgo, R. (2017). Effects of direct instruction and strategy modeling on upper-primary students' writing development. *Frontiers in Pyschology, 8*(1054). doi:10.3389/fpsyg.2017.01054

Martin, J. (2009). Genre and language learning: A social semiotic perspective. *Linguistics and Education, 20*(1), 10-21. doi:10.1016/j.linged.2009.01.003

Martin, J., & Rose, D. (2008). *Genre relations: Mapping culture*. London: Equinox.

McCutchen, D. (2008). Cognitive factors in the development of children's writing. In C. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of writing research* (pp. 115-130). New York: The Guilford Press.

McCutchen, D., Covill, A., Hoyne, S., & Mildes, K. (1994). Individual differences in writing: Implications of translating fluency. *Journal of Educational Psychology, 86*(2), 256-266. doi:10.1037/0022-0663.86.2.256

McCutchen, D., Francis, M., & Kerr, S. (1997). Revising for meaning, effects of knowledge and strategy. *Journal of Educational Psychology, 89*(4), 667-676. doi:0.1037/0022-0663.89.4.667

McKeown, D., Brindle, M., Harris, K., Graham, S., Collins, A., & Brown, M. (2016). Illuminating growth and struggles using mixed methods: Practice-based professional development and coaching for differentiating SRSD instruction in writing. *Reading and Writing, 29*(6), 1105-1140. doi:10.1007/s11145-016-9627-y

National Center for Education Statistics. (2012). *The nation's report card: Writing 2011*. Washington, D.C.: Institute of Education Sciences, U.S. Department of Education.

Pajares, F., & Valiante, G. (1997). Influence of self-efficacy on elementary students' writing. *The Journal of Educational Research, 90*(6), 353-360. doi:10.1080/00220671.1997.10544593

Paquette, K. (2009). Integrating the 6+1 writing traits model with cross-age tutoring: An investigation of elementary students' writing development. *Literacy Research and Instruction, 48*(1), 28-38. doi:10.1080/19388070802226261

Philippakos, Z. (2017). Giving feedback: Preparing students for peer review and self-evaluation. *The Reading Teacher, 71*(1), 13-22. doi:10.1002/trtr.1568

Pollitt, A. (2012). The method of adaptive comparative judgement. *Assessment in Education: Principles, Policy & Practice, 19*(3), 281-300. doi:10.1080/0969594X.2012.665354

Rasbash, J., Charlton, C., Browne, W., Healy, M., & Cameron, B. (2009). MLwiN Version 2.1. Centre for Multilevel Modelling: University of Bristol.

Rhoads, C. (2011). The implications of "contamination" for experimental design in education. *Journal of Educational and Behavioral Studies, 36*(1), 76-104. doi:10.3102/1076998610379133

Rietdijk, S., Janssen, T., van Weijen, D., van den Bergh, H., & Rijlaarsdam, G. (2017). Improving writing in primary schools through a comprehensive writing program. *Journal of Writing Research, 9*(5), 173-225. doi:10.17239/jowr-2017.09.02.04

Rietdijk, S., Van Weijen, D., Janssen, T., van den Bergh, H., & Rijlaarsdam, G. (2018). Teaching writing in primary education: Classroom practice, time, teachers' beliefs and skills. *Journal of Educational Psychology, 110*(2), 640-663. doi:10.1037/edu0000237

Rogers, L., & Graham, S. (2008). A meta-analysis of single subject design writing intervention research. *Journal of Educational Psychology, 100*(4), 879-906. doi:10.1037/0022-0663.100.4.879

Ryan, R., & Deci, E. (2000a). The darker and brighter sides of human existence: Basic psychological needs as a unifying concept. *Psychological Inquiry, 11*(4), 319-338. doi:10.1207/S15327965PLI1104_03

Ryan, R., & Deci, E. (2000b). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology, 25*(1), 54-67. doi:10.1006/ceps.1999.1020

Schellings, G., & Van Hout-Wolters, B. (2011). Measuring strategy use with self-report instruments: theoretical and empirical considerations. *Metacognition Learning, 6*(2), 83-90. doi:10.1007/s11409-011-9081-9

Schoonen, R. (2005). Generalizability of writing scores: An application of structural equation modeling. *Language Testing, 22*(1), 1-30. doi:10.1191/0265532205lt295oa

Sierens, E., Vansteenkiste, M., Goossens, L., Soenens, B., & Dochy, F. (2009). The synergistic relationship of perceived autonomy support and structure in the prediction of self-regulated learning. *The British Psychological Society, 79*(1), 57-68. doi:10.1348/000709908X304398

Sutherland, J., & Topping, K. (1999). Collaborative creative writing in eight-year-olds: comparing cross-ability fixed role and same-ability reciprocal role pairing. *Journal of Research in Reading, 22*(2), 154-179. doi:10.1111/1467-9817.00080

Sweet, S., Fortier, M., Strachan, S., & Blanchard, C. (2012). Testing and integrating Self-Determination Theory and Self-Efficacy Theory in a physical activity context. *Canadian Psychology, 53*(4), 319-327. doi:10.1037/a0030280

Tillema, M., van den Bergh, H., Rijlaarsdam, G., & Sanders, T. (2012). Quantifying the quality difference between L1 and L2 essays: A rating procedure with bilingual raters and L1 and L2 benchmark essays. *Language Testing, 30*(1), 71-97. doi:10.1177/0265532212442647

Troia, G., Harbaugh, A., Shankland, R., Wolbers, K., & Lawrence, A. (2013). Relationships between writing motivation, writing activity, and writing performance: Effects of grade, sex, and ability. *Reading and Writing, 26*(1), 17-44. doi:10.1007/s11145-012-9379-2

Tschannen-Moran, M., Hoy, A., & Hoy, W. (1998). Teacher efficacy: Its meaning and measure. *Review of Educational Research, 68*(2), 202-248. doi:10.3102/00346543068002202

Vaughn, S., Klingner, J., Swanson, E., Boardman, A., Roberts, R., Mohammed, S., & Stillman-Spisak, S. (2011). Efficacy of collaborative strategic reading with middel school students. *American Educational Research Journal, 48*(4), 938-964. doi:10.3102/0002831211410305

Yarrow, F., & Topping, K. (2001). Collaborative writing: The effects of metacognitive prompting and structured peer interaction. *British Journal of Educational Psychology, 71*, 261-282. doi:10.1348/000709901158514

Zimmerman, B., & Risemberg, R. (1997). Becoming a self-regulated writers: A social cognitive perspective. *Contemporary Educational Psychology, 22*, 73-101. doi:10.1006/ceps.1997.0919

Appendices

Table 5. *Summary of the model estimates for the two-level analysis of students' descriptive text quality at posttest.*

	Model 0	**Model 1**	**Model 2**[a]
Fixed part			
CONS	100.61 (1.47)***	99.27 (1.59)***	96.84 (2.18)***
Gender (girl)		2.32 (1.07)*	2.37 (1.07)*
(Pretest score - 100)		0.28 (0.05)***	0.28 (0.05)***
EI+PA			7.44 (3.53)*
EI+IND			1.01 (3.56)
Random part			
Level: Class			
CONS/CONS	37.19 (13.64)**	39.72 (14.24)**	28.65 (10.80)**
R^2	23.92%	27.67%	21.63%
Level: Student			
CONS/CONS	118.27 (8.36)***	103.81 (7.42)***	103.79 (7.42)***
R^2	76.08%	72.33%	78.37%
Loglikelihood	3236.66	3117.65	3111.92
Reference Model		Model 0	Model 1

Note. Standard error estimates are placed between brackets. ***p < .001. **p < .01. *p < .05.
[a]Model equation with business as usual condition as reference condition as an example

Table 6. *Summary of the model estimates for the two-level analysis of students' narrative text quality at posttest.*

	Model 0	**Model 1**	**Model 2[a]**
Fixed part			
CONS	96.21 (0.75)***	95.07 (1.20)***	93.44 (1.73)***
Gender (girl)		1.76 (0.95)	1.73 (0.95)
Grade (6th grade)		2.37 (1.33)	2.15 (1.30)
Home language (foreign language)		-4.34 (1.56)**	-4.62 (1.59)**
Home language (Dutch + foreign language		-1.95 (1.47)	-2.15 (1.48)
(Pretest score – 96.2)		0.22 (0.04)***	0.22 (0.04)***
EI+PA			2.35 (1.94)
EI+IND			2.35 (2.03)
Random part			
Level: Class			
CONS/CONS	6.70 (3.55)	7.31 (3.66)	6.21 (3.32)
R^2	6.80%	8.29%	7.12%
Level: Student			
CONS/CONS	91.76 (6.52)***	80.95 (5.91)***	81.03 (5.92)***
R^2	93.20%	91.81%	92.88%
Loglikelihood	3078.79	2876.74	2875.10
Reference Model		Model 0	Model 1

Note. Standard error estimates are placed between brackets. ***p < .001. **p < .01. *p < .05.
[a]Model equation with business as usual condition as reference condition as an example

Table 7. *Summary of the model estimates for the two-level analysis of students' autonomous writing motivation at posttest.*

	Model 0	**Model 1**	**Model 2[a]**
Fixed part			
CONS	3.12 (0.07)***	3.04 (0.07)***	3.14 (0.12)***
Gender (girl)		0.03 (0.07)	0.04 (0.07)
Home language (foreign language)		-0.10 (0.11)	-0.08 (0.12)
Home language (Dutch + foreign language		0.04 (0.11)	0.05 (0.11)
(Pretest score – 3.21)		0.70 (0.04)***	0.69 (0.04)***
EI+PA			-0.11 (0.14)
EI+IND			-0.16 (0.15)
Random part			
Level: Class			
CONS/CONS	0.06 (0.03)	0.03 (0.02)	0.03 (0.02)
R^2	6.32%	6.52%	6.52%
Level: Student			
CONS/CONS	0.89 (0.06)***	0.43 (0.03)***	0.43 (0.03)***
R^2	93.68%	93.48%	93.48%
Loglikelihood	1142.61	791.25	790.11
Reference Model		Model 0	Model 1

Note. Standard error estimates are placed between brackets. ***p < .001. **p < .01. *p < .05.
[a]Model equation with business as usual condition as reference condition as an example

Table 8. *Summary of the model estimates for the two-level analysis of students' controlled writing motivation at posttest.*

	Model 0	**Model 1**	**Model 2[a]**
Fixed part			
CONS	2.73 (0.07)***	2.31 (0.06)***	2.14 (0.09)***
(Pretest score – 2.77)		0.54 (0.05)***	0.53 (0.05)***
EI+PA			-0.12 (0.10)
EI+IND			0.12 (0.10)
Random part			
Level: Class			
CONS/CONS	0.07 (0.03)*	0.01 (0.01)	0.00 (0.00)
R^2	11.11%	2.17%	0.00%
Level: Student			
CONS/CONS	0.56 (0.04)***	0.45 (0.03)***	0.45 (0.03)***
R^2	88.89%	97.83%	100.00%
Loglikelihood	901.54	746.17	739.50
Reference Model		Model 0	Model 1

Note. Standard error estimates are placed between brackets. ***p < .001. **p < .01. *p < .05.
[a]Model equation with business as usual condition as reference condition as an example

Table 9. *Summary of the model estimates for the two-level analysis of students' self-efficacy for ideation at posttest.*

	Model 0	**Model 1**	**Model 2**[a]
Fixed part			
CONS	71.31 (1.82)***	71.23 (1.62)***	70.83 (2.79)***
Gender (girl)		-0.30 (1.68)	-0.04 (1.68)
(Pretest score – 68.2)		0.49 (0.04)***	0.49 (0.04)***
EI+PA			3.10 (3.31)
EI+IND			-2.68 (3.39)
Random part			
Level: Class			
CONS/CONS	47.19 (20.88)*	24.87 (12.31)*	17.15 (9.79)
R^2	10.77%	8.17%	5.77%
Level: Student			
CONS/CONS	390.87 (27.54)***	279.48 (19.80)***	279.93 (19.84)***
R^2	89.23%	91.83%	94.23%
Loglikelihood	3750.13	3561.59	3557.78
Reference Model		Model 0	Model 1

Note. Standard error estimates are placed between brackets. ***p < .001. **p < .01. *p < .05.
[a]Model equation with business as usual condition as reference condition as an example

Table 10. *Summary of the model estimates for the two-level analysis of students' self-efficacy for convention at posttest.*

	Model 0	**Model 1**	**Model 2**[a]
Fixed part			
CONS	75.72 (1.54)***	75.53 (1.55)***	76.99 (2.88)***
Gender (girl)		-0.61 (1.44)	-0.44 (1.44)
(Pretest score – 77.6)		0.58 (0.04)***	0.58 (0.04)***
EI+PA			0.10 (3.44)
EI+IND			-4.19 (3.51)
Random part			
Level: Class			
CONS/CONS	32.62 (14.94)*	27.09 (11.75)*	22.77 (10.48)*
R^2	9.75%	11.70%	10.02%
Level: Student	301.95 (21.33)***	204.47 (14.54)***	204.48 (14.53)***
CONS/CONS			
R^2	90.25%	88.30%	89.80%
Loglikelihood	3622.22	3420.00	3417.57
Reference Model		Model 0	Model 1

Note. Standard error estimates are placed between brackets. ***p < .001. **p < .01. *p < .05.
[a]Model equation with business as usual condition as reference condition as an example

Table 11. *Summary of the model estimates for the two-level analysis of students' self-efficacy for regulation at posttest.*

	Model 0	**Model 1**	**Model 2[a]**
Fixed part			
CONS	65.79 (1.81)***	66.11 (1.67)***	69.37 (2.67)***
Gender (girl)		0.85 (1.86)	0.95 (1.87)
Home language (foreign language)		-4.61 (2.86)	-4.19 (2.92)
Home language (Dutch + foreign language		-0.80 (2.83)	-0.34 (2.83)
(Pretest score – 69.1)		0.61 (0.05)***	0.61 (0.05)***
EI+PA			-4.77 (3.15)
EI+IND			-3.98 (3.32)
Random part			
Level: Class			
CONS/CONS	42.74 (20.70)*	15.50 (10.04)	11.88 (8.88)
R^2	8.44%	4.54%	3.52%
Level: Student			
CONS/CONS	463.73 (32.79)***	325.77 (23.26)***	325.91 (23.27)***
R^2	91.56%	95.46%	96.48%
Loglikelihood	3791.73	3566.66	3564.40
Reference Model		Model 0	Model 1

Note. Standard error estimates are placed between brackets. ***p < .001. **p < .01. *p < .05

[a]Model equation with business as usual condition as reference condition as an example.

Tout écrivain, pour écrire nettement, doit se mettre à la place de ses lecteurs.

Jean de La Bruyère

8 General conclusion and discussion

Chapter 8

General discussion and conclusion

Abstract

The present dissertation builds upon three main research lines, namely providing a state of the art of writing education in Flanders, studying student and teacher-level correlates of students' writing performance, and optimizing upper-elementary students' writing. This concluding chapter provides a comprehensive discussion of the main results presented in chapters 2 to 7. Furthermore, we aim to take a meta-perspective by discussing the limitations, suggestions for future research, and implications of the present dissertation and position these within current and emerging issues and developments in the field of writing research. More particularly, we provide a 'future retrospective' on this dissertation. In this way, we take the perspective of a future member of the writing research community and we look back at the history and development in our field and position and discuss this dissertation within this field. In this respect, we present nine highlights that reflect issues potentially valuable for future agendas of educational writing practice, policy, and research.

Introduction

In the introductory chapter of this dissertation (i.e., chapter 1), we reported worrying trends across the globe regarding students' substandard level of writing (Inspectie van het Onderwijs, 2010; National Center for Education Statistics, 2012; Ofsted, 2000) and the observed decline in writing motivation as students go through school, which already sets in at the end of elementary education (Cleary, 1991; De Smedt et al., 2019). We related these internationally established trends to the complex and challenging nature of proficient writing, especially for novice writers (i.e., upper-elementary school students). Concerning the cognitive complexity of writing, upper-elementary school students (age 11-12) often fail to apply higher-order writing skills and strategies, such as planning and revising, because lower-order writing skills, such as transcription skills, are not fully automatized yet (Bereiter & Scardamalia, 1987; Berninger, Fuller, & Whitaker 1996; Cameron & Moshenko, 1996; McCutchen, Covill, Hoyne, & Mildes, 1994; McCutchen, Francis, & Kerr, 1997). In addition, students perceive writing in class as a

tedious activity making it difficult for them to put sustained effort in their writing (Bruning & Horn, 2000; Hidi & Boscolo, 2006). In light of the above, we substantiated the key role of high-quality writing education to support developing writers and thereby enhance their writing skills and motivation. In this respect, we stated that gaining in-depth insight in the current state of today's instructional writing practices is an essential first step in understanding how to improve students' writing. To date, however, very little is known about the current practice and outcomes of upper-elementary writing instruction in Flanders (Bonset & Hoogeveen, 2007). Therefore, *gaining in-depth insight in the current state of writing instruction and outcomes in Flanders and providing evidence-based guidelines to improve the quality of writing instruction and, in turn, promote upper-elementary students' writing,* was put forward as the main rationale for the present dissertation.

The theoretical frameworks underlying the current dissertation provide schemas for understanding the complex cognitive as well as motivational processes involved in writing texts and served to guide the development of the empirical studies outlined throughout the different chapters in this dissertation (Graham, 2018a, 2018b; Hayes, 2012; Zimmerman & Risemberg, 1997). More particularly, we focused on the more traditionally studied *cognitive planning, drafting, and revising processes or strategies* (Bereiter & Scardamalia, 1987; Flower & Hayes, 1981) as well as on motivational factors such as *writing motivation* and *self-efficacy for writing* (Bruning & Kauffman, 2016; Graham, 2018a, 2018b; Pajares & Valiante, 2006). Both motivational variables were conceptualized from current leading motivational theories. More particularly, writing motivation and self-efficacy for writing are rooted respectively in the Self-Determination Theory (SDT) (Ryan & Deci, 2000a, 2000b) and in the Self-Efficacy Theory (SET) (Bandura, 1977, 1997). SDT is a well-valued and innovative theory of human motivation and provides in-depth understanding of children's reasons for getting involved in a literacy activity. More particularly, SDT distinguishes *autonomous* (i.e., writing because of intrinsic pleasure or because of the identified value of writing) from *controlled writing motivation* (i.e., writing because of external or internal pressure) (Ryan & Deci, 2000b). Following SDT, we included the adoption of qualitatively different types of writing motivation in the current dissertation. SET explains and predicts how one's expectations of perceived capability influences a person's choice of activities, effort, and persistence (Bandura, 1977, 1997). In line with SET, Bruning, Dempsey, Kauffman, McKim, and Zumbrunn (2013) acknowledged the domain-specific multifaceted nature of self-efficacy by identifying three types of self-efficacy for writing: (a) *self-efficacy for ideation* (i.e., believing in one's capabilities to generate ideas), (b*) self-efficacy for convention* (i.e., believing in one's capabilities to apply language and writing conventions), and (c) *self-efficacy for regulation* (i.e., believing in one's self-regulation capabilities during writing). Following the work of Bandura (1977, 1997) and Bruning et al.

(2013), we included self-efficacy for writing as a multidimensional concept in the current dissertation.

Given the fact that little information is available on the current state of writing education in Flanders and based on the theoretical and empirical writing research literature briefly outlined above, and discussed in detail in chapter 1, three important research lines were put forward in this dissertation.

(1) In view of unraveling the black box of how writing is taught in upper-elementary grades in Flanders, the first research line aimed to provide *a state of the art of writing education in Flanders*. More particularly, it was aimed to provide insights in teachers' beliefs concerning writing and writing instruction on the one hand and on how writing is taught in daily instructional practice on the other hand.

(2) In view of understanding students' writing performance, a second research line focused on studying *student and teacher-level correlates of students' writing performance*. Within this research line, we also specifically concentrated on studying the relationships between students' motivational and cognitive processes and their writing performance.

(3) Based on the in-depth insights required in the research lines above and based on previous theoretical and empirical literature on the effectiveness of explicit writing instruction and peer-assisted writing, the third research line focused on *optimizing upper-elementary students' writing*. This research line was subdivided in two sub goals:

    (a) studying the impact of explicit writing instruction and peer-assisted writing on students' writing performance,

    (b) studying the impact of explicit writing instruction and peer-assisted writing on students' writing motivation and self-efficacy for writing.

Without going into the detail of each previous chapter, in the subsequent sections the main findings of the empirical studies will be discussed in relation to the research lines and previous research. Appendix A included at the end of this chapter further presents a general overview of the obtained main results, study limitations and suggestions for future research, and implications.

Overview and discussion of the main results

Research line 1: State of the art of writing education in Flanders

The survey study on upper-elementary teachers' beliefs and instructional writing practices, reported in chapter 2, led to the following three main conclusions. First, time for writing (instruction) appears to be very limited across subjects in upper-elementary classes in Flanders. Actually, there is not much writing going on as students only spent about 13 minutes each day on planning, composing, or revising texts of paragraph length or longer (compared to other survey studies, mainly conducted in the US, in which 20-30 minutes of daily writing is reported; e.g., Brindle, Graham, Harris, & Hebert, 2016; Cutler & Graham, 2008; Gilbert & Graham, 2010). We also found considerable variability in classroom writing duration, indicating large differences between teachers in the amount of time they spent on writing (instruction). Second, we found that classroom writing practices are rarely in line with evidence-based guidelines, indicating a lack of concordance between instructional writing practices that have been proven to be effective in research on the one hand and instructional writing practices actually being implemented in the classroom on the other hand. For instance, our results showed that teachers predominantly teach basic writing skills (e.g., spelling) and only to a limited extent focus on writing strategies instruction (e.g., planning). Research on effective writing practices in upper-elementary grades, however, produced conclusive evidence on the effectiveness of explicitly teaching students planning, composing, and revising strategies (Graham, McKeown, Kiuhara, & Harris, 2012; Koster, Tribushinina, de Jong, & van den Bergh, 2015). We additionally found that peer-assisted writing practices were only occasionally implemented in daily educational practice and that teachers only limitedly integrated ICT into their writing lessons. Previous research, however, showed that providing opportunities for students to collaborate during writing (e.g., Grünke, Wilbert, Tsiriotakis, & Agirregoikoa, 2017; Hoogeveen & van Gelderen, 2018; Yarrow & Topping, 2001) and offering students support by means of word processors, spelling checkers, or the opportunity to consult sources on the internet (e.g., Englert, Zhao, Dunsmore, Collings, & Wolbers, 2007; Morphy & Graham, 2012), facilitates students' writing. Third, teachers were relatively favorable to writing and writing instruction and they felt relatively self-efficacious in teaching writing. These rather positive teacher beliefs and self-perceptions towards writing and writing instruction might hinder the advancement of today's writing instruction and thereby maintain the status quo described above (cf., limited time spent on writing and discrepancy between effective and actual applied writing practices). If teachers believe their instructional writing practices are efficient in

supporting developing writers, they might be less inclined to optimize their practices and to participate in professionalization initiatives concerning effective writing instruction.

In interpreting the conclusions outlined above, it must, however, be acknowledged that teachers' beliefs and classroom writing practices were investigated solely by means of questionnaires (Brindle, 2013; Brindle et al., 2016; Cutler & Graham, 2008; Graham, Harris, Fink, & MacArthur, 2001). In this respect, we should however be aware of the self-reported nature of these questionnaires, thereby acknowledging that teachers possibly provided socially desirable answers or that they had the tendency to overestimate their capabilities. Therefore, we suggest future studies investigating teachers' writing practices, to complementary conduct classroom observations to examine the extent to which teachers actually apply evidence-based writing practices, to investigate the quality of the implementation of these writing practices (e.g., Coker et al., 2016; Rietdijk, Van Weijen, Janssen, van den Bergh, & Rijlaarsdam, 2018), and to gain in-depth insights into teachers' beliefs by means of, for example, interviews and/or focus groups (e.g., Hall & Grisham-Brown, 2011).

As the study reported in chapter 2 is the first teacher survey explicitly focusing on writing and writing instruction in Flanders, the results provide novel insights into Flemish upper-elementary teachers' beliefs and everyday writing practices. These insights can support policy makers' understanding of the current state of writing education and, therefore, can potentially impact on educational policy decisions concerning actions in view of optimizing and fostering the teaching of writing. In this respect, the survey findings might provide valuable input to interpret and position the results of the 'Peiling Nederlands (basisonderwijs) 2018', in which students' writing attainment level has been evaluated for the first time by means of the Flemish assessments of educational progress[5]. As is always the case with the presentation of the 'peilingsresultaten', the results on whether or not Flemish elementary school children possess proficient or grade-level-adequate writing skills will be groundbreaking news in the Flemish educational sector. Consequently, studies aiming at determining key factors possibly related to students' attainment level might have a strong impact on which course educational policy will steer future educational policy decisions concerning writing and on how educational advisors of educational networks [pedagogische begeleidingsdiensten] will support schools and teachers in providing effective writing instruction.

[5] Expected date of publication of the results is May, 28, 2019.

Research line 2: Student and teacher-level correlates of students' writing performance

Research line 2 was studied in chapter 2 and 3. More particularly, chapter 2 described how student-level variables (i.e., self-efficacy for writing, writing motivation, and writing processes) and teacher-level variables (i.e., teacher self-efficacy, attitudes, and classroom writing practices) correlate with students' writing performance. In chapter 3, the relations between student-level correlates were studied in detail. More particularly, we investigated the relationships between students' motivational variables (i.e., self-efficacy and writing motivation), cognitive writing processes (i.e., the use of thinking, planning, revising, and controlling strategies), and their writing performance. Based on previous theoretical (Graham, 2018a, 2018b; Hayes, 2012) and empirical research (Beauvais, Olive, & Passerault, 2011; Breetvelt, van den Bergh, & Rijlaarsdam, 1994; Graham, Berninger, & Fan, 2007; Pajares & Valiante, 1997; Rietdijk et al., 2018; Troia, Harbaugh, Shankland, Wolbers, & Lawrence, 2013) and on the results discussed in detail in the subsequent sections, we emphasize that, next to the cognitive factors, motivational factors are of overriding importance in predicting students' writing performance. In this respect, we want to stress that motivational factors at both student (e.g., writing motivation and self-efficacy) and teacher level (e.g., teacher self-efficacy) are crucial predictors. Both student and teacher-level correlates are discussed in more detail below.

Concerning *student-level correlates* of writing performance, results presented in chapter 2 and 3 corroborate both theoretical (Graham, 2018a, 2018b; Hayes, 2012; Zimmerman & Risemberg, 1997) and empirical writing research (Graham et al., 2007; Pajares & Valiante, 1997; Teng & Zhang, 2018; Troia et al., 2013) by providing evidence that motivational factors such as autonomous writing motivation, controlled writing motivation, and self-efficacy for ideation are key predictors of students' writing performance. More particularly, students' autonomous writing motivation and self-efficacy for ideation were positively related to students' writing performance, while controlled writing motivation was negatively associated with student performance. Furthermore, the results in chapter 3 revealed positive relationships between self-efficacy for regulation and students' reported cognitive writing processes (i.e., the use of thinking, planning, revising, and controlling strategies). Given the decline of writing motivation, which sets in at the end of elementary education (Cleary, 1991; De Smedt et al., 2019), and given the relationship with writing performance, we advocate in favor of fostering upper-elementary students' autonomous writing motivation and self-efficacy for ideation and regulation. In this respect, we emphasize the need that schools and teachers should invest not only in cognitively challenging writing instruction, but also to create appealing and motivating

writing experiences that give students the incentive to carry on their writing and to support them in perceiving themselves as capable writers. In doing so, the *will* to write will potentially affect the *skill* to write, ultimately resulting in better writing (Shell, Colvin, & Bruning, 1995). Within this dissertation, concrete guidelines to promote students' autonomous writing motivation and self-efficacy for writing were studied in chapter 4 and 7 and will be discussed in the subsequent section (i.e., Research line 3: Optimizing upper-elementary students' writing).

Next to the motivational factors, chapters 2 and 3 also studied cognitive factors related to students' writing performance. Although writing processes have a prominent position in theoretical models of writing (e.g., Graham, 2018a; Graham, 2018b; Hayes, 2012) and although there is abundant empirical evidence for writing processes to be key in predicting students' writing performance (e.g., Beauvais et al., 2011; von Koss Torkildsen, Morken, Helland, & Helland, 2015), we did not find positive relationships between students' reported cognitive processes and their writing achievement. These unexpected results, however, might be explained by the operationalization of the writing processes in the present dissertation (i.e., exclusively relying on off-line self-report measures), which was acknowledged as a major limitation in chapter 3 and will be discussed in more detail below (i.e., Highlight 3).

Chapter 3 also reported on achievement-level differences in the relationships between students' motivational factors and cognitive processes. More particularly, the results showed that the relations between self-efficacy and writing processes differ for low and average achievers as compared to high achievers, thereby confirming the importance of differentiated writing instruction to stimulate students' strategy use. Based on previous research (Pajares & Valiante, 2006; Zimmerman & Kitsantas, 1999), we therefore suggest to foster low and average achievers' self-efficacy for regulation by providing explicit strategy instruction to stimulate the use of revision strategies .

As to the *teacher-level correlates* of students' writing performance, presented in chapter 2, the results revealed that teacher self-efficacy for writing in which teachers attribute students' successful writing to their own instructional efforts is correlated with students' writing performance. Surprisingly, teacher self-efficacy was the only predictor at teacher level that was significantly related to students' writing performance. In interpreting these findings, however, two considerations must be taken into account. First, as already acknowledged above, teacher-level correlates were studied by exclusively relying on teachers' self-report data (cf., tendency to overestimate or to provide socially desirable answers). Second, compared to the effect sizes of the significant student-level variables discussed above (i.e., self-efficacy for ideation, autonomous, and controlled writing motivation), the effect size of teacher self-efficacy was notably larger, thereby underlining the importance of teacher-level correlates of writing performance. Based on these results, we emphasize the need for high-quality teacher

education and professionalization both at the pre-service and in-service level so that teachers feel well-prepared and capable to teach writing.

Research line 3: Optimizing upper-elementary students' writing

Chapters 4 to 7 reported on two iteration intervention studies to promote students' writing of descriptive texts. More particularly, chapters 4 and 5 reported on a first iteration exploring the distinct and combined impact of explicit writing instruction and unprescribed peer-assisted writing on students' descriptive writing performance (i.e., chapter 4) and on their writing motivation and self-efficacy for writing (i.e., chapter 5). More particularly, four experimental writing programs were developed and evaluated (i.e., EI+IND: explicit instruction + individual writing, EI+PA: explicit instruction + unprescribed peer-assisted writing, IND: matched individual practice comparison condition, and PA: matched peer-assisted practice comparison condition). Chapters 6 and 7 subsequently reported on a second iteration intervention study exploring the augmented effect of structured peer assistance in an explicit writing instruction program. While chapter 6 provided a systematic and comprehensive description of the design of two experimental writing programs (i.e., EI+IND: explicit writing instruction and individual writing practice, and EI+PA: explicit writing instruction and structured peer-assisted writing), chapter 7 specifically reported on the effectiveness of the intervention on students' writing performance in the instructed (i.e., descriptive text quality) and uninstructed text genre (i.e., narrative text quality), writing motivation, and self-efficacy for writing. Based on the findings obtained in these studies, the following main conclusions can be drawn.

As to the effect of the interventions on students' *cognitive writing outcomes* (i.e., writing performance), the results first corroborated previous empirical evidence (e.g., Bouwer, Koster, & van den Bergh, 2018; Harris, Graham, & Mason, 2006; López, Torrance, Rijlaarsdam, & Fidalgo, 2017; Rietdijk, Janssen, van Weijen, van den Bergh, & Rijlaarsdam, 2017; Zumbrunn & Bruning, 2013) by signifying the benefits of explicitly teaching students writing knowledge and strategies to enhance their writing. In accordance with evidence-based teaching guidelines (Graham & Harris, 2018a; Graham, Harris, & Chambers, 2016; Graham et al., 2012; Koster et al., 2015), we therefore underline that teachers should be aware of the fact that students do not learn to write spontaneously; they need explicit instruction and guidance that should gradually be diminished by actively encouraging students to internalize relevant writing knowledge and writing strategies during frequent opportunities to practice writing (Bouwer et al., 2018; Graham, Harris, & Troia, 2000). Scaffolding is key here in releasing guidance: teachers have to continuously assess students' strategy use to provide tailored support and

feedback (Puntambekar & Hübscher, 2005). In this respect, the teacher role should shift from model to coach (Larkin, 2009).

Second, the findings revealed that incorporating unprescribed peer-assisted writing in an explicit instruction program did not result in an incremental effect on top of the impact of explicitly teaching writing knowledge and strategies, while integrating structured peer assistance did augment students' writing performance. Compared to previous research which mainly focused on students assisting each other during revision (Graham et al., 2012), students in the current dissertation worked together during each phase of the writing process (i.e., planning, composing, and revising). To illustrate the current findings, table 1 presents an example of the descriptive pretest and posttest written by a student who received explicit writing instruction and practiced during structured peer-assisted writing. Based on these findings, this dissertation corroborates prior empirical studies on the effectiveness of peer-assisted writing (Graham, Harris, & Mason, 2005; Harris et al., 2006; Hoogeveen & van Gelderen, 2018; Nixon & Topping, 2001; Sutherland & Topping, 1999; Yarrow & Topping, 2001) and extends this research field by providing evidence in favor of more structured types of peer-assisted writing. Such structuring is especially helpful for developing writers (i.e., upper-elementary students) as they explicitly need guidance in how to approach peer collaboration (Yarrow & Topping, 2001). Based on these findings, we recommend teachers to structure peer-assisted writing applications by providing upper-elementary students specific guidelines, prompts, or routines that enable them to coordinate their activities during planning, composing, and revising texts collaboratively. As students become familiar with peer-assisted writing routines and consequently become more proficient in collaborating during writing, teachers can potentially reduce such structured support (e.g., students are no longer assigned specific roles during peer-assisted writing because they have internalized these roles). We need, however, more in-depth insights in scaffolded instruction concerning such structured peer-assisted writing practices.

Table 1. *Example texts of a student who received explicit writing instruction and practiced during structured peer-assisted writing: descriptive pretest and posttest.*

Assignment: Descriptive pretest	**Assignment: Descriptive posttest**
Tomorrow, you will have a new classmate. To make sure the new classmate learns to know you a bit better, the teacher asks you to present yourself.	Tomorrow, you will have a new classmate. To make sure the new classmate learns to know you and your family a bit better, the teacher asks you to present one of your family members.
Present yourself to the new classmate by describing who you are.	**Present your family member to the new classmate by describing who he/she is.**
	
Descriptive pretest	**Descriptive posttest**
Hi, My name is Pete. I'm in the sixth grade and I am 11 years old. I cycle and I have a lot of hobby's, such as crafting, playing games and I like to read. I have 1 brother, James and 1 dog, Luna. My mom is Wendy and my dad Dave. I hope we can become friends.	Dear classmate, My name is Pete and I am going to describe my father. I am going to tell about his job, his hobby and about what we do together. My dad has a job, off course. He works in a garden company. For instance, he lays tiles. After work he usually works in the garden. His hobby is cycling. We ride our bikes often! Riding outdoors. Sometimes we play soccer in the garden. Each Sunday, me, my dad and my brother watch the cycling games. Most of the time I am cycling, but I hear my dad yelling: "Come on, you can do it!' If you listened carefully, you now know a lot about my father!

Third, the results revealed that students did not spontaneously transfer general planning, composing, and revising strategies to an uninstructed genre, namely the narrative text. To illustrate these findings, table 2 presents an example of the narrative pretest and posttest written by a student who received explicit writing instruction and practiced during structured peer-assisted writing. When analyzing students' pretests and posttests in more detail, we also noticed that some students overgeneralized the writing knowledge and strategies taught when they were asked to write a narrative text. To illustrate this, table 3 provides an example text in which a student overgeneralizes the text structure of a descriptive text by structuring a narrative text likewise. Based on these findings, we assume that it is important that teachers support students in successfully transferring general writing strategies to other text genres by discussing or modelling how to apply or adapt the writing strategies taught in one genre to uninstructed genres and to provide students opportunities to practice these (genre-specific adjustments of the) strategies (Graham et al., 2005; Harris et al., 2006). Instead of teaching general writing strategies, we also highlighted the potential benefits of teaching students genre-specific writing strategies and knowledge to improve students' writing performance across genres (Rietdijk et al., 2017).

As to the effect on students' *motivational writing outcomes* (i.e., writing motivation and self-efficacy for writing), the results revealed benefits of both unprescribed and structured peer assistance during writing (De Bernardi & Antolini, 2007; Paquette, 2009). More particularly, the results showed that unprescribed peer assistance during writing without any explicit or implicit writing instruction positively impacted students' motivation to write out of inherent satisfaction, pleasure, or recognition of the value of the writing activity (i.e., the most preferable type of motivation, namely autonomous writing motivation) (Ryan & Deci, 2000a, 2000b). Furthermore, the findings in this dissertation revealed that explicitly teaching students writing knowledge and strategies might in one way or another elicit students' controlled writing motivation (i.e., the less favorable type of writing motivation as students' motives to write are based on external or internal pressure). Additional findings, however, showed that integrating structured peer assistance in explicit writing instruction programs might diminish students' feelings of pressure, and in turn, reduce this less favorable type of writing motivation and simultaneously promote students' self-efficacy for ideation (Bruning et al., 2013; Ryan & Deci, 2000a, 2000b). Based on these findings, we argue in favor of implementing either unprescribed peer assistance without any explicit or implicit writing instruction or structured peer assistance in explicit writing instruction programs to create a motivating writing environment for students to persist in their writing and to boost their self-image as capable writers.

Taking into account the conclusions above and attempting to substantiate a final conclusion concerning the overall effect of the interventions developed, implemented, and evaluated in the present dissertation, it appears that we are confronted with a paradox of fostering students'

writing. More particularly, this paradox refers to the tension that instructional writing practices that have been proven to be effective in enhancing students' writing skills are not per definition the most preferable practices to foster students' writing motivation as well. In this dissertation, this paradox became apparent by testing the effectiveness of explicit writing instruction: explicitly teaching students writing knowledge and strategies helped them in becoming better writers, but simultaneously aroused their controlled writing motivation as well. Based on these results and the results in research line 1, which revealed the negative relationship between controlled writing motivation and students' writing performance, explicit writing instruction can potentially elicit maladaptive motivational functioning, which in turn, is related to poor writing outcomes. We aimed to overcome this paradox of explicit writing instruction by revealing the augmented effect of structured peer-assisted writing. More particularly, by incorporating structured peer assistance in explicit writing instruction programs, students became better writers and their feelings of pressure were in one way or another suppressed, resulting in students' decreased controlled writing motivation. Taking into account that SDT distinguishes between different types of writing motivation and positions these on a continuum, more research is needed on how teachers can foster students' innate needs for autonomy, competence, and relatedness and how they can diminish students' feelings of pressure and frustration concerning these basic needs as well. In this respect, more research in general and longitudinal research in particular is needed to get more fine-grained insights in favorable conditions to foster students' writing performance and their autonomous writing motivation simultaneously. In sum, we can conclude that the combination of structured peer-assisted writing and explicit writing instruction is very promising to support upper-elementary students in overcoming cognitive as well as motivational writing challenges.

Table 2. *Example texts of a student who received explicit writing instruction and practiced during structured peer-assisted writing: narrative pretest and posttest.*

Assignment: Narrative pretest	**Assignment: Narrative posttest**
Yesterday, this object washed ashore. Invent a story on how and why this object ended up there.	Yesterday, this object was found in the woods. Invent a story on how and why this object ended up there.
	
Narrative pretest	**Narrative posttest**
Once upon a time, there was a pirate. His name was captain Hook and he had a crew. He sailed across the world for only 1 thing: the map that lead to the treasure. He travelled and travelled until he saw something very beautiful. I went closer and saw the map in a glass bottle. Captain Hook left his ship and screamed: 'Ahoy! We are going to be rich! I've got the map!'. Everybody jumped for joy and they screamed: 'Yippee! Hurray! Party!' Captain Hook also jumped for joy. The glass bottle fell out of his hands and he hoped he could catch it. Splash! They saw the glass bottle falling in the water. Suddenly, they could not see it anymore. The bottle drove to the shore. Passengers looked at it and thought: 'What could that be?' The pirates did not find the treasure. But they lived happily ever after.	Some of you might wonder: 'What is the treasure doing here?' Well, I am going to tell you. Once upon a time, there was a pirate. A very sweet and kind pirate. Although, he was easily scared. There was also a mean troll. His biggest dream was to conquer the world so everybody would work for him as a slave. Do you know that he would not even pay the slaves, the slaves would pay him! One day, the pirate got a letter from the troll. It told that he had to leave 1 million dollar in the woods or else he would search him and release him to his pet animals as food. The pirate got scared and he went to the woods with the money. Years passed and the money was still in the woods. The troll searched everywhere, but he did not find it. When he got older, he simply was not in de mood anymore. That week he died. The pirate never retrieved the money. But he lived happily ever after.

Table 3. *Example text of a student overgeneralizing text structure knowledge of a descriptive text by structuring a narrative text likewise.*

Narrative posttest
The treasure A treasure has been found in the woods tonight. They were surprised and asked people what they knew about it. Nobody knew anything. That is why I am going to explain[a] it in this text. In this text, I will write who put it there, how it ended up there, and why[b]. Actually, pirates left it there. They came out of Africa and there were seven of them. They came here to discover more treasures. But they were also very afraid, because other pirates were chasing them. Because they already stole their treasure, they were very angry. That is why they hid it under ground in the woods. They will pull it up when the other pirates give up. But that can take a while. Now you hopefully know how it ended up there and hopefully you liked it[c].

Note. [a] The student wants to explain what happened, as he would do in a descriptive text.
[b] The student writes an introduction to provide information so the reader has an idea of what the writer is going to write about.
[c] The student writes a conclusion, as he would do in a descriptive text.

A future retrospective

The present dissertation provides insights advancing our understanding of the writing challenges upper-elementary students face and moving the research field on effective writing instruction forward. In this respect, both theoretical and practical implications for pushing educational writing practice, policy, and future writing research forward, can be deduced from the insights. It must, however, be noted that this dissertation is not free of limitations regarding the research setting, study variables, and applied methodologies and, therefore, the present dissertation's overall limitations should be acknowledged. Chapters 2 to 7 already described and discussed study limitations, suggestions for future research, and implications per study (see appendix A for a general overview). In the subsequent sections, however, we aim to take a meta-perspective on these issues and position limitations, guidelines for further research, and implications of the present dissertation within current and emerging topics and developments in the field of writing. More particularly, inspired by the work of Harris (2018) we aim to provide a future retrospective on the dissertation, implying that we will take the

perspective of a future member of the writing research community and look back at the history and development in our field and position and discuss this dissertation within this field of writing research.

Highlights for educational practice, policy, and research

In what follows, we will look back at the history and development of the field of writing research with particular reference to the present dissertation. We will present and discuss 9 highlights that were critical during the trajectory of the present PhD and that reflect valuable issues for future agendas of educational writing practice, policy, and research. Although our field has changed a great deal since the second decade of the 21st century (20teens), the highlights that we now identify when analyzing and reflecting upon our work, might still remain extremely relevant and critical to our field.

Highlight 1: Correlates of students' writing performance

In the present dissertation, we studied both student and teacher-level correlates of students' writing performance. Looking back at the results, it is important to point out the limited variance in students' writing performance actually explained by the variables included in our studies, suggesting that other factors might be key in predicting students' writing outcomes. During the time we worked on this dissertation, Harris and Graham (2016) contended that four main factors impact how students learn to write. In this highlight, we explore these four main factors as presented by Harris and Graham (2016) and we reflect whether or not and how these were addressed in our work. First, they referred to *the challenges inherent in learning to write* by highlighting the complexity of proficient writing and by stressing that student do not naturally become skilled writers. Second, Harris and Graham (2016) referred to *teacher preparation in teaching writing and current writing practices*. In this respect, they presented teacher-level variables such as pre-service preparation in writing instruction, teacher attitudes and beliefs, time spent on (teaching) writing, the use of evidence-based writing practices in everyday practice, and the extent to which teachers meet the diverse writing needs in their classrooms as important predictors of students' writing. Third, Harris and Graham (2016) referred to *current instructional approaches to teach writing*. In this respect, prevalent writing approaches and traditions (e.g., process writing approach vs. product writing approach) strongly predict how students learn to write. Finally, Harris and Graham (2016) indicated *challenges inherent in developing effective writing instruction* as important factors predicting students' writing. In this respect, they highlighted the importance of effective methods for

teaching basic and advanced aspects of writing, implying that teachers should know what to emphasize in writing development and when to teach it.

We addressed the first set of factors presented by Harris and Graham (2016) (i.e., challenges inherent in learning to write) in the current dissertation by studying student-level correlates. More particularly, in line with theoretical models on writing (Graham, 2018a, 2018b; Hayes, 2012; Zimmerman & Risemberg, 1997) we extended the cognitive perspective on writing by investigating both cognitive and motivational correlates of students' writing performance. Given the scope of the current dissertation and to avoid testing overload in the students we focused on a limited set of cognitive and motivational factors. More particularly, we opted for studying cognitive writing processes (i.e., thinking, planning, revising, and controlling strategies) as these become increasingly important for upper-elementary students in view of writing effectively (Berninger et al., 1996; Berninger et al., 1992; Flower & Hayes, 1981) and for examining students' self-efficacy and writing motivation as these are key in predicting elementary students' writing performance (Pajares & Valiante, 1997, 2006; Troia et al., 2013). By including the abovementioned cognitive processes and motivational factors in the studies, it should be noted that we, thereby, neglected the fact that also other cognitive factors (e.g., transcription skills) (Limpo & Alves, 2013) and motivational variables (e.g., writing attitudes or writing interest) (De Bernardi & Antolini, 2007; Graham et al., 2007; Nolen, 2007), might be key in predicting students' writing.

Concerning the second set of factors (i.e., teacher preparation in teaching writing and current writing practices), we did not address all the factors presented by Harris and Graham (2016) to avoid testing overload in the participating teachers. Given the relationship with actual teacher behavior, we explicitly focused on studying teachers' beliefs, such as teacher self-efficacy and attitudes towards writing and writing instruction (Brindle et al., 2016; Desimone, 2009; Graham et al., 2001). Furthermore, we investigated the extent to which teachers implemented a limited set of evidence-based writing practices (i.e., explicit instruction of basic writing skills, explicit strategy instruction, peer-assisted writing, and the use of ICT in writing lessons). We explicitly focused on these practices as these have been identified as evidence-based practices in elementary education (Graham et al., 2012; Koster et al., 2015) and as these are relevant in today's writing instruction in Flanders. Including additional teacher-level variables, such as teacher factors proposed by Harris and Graham (2016), might have provided a richer understanding of how teachers' beliefs and actions potentially affect students' writing (e.g., Rietdijk et al., 2018).

The third set of factors outlined by Harris and Graham (2016) (i.e., current instructional approaches to teach writing) can be situated at the school level and at the level of educational networks [onderwijskoepels]. During the second decade of the 21st century, instructional approaches on how to teach language in Flanders are predominantly based on the language

curriculum [leerplannen Nederlands basisonderwijs] and commercial programs to teach this language curriculum (Onderwijsinspectie, 2015). Although we did not focus on a systematic document analysis of the language curriculum or commercial programs in the dissertation, the results obtained from the survey study (cf., chapter 2) and the reports on school audits by the educational inspectorate of the Flemish Ministry of Education and Training (Onderwijsinspectie, 2015) provide substantial insights on the current instructional writing approach. More particularly, it appears that Flemish elementary school teachers combine traditional skills instruction (e.g., teaching basic writing skills, such as spelling) with a process approach (i.e., creating a supportive writing environment in which students are engaged in cycles of planning and reviewing without any form of explicit instruction, writing for real audiences, and feeling ownership for their writing). Although these approaches are valuable in teaching writing, it must, however, be acknowledged that research in the 20teens already revealed relatively small effects of these practices on students' writing development, especially compared to the larger effects of explicit writing instruction (Graham & Harris, 1997; Graham et al., 2012; Graham & Sandmel, 2011; Harris & Graham, 2016). Although school-level factors and factors at the level of educational networks were not included in the current dissertation, we have to acknowledge that these might be key in predicting students' writing performance. In this respect, we particularly want to highlight the need for future research to study whether and how a school-wide language policy in general, and an explicit writing (instruction) policy in particular, is related to students' writing performance. It might, for instance, be key for teachers to collaborate to attune their instructional writing approaches across elementary grades and thereby invest in continued school-level strategies to promote students' writing.

As to the final set of predictors, Harris and Graham (2016) highlighted the need for a well-established understanding of how writing develops so teachers can support students in developing the basic and advanced aspects of writing as they progress through school. In Flanders, the attainment targets [eindtermen] in writing provide standards for writing at the end of elementary education. Based on these attainment targets in general, and the language curriculum in particular, schools and teachers can autonomously decide how to teach students to write. In this respect, both the attainment targets and the language curriculum provide a good starting point for teachers to create a learning path from basic to more advanced aspects of writing. In the present dissertation, however, we did not study whether and how schools and teachers invested in a continuous learning path for writing across elementary grades and whether or not this was related to students' writing performance.

The limited variance in students' writing performance explained by the studied student and teacher-level variables might also indicate the need to operationalize these variables differently. In this respect and as already referred to above, both student and teacher-level correlates in the present dissertation were studied by exclusively relying on students' and

teachers' self-report data. Measurement issues and potential drawbacks related to self-report questionnaires should, therefore, be acknowledged (e.g., tendency to overestimate or to provide socially desirable answers) (Schellings & Van Hout-Wolters, 2011) and complementary methodologies should be explored. Concerning the teacher-level variables, we already referred to classroom observations to examine the extent to which teachers actually apply evidence-based writing practices (e.g., Coker et al., 2016; Rietdijk et al., 2018) and to interviews and/or focus groups to gain in-depth insights into teachers' beliefs (e.g., Hall & Grisham-Brown, 2011). Concerning student-level variables, we will discuss a variety of on-line process measures and methodologies to capture and study students' cognitive writing processes in Highlight 3.

Finally, we want to conclude by pointing at the limitations of the cross-sectional nature of the data studied in the context of the current dissertation. We studied students' cognitive and motivational writing processes at a given moment in time, thereby not taking into account students' growth in overcoming cognitive and motivational challenges in writing. In line with other scholars in the field (Harris & Graham, 2016) we, however, highlight the pressing need for more longitudinal research on students' writing development in upper-elementary grades. In the context of the current dissertation, it would be particularly interesting to study whether students' growth in applying cognitive writing processes or changes in students' motivational beliefs might impact students' growth in writing performance and vice versa.

Highlight 2: Assessing students' writing performance

To assess students' writing performance, students have to write texts in response to specific writing tasks. Due to the openness of such tasks, students' texts can vary greatly, making it difficult for the assessors to rate text quality (Van Daal, Lesterhuis, Coertjens, Donche, & De Maeyer, 2016). The discussion on how to rate text quality properly, in terms of reliability and validity, was already high on the agenda during the 60's of the 20th century and it continues to be so today. In this respect, the writing assessment method (e.g., number of texts per genre, number of raters, type of assessment) appears to be key in effectively and efficiently rating text quality. In the current section, we position the writing assessment procedures used in the present dissertation within the different strands of assessment methods at the time we worked on the current dissertation. Furthermore, we reflect upon the potential use of the dissertation's writing assessment scales in everyday classroom writing practice and assessment. Finally, we conclude by acknowledging one of the dissertation's main limitations related to the assessment of writing, namely using only one writing test per genre.

At the start of the PhD trajectory, several assessment approaches were available to support raters in assessing texts in a reliable and valid way (Van Steendam, Tillema, Rijlaarsdam, & van den Bergh, 2012). At that time, and already long before, there was however disagreement on which approach was most suitable (e.g., Bouwer, Koster, & van den Bergh, 2016; Hamp-Lyons, 2016). More particularly, assessment methods were distinguished according to two dimensions: analytic versus holistic and absolute versus comparative assessment methods (Coertjens, Lesterhuis, Verhavert, Van Gasse, & De Maeyer, 2017). Although the diversity and the number of assessment methods expanded since the start of the second decade of the 21st century, this categorization is still valid and relevant today. According to *analytic* assessment methods, raters have to assess separate features in the text one by one (e.g., organization, grammar, word choice), after which they are combined into one composite score for text quality (Hamp-Lyons, 2016; Jonsson & Svingby, 2007). On the contrary, raters applying *holistic* assessment methods focus on the text in its entirety to provide an overall evaluation of the text. Raters are instructed to consider writing quality as a combination of different aspects with no single factor receiving undue weight (Sadler, 2009). *Absolute* assessment methods focus on one particular text in isolation, while *comparative* assessment methods are based on the assumption that every judgement is actually a comparison, either with an internal standard or with previously assessed texts (Crisp, 2013). In the dissertation, we aligned with comparative and holistic assessment methods to assess students' texts by using two assessment procedures, namely the *benchmark rating procedure* (cf., chapters 2 to 7) and *comparative judgment* (cf., chapter 7). According to the first procedure, raters assess the overall quality of a specific text (cf., holistic) by comparing texts to five benchmark texts which are selected by an expert panel and which represent different levels of writing quality (cf., comparative) (Bouwer et al., 2016; Tillema, van den Bergh, Rijlaarsdam, & Sanders, 2012). According to the comparative judgement procedure (Coertjens et al., 2017; Lesterhuis, Verhavert, Coertjens, Donche, & De Maeyer, 2017; Pollitt, 2012; Van Daal et al., 2016), pairs of texts are compared by multiple raters who determine holistically which is the best text of each pair (cf., holistic and comparative). In this way, the overall quality of the texts can be ranked on a scale ranging from very low to very high text quality. At the time of deciding on the assessment method in view of the studies of the present dissertation, the number of studies evaluating and comparing both assessment methods were increasing. Based on these studies, both methods were considered very promising in terms of validity and reliability to assess writing (Bouwer et al., 2016; Bouwer, Lesterhuis, De Smedt, Van Keer, & De Maeyer, 2019; Lesterhuis et al., 2017). The benchmark rating procedure was commonly used in writing research in the 20teens (e.g., Bouwer et al., 2018; Elving & van den Bergh, 2017; Graham, Hebert, Sandbank, & Harris, 2016; Rietdijk et al., 2017) and interest in the comparative judgment procedure to assess writing was gaining increased attention (Coertjens et al., 2017; Lesterhuis et al., 2017; Van Daal et al., 2016).

Moreover, also a first call for integrating both procedures in writing assessment research was made (Bouwer et al., 2019; Lesterhuis et al., 2017). Taken into account this call, the empirical study described in chapter 7 of this dissertation was, at that time and to our knowledge, one of the first that actually opted for the integration of both procedures by assessing a subset of texts by means of comparative judgment to calibrate and select the benchmark texts in view of the benchmark rating scale applied subsequently to score all texts. Based on the results, we continue to methodologically argue for combining both methods in today's writing research. In this way, the selection of the benchmark texts is no longer dependent on expert opinion, but is based on reliable rank orders.

Based on the assessment procedures outlined above, this dissertation resulted in benchmark rating scales for both descriptive and narrative texts. In this respect, we contend that the developed scales are not only relevant for research purposes, but can also be useful for everyday classroom writing assessment. For instance, teachers can use these scales for formative and summative assessment and in view of providing feedback. Students can also assess their own writing progress (i.e., self-assessment) as well as others' work (i.e., peer-assessment) by means of the developed scales.

Although we built in some safeguards to assess text quality effectively (e.g., minimize presentation effects by correcting and typing students' handwritten texts, including two or more raters in the assessment procedure, and using valid and reliable assessment methods), we have to acknowledge that we measured students' writing performance using only one test in one genre (i.e., chapter 4 and 5) or one test in two genres (i.e., chapter 2, 3, and 7). Research, however, showed that a singular test provides an estimate of students' writing performance at a given moment in time. To assess students' writing proficiency in a more valid and reliable way, multiple writing tests per genre should be administered (Bouwer, Béguin, Sanders, & van den Bergh, 2015; Rijlaarsdam et al., 2012; Schoonen, 2005; van den Bergh, De Maeyer, van Weijen, & Tillema, 2012; Van Steendam et al., 2012).Such large data collections are very labor and resource-intensive and were within the scope of the current dissertation unfortunately not feasible.

Highlight 3: Analyzing students' writing processes

In line with the limitation addressed in the previous highlight, the current section focusses on another major limitation in this dissertation, namely the assessment of students' cognitive writing processes. Although this issue was generally addressed in chapter 3, we deem it necessary to discuss this limitation in greater depth. In the 20teens, the research field on assessing on-line learning processes in general and on-line writing processes in particular

emerged and advancements in the field are still ongoing nowadays. In this dissertation, however, we measured cognitive writing processes by means of a general questionnaire on planning and revising strategies which relied exclusively on students' self-report. This questionnaire was previously developed to measure planning and revising strategies in argumentative writing in tenth grade (Kieft, Rijlaarsdam, & van den Bergh, 2006, 2008) and the items from this questionnaire were adapted to the context of elementary education in Flanders. Although self-report measures can (a) easily be administered, completed, and scored and (b) provide valuable insights into students' perceptions of using a particular strategy when learning (McCardle & Hadwin, 2015; Vandevelde, Van Keer, & Rosseel, 2013; Zimmerman, 2008), one of the major drawbacks of self-report instruments is the tendency to overestimate or to provide socially desirable answers (Schellings & Van Hout-Wolters, 2011). In contrast to the off-line assessment of writing processes by means of self-report data, we therefore point at the need for data-triangulation by including more objective, on-line measures to complement self-report survey data. In what follows, we will discuss potential advantages, drawbacks, and challenges of on-line assessment methods, which are at present commonly used to capture and analyze elementary students' writing processes.

According to *trace methodology*, observable traces such as notes and outlines on planning sheets and revisions highlighted in a different color, can be analyzed and assessed for features of strategic planning or revising (e.g., Braten & Samuelstuen, 2007; Fidalgo, Torrance, Rijlaarsdam, van den Bergh, & Alvarez, 2015; Merchie & Van Keer, 2014). Further, in view of registering highly detailed process data, researchers can use *keystroke logging tools* to capture keystrokes in relation to a time stamp enabling them to study digital writing processes such as pausing and revising behavior (e.g., Leijten & Van Waes, 2013; Van Waes, Leijten, Wengelin, & Lindgren, 2011) and linguistic processes (Leijten, Van Horenbeeck, & Van Waes, 2019). Instead of keystroke logging, elementary students' writing processes can also be studied by *analyzing pen movements* (e.g., Alamargot, Plane, Lambert, & Chesnet, 2010; Alves et al., 2015; Merchie & Van Keer, 2014). By recording pen position and pressure, handwriting pauses and rates are recorded (e.g., Alamargot et al., 2010) and researchers can analyze how the writing processes evolve by means of a replay function (e.g., Merchie & Van Keer, 2014). Pen movement data are often registered in combination with other on-line data such as eyetracking or think-aloud data. For example, *eye movements*, such as fixation frequency and duration can be matched with pause distribution (e.g., Alamargot et al., 2010). Other digital pen devices have a built-in microphone which simultaneously registers pen movements and verbalizations, enabling researchers to study students' writing processes by means of pen movements in combination with *think-aloud protocols* (e.g., Merchie & Van Keer, 2014). The think-aloud methodology has been regarded as an effective way to access on-line cognitive processes during writing by asking students to say aloud everything they think while

writing (e.g., Braaksma, Rijlaarsdam, & Janssen, 2017; Breetvelt et al., 1994; Escorcia, Passerault, Ros, & Pylouster, 2017). It must be noted, however, that writing is cognitively demanding an sich (Flower & Hayes, 1981). Asking novice writers, for whom writing is especially effortful (Bereiter & Scardamalia, 1987), to report their cognitions and feelings freely during writing can lead to working memory overload resulting in incomplete protocols, misperceiving students' actual writing capabilities, or students withdrawing from think-aloud writing tasks (Vandevelde et al., 2013). Instead of think-aloud protocols, researchers can apply more directed introspection procedures in which students must identify their thoughts in terms of predetermined categories, potentially decreasing the level of obtrusiveness (Olive, Kellogg, & Piolat, 2002). In this respect, *the triple task technique*, for instance, consist of two variants each applying either think aloud protocols or directed introspection procedures. More particularly, this technique is used to study the allocation of working memory resources using reaction time to auditory probes and linking these reaction time data to specific writing processes identified either via analyzing think-aloud protocols or via students categorizing their thoughts (i.e., directed retrospection) (Olive et al., 2002).

Based on the above, multiple (combinations of) on-line process data methods as well as combinations of on-line and off-line methods are possible and are now commonly used in our field. This implies that researchers need to determine the best way to capture and examine students' cognitive writing processes and which methods or tools are most preferable in their specific study. The following considerations can help them in making a conscious choice. First, the methods at hand should *match with current writing practices*. For instance, at present Flemish elementary school students are still primarily used to writing texts using pen and paper instead of computers (cf., chapter 2). In this particular context, methods such as trace methodology or analysis of pen movements were, therefore, more suitable to study writing processes in the context of this dissertation instead of methods that require students to use computers to write (e.g., keystroke logging or triple task technique). Second, researchers should consider the *level of interference* of the preferred methodology and judge whether or not the 'cognitive costs' of this method are attainable for their participants. In this respect, we argue that researchers studying elementary students' writing should prefer the use of unobtrusive methods (e.g., trace methodology, analysis of pen movements or keystroke logging) instead of more obtrusive methods (e.g., think-aloud protocols). However, we have to acknowledge that unobtrusive methods provide behavioral data (e.g., pausing behavior or time spent on writing) without portraying the thinking processes underlying writers' behavior. In contrast, more obtrusive methods provide a much richer set of data providing a useful approximation of writers' thoughts (Olive et al., 2002). In this respect, data obtained by means of specific process methods also should *align with particular research objectives* and researchers should anticipate which method is most suitable to obtain specific types of data.

For instance, a researcher aims to study elementary students' writing behavior by analyzing pausing times (i.e., use of digital pens or keystroke logging programs). However, pausing behavior might reflect elementary students' cognitive effort during writing (or it might just as well reflect the level of distraction during writing), but it does not provide insight in how they plan, compose, and revise their text and in which strategies they apply. Instead, the researcher might opt for think-aloud protocols or the triple task technique as these methods will enable to get more fine-grained data on students' planning and revising strategies. Finally, the *feasibility* of different methodologies needs to be taken into account. In this respect, we particularly refer to chapter 3 in which we aimed to model complex relations between cognitive and motivational challenges and students' writing performance. To ensure the power to run the intended complex writing models, we had to set up a large-scale study. As on-line methods, such as think aloud measures or the triple task technique, are often very time and labor-intensive methodologies and as it was not feasible to administer and analyze all these on-line data, we opted for the use of questionnaires, thereby well aware of the limitations that that entailed.

We want to conclude with a final suggestion for researchers studying cognitive writing processes in elementary grades by means of large-scale administrations (cf., chapter 3). In this respect, we argue to combine and relate off-line (i.e., full sample) and on-line writing process measures (i.e., smaller subsample). As to the off-line measures, we argue in favor of using a *task-specific writing process questionnaire* instead of the general questionnaire applied in this dissertation. Previous research indeed showed that students' self-reports regarding how they study and read are context-specific, implying that strategy questionnaires should ideally be tailored to specific tasks or contexts (Braten & Samuelstuen, 2004; Hadwin, Winne, Stockley, Nesbit, & Woszczyna, 2001). In the context of writing, different strategies can be applied depending on the writing task. Consequently, developing and testing task-specific writing process questionnaires in elementary grades should be high on the current agenda of our field. As to the on-line measures, we want to highlight the potential of the triple task technique with directed retrospection as this methodology reveals students' behavior as well as their underlying thoughts during writing in a less obtrusive way than think-aloud protocols.

Highlight 4: Drawing the card of writing motivation

During the 80's of the 20th century, writing was mainly studied from a cognitive perspective in which research focusing on portraying cognitive writing processes was privileged (Bereiter & Scardamalia, 1987; Boscolo & Hidi, 2007; Flower & Hayes, 1981; MacArthur & Graham, 2016; Pajares, 2003). The importance of motivational factors related to writing were, however, increasingly acknowledged in more current theoretical models of writing (e.g., Graham, 2018a,

2018b; Hayes, 2012; Zimmerman & Risemberg, 1997) and in empirical studies (Graham et al., 2007; Pajares, 2003; Pajares & Valiante, 1997; Teng & Zhang, 2018; Troia et al., 2013) during the 20teens. Although research on motivational aspects of writing was still limited at the start of this PhD trajectory, the majority of the studies focused mainly on three motivational concepts (Boscolo & Hidi, 2007; Bruning & Kauffman, 2016; Hidi & Boscolo, 2006), namely the role of interest in writing (e.g., Albin, Benton, & Khramtsova, 1996; De Bernardi & Antolini, 2007; Nolen, 2007), students' self-efficacy for writing (e.g., Bruning et al., 2013; Pajares, 2003; Pajares, Johnson, & Usher, 2007; Pajares & Valiante, 1997), and students' self-regulation during writing (e.g., Zimmerman & Kitsantas, 2007; Zimmerman & Risemberg, 1997). Our dissertation contributed to these trends as we focused on studying self-efficacy for writing as a multidimensional concept (Bruning et al., 2013). But we also extended the motivational research on writing by adopting a Self-Determination Theory (SDT) framework (Ryan & Deci, 2000a, 2000b; Vansteenkiste & Ryan, 2013) to examine students' motives for writing. In this section, we particularly zoom in on how this dissertation moved the field of writing research forward in this respect. Furthermore, we look back at trends within SDT that originated during the PhD trajectory and we reflect upon the adoption of these trends in writing research to advance our understanding of students' writing motivation.

Chapters 2, 3, 5, and 7 provided pioneering contributions to the field of writing research as writing motivation was conceptualized from the theoretical framework of SDT for the first time. More particularly, this dissertation advanced our understanding of writing motivation by providing novel insights into qualitatively different types of writing motivation (i.e., autonomous versus controlled writing motivation) and by providing empirical evidence on how these relate to students' writing performance. As measurement instruments to assess students' autonomous and controlled writing motivation were lacking, we developed and tested the SRQ-Writing Motivation which was based on the SRQ-Reading Motivation (De Naeghel, Van Keer, Vansteenkiste, & Rosseel, 2012). This instrument measures upper-elementary students' autonomous and controlled writing motivation in a reliable way and the questionnaire's measurement model was found to be invariant across students' gender and general achievement level. Outside the scope of our dissertation, we also adapted the SRQ-Writing Motivation to enable researchers to use the questionnaire across different educational grades (i.e., middle-elementary grades, upper-elementary grades, and lower-secondary grades) and across different contexts for writing (i.e., academic writing and recreational writing) (De Smedt et al., 2019).

In the dissertation we additionally examined whether or not classroom writing practices (i.e., distinct and combined impact of explicit writing instruction and peer-assisted writing, see research line 3 for more details on the results) can affect students' writing motivation. SDT points to the importance of fostering autonomous motivation in students by nurturing their

inherent psychological need for autonomy (i.e., feeling psychologically free), competence (i.e., feeling confident and effective), and relatedness (i.e., feeling related to significant others) (Ryan & Deci, 2000b). To ensure the facilitation of these needs, teachers can adopt a qualitatively supportive teaching style characterized by autonomy-supportive, structured, and involved teacher behavior (Soenens & Vansteenkiste, 2005). In contrast, learning environments can actively hinder students' innate psychological needs as well, thereby creating experiences of need frustration, such as autonomy frustration (cf., feelings of pressure), competence frustration (cf., feelings of failure), and relatedness frustration (cf., feelings of isolation) (Haerens, Vansteenkiste, Aelterman, & Van den Berghe, 2016). According to SDT, need frustration is provoked by controlled teaching, which is characterized by externally (e.g., punishments) or internally controlling teaching strategies (e.g., appealing to students' feelings of guilt) (Vansteenkiste, Simons, Lens, Soenens, & Matos, 2005). In the current dissertation we, however, did not investigate the theoretically hypothesized intermediate step in this respect regarding the extent to which these writing practices foster or hamper students' innate need for autonomy, competence, and relatedness (Ryan & Deci, 2000a; Vansteenkiste & Ryan, 2013).We, therefore, call for more longitudinal research on how teachers can foster students' innate needs for autonomy, competence, and relatedness, and consequently foster students' long-lasting autonomous writing motivation within instructional writing practices.

Next to the impact of specific instructional writing practices on students' innate needs for autonomy, competence, and relatedness, teachers' general (de)motivation style is also one of the key factors according SDT to affect students' motivation (Reeve, 2009). SDT conceptualizes teachers' (de)motivating style by distinguishing between the basic attitude underlying a motivating style (i.e., autonomy support versus control and structure versus chaos) and different motivational approaches that teachers frequently use to motivate their students (e.g., offering choice in writing topics or setting clear writing objectives) (Aelterman et al., 2018; Reeve, 2009; Vansteenkiste, Aelterman, Haerens, & Soenens, 2019). One of the major developments in SDT-based research during the 20teens that unfolded during the trajectory of the present PhD provided fine-grained insights on what a motivating style exactly involves and how different styles are related (Aelterman et al., 2018; Vansteenkiste et al., 2019). More particularly, Aelterman et al. (2018) empirically tested a circumplex model or teaching wheel providing an overview of eight different (de)motivating approaches, which can be situated within a layered perspective towards teachers' motivating style. More particularly, the horizontal axis refers to the degree to which teachers' style is supportive (i.e., autonomy support and structure), relative to frustrating students' innate psychological needs (i.e., chaos and control). The vertical axis refers to the extent to which teachers' style is characterized as highly directive (i.e., structure and control) relative to leaving room for students to take the lead

(i.e., autonomy support and chaos) (see Figure 1) (Aelterman et al., 2018). Within this circumplex structure, eight teaching styles are distinguished, (a) participative (i.e., identifying students' interest by means of dialogue), (b) attuning (i.e., finding ways to nurture students' interests), (c) guiding (i.e., providing appropriate help and assistance when needed), (c) clarifying (i.e., communicating expectations clearly), (e) demanding (i.e., requiring discipline from the students using powerful and commanding language), (f) domineering (i.e., exerting power so students comply), (g) abandoning (i.e., allowing students to do their own thing), and (h) awaiting (i.e., leaving the initiative with the students). Based on this model, teachers not only acquire insight in basic attitudes to foster students' autonomous motivation (i.e., teacher autonomy support and structure), they are also provided with a set of more concrete motivating approaches to translate these attitudes in everyday classroom practices (Vansteenkiste et al., 2019). In line with these developments in the SDT research literature, current writing research should study and uncover teachers' (de)motivating style during writing instruction to gain a deeper understanding of students' motives for writing and how to influence these in a positive way. An interesting and novel way to operationalize teachers' (de)motivating style is by means of the Situations-in-School (SIS) Questionnaire, which is a vignette-based instrument (i.e., vignettes of situations represent a wide range of situations that could be grouped in different ways by both teachers and students) (Aelterman et al., 2018). For each vignette, teachers have to respond by indicating to what degree each of the four teaching behaviors presented (i.e., autonomy-supportive, controlling, structuring, and chaotic teaching style) describe their own teaching style. Additionally, students' perceptions of their teacher's teaching style are measured using slightly adapted vignettes of the teacher-based SIS (Aelterman et al., 2018). Adapting these vignettes to tap into teachers' and students' self-reports on general teaching styles and on more specific didactical approaches in writing instruction is an interesting pathway for today's writing research, since studying students' writing motivation in relation to teachers' (de)motivating styles and approaches during writing instruction can be potentially groundbreaking for our understanding of the development and enhancement of students' motivation for writing.

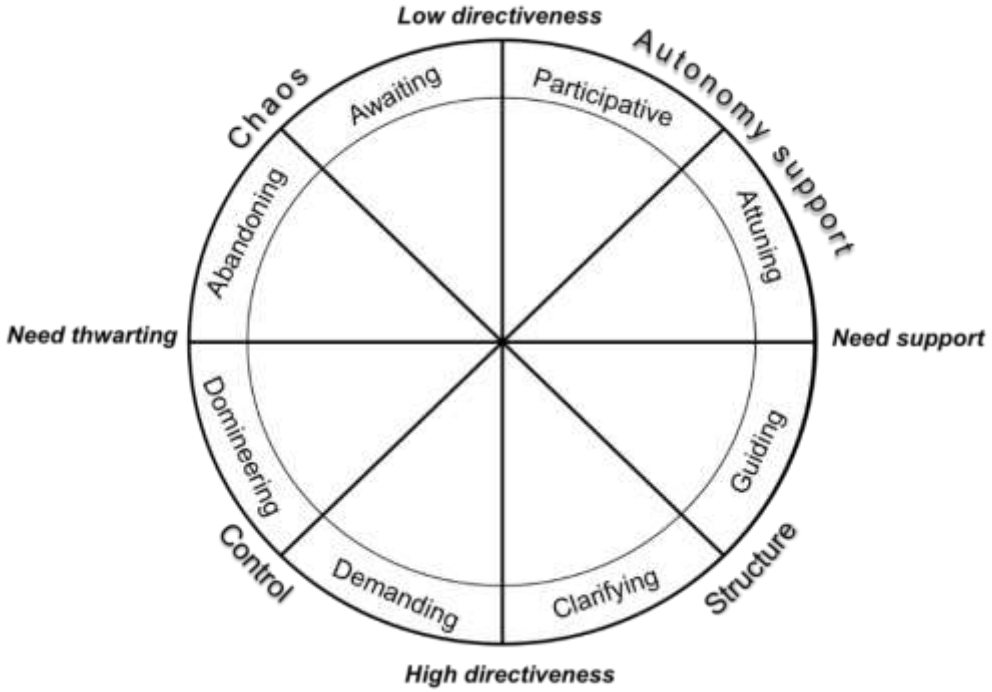


Figure 1. *Graphical representation of the circumplex model or teaching wheel as presented by Aelterman et al. (2018) and Vansteenkiste et al. (2019).*

Highlight 5: Designing and reporting evidence-based writing interventions

A relatively large amount of instructional writing interventions were designed, implemented, and evaluated in the course of the second decade of the 21st century. In this respect, the meta-analyses of Graham et al. (2012) and Koster et al. (2015) provide a good overview of these evidence-based writing practices (EBP's) in elementary education. These EBP's can focus on a single practice (e.g., teaching sentence combining) or can comprise several writing practices in more comprehensive, multifaceted writing programs. Concerning the latter, quite a few comprehensive writing programs were developed at the time of this dissertation's trajectory, such as for example the Self-Regulated Strategy Development (SRSD) (Graham & Harris, 2018b; Harris & Graham, 2016, 2018), the Cognitive Self-Regulation Instruction (Fidalgo & Torrance, 2018), Tekster (Bouwer et al., 2018; Koster & Bouwer, 2018), a comprehensive program focused on communicative writing (Rietdijk et al., 2017), and a reader and writer-focused instruction program focused on revision (López, Rijlaarsdam, Torrance, & Fidalgo, 2018). The instructional interventions presented in this dissertation could also be identified as

a comprehensive program, as multiple writing practices were integrated. By the 20teens, scholars in the field of writing increasingly highlighted the need to report both single writing practices and comprehensive writing programs in a more systematic and analytic way (Bouwer & De Smedt, 2018; Fidalgo, Harris, & Braaksma, 2018; Rijlaarsdam, Janssen, Rietdijk, & van Weijen, 2018). The main assumption of this movement towards more clarity and transparency in writing intervention research was based on the fact that systematic descriptions were assumed critical in the light of replication, theory building, and dissemination of EBP's (Bouwer & De Smedt, 2018; Rijlaarsdam et al., 2018). In the present dissertation, we aligned with this movement by including a systematic and analytic description of the instructional writing interventions studied (cf., chapter 6). The reporting system of Rijlaarsdam et al. (2018) was the first to provide guidance on how to approach such systematic descriptions. More particularly, this system supported researchers in outlining and relating design principles, instructional teaching activities, and learning activities which are central in their writing interventions. Based on the work of Rijlaarsdam et al. (2018), Bouwer and De Smedt (2018) discussed some additional challenges and recommendations that should be considered when reporting on the conceptual structure of writing interventions. More particularly, they provided an overview of mandatory elements in systematic descriptions and concrete guidelines on how to include these in research publications. A first element, put forward by Bouwer and De Smedt (2018), was the description of *the context* in which the intervention takes place (e.g., aim, target group, contextual factors). Providing this information is necessary as the effectiveness of instructional writing programs depends on the context in which these are being implemented (Graham & Harris, 2014). Second, in line with Rijlaarsdam et al. (2018) they stressed the importance of describing *theoretical and/or empirical rationales* that provide evidence for the relationship between instructional teaching activities and learning activities as well as between the learning activities and expected outcomes. In this way, researchers can legitimize the inclusion of a certain instructional activity to foster certain learning activities, which ultimately lead to the desired learning outcome(s). In this respect, also Harris (2018) advocated the need to develop EBP's based on theoretical integration. More particularly, she stated that, "good instruction does not require a forced choice between competing theories, but rather a triangulation across and integration of the evidence from various theories, perspectives, and lines of research" (Harris, 2018, p. 170). The third element put forward by Bouwer and De Smedt (2018), namely the *key design principles of the intervention*, rests on and is thereby influenced by the previous two factors (i.e., the context description and the theoretical and/or empirical grounding of the intervention). In line with previous recommendations (Fidalgo et al., 2018), Bouwer and De Smedt (2018) distinguished the macro and micro level of intervention descriptions. Concerning the *macro level*, the key design principles regarding the focus (i.e., what is taught), mode (i.e., how is it taught), and sequence of the intervention (i.e., the order

of instructional focus and mode) are described. The key design principles at macro or program level are integrated and operationalized into specific instructional activities, learning activities, and instructional materials at the *micro level*. In chapter 6 of this dissertation, we explicitly included the abovementioned mandatory elements and we extended the prescribed macro level by providing guidelines on how to report similarities and differences between different instructional writing programs by introducing *overlapping and diverging design principles*. In sum, chapter 6 provided clear insights in theoretically and empirically founded design choices to foster elementary students' writing, directions and guidelines for the design and implementation of the interventions, and tangible instructional writing materials to use in both research and practice. In this respect, researchers who aim to replicate (parts of) the instructional programs and educational practitioners who intend to implement the interventions in everyday classroom practice can benefit from this analytic description. It must, however, be noted that the interventions were implemented and tested within a specific context (cf., upper-elementary grades in Flanders). What works in one context cannot automatically be transferred to other contexts without any contextual adaptations. To conclude, the systematic approach presented in chapter 6 can be considered as an exemplar for today's researchers aiming to describe instructional interventions in general and writing interventions in particular.

Highlight 6: Fidelity of implementation of interventions

The statistical power of a study depends on the application of reliable and valid measures, appropriate design and sampling techniques, and careful assessment of fidelity of implementation (O'Donnell, 2008). The latter, which is the focus of this section, refers to the congruence between the design of an instructional program and the actual implementation of that program in efficacy or effectiveness studies (O'Donnell, 2008). Low fidelity of implementation, meaning that the instructional program is not implemented as intended according to the original program design, hinders the internal and external validity of the intervention study (Dumas, Lynch, Laughlin, Smith, & Prinz, 2001; Gerstner & Finney, 2013; Mowbray, Holter, Teague, & Bybee, 2003; O'Donnell, 2008; Van Weijen & Koster, in progress). During the PhD trajectory, accountability was already high on the agenda and, as we know, it continues to be a priority nowadays. In this respect, the need to measure and report fidelity of implementation in educational intervention studies increased throughout the 20teens. For instance, methodological consideration of the level of fidelity during implementation increasingly became a necessary condition for publishing intervention research in high-quality journals or a requirement for funding agencies (Capin, Walker, Vaughn, & Wanzek, 2018). Reviews examining the assessment of fidelity of implementation revealed that there is great

diversity in methods to specify fidelity criteria (Mowbray et al., 2003; O'Donnell, 2008; Swanson, Wanzek, Haring, Ciullo, & McCully, 2011). In this respect, Dane and Schneider (1998) identified five dimensions of fidelity of implementation which should be taken into account when specifying and developing fidelity measures: (a) *adherence* (i.e., to what extent are critical intervention components implemented as intended), (b) *quality* (i.e., measure of instructional quality), (c) *exposure* or *dosage* (i.e., amount of instruction provided), (d) *participant responsiveness* (i.e., extent to which participants responded to the intended intervention), and (e) *program differentiation* (i.e., measure to assess differences between the intervention and comparison condition) (Capin et al., 2018; O'Donnell, 2008). The fidelity measures used in this dissertation reflected each of these criteria (cf., chapter 4, 5, and 7). More particularly, we checked whether the critical ingredients of our intervention were implemented as intended by observing the level of alignment between the designed instructional activities and activities actually being implemented (i.e., adherence). We also assessed the quality of instruction and teachers' classroom management skills during classroom observations (i.e., quality). To measure exposure, we assessed teachers' time on/off task, total time spent on each lesson, and the number of completed lessons. Furthermore, we assessed students' responsiveness during classroom observations and teachers had to evaluate their level of responsiveness each lesson. Finally, we conducted observations in the comparison condition to check whether there was any contamination of instruction (i.e., program differentiation). To meet the abovementioned criteria, we used a multimethod, multisource methodology (Mowbray et al., 2003; O'Donnell, 2008), including (a) the analysis of students' writing portfolios, (b) the investigation of self-report data by means of teacher logbooks based on structured protocols, and (c) classroom observations in experimental as well as comparison classes.

Although the fidelity measures were in line with the abovementioned main criteria and multiple methods and sources were used, looking back at our work we need to acknowledge several limitations which also represent challenges for today's research. First, Bouwer and De Smedt (2018) argued that analytically describing the key elements of an intervention by means of design principles, instructional activities, and learning activities (cf., highlight 5) is the essential first step in specifying and developing fidelity measures. Although we identified and systematically described the key ingredients of the instructional interventions in chapter 6, we did not translate all identified instructional activities into concrete measures of fidelity (cf., chapter 7). Furthermore, the fidelity measures used in this dissertation were primarily focused on teachers' behavior (e.g., assessing teachers' time on/off task, teachers' instruction) and to a lesser extent on students' behavior (e.g., assessing students' responsiveness and number of completed writing assignments). Next to developing fidelity measures to assess teachers' instructional activities, Bouwer and De Smedt (2018) argued that research should also include

fidelity measures assessing the extent to which students apply the anticipated learning activities. Researchers can assess students' learning activities by, for instance, observing students during program implementation or analyzing observable traces in their writing assignments and notes (cf., trace methodology, discussed in highlight 3). Second, Mowbray et al. (2003) stated that it is essential to examine the fidelity indicators in terms of their reliability and validity. In this dissertation, however, we did not include reliability measures (e.g., interrater agreement, measures for internal consistency) nor did we analyze construct validity. Finally, as we merely focused on the descriptive analysis of the fidelity data, we did not relate measures of fidelity to outcome measures (O'Donnell, 2008) and consequently did not examine differential effects according to the level of implementation fidelity.

Despite the abovementioned limitations, it must be noted, however, that we had to develop fidelity measures adjusted to the writing programs studied in the present dissertation. More particularly, as we did not replicate a previously validated writing program but developed new writing programs by means of two iterations and as a universal fidelity instrument does not exist (O'Donnell, 2008), we had to develop new fidelity measures with our specific instructional programs in mind. In this respect, Mowbray et al. (2003) stated that multiple iterations or replications are needed to develop enduring programs and during each iteration the fidelity measures should be carefully refined to facilitate movement toward more valid and reliable fidelity measures. Once these measures are sufficiently reliable and valid, relating these to outcome data will provide more in-depth insight into why the program does (not) work.

Highlight 7: Scaling up interventions

Although the careful assessment of fidelity of implementation is essential to conduct high-quality intervention research, leaving room for local adaptations is needed when aiming to promote a *sustainable* intervention (O'Donnell, 2008; Rietdijk et al., 2017). To ensure that the distribution and adoption of an intervention is significant, consequential change must be sustained (Coburn, 2003). By the second decade of the 21st century, research already showed that schools and classes that successfully implemented interventions found it very difficult to sustain them, especially after the initial influx of support and resources were lost and in the face of constantly changing priorities (Coburn, 2003; Hargreaves & Fink, 2000; Hatch, 2000). Although sustainability is the key challenge of bringing interventions to scale up, other dimensions, namely *depth*, *spread*, and *shift of ownership*, are also fundamental (Coburn, 2003). These dimensions of scaling were developed in the beginning of the 21st century, but they continue to be relevant and critical today. *Deep change* goes beyond adopting and implementing surface features of an intervention (i.e., intervention materials) but requires a

shift in teachers' beliefs (i.e., underlying assumptions on learning and instruction), norms of social interaction (i.e., student and teacher interactions), and pedagogical principles (i.e., the way teachers engage and encourage students in learning). A third and more traditional dimension of scale-up, *spread*, refers to the increasing number of classes and schools that implement the intervention (i.e., spread of intervention materials) and that fit in with the underlying beliefs and principles. Finally, Coburn (2003) states that creating conditions to *shift authority, knowledge, and know-how of the intervention* from external actors to teachers and schools is of vital importance to take an intervention to scale. Taken the interrelated dimensions of scale into account, it becomes apparent that the interventions central in our dissertation still have a long journey before the process of scaling up can be initiated. In this respect, we discuss the interventions' limitations that will challenge a potential scale-up at present. First, although the interventions were tested in two iteration interventions and results on the effectiveness, in terms of writing performance and motivation, were promising, further research replicating these findings are needed to foster dissemination and scale-up of the interventions. Second, in contrast to sustainable and wide spread writing interventions (e.g., Rietdijk et al., 2017), the interventions focused on one particular genre, without acknowledging the diversity of genres outlined in the attainment targets for writing in elementary grades (e.g., narrative texts, reports, informational texts) nor were the interventions embedded in language methods that are widely used in Flemish schools. In the light of *sustainability* and *spread*, embedding these interventions in current language methods can be beneficial. As the interventions were rather limited in time and do not comprise all aspects of writing (cf., specific focus on descriptive writing and not on other text genre; other crucial aspects of writing such as handwriting/keyboarding, spelling, grammar or sentence combining were not addressed), such an embedment can be feasible. It must, however, be noted that this implies the integration of the entire instructional program (i.e., intervention materials and instructional principles), leaving room for minor adaptations but without altering the key design principles of the interventions (cf., highlight 5). In the light of creating *deep and long lasting change* in teachers' actions and beliefs and enabling teachers and schools to assume *ownership* for the intervention, ongoing professional development of teachers is of vital importance (Coburn, 2003; Desimone, 2009). In this dissertation, professional development (PD) was limited to one PD-session preceding the intervention and on-demand support during the intervention. We, however, did not actively support teachers and schools in assuming ownership of the innovation (e.g., establishing strategies and approaches to continue, consolidate, and transfer the instructional principles of the writing program into everyday classroom practice). Next to providing support to teachers who were involved in our intervention research, we invested in PD of teachers by organizing an annual PD training day since 2015 and we continue to do so today. In 2019, the year this dissertation was completed, we organized a PD training day which

explicitly focused on evidence-based guidelines, derived from the current dissertation, to foster students' writing.

To conclude, we argue that if these interventions are considered set for scale-up, the process should be closely monitored. In this respect, Coburn (2003) highlighted the need to identify and validate measures of the dimensions of scale (i.e., sustainability, depth, spread, and shift of ownership) to fully understand long-term dynamics and success (or failure) of scaling up instructional interventions. As this will likely result in an expensive and recourse-intensive endeavor, we advocate that research funding should provide recourses to support not only the development, implementation, and evaluation of innovations, but also to facilitate the use of sustainable innovations in everyday practice.

Highlight 8: Studying literacy

Since the 70's of the 20th century, both reading and writing researchers provided considerable contributions by investigating each literacy activity separately. Although reading and writing have cognitively different starting points (i.e., respectively receptive and productive by nature), they are closely related (Fitzgerald & Shanahan, 2000; Shanahan, 2016, 2019). By the 20teens, the research field on literacy, in which the study of reading-writing connections is central, gained increased attention in both theoretical and empirical research (Shanahan, 2016). In this respect, three theoretical models, relevant for today's research, provide significant frameworks for research into the reading-writing nexus. Each framework describes singular ways in how reading and writing are connected (Graham et al., 2018; Shanahan, 2016, 2019). The *rhetorical relations theory*, which is sociocognitive in nature, states that reading and writing are both communication activities in which reader-writer relations and awareness are central. Empirical studies within this research strand have mainly focused on whether and how readers think about authors (i.e., author awareness) (e.g., Shanahan, Shanahan, & Misischia, 2011) and whether and how writers think about readers (i.e., audience awareness) (e.g., Lindgren, Leijten, & Van Waes, 2011). The *functional theory* envisions reading and writing as functional activities that can be combined to accomplish specific learning goals. Functional investigations have studied the impact of combining reading and writing on two major outcomes, namely learning information from text (e.g., Merchie & Van Keer, 2016) and writing syntheses using multiple source texts (e.g., Mateos & Solé, 2009; Vandermeulen, Van Steendam, Rijlaarsdam, & van den Broek, 2019). Finally, according to the *shared knowledge and process theory*, reading and writing depend on similar knowledge and cognitive processes. Empirical research that draws on the shared knowledge theory has provided a rich tradition of cognitive studies on reading-writing connections. Since the '80 of the 20th century, cognitive

studies focused on complex models to reveal patterns of relations between reading and writing (e.g., Shanahan & Lomax, 1986, 1988). By the 20teens, these models became more sophisticated by taking into account the developmental nature of reading-writing relations using advanced modeling techniques (e.g., Ahmed, Wagner, & Lopez, 2014).

Within this dissertation, we studied students' writing skills apart from their reading abilities. As we aimed to prevent students' writing performance being influenced by their reading comprehension skills, we opted for the use of visual prompts instead of source texts during the administration of writing tests and during writing practice. Additionally, the interventions central in our dissertation focused exclusively on teaching writing knowledge and strategies without addressing aspects such as audience awareness or teaching students the combined use of reading and writing strategies. Instead of disregarding the existence of fruitful relations between reading and writing we, however, underline the call of literacy scholars to adopt an integrated approach to study literacy in today's research (Alves, Limpo, & Joshi, 2018; Limpo, Alves, & Joshi, 2018; Wagner, 2018). More particularly, experts in the field have called for more empirical research on the developmental nature of the reading-writing nexus and more experimental studies aimed at exploiting the major reading-writing relations which are identified in sophisticated cognitive models (Graham et al., 2018; Shanahan, 2016). Concerning the latter, research studies on balanced literacy programs, in which reading and writing instruction are integrated so instruction in each is purposefully designed to optimize both skills simultaneously, can drastically move the literacy field forward (Graham et al., 2018).

Highlight 9: Writing in the digital age

In the current dissertation, we aimed to study elementary students' writing by closely aligning to prevalent writing practices. Because Flemish elementary school students are currently (still) primarily used to writing texts using pen and paper instead of computers (cf., chapter 2), writing was perceived and investigated as a paper-pencil activity. We must, however, be aware that during the last decades, writing has undertaken a major shift in everyday life from a paper-pencil activity to a technology-driven endeavor (Peterson-Karlan, 2011). Therefore, we argue that neither educational practice, nor educational research can remain blind for the immense impact of new and rapidly changing technologies on communication and writing processes of children (Cutler & Graham, 2008; MacArthur, 2006). However, it appears that integrating new technologies in schools, to guarantee that students are well-prepared to participate in a technology-infused world (Wollak & Koppenhaver, 2011), is not yet common practice in Flanders. To successfully integrate ICT in daily writing instruction, it must be noted that simply increasing the number of available laptops or

computers will not suffice; we need to consider how these technologies will be used to attain specific instructional writing purposes. As a result of the technology-boom during the 20teens, the writing research field began to incorporate new technologies by studying technology-based writing instruction. In this respect, the special issue by Limpo, Nunes, and Coelho (2020)[6] in the Journal of Writing Research provides a comprehensive overview on technology-based instruction tools to support the teaching and learning of writing. Previous empirical research on technology-based instruction has provided evidence that elementary school students' writing improves when using word processors instead of pen and paper (Bangert-Drowns, 1993; Goldberg, Russel, & Cook, 2003; Graham et al., 2012; Morphy & Graham, 2012). On condition that students have developed sufficient keyboarding skills, word processing programs (with or without supportive software such as spell checkers or speech synthesis) have a number of advantages such as, the ease in which writers can add, delete, and revise their digital text (Graham & Harris, 2019). However, the inclusion of word processing tools is only one way in which technology can be integrated in classroom writing practices (i.e., technology supporting students' writing). Other forms of how technology can be adopted are technology-enabled writing (i.e., new sources and tools that enhance sharing and editing) and multimedia writing (i.e., writing hypermedia texts) (Karchmer-Klein, 2019; MacArthur, 2006). Research on the integration of web 2.0 technologies (cf., blogs, wikis, social media tools) in elementary education is increasing (e.g., Liu, Liu, Chen, Lin, & Chen, 2011), but compared to secondary and higher education, remain a blind spot (Karchmer-Klein, 2019; MacArthur, 2006). Given technology's rapid rate of development, the research field on writing has to keep up with these digital tools and explore innovative approaches to incorporate these in everyday practice to facilitate the implementation of best practices in writing instruction (Karchmer-Klein, 2019).

Final conclusion

According to the main rationale of the present dissertation, we aimed at gaining in-depth insight in the current state of today's writing instruction and outcomes in Flanders and providing evidence-based guidelines to improve the quality of writing instruction and, in turn, enhance upper-elementary students' writing. Three research lines were derived from this main rationale. The first research line unraveled insights in teachers' beliefs on writing and writing instruction

[6] Forthcoming special issue in the Journal of Writing Research. Expected publication date is February 2020.

and in their daily instructional writing practice. The second research line focused on studying student and teacher-level correlates of students' writing performance and on the relationships between students' motivation and cognitive processes and their writing performance. Both research lines were intended as an initial step in gaining a deeper understanding of key factors affecting upper-elementary students' writing. Based on the obtained results, we can conclude that there is room for improvement concerning current educational writing practices in Flanders. In this respect, we want to emphasize the need to invest in cognitive challenging writing instruction as well as in creating appealing and motivating writing experiences to support students in becoming capable and motivated writers. The insights required in research line 1 and 2 led to the third and final research line in which we studied the impact of explicit writing instruction and peer-assisted writing on students' writing performance, motivation, and self-efficacy for writing. Based on the results in research line 3, we can conclude that the combination of structured peer-assisted writing and explicit writing instruction is a promising approach to support upper-elementary students in overcoming cognitive as well as motivational writing challenges.

The present dissertation provides insights advancing our understanding of cognitive and motivational challenges upper-elementary students face when writing and how to support them in effectively overcoming these challenges. By discussing eight major highlights derived from the dissertation's limitations, implications, and suggestions for future research, we aimed to position this dissertation within current and emerging issues and developments in the field of writing and to provide valuable contributions potentially directing future agendas of educational writing practice, policy, and research.

References

Aelterman, N., Vansteenkiste, M., Haerens, L., Soenens, B., Fontaine, J., & Reeve, J. (2018). Toward an integrative and fine-grained insight in motivating and demotivating teaching styles: The merits of a circumplex approach. *Journal of Educational Psychology*. doi:10.1037/edu0000293

Ahmed, Y., Wagner, R., & Lopez, D. (2014). Developmental relations between reading and writing at the word, sentence, and text levels: A latent change score analysis. *Journal of Educational Psychology, 106*(2), 419-434. doi:10.1037/a0035692

Alamargot, D., Plane, S., Lambert, E., & Chesnet, D. (2010). Using eye and pen movements to trace the development of writing expertise: Case studies of a 7th, 9th and 12th grader,

graduate students, and professional writer. *Reading and Writing, 23*(7), 853-888. doi:10.1007/s11145-009-9191-9

Albin, M., Benton, S., & Khramtsova, I. (1996). Individual differences in interest and narrative writing. *Contemporary Educational Psychology, 21*(4), 305-324. doi:10.1006/ceps.1996.0024

Alves, R., Limpo, T., Fidalgo, R., Carvalhais, L., Pereira, L., & Castro, S. (2015). The impact of promoting transcription on early text production: Effects on bursts and pauses, levels of written language, and writing performance. *Journal of Educational Psychology, 108*(5), 665-679. doi:10.1037/edu0000089

Alves, R., Limpo, T., & Joshi, M. (2018). *Reading-writing connections: A case for integrative literacy science*. Paper presented at the Twenty-Fourth Annual Society for the Scientific Study of Reading Meeting.

Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychological Review, 84*(2), 191-125. doi:10.1037/0033-295X.84.2.191

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York, NY: Freeman.

Bangert-Drowns, R. (1993). The word processor as an instructional tool: A meta-analysis of word processing in writing instruction. *Review of Educational Research, 63*(1), 69-93. doi:10.2307/1170560

Beauvais, C., Olive, T., & Passerault, J. (2011). Why are some texts good and others not? Relationship between text quality and management of the writing processes. *Journal of Educational Psychology, 103*(2), 415-428. doi:10.1037/a0022545

Bereiter, C., & Scardamalia, M. (1987). *The psychology of written composition*. Hillsdale, N.J.: L. Erlbaum Associates.

Berninger, V., Fuller, F., & Whitaker , D. (1996). A process model of writing development across the life span. *Educational Psychology Review, 8*(3), 193-218. doi:10.1007/BF01464073

Berninger, V., Yates, C., Cartwright, A., Rutberg, J., Remy, E., & Abbott, R. (1992). Lower-level developmental skills in beginning writing. *Reading and Writing, 4*(3), 257-280. doi:10.1007/BF01027151

Bonset, H., & Hoogeveen, M. (2007). *Schrijven in het basisonderwijs. Een inventarisatie van empirisch onderzoek in het perspectief van leerplanontwikkeling.* Enschede: Stichting leerplanontwikkeling.

Boscolo, P., & Hidi, S. (2007). The multiple meanings of motivation to write. In G. Rijlaarsdam (Ed.), *Studies in Writing* (pp. 1-16). Oxford: Elsevier.

Bouwer, R., Béguin, A., Sanders, T., & van den Bergh, H. (2015). Effect of genre on the generalizability of writing scores. *Language Testing, 32*(1), 83-100. doi:10.1177/0265532214542994

Bouwer, R., & De Smedt, F. (2018). Introduction special issue: Considerations and recommendations for reporting writing interventions in research publications. *Journal of Writing Research, 10*(2), 115-137. doi:10.17239/jowr-2018.10.02.01

Bouwer, R., Koster, M., & van den Bergh, H. (2016). *Benchmark rating procedure, best of both worlds? Comparing procedures to rate text quality in a reliable and valid manner*. Bringing writing research into the classroom. The effectiveness of Tekster, a newly developed writing program for elementary students (Doctoral Dissertation). Utrecht University. Utrecht, the Netherlands.

Bouwer, R., Koster, M., & van den Bergh, H. (2018). Effects of a strategy-focused instructional program on the writing quality of upper elementary students in the Netherlands. *Journal of Educational Psychology, 110*(1), 58-71. doi:10.1037/edu0000206

Bouwer, R., Lesterhuis, M., De Smedt, F., Van Keer, H., & De Maeyer, S. (2019). A comparative approach to the assessment of writing: Benefits of benchmark ratings and comparative judgement. *Manuscript submitted for publication*.

Braaksma, M., Rijlaarsdam, G., & Janssen, T. (2017). Writing hypertexts: Proposed effects on writing processes and knowledge acquisition. *Educational Studies in Language and Literature, 7*(4), 93-122. doi:10.17239/L1ESLL-2007.07.04.06

Braten, I., & Samuelstuen, M. (2004). Does the influence of reading purpose on reports of strategic text processing depend on students' topic knowledge. *Journal of Educational Psychology, 96*(2), 324-336. doi:10.1037/0022-0663.96.2.324

Braten, I., & Samuelstuen, M. (2007). Measuring strategic processing: Comparing task-specific self-reports to traces. *Metacognition Learning, 2*(1), 1-20. doi:10.1007/s11409-007-9004-y

Breetvelt, I., van den Bergh, H., & Rijlaarsdam, G. (1994). Relations between writing processes and text quality: When and how? *Cognition and Instruction, 12*(2), 103-123. doi:10.1207/s1532690xci1202_2

Brindle, M. (2013). *Examining relationships among teachers' preparation, efficacy, and writing practices.* Vanderbilt University, Nashville, Tennessee.

Brindle, M., Graham, S., Harris, K. R., & Hebert, M. (2016). Third and fourth grade teacher's classroom practices in writing: A national survey. *Reading and Writing, 29*(5), 929-954. doi:10.1007/s11145-015-9604-x

Bruning, R., Dempsey, M., Kauffman, D., McKim, C., & Zumbrunn, S. (2013). Examining dimensions of self-efficacy for writing. *Journal of Educational Psychology, 105*(1), 25-38. doi:10.1037/a0029692

Bruning, R., & Horn, C. (2000). Developing motivation to write. *Educational Psychologist, 35*(1), 25-37. doi:10.1207/S15326985ep3501_4

Bruning, R., & Kauffman, D. (2016). Self-efficacy beliefs and motivation in writing development. In C. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of Writing Research* (pp. 160-173). New York: The Guilford Press.

Cameron, C., & Moshenko, B. (1996). Elicitation of knowledge transformational reports while children write narratives. *Canadian Journal of Behavioural Science, 28*(4), 271-280. doi:10.1037/0008-400X.28.4.271

Capin, P., Walker, M., Vaughn, S., & Wanzek, J. (2018). Examining how treatment fidelity is supported, measured, and reported in K-3 reading intervention research. *Educational Pyschology Review, 30*(3), 885-919. doi:10.1007/s10648-017-9429-z

Cleary, M. (1991). Affect and cognition in the writing processes of eleventh graders: A study of concentration and motivation. *Written Communication, 8*(4), 473-508. doi:10.1177/0741088391008004003

Coburn, C. (2003). Rethinking scale: Moving beyond numbers to deep and lasting change. *Educational Researcher, 32*(6), 3-12. doi:10.3102/0013189X032006003

Coertjens, L., Lesterhuis, M., Verhavert, S., Van Gasse, R., & De Maeyer, S. (2017). Teksten beoordelen met criterialijsten of via paarsgewijze vergelijking: een afweging van betrouwbaarheid en tijdsinvestering. *Pedagogische Studiën, 94*(4), 283-303.

Coker, D., Farley-Ripple, E., Jackson, A., Wen, H., MacArthur, C., & Jennings, A. (2016). Writing in first grade: an observational study. *Reading and Writing, 29*(5), 793-832. doi:10.1007/s11145-015-9596-6

Crisp, V. (2013). Criteria, comparison and past experiences: How do teachers make judgements when marking coursework? *Assessment in Education: Principles, Policy & Practice, 20*(1), 127-144. doi:10.1080/0969594X.2012.741059

Cutler, L., & Graham, S. (2008). Primary grade writing instruction: A national survey. *Journal of Educational Psychology, 100*(4), 907-919. doi:10.1037/A0012656

Dane, A., & Schneider, B. (1998). Program integrity in primary and early secondary prevention: are implementation effects out of control? *Clinical Psychology Review, 18*(1), 23-45. doi:10.1016/S0272-7358(97)00043-3

De Bernardi, B., & Antolini, E. (2007). Fostering students'willingness and interest in argumentative writing: An intervention study. In S. Hidi & P. Boscolo (Eds.), *Writing and Motivation* (pp. 183-202). Oxford: Elsevier.

De Naeghel, J., Van Keer, H., Vansteenkiste, M., & Rosseel, Y. (2012). The relation between elementary students' recreational and academic reading motivation, reading frequency, engagement, and comprehension: A self-determination theory perspective. *Journal of Educational Psychology, 104*(4), 1006-1021. doi:10.1037/a0027800

De Smedt, F., Rogiers, A., Heirweg, S., Vandamme, S., Merchie, E., & Van Keer, H. (2019). Reading and writing motivation across grades in primary and secondary education: A self-determination theory perspective. *Submitted for publication*.

Desimone, L. (2009). Improving impact studies of teachers' professional development: Toward better conceptualizations and measures. *Educational Researcher, 38*(3), 181-199. doi:10.3102/0013189X08331140

Dumas, J., Lynch, A., Laughlin, J., Smith, E., & Prinz, R. (2001). Promoting intervention fidelity: Conceptual issues, methods and preliminary results form the EARLY ALLIANCE prevention trial. *American Journal of Preventive Medicine, 20*(1), 38-47. doi:10.1016/S0749-3797(00)00272-5

Elving, K., & van den Bergh, H. (2017). Doen we weer Booster? Het effect van een digitale en interactieve schrijfcursus op tekstkwaliteit in havo 4. *Pedagogische Studiën, 94*(4), 330-347.

Englert, C., Zhao, Y., Dunsmore, K., Collings, N., & Wolbers, K. (2007). Scaffolding the writing of students with disabilities through procedural facilitation: Using an internet-based technology to improve performance. *Learning Disability Quarterly, 30*(9), 9-29. doi:10.2307/30035513

Escorcia, D., Passerault, J., Ros, C., & Pylouster, J. (2017). Profiling writers: analysis of writing dynamics among college students. *Metacognition and Learning, 12*(2), 233-273. doi:10.1007/s11409-016-9166-6

Fidalgo, R., Harris, K., & Braaksma, M. (2018). *Design Principles for Teaching Effective Writing* (Vol. 34). Leiden; Boston: Brill.

Fidalgo, R., & Torrance, M. (2018). Developing writing skills through cognitive self-regulation instruction. In R. Fidalgo, K. Harris, & M. Braaksma (Eds.), *Design Principles for Teaching Effective Writing* (Vol. 34, pp. 89-118). Leiden; Boston: Brill.

Fidalgo, R., Torrance, M., Rijlaarsdam, G., van den Bergh, H., & Alvarez, M. (2015). Strategy-focused writing instruction: just observing and reflecting on a model benefits 6th grade students. *Contemporary Educational Psychology, 41*, 37-50. doi:10.1016/j.cedpsych.2014.11.004

Fitzgerald, J., & Shanahan, T. (2000). Reading and writing relations and their development. *Educational Psychologist, 35*(1), 39-50. doi:10.1207/S15326985EP3501_5

Flower, L., & Hayes, J. (1981). A cognitive process theory of writing. *College Composition and Communication, 32*(4), 365-387. doi:10.2307/356600

Gerstner, J., & Finney, S. (2013). Measuring the implementation fidelity of student affairs programs: A critical component of the outcomes assessment cycle. *Research and Practice in Assessment, 8*, 15-28.

Gilbert, J., & Graham, S. (2010). Teaching writing to elementary students in grades 4-6: A national survey. *The Elementary School Journal, 110*(4), 494-518. doi:10.1086/651193

Goldberg, A., Russel, M., & Cook, A. (2003). The effect of computers on student writing: A meta-analysis of studies from 1992 to 2002. *The Journal of Technology, Learning, and Assessment, 2*(1), 3-51.

Graham, S. (2018a). A revised Writer(s)-Within-Community Model of writing. *Educational Psychologist, 53*(4), 258-279. doi:10.1080/00461520.2018.1481406

Graham, S. (2018b). A writer(s) within community model of writing. In C. Bazerman, V. Berninger, D. Brandt, S. Graham, J. Langer, S. Murphy, P. Matsuda, D. Rowe, & M. Schleppegrell (Eds.), *The lifespan development of writing* (pp. 271-325). Urbana, IL: National Council of English.

Graham, S., Berninger, V., & Fan, W. (2007). The structural relationship between writing attitude and writing achievement in first and third grade students. *Contemporary Educational Psychology, 32*(3), 516-536. doi:10.1016/j.cedpsych.2007.01.002

Graham, S., & Harris, K. (1997). It can be taught, but it does not develop naturally: Myths and realities in writing instruction. *School Psychology Review, 26*(3), 414-424.

Graham, S., & Harris, K. (2014). Conducting high quality writing intervention research: Twelve recommendations. *Journal of Writing Research, 62*(2), 89-123. doi:0.17239/jowr-2014.06.02.1

Graham, S., & Harris, K. (2018a). Evidence-based writing practices: A meta-analysis of existing meta-analyses. In R. Fidalgo, K. Harris, & M. Braaksma (Eds.), *Design Principles for Teaching Effective Writing* (pp. 13-37). Leiden: Brill.

Graham, S., & Harris, K. (2018b). An examination of the design principles underlying a Self-Regulated Strategy Development study. *Journal of Writing Research, 10*(2). doi:10.17239/jowr-2018.10.02.02

Graham, S., & Harris, K. (2019). Evidence-based practices in writing. In S. Graham, C. MacArthur, & M. Hebert (Eds.), *Best Practices in Writing Instruction*. New York: Guilford Press.

Graham, S., Harris, K., & Chambers, A. (2016). Evidence-based practice and writing instruction: A review of reviews. In C. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of Writing Research* (pp. 211-226). New York: The Guilford Press.

Graham, S., Harris, K., Fink, B., & MacArthur, C. (2001). Teacher efficacy in writing: A construct validation with primary grade teachers. *Scientific Studies of Reading, 5*(2), 177-202. doi:10.1207/S1532799Xssr0502_3

Graham, S., Harris, K., & Mason, L. (2005). Improving the writing performance, knowledge, and self-efficacy of struggling young writers: The effects of self-regulated strategy development. *Contemporary Educational Psychology, 30*(2), 207-241. doi:10.1016/j.cedpsych.2004.08.001

Graham, S., Harris, K., & Troia, G. (2000). Self-regulated strategy development revisited: Teaching writing strategies to struggling writers. *Topics in Language Disorders, 20*(4), 1-14. doi:10.1097/00011363-200020040-00003

Graham, S., Hebert, M., Sandbank, M., & Harris, K. (2016). Assessing the writing achievement of young struggling writers: Application of generalizability theory. *Learning Disability Quarterly, 39*(2), 72-82. doi:10.1177/0731948714555019

Graham, S., Liu, X., Aitken, A., Ng, C., Bartlett, B., Harris, K., & Holzapfel, J. (2018). Effectiveness of literacy programs balancing reading and writing instruction: A Meta-Analysis. *Reading Research Quarterly, 53*(3), 249-304. doi:10.1002/rrq.194

Graham, S., McKeown, D., Kiuhara, S., & Harris, K. (2012). A meta-analysis of writing instruction for students in the elementary grades. *Journal of Educational Psychology, 104*(3), 879-896. doi:10.1037/A0029185

Graham, S., & Sandmel, K. (2011). The process writing approach: A meta-analysis. *Journal of Educational Research, 104*(6), 396-407. doi:10.1080/00220671.2010.488703

Grünke, M., Wilbert, J., Tsiriotakis, I., & Agirregoikoa, A. (2017). Improving the length and quality of texts written by fourth graders with learning dissabilities through a peer-tutoring graphic organizing strategy. *Insights into Learning Disabilities, 14*(2), 167-188.

Hadwin, A., Winne, P., Stockley, D., Nesbit, J., & Woszczyna, C. (2001). Context moderates students' self-reports about how they study. *Journal of Educational Psychology, 93*(3), 477-487. doi:10.1037//O022-0663.93.3.47

Haerens, L., Vansteenkiste, M., Aelterman, N., & Van den Berghe, L. (2016). Towards a systematic study of the dark side of student motivation: antecedents and consequences of teachers' controlling behaviors. In W. Liu, J. Wang, & R. Ryan (Eds.), *Building autonomous learners : perspectives from research and practice using self-determination theory* (pp. 59-81). Singapore: Springer.

Hall, A., & Grisham-Brown, J. (2011). Writing development over time: Examining preservice teachers' attitudes and beliefs about writing. *Journal of Early Childhood Teacher Education, 32*(2), 148-158. doi:10.1080/10901027.2011.572230

Hamp-Lyons, L. (2016). Farewell to holistic scoring. Part two: Why build a house with only one brick? *Assessing Writing, 29*, A1-A5. doi:10.1016/j.asw.2016.06.006

Hargreaves, A., & Fink, D. (2000). The three dimensions of reform. *Educational Leadership, 57*(7), 30-34.

Harris, K. (2018). Educational Psychology: A future retrospective. *Journal of Educational Psychology, 110*(2), 163-173. doi:10.1037/edu0000267

Harris, K., & Graham, S. (2016). Self-Regulated Strategy Development in writing: Policy implications of an evidence-based practice. *Policy Insights from the Behavioral and Brain Sciences, 3*(1), 77-84. doi:10.1177/2372732215624216

Harris, K., & Graham, S. (2018). Self-Regulated Strategy Development: Theoretical bases, critical instructional elements, and future research. In R. Fidalgo, K. Harris, & M. Braaksma (Eds.), *Design Principles for Teaching Effective Writing* (Vol. 34, pp. 119-151). Leiden; Boston: Brill

Harris, K., Graham, S., & Mason, L. (2006). Improving the writing, knowledge, and motivation of struggling young writers: Effects of self-regulated strategy development with and without peer support. *American Educational Research Journal, 43*(2), 295-340. doi:10.3102/00028312043002295

Hatch, T. (2000). What does it take to break the mold? Rhetoric and reality in New American Schools. *Teachers College Record, 102*(3), 561-589. doi:10.1111/0161-4681.00068

Hayes, J. (2012). Modeling and remodeling writing. *Written Communication, 29*(3), 369-388. doi:10.1177/0741088312451260

Hidi, S., & Boscolo, P. (2006). Motivation and writing. In C. A. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of writing research* (pp. 144-157). New York: The Guilford Press.

Hoogeveen, M., & van Gelderen, A. (2018). Writing with peer response using different types of genre knowledge: Effects on linguistic features and revisions of sixth-grade writers. *The Journal of Educational Research, 111*(1), 66-80. doi:10.1080/00220671.2016.1190913

Inspectie van het Onderwijs. (2010). *Het onderwijs in het schrijven van teksten. De kwaliteit van het schrijfonderwijs in het basisonderwijs.* Utrecht: Ministerie van Onderwijs, Cultuur en Wetenschap.

Jonsson, A., & Svingby, G. (2007). The use of scoring rubrics: Reliability, validity and educational consequences. *Educational Research Review, 2*(2), 130-144. doi:10.1016/j.edurev.2007.05.002

Karchmer-Klein, R. (2019). Writing with Digital Tools. In S. Graham, C. MacArthur, & M. Hebert (Eds.), *Best Practices in Writing Instruction* (pp. 185-208). New York: Guilford Press.

Kieft, M., Rijlaarsdam, G., & van den Bergh, H. (2006). Writing as a learning tool: Testing the role of students' writing strategies. *European Journal of Psychology of Education, 12*(1), 17-34. doi:10.1007/BF03173567

Kieft, M., Rijlaarsdam, G., & van den Bergh, H. (2008). An aptitude-treatment interaction approach to writing-to-learn. *Learning and Instruction, 18*(4), 379-390. doi:10.1016/j.learninstruc.2007.07.004

Koster, M., & Bouwer, R. (2018). Describing multifaceted writing interventions: From design principles for the focus and mode of instruction to student and teacher activities. *Journal of Writing Research, 10*(2). doi:10.17239/jowr-2018.10.02.03

Koster, M., Tribushinina, E., de Jong, P., & van den Bergh, H. (2015). Teaching children to write: A meta-analysis of writing intervention research. *Journal of Writing Research, 7*(2), 299-324. doi:10.17239/jowr-2015.07.02.2

Larkin, S. (2009). *Metacognition in young children*. London: Routledge.

Leijten, M., Van Horenbeeck, E., & Van Waes, L. (2019). Analyzing keystroke logging data from a linguistic perspective. In K. Sullivan & E. Lindgren (Eds.), *Observing writing: Insights from keystroke logging and handwriting* (pp. 71-95). Amsterdam: Brill.

Leijten, M., & Van Waes, L. (2013). Keystroke logging in writing research: Using Inputlog to analyze and visualize writing processes. *Written Communication, 30*(3), 358-392. doi:0.1177/0741088313491692

Lesterhuis, M., Verhavert, S., Coertjens, L., Donche, V., & De Maeyer, S. (2017). Comparative judgement as a promising alternative to score competences In E. Cano & G.Ion (Eds.), *Innovative Practices for Higher Education Assessment and Measurement*. Hershey: PA: IGI Global.

Limpo, T., & Alves, R. (2013). Modeling writing development: Contribution of transcription and self-regulation to portuguese students' text generation quality. *Journal of Educational Psychology, 105*(2), 401-413. doi:10.1037/a0031391

Limpo, T., Alves, R., & Joshi, M. (2018). *Integrative approaches to literacy instuction and remediation*. Paper presented at the Twenty-Fourth Annual Society for the Scientific Study of Reading Meeting.

Limpo, T., Nunes, A., & Coelho, A. (2020). Technology-based writing instruction: A collection of effective tools. *Forthcoming special issue in Journal of Writing Research*.

Lindgren, E., Leijten, M., & Van Waes, L. (2011). Adapting to the reader during writing. *Written Language and Literacy, 14*(2), 188-223. doi:10.1075/wll.14.2.02lin

Liu, C., Liu, K., Chen, W., Lin, C., & Chen, G. (2011). Collaborative storytelling experiences in social media: Influence of peer-assistance mechanisms. *Computers & Education, 57*, 1544-1556. doi:10.1016/j.compedu.2011.02.002

López, P., Rijlaarsdam, G., Torrance, M., & Fidalgo, R. (2018). How to report writing interventions? A case study on the analytic description of two effective revision interventions *Journal of Writing Research, 10*(2).

López, P., Torrance, M., Rijlaarsdam, G., & Fidalgo, R. (2017). Effects of direct instruction and strategy modeling on upper-primary students' writing development. *Frontiers in Pyschology, 8*(1054). doi:10.3389/fpsyg.2017.01054

MacArthur, C. (2006). The effects of new technologies on writing and writing processes. In C. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of writing research* (pp. 248-262). New York: Guilford Press.

MacArthur, C., & Graham, S. (2016). Writing research from a cognitive perspective. In C. A. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of writing research*. New York: The Guilford Press.

Mateos, M., & Solé, I. (2009). Synthesising information from various texts: A study of procedures and products at different educational levels. *European Journal of Psychology of Education, 24*(4), 435-451. doi:10.1007/BF03178760

McCardle, L., & Hadwin, A. (2015). Using multiple, contextualized data sources to measure learners' perceptions of their self-regulated learning. *Metacognition Learning, 10*(1), 43-75. doi:10.1007/s11409-014-9132-0

McCutchen, D., Covill, A., Hoyne, S., & Mildes, K. (1994). Individual differences in writing: Implications of translating fluency. *Journal of Educational Psychology, 86*(2), 256-266. doi:10.1037/0022-0663.86.2.256

McCutchen, D., Francis, M., & Kerr, S. (1997). Revising for meaning, effects of knowledge and strategy. *Journal of Educational Psychology, 89*(4), 667-676. doi:0.1037/0022-0663.89.4.667

Merchie, E., & Van Keer, H. (2014). Using on-line and off-line measures to explore fifth and sixth graders' text-learning strategies and schematizing skills. *Learning and Individual Differences, 32*, 193-203. doi:10.1016/j.lindif.2014.03.012

Merchie, E., & Van Keer, H. (2016). Mind mapping as a meta-learning strategy: stimulating pre-adolescents' text-learning strategies and performance. *Contemporary Educational Psychology, 46*, 128-147. doi:10.1016/j.cedpsych.2016.05.005

Morphy, P., & Graham, S. (2012). Word processing programs and weaker writers/readers: A meta-analysis of research findings. *Reading and Writing, 25*(3), 641-678. doi:10.1007/s11145-010-9292-5

Mowbray, C., Holter, M., Teague, G., & Bybee, D. (2003). Fidelity criteria: Development, measurement, and validation. *American Journal of Evaluation, 24*(3), 315-340.

National Center for Education Statistics. (2012). *The nation's report card: Writing 2011*. Washington, D.C.: Institute of Education Sciences, U.S. Department of Education.

Nixon, J., & Topping, K. (2001). Emergent writing: the impact of structured peer interaction. *Educational Psychology, 21*(1), 41-58. doi:10.1080/01443410020019821

Nolen, S. (2007). The role of literate communities in the development of children's interest in writing. In S. Hidi & P. Boscolo (Eds.), *Writing and Motivation* (1 ed., Vol. 19, pp. 241-256). Oxford: Elsevier.

O'Donnell. (2008). Defining, conceptualizing, and measuring fidelity of implementation and its relationship to outcomes in K-12 curriculum intervention research. *Review of Educational Research, 78*(1), 33-48. doi:10.3102/0034654307313793

Ofsted. (2000). *Teaching of writing in primary schools: could do better*. Manchester: Ofsted.

Olive, T., Kellogg, R., & Piolat, A. (2002). The triple task technique for studying the process of writing. In T. Olive & C. Levy (Eds.), *Contemporary tools and techniques for studying writing* (pp. 31-59). Dordrecht, the Netherlands: Kluwer Academic.

Onderwijsinspectie. (2015). *Onderwijsspiegel 2015: Jaarlijks rapport van de onderwijsinspectie*: Vlaams Ministerie van Onderwijs en Vorming.

Pajares, F. (2003). Self-efficacy beliefs, motivation, and achievement in writing: A review of the literature. *Reading & Writing Quarterly: Overcoming Learning Difficulties, 19*(2), 139-158. doi:10.1080/10573560390143085

Pajares, F., Johnson, M., & Usher, E. (2007). Sources of writing self-efficacy beliefs of elementary, middle, and high school students. *Research in the Teaching of English, 42*(1), 104-120.

Pajares, F., & Valiante, G. (1997). Influence of self-efficacy on elementary students' writing. *The Journal of Educational Research, 90*(6), 353-360. doi:10.1080/00220671.1997.10544593

Pajares, F., & Valiante, G. (2006). Self-efficacy beliefs and motivation in writing development. In C. A. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of writing research* (pp. 158-170). New York: The Guilford Press.

Paquette, K. (2009). Integrating the 6+1 writing traits model with cross-age tutoring: An investigation of elementary students' writing development. *Literacy Research and Instruction, 48*(1), 28-38. doi:10.1080/19388070802226261

Peterson-Karlan, G. (2011). Technology to support writing by students with learning and academic disabilities: Recent research trends and findings. *Assistive Technology Outcomes and Benefits, 7*(1), 39-62.

Pollitt, A. (2012). The method of adaptive comparative judgement. *Assessment in Education: Principles, Policy & Practice, 19*(3), 281-300. doi:10.1080/0969594X.2012.665354

Puntambekar, S., & Hübscher, R. (2005). Tools for scaffolding students in a complex learning environment: What have we gained and what have we missed? *Educational Pyschologist, 40*(1), 1-12. doi:10.1207/s15326985ep4001_1

Reeve, J. (2009). Why teachers adopt a controlling motivating style toward students and how they can become more autonomy supportive. *Educational Psychologist, 44*(3), 159-175. doi:10.1080/00461520903028990

Rietdijk, S., Janssen, T., van Weijen, D., van den Bergh, H., & Rijlaarsdam, G. (2017). Improving writing in primary schools through a comprehensive writing program. *Journal of Writing Research, 9*(5), 173-225. doi:10.17239/jowr-2017.09.02.04

Rietdijk, S., Van Weijen, D., Janssen, T., van den Bergh, H., & Rijlaarsdam, G. (2018). Teaching writing in primary education: Classroom practice, time, teachers' beliefs and skills. *Journal of Educational Psychology, 110*(2), 640-663. doi:10.1037/edu0000237

Rijlaarsdam, G., Janssen, T., Rietdijk, S., & van Weijen, D. (2018). Reporting design principles for effective instruction of writing: Interventions as constructs. In R. Fidalgo, K. Harris, &

M. Braaksma (Eds.), *Design Principles for Teaching Effective Writing* (Vol. 34, pp. 280-313). Leiden; Boston: Brill.

Rijlaarsdam, G., van den Bergh, H., Couzijn, M., Janssen, T., Braaksma, M., Tillema, M., . . . Raedt, M. (2012). Writing. In K. Harris, S. Graham, T. Urdan, A. Bus, S. Major, & H. Swanson (Eds.), *APA Educational Psychology Handbook: Vol. 3. Application to Learning and Teaching* (pp. 189-227). Washington DC: American Psychological Association.

Ryan, R., & Deci, E. (2000a). The darker and brighter sides of human existence: Basic psychological needs as a unifying concept. *Psychological Inquiry, 11*(4), 319-338. doi:10.1207/S15327965PLI1104_03

Ryan, R., & Deci, E. (2000b). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology, 25*(1), 54-67. doi:10.1006/ceps.1999.1020

Sadler, D. (2009). Indeterminacy in the use of preset criteria for assessment and grading. *Assessment & Evaluation in Higher Education, 34*(2), 159-179. doi:10.1080/02602930801956059

Schellings, G., & Van Hout-Wolters, B. (2011). Measuring strategy use with self-report instruments: theoretical and empirical considerations. *Metacognition Learning, 6*(2), 83-90. doi:10.1007/s11409-011-9081-9

Schoonen, R. (2005). Generalizability of writing scores: An application of structural equation modeling. *Language Testing, 22*(1), 1-30. doi:10.1191/0265532205lt295oa

Shanahan. (2016). Relationships between reading and writing development. In C. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of Writing Research* (pp. 194-207). New York: The Guilford Press.

Shanahan. (2019). Reading-writing connections. In S. Graham, C. MacArthur, & M. Hebert (Eds.), *Best Practices in Writing Instruction* (pp. 309-332). New York: The Guilford Press.

Shanahan, & Lomax, R. (1986). An analysis and comparison of theoretical models of the reading-writing relationship. *Journal of Educational Psychology, 78*(2), 116-123. doi:10.1037/0022-0663.78.2.116

Shanahan, & Lomax, R. (1988). A developmental comparison of three theoretical models of reading-writing relationships. *Research in the Teaching of English, 22*(2), 196-212.

Shanahan, Shanahan, & Misischia, C. (2011). Analysis of expert readers in three disciplines: History, mathematics, and chemistry. *Journal of Literacy Research, 43*(4), 393-429. doi:10.1177/1086296X11424071

Shell, D., Colvin, C., & Bruning, R. (1995). Self-efficacy, attribution, and outcome expectancy mechanisms in reading and writing achievement: Grade-level and achievement-level differences. *Journal of Educational Psychology, 87*(3), 386-398. doi:10.1037/0022-0663.87.3.386

Soenens, B., & Vansteenkiste, M. (2005). Antecedents and outcomes of self-determination in 3 life domains: The role of parents' and teachers' autonomy support. *Journal of Youth and Adolescence, 34*(6), 589-604. doi:10.1007/s10964-005-8948-y

Sutherland, J., & Topping, K. (1999). Collaborative creative writing in eight-year-olds: comparing cross-ability fixed role and same-ability reciprocal role pairing. *Journal of Research in Reading, 22*(2), 154-179. doi:10.1111/1467-9817.00080

Swanson, E., Wanzek, J., Haring, C., Ciullo, S., & McCully, L. (2011). Intervention fidelity in special and general education research journals. *The Journal of Special Education, 47*(1), 3-13. doi:10.1177/0022466911419516

Teng, L., & Zhang, L. (2018). Effects of motivational regulation strategies on writing performance: A mediation model of self-regulated learning of writing in English as a second/foreign language. *Metacognition Learning, 13*(2), 213-240. doi:10.1007/s11409-017-9171-4

Tillema, M., van den Bergh, H., Rijlaarsdam, G., & Sanders, T. (2012). Quantifying the quality difference between L1 and L2 essays: A rating procedure with bilingual raters and L1 and L2 benchmark essays. *Language Testing, 30*(1), 71-97. doi:10.1177/0265532212442647

Troia, G., Harbaugh, A., Shankland, R., Wolbers, K., & Lawrence, A. (2013). Relationships between writing motivation, writing activity, and writing performance: Effects of grade, sex, and ability. *Reading and Writing, 26*(1), 17-44. doi:10.1007/s11145-012-9379-2

Van Daal, T., Lesterhuis, M., Coertjens, L., Donche, V., & De Maeyer, S. (2016). Validity of comparative judgement to assess academic writing: examining implications of its holistic character and building on a shared consensus. *Assessment in Education: Principles, Policy & Practice*, 1-16. doi:10.1080/0969594X.2016.1253542

van den Bergh, H., De Maeyer, S., van Weijen, D., & Tillema, m. (2012). Generalizability of text quality scores. In E. Van Steendam, M. Tillema, G. Rijlaarsdam, & H. van den Bergh

(Eds.), *Measuring writing: Recent insights into theory, methodology and practice* (pp. 23-32). Leiden: Brill.

Van Steendam, E., Tillema, M., Rijlaarsdam, G., & van den Bergh, H. (2012). Introduction. In E. Van Steendam, M. Tillema, G. Rijlaarsdam, & H. van den Bergh (Eds.), *Measuring writing: Recent insights into theory, methodology and practices*. Leiden: Brill.

Van Waes, L., Leijten, M., Wengelin, A., & Lindgren, E. (2011). Logging tools to study digital writing processes. In V. Berninger (Ed.), *Past, present, and future contributions of cognitive writing research to cognitive psychology* (pp. 507-534). New York: Psychology Press.

Van Weijen, D., & Koster, M. (in progress). The role of implementation fidelity in writing research.

Vandermeulen, N., Van Steendam, E., Rijlaarsdam, G., & van den Broek, B. (2019). In search of an effective source use pattern for writing argumentative and informative synthesis texts. *Manuscript submitted for publication*.

Vandevelde, S., Van Keer, H., & Rosseel, Y. (2013). Measuring the complexity of upper primary school children's self-regulated learning: A multi-component approach. *Contemporary Educational Psychology, 38*(4), 407-425. doi:10.1016/j.cedpsych.2013.09.002

Vansteenkiste, M., Aelterman, N., Haerens, L., & Soenens, B. (2019). Seeking stability in stormy educational times: A need-based perspective on (de)motivating teaching grounded in Self-Determination Theory. *Submitted for publication*.

Vansteenkiste, M., & Ryan, R. (2013). On psychological growth and vulnerability: Basic psychological need satisfaction and need frustration as a unifying principle. *Journal of Psychotherapy Integration, 23*(3), 263-280. doi:10.1037/a0032359

Vansteenkiste, M., Simons, J., Lens, W., Soenens, B., & Matos, L. (2005). Examining the motivational impact of intrinsic versus extrinsic goal framing and autonomy-supportive versus internally controlling communication style on early adolescents' academic achievement. *Child Development, 76*(2), 483-501. doi:10.1111/j.1467-8624.2005.00858.x

von Koss Torkildsen, J., Morken, F., Helland, W. A., & Helland, T. (2015). The dynamics of narrative writing in primary grade children: writing process factors predict story quality. *Reading and Writing, 29*(3), 529-554. doi:10.1007/s11145-015-9618-4

Wagner, R. (2018). *Understanding the development of literacy in context*. Paper presented at the First Literacy Summit.

Wollak, B., & Koppenhaver, D. (2011). Developing technology-supported, evidence-based writing instruction for adolescents with significant writing disabilities. *Assistive Technology Outcomes and Benefits, 7*(1), 1-23.

Yarrow, F., & Topping, K. (2001). Collaborative writing: The effects of metacognitive prompting and structured peer interaction. *British Journal of Educational Psychology, 71*, 261-282. doi:10.1348/000709901158514

Zimmerman, B. (2008). Investigating self-regulation and motivation: Historical background, methodological developments, and future prospects. *American Educational Research Journal, 45*(1), 166-183. doi:10.3102/0002831207312909

Zimmerman, B., & Kitsantas, A. (1999). Acquiring writing revision skill: Shifting from process to outcome self-regulatory goals. *Journal of Educational Psychology, 91*(2), 241-250. doi:10.1037//0022-0663.91.2.241

Zimmerman, B., & Kitsantas, A. (2007). A writer's discipline: The development of self-regulatory skills. In S. Hidi & P. Boscolo (Eds.), *Writing and Motivation* (1st ed., Vol. 19, pp. 51-69). Oxford: Elsevier.

Zimmerman, B., & Risemberg, R. (1997). Becoming a self-regulated writers: A social cognitive perspective. *Contemporary Educational Psychology, 22*, 73-101. doi:10.1006/ceps.1997.0919

Zumbrunn, S., & Bruning, R. (2013). Improving the writing and knowledge of emergent writers: The effects of self-regulated strategy development. *Reading and Writing, 26*(1), 91-110. doi:10.1007/s11145-012-9384-5

Appendix A. *Main results, limitations and suggestions for future research, and implications of the studies linked to the research lines and dissertation chapters.*

Research line	Chapter	Main results	Limitations and suggestions for future research	Implications
1	2	- Teachers indicated that students wrote about 65 minutes each week. - There was considerable variability in the amount of time spent on writing and teaching basic writing skills and strategies. - Teachers predominantly teach writing skills and, to a lesser extent, writing strategies. - Peer-assisted writing practices were occasionally implemented in daily educational practice and teachers failed to integrate ICT regularly into their writing lessons. - Teachers reported a rather positive attitude towards writing and writing instruction and a relatively high teacher-efficacy for writing.	- The self-reported nature of the classroom writing practices should be acknowledged. Future studies should conduct classroom observations to examine the extent to which teachers actually apply evidence-based writing practices and to investigate the quality of these writing practices. - More experimental research investigating whether evidence-based writing practices in elementary grades are also effective in stimulating Flemish elementary students' writing achievement.	- Flemish students do not spend a lot of time writing - Reported instructional writing practices are not always in line with evidence-based writing practices. - This study adds to the literature as it is the first study that provides insight to how writing is taught in Flanders.
2	2	- Students with a higher self-efficacy for ideation wrote qualitatively better texts. - Autonomously motivated students wrote qualitatively better texts, while controlled motivated students performed significantly lower. - None of the student-reported writing strategies were significantly associated with students' writing performance. - There was a positive relationship between teacher self-efficacy in which teachers attributed students' successful writing performance to their own instruction and students' writing achievement. - Teachers' reported attitudes and instructional writing practices were not	- The issue of self-report measures to assess students' writing strategy use requires specific attention (cf., overestimation). Future studies should focus on data triangulation, combining on-line and off-line research methods to assess students' writing strategy use. - More experimental research on effective writing interventions to enhance students' autonomous writing motivation. - Other variables might play a more important part in predicting students' writing outcomes. Future research studies should further unravel this black box by investigating possible correlates on the student and teacher level.	- Motivational factors, such as students' writing motivation and self-efficacy for writing, are important predictors of upper-elementary students' writing performance. - Teacher self-efficacy for writing is an important predictor of upper-elementary students' writing performance.

		associated with students' writing performance. - Concerning the relative impact of the significant student and teacher-level correlates, the reported effect sizes were generally rather small.		
	3	- Self-efficacy for conventions was negatively related to students' writing strategies. - Students who were more self-efficacious concerning the regulation of their own writing process, applied more thinking, planning, revision, and control strategies. - Girls and boys who were more self-efficacious to come up with ideas to write, applied significantly less planning and control strategies. - Autonomous writing motivation made a positive contribution to students' writing performance in the model for low, average, and high achievers. - Planning strategies were negatively related to the text quality in the model for boys and girls. - Relationships between cognitive challenges, motivational challenges and students' writing performance did not differ for boys and girls. - The higher the confidence average and low achievers had in regulating their writing behavior, the more they reported applying revision strategies. Similarly, the higher the confidence average and low achievers had in applying writing conventions, the less they reported using revision strategies. Both relationships were not significant for high achievers.	- It is possible that common method variance or shared method variance may have inflated strong associations between the motivational challenges and the cognitive challenges because we measured both constructs by means of self-report questionnaires. Similarly, the weak associations between the motivational and cognitive challenges (i.e., assessed by means of subjective measures based on self-report) and students' writing performance (i.e., assessed by means of objective measures based on writing tests) also might be explained by the operationalization. Data-triangulation (i.e., off-line and on-line measures) should, therefore, be considered in further research - Future research studies should confirm and cross-validate both MG-SEM models.	- Tackling motivational writing challenges is of equal importance as teaching students cognitive writing strategies. - We urge for more differentiated writing instruction because of achievement-level differences in the relationship between motivational and cognitive writing challenges. - Studying complex models for different groups of students is necessary to receive more refined insight on how motivational and cognitive challenges mediate and relate to students' writing performance. - We underline the paradox within research focused on modeling elementary students' writing, namely: (a) conducting solid research in which on-line writing measures are essential to accurately assess students' applied writing strategies and (b) taking the feasibility of this

				type of research into account.
3	4	- EI+IND, EI+PA, and PA students outperformed the BAU students. - EI+IND students outperformed IND students. - No significant differences were found comparing the individual writing conditions with the peer-assisted writing conditions. - Results revealed no significant differential effects of the conditions for boys and girls or for low, average, and high achievers.	- Rather small sample size with only two classes per condition. - Long-term maintenance effects were not investigated. - The instructional writing programs focused on only one text genre (i.e., descriptive genre). Future studies should investigate transfer effects to other genres. - Students' writing performance was measured by only one task in one genre. - Future studies should implement, test, and evaluate the added value of a more structured application of peer-assisted writing integrated in an explicit instruction writing program.	- Teachers should be aware of the fact that students do not learn to write automatically; they need explicit instruction and guidance. - It appears essential to create supportive writing environments in which students can apply what they have learned by practicing either individually or collaboratively.
	5	- PA students were more autonomously motivated at posttest compared to BAU students. - IND students were less controlled motivated than EI+IND and BAU students at posttest. - No significant differences were found comparing the individual writing conditions with the peer-assisted conditions. - No significant effects of explicit instruction nor peer-assisted writing were found for students' self-efficacy for writing. - PA girls were less controlled motivated at posttest compared to IND girls and BAU girls.	- Relatively short intervention period (i.e., 5 weeks). Future studies should study similar interventions spread over a longer time period. - We did not use genre-specific measures to assess students' motivation and self-efficacy. - More longitudinal research is needed to get more in-depth insights into the effect of explicit writing instruction and peer-assisted writing on students' motivation from the angle of the SDT-framework. - Future studies should try to identify favorable conditions for implementing peer-assistance to foster students' innate psychological needs for autonomy, competence, and relatedness in view of creating a 'bright' pathway towards autonomous writing motivation.	- This study takes an innovative angle on studying motivational components of writing by going beyond a sole focus on the quantity of motivation through differentiating between qualitatively different types of motivation and by acknowledging self-efficacy for writing as a multidimensional construct. - It appears important for teachers to implement peer-assisted writing practices to foster students' autonomous writing motivation.

	6	The following *overlapping* design principles were described and translated into concrete instructional teaching and learning activities: - If you aim to increase writing knowledge, then offer students a variation of model texts so they can compare and contrast these texts. - If you aim to increase students' use of writing strategies (e.g., planning, writing, and revising), then explicitly teach and model how, when, and why they should use these strategies. - If you aim to increase the internalization of writing knowledge and the use of writing strategies, then provide optimal writing opportunities so students can practice while gradually diminishing guidance The following *diverging* design principles were described and translated into concrete instructional teaching and learning activities: - If you aim to increase students' writing, then provide peer-assisted writing opportunities to practice collaboratively with a peer. - If you aim to increase students' writing, then provide individual writing opportunities to practice individually		- The present study provides clear guidelines on how to report similarities and differences between different instructional writing programs by means of overlapping and diverging design principles. - The adoption of overlapping and diverging design principles when describing intervention programs becomes increasingly important in the light of the growing need for response to intervention studies (RTI). - By reporting design principles, instructional teaching activities and learning activities, we contributed to theory building, replication, dissemination, and implementation of evidence-based writing practices.
	7	- EI+PA students outperformed EI+IND and BAU students. - EI+IND students did not outperform BAU students. - There were no transfer effects to the uninstructed genre. - There were no significant differences between EI+PA, EI+IND, and BAU students' autonomous writing motivation.	- Students' writing performance in both writing genres was measured using only one test per genre. - Limitations of using self-report questionnaires to measure students' writing motivation and self-efficacy for writing (cf., overestimation and elicitation of socially desirable answers). Future research should complement self-report	- Peer assistance augments learning in an explicit writing programs in terms of (a) optimizing students' writing performance, (b) reducing the less favorable type of writing motivation, and (c) fostering students'

		- EI+PA students evidenced significantly less controlled motivation at posttest compared to EI+IND students. - EI+PA students felt more self-efficacious to invent ideas compared to their EI+IND counterparts. - There were no significant differences between EI+PA, EI+IND, and BAU students on their self-efficacy for conventions and regulation.	data with other data, such as observational data or data retrieved from conversational interviews. - Future studies should conduct component analyses to determine the differential effectiveness of the intervention to uncover the most powerful ingredients of peer-assisted writing. - Future research should study more in-depth to what extent the inclusion and explicit modeling of roles in peer-assisted writing can possibly affect students' interactions within writing groups.	perceived competence to come up with ideas. - The present study provides more in-depth insight into possible essential prerequisites for 'a structured system of peer assistance' to be powerful and effective. - The present study underlines the need to explicitly teach genre-specific writing strategies to improve students' overall writing performance across genres.

Neergepend. Maar nog niet uitgeschreven.

Appendices

I English summary

English summary
Cognitive and motivational challenges in writing: The impact of explicit instruction and peer-assisted writing in upper-elementary grades

Given the worrying trends concerning students' writing abilities and the observed decline in writing motivation during students' school years (Boscolo & Hidi, 2007; Cleary, 1991; De Smedt et al., 2019; Inspectie van het Onderwijs, 2010; National Center for Education Statistics, 2012; Ofsted, 2000), there is an ongoing call to support novice writers (i.e., upper-elementary school students, age 10-11) in becoming effective and motivated writers. Assisting these students is of vital importance given the cognitive (Bereiter & Scardamalia, 1987; Berninger, Fuller, & Whitaker 1996; Cameron & Moshenko, 1996; Flower & Hayes, 1981; McCutchen, 2008; McCutchen, Covill, Hoyne, & Mildes, 1994; McCutchen, Francis, & Kerr, 1997) and motivational challenges (Boscolo & Hidi, 2007; Bruning & Horn, 2000; Hidi & Boscolo, 2006) they face during writing. In Flanders, however, very little is known about the current practice and outcomes of upper-elementary writing instruction (Bonset & Hoogeveen, 2007). To tackle the abovementioned challenges, the present dissertation aims to *gain in-depth insight in the current state of writing instruction and outcomes in Flanders and to provide evidence-based guidelines to improve the quality of writing instruction and, in turn, promote upper-elementary students' writing.* In this respect, three important research lines are central in this dissertation:

(1) In view of unraveling the black box of how writing is taught in upper-elementary grades in Flanders, the first research line aims to provide *a state of the art of writing education in Flanders*. More particularly, we aim to offer insights in teachers' beliefs concerning writing and writing instruction on the one hand and on how writing is taught in daily instructional practice on the other hand.
(2) In view of understanding students' writing performance, a second research line focusses on studying *student and teacher-level correlates of students' writing performance*. Within this research line, we also specifically concentrate on studying the relationships between students' motivational and cognitive processes and their writing performance.
(3) Based on the in-depth insights required in the research lines above and based on previous theoretical and empirical literature on the effectiveness of explicit writing

instruction and peer-assisted writing, the third research line focusses on *optimizing upper-elementary students' writing*. This research line is subdivided in two sub goals:

(a) studying the impact of explicit writing instruction and peer-assisted writing on students' writing performance,

(b) studying the impact of explicit writing instruction and peer-assisted writing on students' writing motivation and self-efficacy for writing.

The first research line *'providing a state of the art of writing instruction in Flanders'* is addressed in chapter 2. The second research line *'clarifying correlates of students' writing performance'* is addressed in chapter 2 and 3. More particularly, chapter 2 focusses on student, teacher, and class-level correlates of writing performance, whereas chapter 3 provides more in-depth information on the relations between student-level correlates. Finally, the insights required in research line 1 and 2 led to the third and final research line *'optimizing students' writing'* which is addressed in chapters 4 to 7. More particularly, chapters 4 and 5 report on a first iteration intervention study exploring the distinct and combined impact of explicit writing instruction and unprescribed peer-assisted writing, while chapters 6 and 7 present a second iteration intervention study investigating the augmented effect of structured peer assistance in an explicit writing instruction program. Content-wise, the research lines in general and the different chapters in particular are strongly interrelated as findings obtained in one study, provide the input for another study (see Figure 1). From a methodological point of view, the studies are also related because of the recurrent use of instruments and text quality assessment procedures throughout the dissertation.

Figure 1. *Overview of the studies and their relation to the general research lines and dissertation chapters.*

In **chapter 2**, we present a-state-of-the-art study of the practice of writing instruction in Flemish upper-elementary education. In total, 128 teachers and 800 fifth and sixth-grade students completed teacher and student questionnaires. Students also completed two writing tests (i.e., writing a descriptive and a narrative text). The descriptive results on the teacher questionnaire showed that upper-elementary school teachers spent only about 13 minutes each day on writing in class. During these lessons, teachers primarily focused on explicit instruction of writing skills and to a lesser extent on teaching writing strategies. They also limitedly integrated peer-assisted and computer-assisted writing. In addition, teachers were generally positive towards writing and writing instruction and they felt self-efficacious in teaching writing. As to the relationships with students' writing performance, multilevel analyses indicated that students with a high self-efficacy for ideation and autonomous motivation wrote qualitatively better texts, while students with controlled motivation were significantly less successful in writing. Also, teacher self-efficacy for writing was positively correlated with text

quality. In conclusion, this study represents an important starting point in unraveling the black box of writing instruction in Flanders.

Chapter 3 specifically zooms in on student-level variables by studying the relationship between cognitive writing processes, motivational factors, and students' writing performance. In total, 1577 fifth and sixth-grade students completed questionnaires regarding their self-efficacy for writing, writing motivation, and cognitive writing processes. In addition, half of the students completed two writing tests, respectively focusing on the descriptive (*n* = 782) and narrative text genre (*n* = 790). Based on multiple group structural equation modeling (MG-SEM) we put forward two models: (a) a MG-SEM model for boys and girls and (b) a MG-SEM model for low, average, and high achievers. The results underline the importance of studying writing models for different groups of students to gain a more refined insight on the complex interplay between motivational and cognitive challenges related to students' writing performance.

Chapter 4 investigates the distinct and combined effectiveness of explicit writing instruction and an unprescribed application of peer-assisted writing. Eleven teachers and their 206 fifth and sixth-grade students participated in the study and were randomly assigned to either one of the four experimental conditions (i.e., EI+IND: explicit instruction + individual writing, EI+PA: explicit instruction + unprescribed peer-assisted writing, IND: matched individual practice comparison condition, and PA: matched peer-assisted practice comparison condition) or the business as usual condition. Multilevel analyses showed that EI+IND, EI+PA, and PA students outperformed the business as usual students. As to the distinct impact of explicit writing instruction, EI+IND students outperformed IND students at posttest, revealing the effectiveness of explicit writing instruction. As to the effect of unprescribed peer-assisted writing, there were no significant differences between the individual writing conditions (EI+IND and IND) and the peer-assisted conditions (EI+PA and PA respectively). The obtained results highlight the need for explicit instruction and guidance as students do not learn to write automatically without such support.

In **chapter 5**, we investigated the impact of explicit writing instruction and unprescribed peer-assisted writing on students' writing motivation and self-efficacy for writing. A 2x2 experimental design, as outlined in chapter 4, was applied. Multilevel analyses showed that students writing with a peer, were more autonomously motivated at posttest than business as usual students. Additionally, business as usual students and students receiving explicit instruction were more controlled motivated than students who were offered ample writing opportunities while practicing individually. To conclude, the results underline the need to enhance students' autonomous writing motivation. In realizing this, it appears important for

teachers to implement peer-assisted writing practices in which students are offered ample writing opportunities to write together.

Chapter 6 provides in-depth insight into two instructional writing programs via an analytic and systematic description of both programs. More particularly, EI+PA students received explicit writing instruction and practiced their writing collaboratively, while EI+IND students received the same explicit writing instruction; however, they practiced by writing individually. Both interventions were analytically described by means of a newly-developed reporting system (Rijlaarsdam, Janssen, Rietdijk, & van Weijen, 2018). Following this procedure, the writing lesson programs were more particularly described by defining overlapping and diverging design principles, instructional teaching activities, and student learning activities.

In **chapter 7** we investigate the incremental effect of structured peer-assisted writing in an explicit writing instruction program on students' writing performance, writing motivation, and self-efficacy for writing. A pretest-posttest design with two experimental conditions (i.e., EI+IND and EI+PA, systematically described in chapter 6) and one business as usual condition (BAU) was applied. Participating classes (n = 431 students, n = 20 teachers) were randomly assigned to the three conditions. EI+PA students outperformed both EI+IND and BAU students on the writing measure. Additionally, EI+PA students were less motivated to write than EI+IND students because of internal or external pressure, but they were more confident as to their capability to invent ideas when compared to their EI+IND counterparts. Based on these results, we can conclude that students can benefit from the combination of explicit writing instruction and structured peer assistance in terms of cognitive and motivational writing outcomes.

In sum, the present dissertation provides valuable insights advancing our understanding of cognitive and motivational challenges upper-elementary students face when writing and how to support them in effectively overcoming these challenges. More particularly, this dissertation is the first to unravel the black box of how writing is taught in upper-elementary grades in Flanders and to provide insights in how we can foster Flemish students' writing outcomes. Based on the obtained results, we can conclude that there is room for improvement concerning current educational writing practices in Flanders. In this respect, we want to emphasize the need to invest in cognitive challenging writing instruction as well as in creating appealing and motivating writing experiences to support students in becoming capable and motivated writers. Based on the results, we suggest that the combination of structured peer-assisted writing and explicit writing instruction is a promising approach to support upper-elementary students in overcoming cognitive as well as motivational writing challenges.

References

Bereiter, C., & Scardamalia, M. (1987). *The psychology of written composition*. Hillsdale, N.J.: L. Erlbaum Associates.

Berninger, V., Fuller, F., & Whitaker , D. (1996). A process model of writing development across the life span. *Educational Psychology Review, 8*(3), 193-218. doi:10.1007/BF01464073

Bonset, H., & Hoogeveen, M. (2007). *Schrijven in het basisonderwijs. Een inventarisatie van empirisch onderzoek in het perspectief van leerplanontwikkeling.* Enschede: Stichting leerplanontwikkeling.

Boscolo, P., & Hidi, S. (2007). The multiple meanings of motivation to write. In G. Rijlaarsdam (Ed.), *Studies in Writing* (pp. 1-16). Oxford: Elsevier.

Bruning, R., & Horn, C. (2000). Developing motivation to write. *Educational Psychologist, 35*(1), 25-37. doi:10.1207/S15326985ep3501_4

Cameron, C., & Moshenko, B. (1996). Elicitation of knowledge transformational reports while children write narratives. *Canadian Journal of Behavioural Science, 28*(4), 271-280. doi:10.1037/0008-400X.28.4.271

Cleary, M. (1991). Affect and cognition in the writing processes of eleventh graders: A study of concentration and motivation. *Written Communication, 8*(4), 473-508. doi:10.1177/0741088391008004003

De Smedt, F., Rogiers, A., Heirweg, S., Vandamme, S., & Van Keer, H. (2019). Reading and writing motivation across grades in primary and secondary education: A self-determination theory perspective. *Submitted for publication*.

Flower, L., & Hayes, J. (1981). A cognitive process theory of writing. *College Composition and Communication, 32*(4), 365-387. doi:10.2307/356600

Hidi, S., & Boscolo, P. (2006). Motivation and writing. In C. A. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of writing research* (pp. 144-157). New York: The Guilford Press.

Inspectie van het Onderwijs. (2010). *Het onderwijs in het schrijven van teksten. De kwaliteit van het schrijfonderwijs in het basisonderwijs.* Utrecht: Ministerie van Onderwijs, Cultuur en Wetenschap.

McCutchen, D. (2008). Cognitive factors in the development of children's writing. In C. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of writing research* (pp. 115-130). New York: The Guilford Press.

McCutchen, D., Covill, A., Hoyne, S., & Mildes, K. (1994). Individual differences in writing: Implications of translating fluency. *Journal of Educational Psychology, 86*(2), 256-266. doi:10.1037/0022-0663.86.2.256

McCutchen, D., Francis, M., & Kerr, S. (1997). Revising for meaning, effects of knowledge and strategy. *Journal of Educational Psychology, 89*(4), 667-676. doi:0.1037/0022-0663.89.4.667

National Center for Education Statistics. (2012). *The nation's report card: Writing 2011*. Washington, D.C.: Institute of Education Sciences, U.S. Department of Education.

Ofsted. (2000). *Teaching of writing in primary schools: could do better*. Manchester: Ofsted.

Rijlaarsdam, G., Janssen, T., Rietdijk, S., & van Weijen, D. (2018). Reporting design principles for effective instruction of writing: Interventions as constructs. In R. Fidalgo, K. Harris, & M. Braaksma (Eds.), *Design Principles for Teaching Effective Writing* (Vol. 34, pp. 280-313). Leiden; Boston: Brill.

II Dutch summary

Dutch summary
Nederlandstalige samenvatting

Cognitieve en motivationele uitdagingen in schrijven: De impact van expliciete instructie en peer-assisted schrijven in de bovenbouw van het lager onderwijs

Inleiding

In november 2018 heeft de European Literacy Network (ELN) een charter getekend waarin ze hun engagement verklaren om alle Europeanen, ongeacht hun individuele achtergrond, te ondersteunen in de ontwikkeling van effectieve lees- en schrijfvaardigheden. Dit is meer dan ooit belangrijk om ten volle te kunnen participeren in onze 21^{e}-eeuwse samenleving. Dit proefschrift focust zich meer bepaald op de schrijfvaardigheden van leerlingen aan het einde van het lager onderwijs. In dit verband wijzen internationale onderzoeksrapporten echter op een alarmerend en ondermaats schrijfvaardigheidsniveau van leerlingen (Inspectie van het Onderwijs, 2010; National Center for Education Statistics, 2012; Ofsted, 2000). Deze zorgwekkende resultaten kunnen gerelateerd worden aan de cognitieve complexiteit, inherent verbonden aan het schrijfproces (Bereiter & Scardamalia, 1987; Flower & Hayes, 1981). Uit onderzoek blijkt namelijk dat beginnende schrijvers, en meer bepaald leerlingen in het lager onderwijs (10- en 11-jarigen), moeilijkheden ervaren om zich te concentreren op het toepassen van hogere-orde schrijfvaardigheden (d.i., plannen en reviseren) terwijl lagere-orde schrijfvaardigheden (d.i., transcriptie- en spellingsvaardigheden) nog niet volledig geautomatiseerd zijn (Bereiter & Scardamalia, 1987; Berninger et al., 1992; Cameron & Moshenko, 1996; McCutchen, 2008; McCutchen et al., 1994; McCutchen et al., 1997; McCutchen, Teske, & Bankston, 2006). Schrijven is voor veel leerlingen niet alleen een complexe cognitieve vaardigheid, maar wordt vaak ook ervaren als een ontmoedigende en

oninteressante taak (Boscolo & Gelati, 2013; Boscolo & Hidi, 2007; Bruning & Horn, 2000; Hidi & Boscolo, 2006). De geobserveerde dalende trend in schrijfmotivatie van leerlingen doorheen hun schoolloopbaan is in dit verband verontrustend (Cleary, 1991; De Smedt et al., 2019). Gezien de cognitieve en motivationele uitdagingen in schrijven, heeft de Taalunie in een recent adviesrapport dan ook opgeroepen om het schrijfonderwijs in Vlaanderen en Nederland te versterken opdat alle leerlingen de kans krijgen om hun schrijfvaardigheden optimaal te ontwikkelen (Taalunie, 2015). In Vlaanderen is er echter tot op heden weinig onderzoek naar hoe we de schrijfvaardigheden van leerlingen kunnen optimaliseren en welke schrijfdidactiek hierbij mogelijk kan ingezet worden. Meer nog, in tegenstelling tot in Nederland, weten we nog heel weinig over de vigerende schrijfinstructie- en leerprocessen op het niveau van het Vlaamse basisonderwijs (Bonset & Hoogeveen, 2007). Alvorens er echter kan ingezet worden op het optimaliseren en versterken van het schrijfonderwijs, is het belangrijk om eerst in kaart te brengen hoe het huidige schrijfonderwijs ingericht en ervaren wordt. De grondgedachte van dit proefschrift luidt dan ook als volgt: *inzicht krijgen in de vigerende schrijfinstructie- en leerprocessen in Vlaanderen en het optimaliseren van de kwaliteit van deze schrijfinstructie om zo de schrijfvaardigheden van vijfde- en zesdeklassers te bevorderen*.

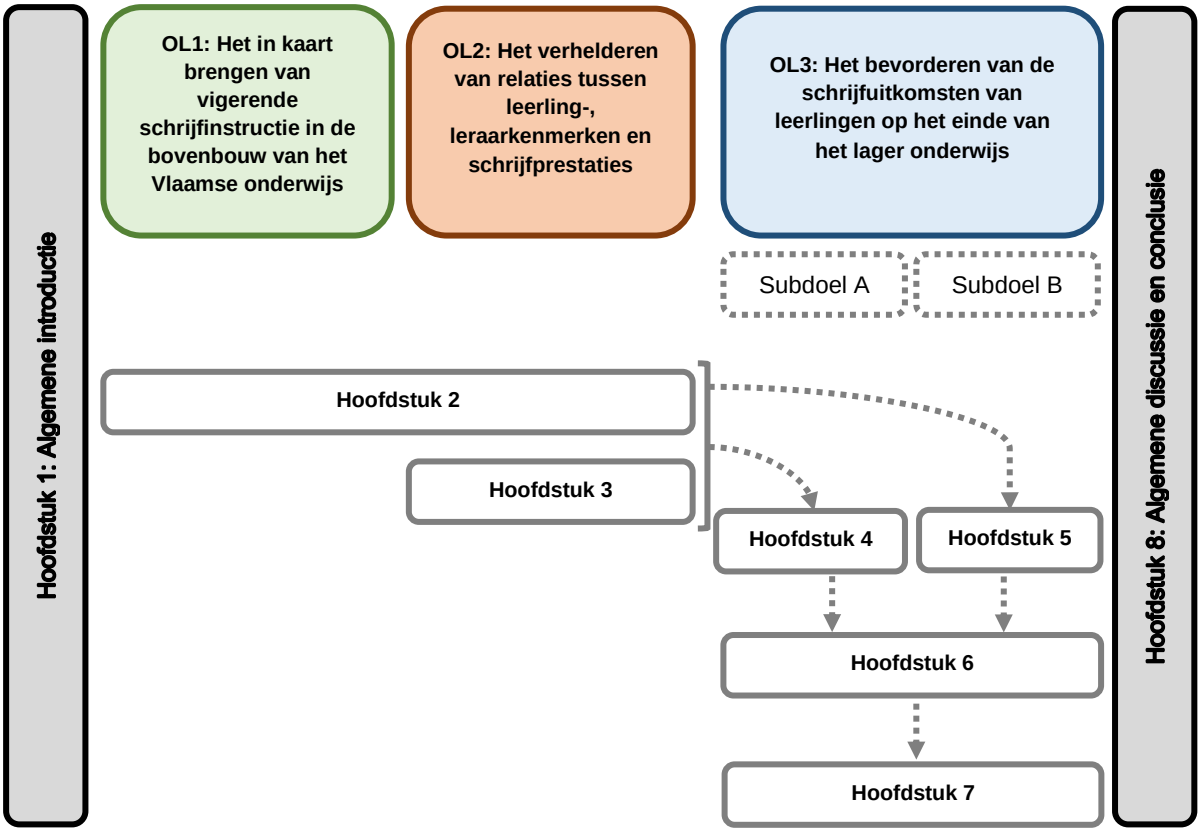
Onderzoekslijnen

Bovenstaande beschouwingen leidden tot drie concrete onderzoekslijnen die dit proefschrift vorm gaven:

(1) Binnen de eerste onderzoekslijn werd gefocust op het in kaart brengen van de vigerende schrijfinstructie in de bovenbouw van het Vlaamse lager onderwijs om zo deze de black box open te breken. Concreet werd er getracht inzicht te verkrijgen in de opvattingen van leraren omtrent schrijven en schrijfinstructie enerzijds en in de dagelijkse schrijfinstructiepraktijken anderzijds.
(2) De tweede onderzoekslijn richtte zich op het verhelderen van relaties tussen leerling-, leraarkenmerken en schrijfprestaties. Binnen deze onderzoekslijn werd er ook specifiek ingezoomd op de relaties tussen leerlingkenmerken, namelijk tussen motivationele factoren, cognitieve schrijfprocessen en schrijfvaardigheden van leerlingen.
(3) Binnen de derde onderzoekslijn werd er gefocust op het bevorderen van de schrijfuitkomsten bij leerlingen op het einde van het lager onderwijs. Deze onderzoekslijn werd opgesplitst in twee subdoelen, namelijk:

(a) het bestuderen van de impact van expliciete schrijfinstructie en peer-assisted schrijven op schrijfprestaties,
(b) het bestuderen van de impact van expliciete schrijfinstructie en peer-assisted schrijven op schrijfmotivatie en self-efficacy met betrekking tot schrijven.

De eerste onderzoekslijn *'het in kaart brengen van de vigerende schrijfinstructie in de bovenbouw van het Vlaamse lager onderwijs'* werd uitgewerkt in hoofdstuk 2. De tweede onderzoekslijn *'het verhelderen van relaties tussen leerling-, leraarkenmerken en schrijfprestaties'* werd behandeld in hoofdstuk 2 en 3. Hoofdstuk 2 focuste zich op de samenhang tussen leraarkenmerken en schrijfprestaties enerzijds en de samenhang tussen leerlingkenmerken en schrijfprestaties anderzijds. Hoofdstuk 3 ging in op de samenhang tussen leerlingkenmerken onderling door de relaties tussen motivationele factoren, cognitieve schrijfprocessen en schrijfprestaties te onderzoeken. De inzichten verkregen in onderzoekslijnen 1 en 2 vormden de input voor de derde en laatste onderzoekslijn *'het bevorderen van schrijfuitkomsten bij leerlingen op het einde van het lager onderwijs'*. Deze onderzoekslijn werd uiteengezet in hoofdstukken 4 tot en met 7. In hoofdstuk 4 en 5 werd een eerste iteratie-interventie gerapporteerd waarin enerzijds de impact op schrijfprestaties (cf., hoofdstuk 4) en anderzijds de impact op schrijfmotivatie en self-efficacy met betrekking tot schrijven werd bestudeerd (cf., hoofdstuk 5). De resultaten van de eerste iteratie-interventie fungeerden als input voor de tweede iteratie-interventie die beschreven werd in hoofdstukken 6 en 7. In hoofdstuk 6 werd een systematische en analytische beschrijving van de interventies weergegeven. De impact van deze interventies op schrijfprestaties, schrijfmotivatie en self-efficacy met betrekking tot schrijven werd onderzocht in hoofdstuk 7. De onderzoekslijnen in het algemeen en de hoofdstukken in het bijzonder bouwen op elkaar voort waardoor deze zowel inhoudelijk als methodologisch sterk samenhangen. Deze samenhang wordt gepresenteerd in figuur 1.



Figuur 1. *Overzicht van de hoofdstukken en hun relatie met de overkoepelende onderzoekslijnen (OL) binnen het proefschrift.*

Overzicht en discussie van de hoofdbevindingen

Onderzoekslijn 1: Het in kaart brengen van de vigerende schrijfinstructie in de bovenbouw van het Vlaamse lager onderwijs

Op basis van de resultaten van de lerarenbevraging (*n* = 128 leraren bovenbouw lager onderwijs), uiteengezet in hoofdstuk 2, kunnen we drie conclusies trekken. Ten eerste blijkt uit de gerapporteerde tijdsbesteding met betrekking tot schrijven en schrijfinstructie dat leerlingen relatief weinig schrijven in de klas: ze krijgen gemiddeld slechts 13 minuten per dag de tijd om teksten te schrijven die minimaal één paragraaf lang zijn. Vervolgens tonen de resultaten aan dat de gerapporteerde schrijfdidactieken niet altijd in lijn liggen met wat effectief is gebleken uit vorig onderzoek (Graham, McKeown, Kiuhara, & Harris, 2012; Koster, Tribushinina, de

Jong, & van den Bergh, 2015). Vroegere studies tonen namelijk aan dat expliciete instructie in zowel basisschrijfvaardigheden (Alves et al., 2015) als schrijfstrategieën (Bouwer, Koster, & van den Bergh, 2018; Rietdijk, Janssen, van Weijen, van den Bergh, & Rijlaarsdam, 2017), alsook de integratie van peer-assisted schrijven (Grünke, Wilbert, Tsiriotakis, & Agirregoikoa, 2017; Hoogeveen & van Gelderen, 2018; Yarrow & Topping, 2001) en computer-assisted schrijven (Englert, Zhao, Dunsmore, Collings, & Wolbers, 2007; Morphy & Graham, 2012) veelbelovende schrijfdidactieken zijn. Wanneer we deze vergelijken met hoe schrijfinstructie daadwerkelijk vorm krijgt in Vlaanderen, dan kunnen we een discrepantie vaststellen. Vlaamse leraren stellen namelijk in de eerste plaats het aanleren van basisschrijfvaardigheden centraal, maar in mindere mate instructie in schrijfstrategieën. Ze voorzien ook weinig mogelijkheden voor interactie en samenwerking tijdens schrijflessen en het gebruik van ICT is nog niet gangbaar. Wat de attitudes van de leraren tot slot betreft, tonen de resultaten aan dat leraren relatief positief zijn ten opzichte van schrijven en schrijfinstructie en ze voelen zich behoorlijk capabel om effectieve schrijfinstructie te geven.

Samenvattend kunnen we stellen dat de studie, gerapporteerd in hoofdstuk 2, een eerste aanzet vormt om het Vlaamse schrijfonderwijs in het lager onderwijs in kaart te brengen. Deze surveyresultaten bevatten waardevolle informatie om het schrijfvaardigheidsniveau van de leerlingen te begrijpen en te interpreteren. De vraag of Vlaamse leerlingen op het einde van het lager onderwijs de eindtermen voor schrijven behalen en of hun schrijfvaardigheidsniveau bijgevolg voldoende hoog is, werd in 2018 voor het eerst opgenomen in het Vlaamse peilingsonderzoek. De resultaten van deze peiling worden in mei 2019 gepubliceerd. Beleidsmakers zullen kunnen gebruik maken van de inzichten in dit proefschrift om de huidige stand van zaken in het Vlaamse schrijfonderwijs beter te begrijpen en om op een geïnformeerde wijze toekomstige beleidsbeslissingen met betrekking tot schrijfonderwijs te nemen.

Onderzoekslijn 2: Het verhelderen van relaties tussen leerling-, leraarkenmerken en schrijfprestaties

De relaties tussen leerlingkenmerken en schrijfprestaties werden onderzocht aan de hand van een grootschalige bevraging bij vijfde- en zesdeklassers. De vragenlijst- en schrijftestdata werden geanalyseerd aan de hand van zowel multilevel analyses in hoofdstuk 2 (n = 800 leerlingen) als structural equation modeling (SEM) in hoofdstuk 3 (n = 1577 leerlingen). Op basis van de resultaten kunnen we volgende conclusies trekken. Ten eerste tonen de resultaten aan dat er een relatie is tussen autonome schrijfmotivatie en schrijfprestaties enerzijds en self-efficacy met betrekking tot ideegeneratie en schrijfprestaties anderzijds. Er

werd ook een negatieve relatie tussen gecontroleerde schrijfmotivatie en schrijfprestaties vastgesteld. Bijgevolg bevestigt dit proefschrift zowel theoretisch (Graham, 2018; Hayes, 2012; Zimmerman & Risemberg, 1997) als empirisch onderzoek (Graham, Berninger, & Fan, 2007; Pajares & Valiante, 1997; Teng & Zhang, 2018; Troia, Harbaugh, Shankland, Wolbers, & Lawrence, 2013) waarin de prominente rol van motivationele factoren in het verklaren van schrijfprestaties werd benadrukt. Vervolgens toonden de SEM-modellen in hoofdstuk 3 aan dat er een positieve samenhang was tussen motivationele factoren en cognitieve schrijfprocessen (Shell, Colvin, & Bruning, 1995; Zimmerman & Risemberg, 1997). Meer bepaald werd er een positieve relatie vastgesteld tussen self-efficacy met betrekking tot zelfregulatie en gerapporteerde schrijfstrategieën. Gezien de geobserveerde dalende trend in schrijfmotivatie van leerlingen doorheen hun schoolloopbaan (Cleary, 1991; De Smedt et al., 2019), wijst dit proefschrift op het belang om expliciete aandacht te besteden aan het bevorderen van de schrijfmotivatie van leerlingen. In dit verband raden we scholen en leraren dan ook aan om te investeren in de ontwikkeling van schrijfinstructiepraktijken die de leerlingen niet alleen cognitief uitdagen, maar hen ook dermate kunnen prikkelen en motiveren zodat leerlingen hun uiterste best doen tijdens het schrijven. Op die manier kan de *will* om te schrijven mogelijks een invloed hebben op de *skill*, wat zich uiteindelijk zal uiten in algemeen betere schrijfprestaties.

Naast de motivationele factoren hebben we in hoofdstuk 2 en 3 ook de relatie tussen cognitieve schrijfprocessen en schrijfprestaties bestudeerd. Hoewel cognitieve schrijfprocessen centraal staan binnen theoretische schrijfmodellen (Graham, 2018; Hayes, 2012) en ondanks veelvuldig empirische onderzoek naar het belang van deze processen om schrijfprestaties te verklaren (Beauvais, Olive, & Passerault, 2011; von Koss Torkildsen, Morken, Helland, & Helland, 2015), hebben we in dit proefschrift geen positieve relaties gevonden tussen de gerapporteerde cognitieve schrijfprocessen en de schrijfprestaties van leerlingen. Deze onverwachte resultaten kunnen mogelijks verklaard worden door de manier waarop schrijfprocessen werden gemeten binnen dit proefschrift, namelijk aan de hand van een vragenlijst (Kieft, Rijlaarsdam, & van den Bergh, 2006, 2008). Bijgevolg berustte de evaluatie van schrijfprocessen uitsluitend op zelf-rapportage van de leerlingen (d.i., off-line metingen) waardoor zij mogelijks de neiging hadden om sociaal aanvaardbaar te antwoorden of om zichzelf te overschatten (Schellings & Van Hout-Wolters, 2011). In dit opzicht benadrukken we het belang om objectieve, on-line metingen te integreren bij het meten en evalueren van schrijfprocessen. Mogelijke onderzoeksmethodes om schrijfprocessen on-line te analyseren zijn bijvoorbeeld het bestuderen van observeerbare traces (d.i., aantekeningen tijdens het schrijven) (Braten & Samuelstuen, 2007), keystroke logging (Leijten & Van Waes, 2013), analyseren van pen- en oogbewegingen (Alamargot, Plane, Lambert, & Chesnet,

2010), hardop-denk protocollen (Braaksma, Rijlaarsdam, & Janssen, 2017), of de triple task methode (Olive, Kellogg, & Piolat, 2002).

Tot slot werden in hoofdstuk 2 de relaties tussen leraarkenmerken en schrijfprestaties onderzocht aan de hand van een grootschalige bevraging (*n* = 128 leraren en *n* = 800 leerlingen). Uit de resultaten bleek dat de mate waarin leraren succesvolle schrijfprestaties van leerlingen toeschrijven aan de effectiviteit van hun schrijfinstructie, samenhangt met de schrijfprestaties van leerlingen. Op basis van deze bevindingen wijzen we op het belang om te investeren in een kwaliteitsvolle lerarenopleiding en nascholingsinitiatieven wat betreft schrijfinstructie, zodat leraren vertrouwen opbouwen in hun eigen kennen en kunnen.

Onderzoekslijn 3: Het bevorderen van schrijfuitkomsten bij leerlingen op het einde van het lager onderwijs

In dit proefschrift werd de impact van expliciete schrijfinstructie en peer-assisted schrijven bestudeerd aan de hand van twee iteratie-interventies. In de eerste iteratie (*n* = 206 vijfde en zesdeklassers en *n* = 11 leraren) werd zowel de afzonderlijke als de gecombineerde impact van beide schrijfinstructiepraktijken (d.i., expliciete schrijfinstructie en een niet-gestructureerde toepassing van peer-assisted schrijven) op schrijfprestaties enerzijds (cf., hoofdstuk 4) en schrijfmotivatie en self-efficacy met betrekking tot schrijven anderzijds bestudeerd (cf., hoofdstuk 5). In de tweede iteratie (*n* = 431 vijfde en zesdeklassers en *n* = 20 leraren) werd de gecombineerde impact van expliciete schrijfinstructie en een gestructureerde toepassing van peer-assisted schrijven op de schrijfprestaties, schrijfmotivatie en self-efficacy met betrekking tot schrijven onderzocht (cf., hoofdstuk 6 geeft een systematische en analytische beschrijving van de interventies weer, hoofdstuk 7 presenteert de effecten van deze interventies).

Op basis van de bevindingen uit beide iteratie-interventies kunnen we, wat betreft het effect op schrijfprestaties, het volgende concluderen. Ten eerste bevestigden de resultaten de effectiviteit van expliciete schrijfinstructie om schrijfprestaties van leerlingen in de bovenbouw van het lager onderwijs te bevorderen (Bouwer et al., 2018; Graham et al., 2012; Harris, Graham, & Mason, 2006; Koster et al., 2015; López, Torrance, Rijlaarsdam, & Fidalgo, 2017; Rietdijk et al., 2017; Zumbrunn & Bruning, 2013). Aangezien leerlingen niet spontaan en automatisch de nodige schrijfvaardigheden ontwikkelen, hebben zij nood aan directe, expliciete instructie en ondersteuning die na verloop van tijd wordt afgebouwd door leerlingen actief aan te moedigen de aangeleerde schrijfkennis en –strategieën te internaliseren (Graham & Harris, 2018; Graham, Harris, & Chambers, 2016; Harris & Graham, 2016; Koster et al., 2015). Ten tweede toonden de resultaten aan dat de integratie van een niet-gestructureerde toepassing van peer-assisted schrijven in een expliciet schrijfinstructieprogramma geen

toegevoegd effect had op de schrijfprestaties van leerlingen, terwijl er wel positieve effecten werden gevonden bij de integratie van een gestructureerde toepassing. Op basis van deze bevindingen raden we leraren dan ook aan om leerlingen specifieke richtlijnen of routines mee te geven zodat ze in staat zijn hun samenwerking tijdens het schrijven te coördineren (Graham, Harris, & Mason, 2005; Harris et al., 2006; Nixon & Topping, 2001; Sutherland & Topping, 1999; Yarrow & Topping, 2001). Ten slotte bleek uit de resultaten dat leerlingen niet in staat waren om de algemene plannings-, compositie-, en revisiestrategie toe te passen in een nieuw, niet-aangeleerd tekstgenre. Op basis van deze inzichten raden we leraren dan ook aan om leerlingen expliciet te ondersteunen in het maken van deze transfer door uit te leggen en te modelleren hoe de strategieën kunnen toegepast worden in andere schrijfgenres en door voldoende oefenmogelijkheden te voorzien (Graham et al., 2005; Harris et al., 2006).

Naast het effect van de interventie op schrijfprestaties, werd ook het effect op schrijfmotivatie en self-efficacy met betrekking tot schrijven onderzocht. Op basis van de bevindingen uit beide iteratie-interventies kunnen we besluiten dat zowel een niet-gestructureerde als gestructureerde toepassing van peer-assisted schrijven positieve effecten heeft op de motivatie van leerlingen om te schrijven (De Bernardi & Antolini, 2007; Paquette, 2009). De resultaten tonen namelijk aan dat wanneer leerlingen spontaan samen schrijven, zonder enige vorm van expliciete of impliciete schrijfinstructie, ze een hogere autonome motivatie hebben (d.i., schrijven omwille van plezier en voldoening of omwille van de waarde van het schrijven zelf) (Ryan & Deci, 2000a, 2000b). Daarnaast blijkt uit de resultaten van dit proefschrift dat expliciete schrijfinstructie op één of andere manier de gecontroleerde schrijfmotivatie van leerlingen prikkelt (d.i., schrijven omwille van interne of externe druk). Bijkomende inzichten hebben vervolgens aangetoond dat de integratie van een gestructureerde toepassing van peer-assisted schrijven in een expliciet schrijfinstructieprogramma, deze gevoelens van interne of externe druk bij leerlingen onderdrukt en bijgevolg het minst gunstige type motivatie (d.i., gecontroleerde motivatie) doet afnemen (Ryan & Deci, 2000a, 2000b). Daarnaast blijkt ook dat wanneer leerlingen tijdens gestructureerde schrijfactiviteiten samenwerken, dit een positief effect heeft op hun self-efficacy met betrekking tot ideegeneratie (Bruning, Dempsey, Kauffman, McKim, & Zumbrunn, 2013).

Algemeen besluit

Het huidig proefschrift levert waardevolle inzichten aan waardoor we de cognitieve en motivationele uitdagingen in schrijven beter begrijpen en waardoor we leerlingen in de bovenbouw van het lager onderwijs op een effectieve manier kunnen ondersteunen deze

uitdagingen te overwinnen. Dit proefschrift vormt namelijk een eerste aanzet om de black box van het Vlaamse schrijfonderwijs te doorbreken door inzicht te bieden in hoe schrijven wordt aangeleerd in de bovenbouw van het lager onderwijs en door aan te tonen hoe we de schrijfuitkomsten van leerlingen kunnen bevorderen. Op basis van de resultaten omtrent de vigerende schrijfinstructie in Vlaamse lagere scholen kunnen we besluiten dat er ruimte voor verbetering is. In dit verband raden we scholen en leraren dan ook aan om te investeren in de ontwikkeling van cognitief uitdagende schrijfinstructiepraktijken die tegelijk ook de schrijfmotivatie van leerlingen aanwakkeren. Op basis van dit proefschrift concluderen we dat het combineren van een gestructureerde toepassing van peer-assisted schrijven en expliciete schrijfinstructie veelbelovend is om leerlingen te ondersteunen en aan te moedigen om zich te ontwikkelen tot vaardige en gemotiveerde schrijvers.

Referenties

Alamargot, D., Plane, S., Lambert, E., & Chesnet, D. (2010). Using eye and pen movements to trace the development of writing expertise: Case studies of a 7th, 9th and 12th grader, graduate students, and professional writer. *Reading and Writing, 23*(7), 853-888. doi:10.1007/s11145-009-9191-9

Alves, R., Limpo, T., Fidalgo, R., Carvalhais, L., Pereira, L., & Castro, S. (2015). The impact of promoting transcription on early text production: Effects on bursts and pauses, levels of written language, and writing performance. *Journal of Educational Psychology, 108*(5), 665-679. doi:10.1037/edu0000089

Beauvais, C., Olive, T., & Passerault, J. (2011). Why are some texts good and others not? Relationship between text quality and management of the writing process. *Journal of Educational Psychology, 103*(2), 415-428. doi:10.1037/a0022545

Bereiter, C., & Scardamalia, M. (1987). *The psychology of written composition*. Hillsdale, N.J.: L. Erlbaum Associates.

Berninger, V., Fuller, F., & Whitaker , D. (1996). A process model of writing development across the life span. *Educational Psychology Review, 8*(3), 193-218. doi:10.1007/BF01464073

Berninger, V., Yates, C., Cartwright, A., Rutberg, J., Remy, E., & Abbott, R. (1992). Lower-level developmental skills in beginning writing. *Reading and Writing, 4*(3), 257-280. doi:10.1007/BF01027151

Bonset, H., & Hoogeveen, M. (2007). *Schrijven in het basisonderwijs. Een inventarisatie van empirisch onderzoek in het perspectief van leerplanontwikkeling.* Enschede: Stichting leerplanontwikkeling.

Boscolo, P., & Gelati, C. (2013). Best practices in promoting motivation for writing. In S. Graham, C. MacArthur, & J. Fitzgerald (Eds.), *Best practices in writing instruction* (pp. 284-308). New York: The Guilford Press.

Boscolo, P., & Hidi, S. (2007). The multiple meanings of motivation to write. In G. Rijlaarsdam (Ed.), *Studies in Writing* (pp. 1-16). Oxford: Elsevier.

Bouwer, R., Koster, M., & van den Bergh, H. (2018). Effects of a strategy-focused instructional program on the writing quality of upper elementary students in the Netherlands. *Journal of Educational Psychology, 110*(1), 58-71. doi:10.1037/edu0000206

Braaksma, M., Rijlaarsdam, G., & Janssen, T. (2017). Writing hypertexts: Proposed effects on writing processes and knowledge acquisition. *Educational Studies in Language and Literature, 7*(4), 93-122. doi:10.17239/L1ESLL-2007.07.04.06

Braten, I., & Samuelstuen, M. (2007). Measuring strategic processing: Comparing task-specific self-reports to traces. *Metacognition Learning, 2*(1), 1-20. doi:10.1007/s11409-007-9004-y

Bruning, R., Dempsey, M., Kauffman, D., McKim, C., & Zumbrunn, S. (2013). Examining dimensions of self-efficacy for writing. *Journal of Educational Psychology, 105*(1), 25-38. doi:10.1037/a0029692

Bruning, R., & Horn, C. (2000). Developing motivation to write. *Educational Psychologist, 35*(1), 25-37. doi:10.1207/S15326985ep3501_4

Cameron, C., & Moshenko, B. (1996). Elicitation of knowledge transformational reports while children write narratives. *Canadian Journal of Behavioural Science, 28*(4), 271-280. doi:10.1037/0008-400X.28.4.271

Cleary, M. (1991). Affect and cognition in the writing processes of eleventh graders: A study of concentration and motivation. *Written Communication, 8*(4), 473-508. doi:10.1177/0741088391008004003

De Bernardi, B., & Antolini, E. (2007). Fostering students'willingness and interest in argumentative writing: An intervention study. In S. Hidi & P. Boscolo (Eds.), *Writing and Motivation* (pp. 183-202). Oxford: Elsevier.

De Smedt, F., Rogiers, A., Heirweg, S., Vandamme, S., Merchie, E., & Van Keer, H. (2019). Reading and writing motivation across grades in primary and secondary education: A self-determination theory perspective. *Submitted for publication*.

Englert, C., Zhao, Y., Dunsmore, K., Collings, N., & Wolbers, K. (2007). Scaffolding the writing of students with disabilities through procedural facilitation: Using an internet-based technology to improve performance. *Learning Disability Quarterly, 30*(9), 9-29. doi:10.2307/30035513

Flower, L., & Hayes, J. (1981). A cognitive process theory of writing. *College Composition and Communication, 32*(4), 365-387. doi:10.2307/356600

Graham, S. (2018). A writer(s) within community model of writing. In C. Bazerman, V. Berninger, D. Brandt, S. Graham, J. Langer, S. Murphy, P. Matsuda, D. Rowe, & M. Schleppegrell (Eds.), *The lifespan development of writing* (pp. 271-325). Urbana, IL: National Council of English.

Graham, S., Berninger, V., & Fan, W. (2007). The structural relationship between writing attitude and writing achievement in first and third grade students. *Contemporary Educational Psychology, 32*(3), 516-536. doi:10.1016/j.cedpsych.2007.01.002

Graham, S., & Harris, K. (2018). Evidence-based writing practices: A meta-analysis of existing meta-analyses. In R. Fidalgo, K. Harris, & M. Braaksma (Eds.), *Design Principles for Teaching Effective Writing* (pp. 13-37). Leiden: Brill.

Graham, S., Harris, K., & Chambers, A. (2016). Evidence-based practice and writing instruction: A review of reviews. In C. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of Writing Research* (pp. 211-226). New York: The Guilford Press.

Graham, S., Harris, K., & Mason, L. (2005). Improving the writing performance, knowledge, and self-efficacy of struggling young writers: The effects of self-regulated strategy development. *Contemporary Educational Psychology, 30*(2), 207-241. doi:10.1016/j.cedpsych.2004.08.001

Graham, S., McKeown, D., Kiuhara, S., & Harris, K. (2012). A meta-analysis of writing instruction for students in the elementary grades. *Journal of Educational Psychology, 104*(3), 879-896. doi:10.1037/A0029185

Grünke, M., Wilbert, J., Tsiriotakis, I., & Agirregoikoa, A. (2017). Improving the length and quality of texts written by fourth graders with learning dissabilities through a peer-tutoring graphic organizing strategy. *Insights into Learning Disabilities, 14*(2), 167-188.

Harris, K., & Graham, S. (2016). Self-Regulated Strategy Development in writing: Policy implications of an evidence-based practice. *Policy Insights from the Behavioral and Brain Sciences, 3*(1), 77-84. doi:10.1177/2372732215624216

Harris, K., Graham, S., & Mason, L. (2006). Improving the writing, knowledge, and motivation of struggling young writers: Effects of self-regulated strategy development with and without peer support. *American Educational Research Journal, 43*(2), 295-340. doi:10.3102/00028312043002295

Hayes, J. (2012). Modeling and remodeling writing. *Written Communication, 29*(3), 369-388. doi:10.1177/0741088312451260

Hidi, S., & Boscolo, P. (2006). Motivation and writing. In C. A. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of writing research* (pp. 144-157). New York: The Guilford Press.

Hoogeveen, M., & van Gelderen, A. (2018). Writing with peer response using different types of genre knowledge: Effects on linguistic features and revisions of sixth-grade writers. *The Journal of Educational Research, 111*(1), 66-80. doi:10.1080/00220671.2016.1190913

Inspectie van het Onderwijs. (2010). *Het onderwijs in het schrijven van teksten. De kwaliteit van het schrijfonderwijs in het basisonderwijs.* Utrecht: Ministerie van Onderwijs, Cultuur en Wetenschap.

Kieft, M., Rijlaarsdam, G., & van den Bergh, H. (2006). Writing as a learning tool: Testing the role of students' writing strategies. *European Journal of Psychology of Education, 12*(1), 17-34. doi:10.1007/BF03173567

Kieft, M., Rijlaarsdam, G., & van den Bergh, H. (2008). An aptitude-treatment interaction approach to writing-to-learn. *Learning and Instruction, 18*(4), 379-390. doi:10.1016/j.learninstruc.2007.07.004

Koster, M., Tribushinina, E., de Jong, P., & van den Bergh, H. (2015). Teaching children to write: A meta-analysis of writing intervention research. *Journal of Writing Research, 7*(2), 299-324. doi:10.17239/jowr-2015.07.02.2

Leijten, M., & Van Waes, L. (2013). Keystroke logging in writing research: Using Inputlog to analyze and visualize writing processes. *Written Communication, 30*(3), 358-392. doi:0.1177/0741088313491692

López, P., Torrance, M., Rijlaarsdam, G., & Fidalgo, R. (2017). Effects of direct instruction and strategy modeling on upper-primary students' writing development. *Frontiers in Pyschology, 8*(1054). doi:10.3389/fpsyg.2017.01054

McCutchen, D. (2008). Cognitive factors in the development of children's writing. In C. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of writing research* (pp. 115-130). New York: The Guilford Press.

McCutchen, D., Covill, A., Hoyne, S., & Mildes, K. (1994). Individual differences in writing: Implications of translating fluency. *Journal of Educational Psychology, 86*(2), 256-266. doi:10.1037/0022-0663.86.2.256

McCutchen, D., Francis, M., & Kerr, S. (1997). Revising for meaning, effects of knowledge and strategy. *Journal of Educational Psychology, 89*(4), 667-676. doi:0.1037/0022-0663.89.4.667

McCutchen, D., Teske, P., & Bankston, C. (2006). Writing and cognition: Implications of the cognitive architecture for learning to write and writing to learn. In C. Bazerman (Ed.), *Handbook of research on writing* (pp. 451-470). New York: L. Erlbaum Associates.

Morphy, P., & Graham, S. (2012). Word processing programs and weaker writers/readers: A meta-analysis of research findings. *Reading and Writing, 25*(3), 641-678. doi:10.1007/s11145-010-9292-5

National Center for Education Statistics. (2012). *The nation's report card: Writing 2011*. Washington, D.C.: Institute of Education Sciences, U.S. Department of Education.

Nixon, J., & Topping, K. (2001). Emergent writing: the impact of structured peer interaction. *Educational Psychology, 21*(1), 41-58. doi:10.1080/01443410020019821

Ofsted. (2000). *Teaching of writing in primary schools: could do better*. Manchester: Ofsted.

Olive, T., Kellogg, R., & Piolat, A. (2002). The triple task technique for studying the process of writing. In T. Olive & C. Levy (Eds.), *Contemporary tools and techniques for studying writing* (pp. 31-59). Dordrecht, the Netherlands: Kluwer Academic.

Pajares, F., & Valiante, G. (1997). Influence of self-efficacy on elementary students' writing. *The Journal of Educational Research, 90*(6), 353-360. doi:10.1080/00220671.1997.10544593

Paquette, K. (2009). Integrating the 6+1 writing traits model with cross-age tutoring: An investigation of elementary students' writing development. *Literacy Research and Instruction, 48*(1), 28-38. doi:10.1080/19388070802226261

Rietdijk, S., Janssen, T., van Weijen, D., van den Bergh, H., & Rijlaarsdam, G. (2017). Improving writing in primary schools through a comprehensive writing program. *Journal of Writing Research, 9*(5), 173-225. doi:10.17239/jowr-2017.09.02.04

Rijlaarsdam, G., Janssen, T., Rietdijk, S., & van Weijen, D. (2018). Reporting design principles for effective instruction of writing: Interventions as constructs. In R. Fidalgo, K. Harris, & M. Braaksma (Eds.), *Design Principles for Teaching Effective Writing* (Vol. 34, pp. 280-313). Leiden; Boston: Brill.

Ryan, R., & Deci, E. (2000a). The darker and brighter sides of human existence: Basic psychological needs as a unifying concept. *Psychological Inquiry, 11*(4), 319-338. doi:10.1207/S15327965PLI1104_03

Ryan, R., & Deci, E. (2000b). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology, 25*(1), 54-67. doi:10.1006/ceps.1999.1020

Schellings, G., & Van Hout-Wolters, B. (2011). Measuring strategy use with self-report instruments: theoretical and empirical considerations. *Metacognition Learning, 6*(2), 83-90. doi:10.1007/s11409-011-9081-9

Shell, D., Colvin, C., & Bruning, R. (1995). Self-efficacy, attribution, and outcome expectancy mechanisms in reading and writing achievement: Grade-level and achievement-level differences. *Journal of Educational Psychology, 87*(3), 386-398. doi:10.1037/0022-0663.87.3.386

Sutherland, J., & Topping, K. (1999). Collaborative creative writing in eight-year-olds: comparing cross-ability fixed role and same-ability reciprocal role pairing. *Journal of Research in Reading, 22*(2), 154-179. doi:10.1111/1467-9817.00080

Taalunie. (2015). *Schrijfonderwijs in de schijnwerpers. Naar een betere schrijfvaardigheid van Nederlandse en Vlaamse leerlingen*: Nederlandse Taalunie.

Teng, L., & Zhang, L. (2018). Effects of motivational regulation strategies on writing performance: A mediation model of self-regulated learning of writing in English as a second/foreign language. *Metacognition Learning, 13*(2), 213-240. doi:10.1007/s11409-017-9171-4

Troia, G., Harbaugh, A., Shankland, R., Wolbers, K., & Lawrence, A. (2013). Relationships between writing motivation, writing activity, and writing performance: Effects of grade, sex, and ability. *Reading and Writing, 26*(1), 17-44. doi:10.1007/s11145-012-9379-2

von Koss Torkildsen, J., Morken, F., Helland, W. A., & Helland, T. (2015). The dynamics of narrative writing in primary grade children: writing process factors predict story quality. *Reading and Writing, 29*(3), 529-554. doi:10.1007/s11145-015-9618-4

Yarrow, F., & Topping, K. (2001). Collaborative writing: The effects of metacognitive prompting and structured peer interaction. *British Journal of Educational Psychology, 71*, 261-282. doi:10.1348/000709901158514

Zimmerman, B., & Risemberg, R. (1997). Becoming a self-regulated writers: A social cognitive perspective. *Contemporary Educational Psychology, 22*, 73-101. doi:10.1006/ceps.1997.0919

Zumbrunn, S., & Bruning, R. (2013). Improving the writing and knowledge of emergent writers: The effects of self-regulated strategy development. *Reading and Writing, 26*(1), 91-110. doi:10.1007/s11145-012-9384-5

III Academic output

Academic output

Output integrated in this dissertation

Journals (a1)

De Smedt, F., Van Keer, H., & Merchie, E. (2016). Student, teacher and class-level correlates of Flemish late elementary school children's writing performance. *Reading and Writing 29*(5), 833-868. doi: 10.1007/s11145-015-9590-z.

De Smedt, F., Graham, S., & Van Keer, H. (2018). The bright and dark side of writing motivation: Effects of explicit instruction and peer assistance. *The Journal of Educational Research*. doi:10.1080/00220671.2018.1461598.

De Smedt, F., & Van Keer, H. (2018). Fostering writing in upper primary grades: a study into the distinct and combined impact of explicit instruction and peer assistance. *Reading and Writing, 31*(2), 325-354. doi:10.1007/s11145-017-9787-4.

De Smedt, F., Merchie, E., Barendse, M., Rosseel, Y., De Naeghel, J., & Van Keer, H. (2018). Cognitive and motivational challenges in writing: Studying the relationship with writing performance across students' gender and achievement level. *Reading Research Quarterly, 53*(2), 249-272. doi:10.1002/rrq.193.

De Smedt, F., Graham, S., & Van Keer, H. (2019). "It takes two": The added value of peer-assisted writing in explicit writing instruction. *Revised and resubmitted to Reading Research Quarterly.*

Journals (a2)

De Smedt, F., & Van Keer, H. (2018). An analytic description of an instructional writing program combining explicit writing instruction and peer-assisted writing. *Journal of Writing Research, 10*(2), 225-277, doi: 10.17239/jowr-2018.10.02.04

Conference contributions

De Smedt, F., & Van Keer, H. (2013). *Explicit strategy instruction, collaborative writing and ICT in writing instruction.* 16th Biennial Conference on Teachers and Teaching. Poster presented at the 16th Biennial Conference on Teachers and Teaching, Ghent, Belgium, July 1-5, 2013.

De Smedt, F., & Van Keer, H. (2014). *Studying the relationship between writing performance, self-efficacy for writing, writing motivation, and writing processes in upper-primary grades.* Conference on Writing Research. Paper presented at the Conference on Writing Research, Amsterdam, the Netherlands, August 27-29, 2014.

De Smedt, Fien, & Van Keer, H. (2014). *Writing education and writing performance in Flanders' upper-primary grades: a state-of-the-art.* Research School, Conference on Writing Research. Poster presented at the Research School of the Conference on Writing Research, Utrecht, the Netherlands, August 25-26, 2014.

De Smedt, F., & Van Keer, H. (2014). *Gender and achievement-level differences in writing motivation, self-efficacy for writing, writing processes, and writing performance in upper-elementary grades.* Society for the Scientific Study of Reading. Paper presented at the Society for the Scientific Study of Reading, Santa Fe, United States, July 10-15, 2014.

De Smedt, F., & Van Keer, H. (2015). *Cognitive and motivational correlates of elementary school children's writing performance.* Poster presented at the 2015 Annual Meeting of the American Educational Research Association, Chicago, United States, April 16-20, 2015.

De Smedt, F., Van Keer, H., & Merchie, E. (2015). *Student and class-level correlates of Flemish late elementary school children's writing performance.* Paper presented at the 16th Biennial EARLI Conference for Research on Learning and Instruction, Limassol, Cyprus, August 25-29, 2015.

De Smedt, F., & Van Keer, H. (2016). *Improving writing performance and fostering writing motivation: a quasi-experimental study focused on explicit instruction and peer assistance*. Poster presented at Research School of the SIG Writing Conference 2016, Liverpool, United Kingdom, July 1-6, 2016.

De Smedt, F., & Van Keer, H. (2016). *Explicit strategy instruction and peer assistance: a quasi-experimental study on the effects on writing skills in upper-primary education.* Paper presented at the SIG Writing Conference 2016, Liverpool, United Kingdom, July 1-6, 2016.

De Smedt, F., & Van Keer, H. (2016). *A strategy-oriented intervention study focusing on peer assistance: an analytic description of the writing program.* Paper presented at the SIG Writing Conference 2016, Liverpool, United Kingdom, July 1-6, 2016.

De Smedt, F., & Van Keer, H. (2016). *Fidelity of implementation in a strategy-oriented intervention study focusing on peer assistance*. Paper presented at the SIG Writing Conference 2016, Liverpool, United Kingdom, July 1-6, 2016.

De Smedt, F., Merchie, E., Mortaignie, N., & Van Keer, H. (2016). *How do novice writers write texts? Using digital pen technology to explore the development and application of cognitive writing processes.* Flipped paper presented at the EARLI SIG 27 - Online Measures of Learning Processes, Oulu, Finland, November 29 – December 1, 2016.

De Smedt, F., Merchie, E., Barendse, M., Rosseel, Y., De Naeghel, J., & Van Keer, H. (2017). *Cognitive and motivational key factors of late primary students' writing performance.* Paper presented at the 17th Biennial EARLI Conference, Tampere, Finland, August 27 – September 2, 2017.

De Smedt, F., & Van Keer, H. (2018). *Writing instruction in Flanders: What's the current state and how to improve it?* Paper presented at the AERA 2018 Annual Meeting, New York, United States, April 13-17, 2018.

De Smedt, F., & Van Keer, H. (2018). *Does the teacher matter? A study into teacher beliefs on writing and instructional writing practices.* Paper presented at the 16th International Conference of the EARLI SIG Writing, Antwerp, Belgium, August 29-31, 2018.

De Smedt, F., Graham, S., & Van Keer, H. (2018). *Promoting primary students' writing: Results of a second iteration intervention study.* Paper presented at the 16th International Conference of the EARLI SIG Writing, Antwerp, Belgium, August 29-31, 2018.

De Smedt, F., Graham, S., & Van Keer, H. (2018). *Teaching primary school students to write effectively: Combining explicit writing instruction and collaborative writing.* Paper presented at

the 1st Literacy Summit of the European Literacy Network, Porto, Portugal, November 1-3, 2018.

De Smedt, F., Graham, S., & Van Keer, H. (2019). *Overcoming motivational challenges in writing: A randomized control trial.* Paper presented at the Society for Research on Educational Effectiveness, Washington, United States, March 6-9, 2019.

De Smedt, F., Graham, S., & Van Keer, H. (2019). *Stimulating students' self-efficacy for writing: Lessons learned from a two-iteration intervention study*. Paper accepted to present at the at the 17th Biennial EARLI Conference, Aachen, Germany, August, 12-16, 2019.

De Smedt, F., Graham, S., & Van Keer, H. (2019). *Writing texts because you 'want' or because you 'must'?: A self-determination theory perspective*. Paper accepted to present at the at the 17th Biennial EARLI Conference, Aachen, Germany, August, 12-16, 2019.

Other academic output

Journals (a1)

De Smedt, F., & Van Keer, H. (2017). Het openbreken van een black box: schrijven en schrijfinstructie in het Vlaamse lager onderwijs. *Pedagogische Studiën, 94*(4), 254–282.

Lesterhuis, M., **De Smedt, F**., & Bouwer, R. (2017). Schrijven en schrijfonderwijs: inleiding op het themanummer. *Pedagogische Studiën, 94*(4), 211–215.

De Smedt, F., Rogiers, A., Heirweg, S., Vandamme, S., Merchie, E., & Van Keer, H. (2019). Reading and writing motivation across grades in primary and secondary education: A self-determination theory perspective. *Submitted for publication in Contemporary Educational Psychology.*

Bouwer, R., Lesterhuis, M., **De Smedt, F.,** Van Keer, H., & De Maeyer, S. (2019). A comparative approach to the assessment of writing: Benefits of benchmark ratings and comparative judgement. *Submitted for publication in Reading and Writing.*

Journals (a2)

Bouwer, R., & **De Smedt, F.** (2018). Introduction Special Issue: Considerations and recommendations for reporting writing interventions in research publications. *Journal of Writing Research, 10*(2), 115-137, doi:10.17239/jowr-2018.10.02.01

Journals (a4)

De Smedt, F. (2012). Verklaringen voor de cognitieve verwerkingsstrategieën van leerlingen in de derde graad ASO voor het vak geschiedenis. *Hermes, 16* (52), 60–65.

Journals (p1)

De Smedt, F., & Van Keer, H. (2014). A research synthesis on effective writing instruction in primary education. *Procedia – Social and Behavioral Sciences, 112*, 693-701. doi: 10.1016/j.sbspro.2014.01.1219

Book chapters (b2)

Rogiers, A., Merchie, E., **De Smedt, F**., De Backer, L., & Van Keer, H. (2019). A lifespan development perspective on strategic processing. In L., Dinsmore, L., Fryer, M., Parkinson (Eds.), Handbook of Strategies and Strategic Processing: Conceptualization, Intervention, Measurement, and Analysis. *Submitted for publication and under review.*

Other publications (v)

De Smedt, F., & Van Keer, H. (2015). *Vier effectieve schrijfdidactieken. De bovenbouw van het basisonderwijs.* In opdracht van de Nederlandse Taalunie.

Conference contributions

De Smedt, F., & Valcke, M. (2013). *Cognitieve verwerkingsstrategieën van leerlingen in de derde graad ASO secundair onderwijs voor het vak Geschiedenis*. Onderwijs Research Dagen, Abstracts. Paper presented at the Onderwijs Research Dagen, Brussels, Belgium, May 29-31, 2013.

Lesterhuis, M., **De Smedt, F.,** Bouwer, R., Van Keer, H., & De Maeyer, S. (2017). *Best of two worlds in writing assessment: Integrating benchmarking and comparative judgement.* Paper presented at the 17th Biennial EARLI Conference, Tampere, Finland, August 27 – September 2, 2017.

De Smedt, F., Rogiers, A., Heirweg, S., Merchie, E., Van Damme, S., Cabbeke, B., & Van Keer, H. (2017). *Assessing reading and writing motivation across grades in elementary and secondary education: A self-determination theory perspective.* Paper presented at the Applied Linguistics Conference, Auckland, New Zealand, November 27-29, 2017.

Rogiers, A., **De Smedt, F.,** Heirweg, S., Merchie, E., & Van Keer, H. (2017). *The decline in reading motivation from elementary to secondary education. What to learn from Self-Determination Theory?* Paper presented at the Applied Linguistics Conference, Auckland, New Zealand, November 27-29, 2017.

De Smedt, F., Lesterhuis, M., Bouwer, R., De Maeyer, S., & Van Keer, H. (2017). *Het beoordelen van teksten: de beoordelingsschaal aan de hand van ankerteksten en de paarsgewijze vergelijking.* Paper presented at the Onderwijs Research Dagen 2017, Antwerp, Belgium, June 28-30, 2017.

Van Steendam, E., & **De Smedt, F.** (2018). *An introduction in "Collaborative Writing."* Workshop at the Research School of the 16th International Conference of the EARLI SIG Writing, Ghent, Belgium, August 26-28, 2018.

IV Data storage fact sheets

Data storage fact sheets

Data storage fact sheet 1

% Data Storage Fact Sheet

% Name/identifier study: Chapter 2 and 3

% Author: Fien De Smedt

% Date: February, 4, 2019

1. Contact details

==========

1a. Main researcher

- name: Fien De Smedt

- address: Henri Dunantlaan 2, 9000 Ghent, Belgium

- e-mail: Fien.DeSmedt@UGent.be

1b. Responsible Staff Member (ZAP)

- name: Hilde Van keer (supervisor)

- address: Henri Dunantlaan 2, 9000 Ghent, Belgium

- e-mail: Hilde.VanKeer@UGent.be

If a response is not received when using the above contact details, please send an email to data.pp@ugent.be or contact Data Management, Faculty of Psychology and Educational Sciences, Henri Dunantlaan 2, 9000 Ghent, Belgium.

2. Information about the datasets to which this sheet applies

==========

* Reference of the publication in which the datasets are reported:

De Smedt, F., Van Keer, H., & Merchie, E. (2016). Student, teacher and class-level correlates of Flemish late elementary school children's writing performance. Reading and Writing, 29(5), 833-868. doi:10.1007/s11145-015-9590-z

De Smedt, F., Merchie, E., Barendse, M., Rosseel, Y., De Naeghel, J., & Van Keer, H. (2018). Cognitive and motivational challenges in writing: Studying the relationship with writing performance

across students' gender and achievement level. Reading Research Quarterly, 53(2), 249-272. doi:10.1002/rrq.193

* Which datasets in that publication does this sheet apply to?:

The sheet applies to all the data used in both publications

3. Information about the files that have been stored

==========

3a. Raw data

---

* Have the raw data been stored by the main researcher? [X] YES / [ ] NO

If NO, please justify:

* On which platform are the raw data stored?

- [ ] researcher PC

- [ ] research group file server

- [X] other (specify): Teacher and student surveys + students' writing tests: Paper versions stored in the Faculty Archive for Research Material.

* Who has direct access to the raw data (i.e., without intervention of another person)?

- [ ] main researcher

- [ ] responsible ZAP

- [ ] all members of the research group

- [ ] all members of UGent

- [X] other (specify): Jan Lammertyn has access to the Faculty Archive for Research Material (Research Support Office of the Faculty of Psychology and Educational Sciences)

3b. Other files

---

* Which other files have been stored?

- [X] file(s) describing the transition from raw data to reported results. Specify: .wsz-files were stored regarding the different models reported in chapter 2 of the dissertation. txt-files or .R-files were stored regarding the different analyses (in R – Lavaan) reported in chapter 3 of the dissertation.

- [X] file(s) containing processed data. Specify: Teacher and student survey data was processed

(i.e., cleaned data in SPSS, aggregated for analysis); all handwritten writing tests were typed before assessed and processed (i.e., cleaned data in SPSS, aggregated for analysis)

- [X] file(s) containing analyses. Specify: MlWin-generated output (i.e., output of preliminary analyses as well as output of the main analyses regarding the research questions) was stored as .wsz files. R-generated output (i.e., output of preliminary analyses as well as output of the main analyses regarding the research questions) was stored as .R-files or .txt-files.

- [ ] files(s) containing information about informed consent

- [ ] a file specifying legal and ethical provisions

- [ ] file(s) that describe the content of the stored files and how this content should be interpreted. Specify: ...

- [ ] other files. Specify: ...

* On which platform are these other files stored?

- [X] individual PC

- [ ] research group file server

- [X] other: external hard drive of the researcher

* Who has direct access to these other files (i.e., without intervention of another person)?

- [X] main researcher

- [ ] responsible ZAP

- [ ] all members of the research group

- [ ] all members of UGent

- [ ] other (specify): ...

4. Reproduction

==========

* Have the results been reproduced independently?: [ ] YES / [X] NO

* If yes, by whom (add if multiple):

- name:

- address:

- affiliation:

- e-mail:

v0.2

Data storage fact sheet 2

% Data Storage Fact Sheet

% Name/identifier study: Chapter 4 and 5

% Author: Fien De Smedt

% Date: February, 4, 2019

1. Contact details

==========

1a. Main researcher

- name: Fien De Smedt

- address: Henri Dunantlaan 2, 9000 Ghent, Belgium

- e-mail: Fien.DeSmedt@UGent.be

1b. Responsible Staff Member (ZAP)

- name: Hilde Van keer (supervisor)

- address: Henri Dunantlaan 2, 9000 Ghent, Belgium

- e-mail: Hilde.VanKeer@UGent.be

If a response is not received when using the above contact details, please send an email to data.pp@ugent.be or contact Data Management, Faculty of Psychology and Educational Sciences, Henri Dunantlaan 2, 9000 Ghent, Belgium.

2. Information about the datasets to which this sheet applies

==========

* Reference of the publication in which the datasets are reported:

De Smedt, F., Graham, S., & Van Keer, H. (2018). The bright and dark side of writing motivation: Effects of explicit instruction and peer assistance. The Journal of Educational Research. doi:10.1080/00220671.2018.1461598

De Smedt, F., & Van Keer, H. (2018). Fostering writing in upper primary grades: a study into the distinct and combined impact of explicit instruction and peer assistance. Reading and Writing, 31(2), 325-354. doi:10.1007/s11145-017-9787-4

* Which datasets in that publication does this sheet apply to?:

The sheet applies to all the data used in both publications

3. Information about the files that have been stored

==========

3a. Raw data

---

* Have the raw data been stored by the main researcher? [X] YES / [ ] NO

If NO, please justify:

* On which platform are the raw data stored?

- [X] researcher PC: Video files: Videotaped intervention lessons
- [ ] research group file server
- [X] other (specify): Teacher and student surveys + students' writing tests + students' writing portfolios + teachers' logbooks + observation schemes + informed consents of the participating schools: Paper versions stored in the Faculty Archive for Research Material.

* Who has direct access to the raw data (i.e., without intervention of another person)?

- [X] main researcher: has access to the video files
- [ ] responsible ZAP
- [ ] all members of the research group
- [ ] all members of UGent
- [X] other (specify): Jan Lammertyn has access to the Faculty Archive for Research Material (Research Support Office of the Faculty of Psychology and Educational Sciences)

3b. Other files

---

* Which other files have been stored?

- [X] file(s) describing the transition from raw data to reported results. Specify: .wsz-files were stored regarding the different models reported in chapter 4 and 5 of the dissertation.
- [X] file(s) containing processed data. Specify: Teacher and student survey data was processed (i.e., cleaned data in SPSS, aggregated for analysis); all handwritten writing tests were typed before assessed and processed (i.e., cleaned data in SPSS, aggregated for analysis); teachers' logbook data was processed (i.e., cleaned data in SPSS, aggregated for analysis), classroom observation data was processed (i.e., cleaned data in SPSS, aggregated for analysis), and data retrieved from students' writing portfolios was processed (i.e., cleaned data in SPSS, aggregated

for analysis)

- [X] file(s) containing analyses. Specify: MlWin-generated output (i.e., output of preliminary analyses as well as output of the main analyses regarding the research questions) was stored as .wsz files.

- [X] files(s) containing information about informed consent: Informed consents of the participating schools were scanned and stored as pdf-files.

- [ ] a file specifying legal and ethical provisions

- [ ] file(s) that describe the content of the stored files and how this content should be interpreted. Specify: ...

- [ ] other files. Specify: ...

* On which platform are these other files stored?

- [X] individual PC

- [ ] research group file server

- [X] other: external hard drive of the researcher

* Who has direct access to these other files (i.e., without intervention of another person)?

- [X] main researcher

- [ ] responsible ZAP

- [ ] all members of the research group

- [ ] all members of UGent

- [ ] other (specify): ...

4. Reproduction

==========

* Have the results been reproduced independently?: [ ] YES / [X] NO

* If yes, by whom (add if multiple):

- name:

- address:

- affiliation:

- e-mail:

v0.2

Data storage fact sheet 3

% Data Storage Fact Sheet

% Name/identifier study: Chapter 7

% Author: Fien De Smedt

% Date: February, 4, 2019

1. Contact details

==========

1a. Main researcher

- name: Fien De Smedt
- address: Henri Dunantlaan 2, 9000 Ghent, Belgium
- e-mail: Fien.DeSmedt@UGent.be

1b. Responsible Staff Member (ZAP)

- name: Hilde Van Keer (supervisor)
- address: Henri Dunantlaan 2, 9000 Ghent, Belgium
- e-mail: Hilde.VanKeer@UGent.be

If a response is not received when using the above contact details, please send an email to data.pp@ugent.be or contact Data Management, Faculty of Psychology and Educational Sciences, Henri Dunantlaan 2, 9000 Ghent, Belgium.

2. Information about the datasets to which this sheet applies

==========

* Reference of the publication in which the datasets are reported:

De Smedt, F., Graham, S., & Van Keer, H. (2019). "It takes two": The added value of peer-assisted writing in explicit writing instruction. Revised and resumbitted to Reading Research Quarterly.

* Which datasets in that publication does this sheet apply to?:

The sheet applies to all the data used in both publications

3. Information about the files that have been stored

==========

3a. Raw data

---

* Have the raw data been stored by the main researcher? [X] YES / [ ] NO

If NO, please justify:

* On which platform are the raw data stored?

- [X] researcher PC: Video files: videotaped intervention lessons

- [ ] research group file server

- [X] other (specify): Teacher and student surveys + students' writing tests + students' writing portfolios + teachers' logbooks + observation schemes + informed consents of the participating schools: Paper versions stored in the Faculty Archive for Research Material.

* Who has direct access to the raw data (i.e., without intervention of another person)?

- [X] main researcher: has access to the video files

- [ ] responsible ZAP

- [ ] all members of the research group

- [ ] all members of UGent

- [X] other (specify): Jan Lammertyn has access to the Faculty Archive for Research Material (Research Support Office of the Faculty of Psychology and Educational Sciences)

3b. Other files

---

* Which other files have been stored?

- [X] file(s) describing the transition from raw data to reported results. Specify: .wsz-files were stored regarding the different models reported in chapter 7 of the dissertation.

- [X] file(s) containing processed data. Specify: Teacher and student survey data was processed (i.e., cleaned data in SPSS, aggregated for analysis); all handwritten writing tests were typed before assessed and processed (i.e., cleaned data in SPSS, aggregated for analysis); teachers' logbook data was processed (i.e., cleaned data in SPSS, aggregated for analysis), classroom observation data was processed (i.e., cleaned data in SPSS, aggregated for analysis), and data retrieved from students' writing portfolios was processed (i.e., cleaned data in SPSS, aggregated for analysis)

- [X] file(s) containing analyses. Specify: MlWin-generated output (i.e., output of preliminary analyses as well as output of the main analyses regarding the research questions) was stored as .wsz files.

- [X] files(s) containing information about informed consent: Informed consents of the participating

schools were scanned and stored as pdf-files.

- [ ] a file specifying legal and ethical provisions
- [ ] file(s) that describe the content of the stored files and how this content should be interpreted. Specify: ...
- [ ] other files. Specify: ...

* On which platform are these other files stored?

- [X] individual PC
- [ ] research group file server
- [X] other: external hard drive of the researcher

* Who has direct access to these other files (i.e., without intervention of another person)?

- [X] main researcher
- [ ] responsible ZAP
- [ ] all members of the research group
- [ ] all members of UGent
- [ ] other (specify): ...

4. Reproduction

==========

* Have the results been reproduced independently?: [ ] YES / [X] NO

* If yes, by whom (add if multiple):

- name:
- address:
- affiliation:
- e-mail:

v0.2