

The impact of combining SRSD instruction with a brief growth mindset intervention on sixth graders' writing motivation and performance

Ana Camacho^{a,*}, Rui A. Alves^a, Mariana Silva^a, Paula Ferreira^{a,b}, Nadine Correia^c, João R. Daniel^d

^a Faculty of Psychology and Education Sciences, University of Porto, Portugal

^b School of Education and Social Sciences, Polytechnic of Leiria, Portugal

^c Instituto Universitário de Lisboa (ISCTE-IUL), CIS-IUL, Portugal

^d William James Center for Research, ISPA-Instituto Universitário, Portugal

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ABSTRACT

Self-Regulated Strategy Development (SRSD) is an evidence-based instructional approach combining background knowledge, writing, and self-regulation strategies to improve students' writing motivation and performance. While the positive impact of SRSD on writing performance variables is well-established, mixed findings were found for motivational variables, namely self-efficacy. In addition, the impact of SRSD on motivational constructs other than self-efficacy—such as implicit theories—has received considerably less attention. In this study, we examined the impact of an SRSD instructional program about opinion text writing on two extensively studied writing performance variables (i.e., text quality and text length) and on two motivational variables (i.e., self-efficacy and implicit theories). Moreover, we tested whether adding a brief growth mindset intervention to SRSD instruction would result in gains in writing motivation and performance. To this end, we enrolled 191 sixth graders, from 11 classes, and their Portuguese language teachers to participate in a six-week intervention study. Using a quasi-experimental design, the classes were assigned to one of three conditions: (a) an active control condition (three classes); (b) an SRSD group (four classes); (c) an SRSD plus growth mindset intervention group (henceforth, SRSD + GM; four classes). Our results showed that both the SRSD and the SRSD + GM generally did not significantly differ from the active control group in self-efficacy and implicit theories of writing at posttest. The only exception was self-efficacy for ideation. Of note, the SRSD and the SRSD + GM groups outperformed the active control group in terms of text quality and text length. Our findings did not reveal an added value of a brief growth mindset intervention for SRSD instruction. Overall, our study showed that a six-week SRSD instructional program was effective in improving students' self-efficacy for ideation and writing performance. However, the brief nature of both SRSD and mindset interventions may have precluded a broader positive impact on motivational beliefs, such as self-efficacy for conventions, self-efficacy for self-regulation, and implicit theories.

1. Introduction

Writing well raises students' chances of succeeding in school and gaining access to lifelong opportunities. The importance of writing becomes apparent in an increasingly digitalized and fast-paced world, where workplaces and civic participation are more literacy-dependent (Carpentieri, 2012). Despite the importance of writing, many students still fail to acquire robust writing skills, which may limit their educational attainments, future employment opportunities, and active participation in society (Graham et al., 2015).

Not so long ago, the European Commission warned that one in five European adolescents lacked basic reading and writing skills (Carpentieri, 2012). Recently, school closures and sudden shifts to online learning, driven by successive COVID-19 pandemic waves, may have curtailed the development of students' literacy skills (Domingue et al., 2021), especially writing (Skar et al., 2021). Therefore, implementing evidence-based writing practices in schools is highly needed (Graham et al., 2016; Harris & Graham, 2016) in the current context to enhance students' writing motivation and performance. The twofold aim of this intervention study was to examine the impact of Self-Regulated Strategy

* Corresponding author at: Faculdade de Psicologia e de Ciências da Educação, Universidade do Porto, Rua Alfredo Allen, 4200-135 Porto, Portugal.

E-mail address: anacamacho@fpce.up.pt (A. Camacho).

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Development (SRSD) instruction about opinion text writing (Harris et al., 2008) on sixth-grade students' writing motivation and performance, and to analyze the added value of a brief growth mindset intervention conveying the message that writing skills are malleable. Over the next sections, we review evidence on the effectiveness of SRSD instruction and growth mindset interventions.

1.1. Self-Regulated Strategy Development (SRSD) instruction

Strategy instruction aims to teach students how to plan, compose, and revise texts by explicitly and systematically endowing students with writing strategies and background knowledge about text genre (De Smedt, Graham, et al., 2020; Graham & Perin, 2007). A particularly effective and widespread instructional approach is the Self-Regulated Strategy Development (SRSD) created by Karen Harris. Harris placed the emphasis not only on teaching writing strategies and background knowledge but also on teaching self-regulation strategies to guide the writing process (Harris et al., 2008; Harris & Graham, 1996, 2009). The merits of teaching self-regulation strategies in tandem with writing strategies were supported in a study by Brunstein and Glaser (2011). They showed that students receiving strategy instruction coupled with self-regulation strategies improved writing quality more and reported higher self-efficacy, compared with students receiving strategy instruction alone. Indeed, writing well depends on high levels of self-regulation (Zimmerman & Risemberg, 1997).

The assumption underpinning SRSD is that writing is taught in an explicit, stepwise, and interactive manner to help students become more effective and motivated writers. An important tenet of the model is that instruction is scaffolded, which implies that students become progressively responsible for applying the writing and self-regulation strategies, while the teacher support is gradually faded. The collaborative and engaging nature of SRSD supports students in developing writing motivation, positive writing attitudes, and self-beliefs as capable writers (Harris & Graham, 2017). SRSD should be implemented as a supplement to national writing guidelines and should not be seen as a replacement. As noted by Harris et al. (2008), "SRSD is meant to supplement, not supplant, the larger writing curriculum" (p. 7).

Flexibility is also a key feature of SRSD since it can be implemented: (a) across all grade-levels, from elementary grades through high school; (b) using entire classes, small groups, or even individually; (c) with typically developing students or students with special educational needs; (d) across a variety of writing genres, such as personal narratives, story writing, opinion texts, expository essays, and report writing (Harris et al., 2008). In addition, the flexibility of this instructional approach is evident in the delivery mode as it comprises six recursive (and not strict) instructional stages. Specifically, the teacher: provides background knowledge about the text genre being addressed (stage 1); discusses the writing and self-regulation strategies with students (stage 2); models the use of strategies (stage 3); helps students to memorize the strategies (stage 4); supports students using both writing and self-regulation strategies (stage 5); and observes and monitors students' independent performance (stage 6).

In stage 1, *Develop Background Knowledge*, students acquire background knowledge and prerequisite skills in the targeted text genre (e.g., "What is an opinion? What are the parts of an opinion text? What are the characteristics of a good opinion text?"). This background knowledge provides the foundation for students to learn how to use writing and self-regulation strategies. These self-regulation strategies, such as goal-setting and self-monitoring, are also introduced during this stage (Harris et al., 2013; Harris et al., 2008).

In stage 2, *Discuss It*, students reflect on their current writing and self-regulation skills. In this respect, students may examine prior compositions and find the number of parts included. For instance, if the teacher introduced the opinion text, students may check whether they included an introductory paragraph stating the opinion, at least three reasons supporting the opinion, the respective examples, and the ending. This

process will prepare students to set goals and self-monitor their performance in the following lessons. During this stage, the teacher also discusses the usefulness of the writing and self-regulation strategies and stresses the importance of students' effort and commitment (Harris et al., 2006; Harris et al., 2008; Harris et al., 2013).

In stage 3, *Model It*, the teacher models how to use the writing strategy (e.g., a mnemonic to use when planning an opinion text) and demonstrates the importance of applying self-regulation strategies, such as goal-setting, self-instructions, self-reinforcement, and self-assessment. Teachers can make use of collaborative modelling, asking students to help them while planning and composing the text. After modelling, the teacher discusses with students the importance of using self-instructions while writing, thereby encouraging them to generate their own self-instructions (Harris et al., 2013; Harris et al., 2008).

In stage 4, *Memorize It*, the teacher asks students to recall the writing strategies (e.g., the meaning of the mnemonic) and self-instructions. This stage typically begins at previous stages, but the teacher should intentionally confirm and support memorization, especially for students with memory problems (Harris et al., 2013; Harris et al., 2008).

In stage 5, *Support It*, students use the writing and self-regulation strategies while composing and the teacher scaffolds as much as needed. During this stage, students and the teacher collaborate while planning, composing, and revising. Typically, students rely on resources to guide the writing process, such as mnemonic strategy charts, graphic organizers for planning, self-statements sheets, and lists of words typical of the targeted text genre. This is a critical stage, in which students should be given adequate time and support to manage the strategies. In this stage, the teacher also discusses plans for maintaining and generalizing the strategies to other contexts (Harris et al., 2013; Harris et al., 2008).

Finally, in stage 6, *Independent Performance*, students plan, compose, and revise a text independently using the writing and self-regulation strategies. Typically, the abovementioned resources (i.e., mnemonic strategy charts, graphic organizers, self-statement sheets, word lists) are faded and the teacher provides support only when necessary (Harris et al., 2013; Harris et al., 2008).

Regarding the effectiveness of SRSD instruction, significant gains in five domains—text quality, self-efficacy, knowledge of writing, text genre elements included, and approach to writing—have been observed in students from elementary grades through high school (Harris & Graham, 2009). This effectiveness is corroborated across several meta-analyses, which indicated that strategy instruction significantly improved students' writing quality and length of writing, with large effect sizes (Graham et al., 2012; Graham & Perin, 2007; Rogers & Graham, 2008). Importantly, in a review of evidence-based writing practices, Graham et al. (2016) found that SRSD stands out as the instructional practice with the largest effect size on students' writing quality ($ES = 1.59$) among 26 other writing practices. As recently emphasized by Graham and Alves (2021), SRSD is "perhaps the most tested writing instructional practice of all time, and the one yielding the largest effects sizes" (p. 1618).

Concerning the effect of SRSD instruction on motivational outcomes, self-efficacy (i.e., the confidence that one can perform successfully in writing) has been the most studied motivational construct (Latif, 2020). However, prior studies yielded mixed results (Camacho et al., 2021; De Smedt, Graham, et al., 2020; Klassen, 2002; Latif, 2020). While some studies showed that SRSD instruction resulted in a heightened sense of self-efficacy for writing (e.g., Brunstein & Glaser, 2011; Graham & Harris, 1989), other studies revealed no gains in writing self-efficacy (e.g., García-Sánchez & Fidalgo-Redondo, 2006; Graham et al., 2005). In this regard, Klassen (2002) noticed that some of these studies improved writing performance but not self-efficacy, arguing that deeply rooted beliefs about writing are less susceptible to change with relatively brief interventions.

While the positive, significant impact of SRSD on writing performance variables is well-documented (with large effect sizes), more

mixed findings were found regarding motivational variables, namely self-efficacy. In addition, the effect of SRSD instruction on other motivational constructs—such as implicit theories—has received little attention (Latif, 2020). Given that beliefs about writing seem hard to change (Klassen, 2002), a fruitful research endeavor is to examine whether motivation-related modules grounded on established theories of achievement motivation—such as a growth mindset intervention—can enhance the impact of SRSD on motivational outcomes (Camacho et al., 2021).

1.2. Growth mindset interventions

Implicit theories—also known as mindsets and self-theories—pertain to people's beliefs about the fixed or malleable nature of their personal qualities, such as intelligence (Dweck & Master, 2009; Dweck & Morden, 2017). According to Dweck (1999), people can conceive intelligence in two different ways. People with an entity theory or fixed mindset believe they own a certain amount of intelligence and they cannot do much to change it. People with an incremental theory or growth mindset believe intelligence is something that can be cultivated over time through learning, effort, and guidance. Intelligence is thus conceived as a static and innate trait for entity theorists and as a malleable quality for incremental theorists (Dweck & Leggett, 1988).

In the school context, endorsing entity or incremental theories may result in different motivational meaning systems, which will differently influence academic achievement. Students with entity theories are overconcerned with displaying intelligence, tend to avoid challenges, and show impaired ability to deal with setbacks, which may hinder their academic achievement. Conversely, students with incremental theories exert effort to learn how to master something new, seek challenging tasks, and show persistence in the face of failure, which in turn may enhance their academic attainment (Dweck, 1999; Dweck & Leggett, 1988).

To test these assumptions, meta-analyses were conducted to examine the relations of implicit theories with self-regulation (Burnette et al., 2013) and academic achievement (Costa & Faria, 2018; Sisk et al., 2018). Regarding self-regulation, Burnette et al. (2013) found that incremental theories, as opposed to entity theories, were negatively associated with performance-oriented goals, helplessness-oriented strategies, and negative emotions, and positively associated with learning goals, mastery-oriented strategies, and optimistic expectation evaluations. Concerning academic achievement, Sisk et al. (2018) noticed a weak correlation between growth mindsets and academic achievement across 129 studies ($r = 0.10$). In the same line, Costa and Faria (2018) found support for a significant, yet low, association between implicit theories and academic achievement across 46 studies. Specifically, the authors found that incremental theories were associated with grades in verbal and quantitative subjects and with overall academic achievement (r s between 0.10 and 0.15). Entity theories were positively associated with grades in verbal and quantitative subjects (r s between 0.07 and 0.08)—but to a lesser degree compared to incremental theories—and were not associated with overall academic achievement. Nonetheless, as stated by Sisk et al. (2018, p. 561), “it is possible that despite generally weak relationships between students' naturally held mindsets and academic achievement, interventions promoting growth mindsets might still be effective, especially for certain subgroups.”

Currently, an intense debate is ongoing about whether or not growth mindset interventions are effective (Denworth, 2019; Miller, 2019). Growth mindset interventions convey the message that intellectual abilities can be developed through effort and hard work and that struggles are an opportunity to further nurture intelligence (Paunesku et al., 2015). Criticism is based on the small effect sizes or near-zero effects of growth mindset interventions on students' academic outcomes (e.g., Foliano et al., 2019; Li & Bates, 2019). However, the proponents of the theory argue that growth mindsets may have benefits for specific groups of students. In a meta-analysis, Sisk et al. (2018)

concluded that 37 out of 43 effect sizes retrieved from growth mindset intervention studies were not significantly different from zero. In other words, most studies showed that students who received a growth mindset intervention did not improve academic achievement when compared with students assigned to control groups. Nevertheless, even though growth mindset interventions did not improve academic achievement of middle- or upper-class students, they did for students with low socioeconomic status.

In the same line, Paunesku et al. (2015) showed that a brief growth mindset intervention delivered online improved academic achievement of underperforming high school students (i.e., bottom third of students in the sample). In a recent randomized controlled trial, Yeager et al. (2019) demonstrated that a one-hour, online brief growth intervention increased grade-point average (GPA) among lower-achieving students from a national representative sample enrolled in secondary education in the United States. An important feature of this study is that the authors pre-registered it, hypothesizing that the growth mindset intervention would have a small, near-zero effect on the full sample but that it would improve GPA for the subgroup of underperforming students, which was confirmed ($ES = 0.11$). Altogether, these studies showed a positive, although small, impact of brief growth mindset interventions, especially on the academic achievement of vulnerable student populations (i.e., lower-achieving students and students with low socioeconomic status).

In the writing field, growth mindset interventions have been seldom tested (Camacho et al., 2021). An exception is the study by Schrodt et al. (2019), who designed an intervention combining instruction in writing, self-regulation strategies, and growth mindset for 14 kindergarten children aged five to six. The growth mindset intervention encompassed read-aloud activities about book characters who persisted when facing difficulties to convey the message that intelligence is malleable. It also included stories about two fictional characters, one holding a growth mindset and the other representing a fixed mindset. This intervention resulted in enhanced students' writing outcomes as well as increased writing motivation and openness to take on difficult tasks when compared to peers who only received instruction in writing. Since this study included a time-consuming intervention (i.e., 30 sessions of 20 min each devoted to growth mindset) and targeted a small number of kindergarten children, some questions remain unanswered. One question is whether a shorter growth mindset intervention would be equally effective in improving students' writing motivation and performance. Another question is whether such an intervention would work for older children, namely middle school students.

1.3. The present study

Based on the reviewed literature, we identified three unresolved issues that warranted further empirical inquiry. First, self-efficacy was the most studied motivational outcome in SRSD studies, but mixed evidence emerged across studies. Second, other motivational constructs have been comparatively less studied in SRSD research, such as implicit theories (Latif, 2020). Third, there is limited research on the effectiveness of growth mindset interventions in writing, especially brief ones (Camacho et al., 2021; Schrodt et al., 2019).

To address these research gaps, we designed and tested the effectiveness of a Self-Regulated Strategy Development (SRSD) instructional program focused on planning and composing opinion texts along with a brief growth mindset intervention to convey the message that writing skills can be developed through effort and hard work. The aim of the current study was twofold. First, we sought to examine the impact of the SRSD instructional program on Portuguese sixth-grade students' motivation (viz., writing self-efficacy and implicit theories) and writing performance (i.e., opinion text quality and text length). Second, we aimed to analyze whether including a brief growth mindset intervention would add value to SRSD instruction, thereby enhancing the putative positive impact of SRSD on students' motivational and writing

outcomes. Based on these aims, we formulated the following three research questions accompanied by three hypotheses:

1. Research Question 1 (RQ1): Do students who receive SRSD instruction increase writing motivation (i.e., higher self-efficacy for writing and more incremental beliefs about writing) compared to students in an active control group?
Hypothesis 1 (H1): We predicted that students who received SRSD instruction on opinion text writing would report higher writing self-efficacy than an active control group at posttest. Although some SRSD interventions failed to promote writing self-efficacy (e.g., [García-Sánchez & Fidalgo-Redondo, 2006](#); [Graham et al., 2005](#)), other SRSD interventions were successful in improving these self-beliefs (e.g., [Brunstein & Glaser, 2011](#); [Graham & Harris, 1989](#)). In particular, the SRSD instructional model provides students with self-regulation strategies (e.g., goal-setting and self-assessment), emphasizing students' progress in writing over time, which may lead to more self-efficacious students ([Harris et al., 2008](#)). We refrained from formulating a hypothesis on the impact of SRSD on implicit theories due to the dearth of previous research.
2. Research Question 2 (RQ2): Do students who receive SRSD instruction improve opinion writing performance (i.e., higher text quality and lengthier texts) compared to students in an active control group?
Hypothesis 2 (H2): We hypothesized that students who received SRSD instruction would write higher quality and lengthier opinion texts compared to an active control group at posttest. This hypothesis is anchored in extensive prior evidence indicating that SRSD has a positive, significant impact on students' writing quality and text length across grade-levels and text genres, including opinion text ([Graham et al., 2016](#); [Graham et al., 2012](#); [Graham & Perin, 2007](#); [Rogers & Graham, 2008](#)).
3. Research Question 3 (RQ3): Do students who receive a brief growth mindset intervention in addition to SRSD instruction improve motivational (i.e., higher self-efficacy, more incremental beliefs about writing, and more incremental beliefs about intelligence) and writing outcomes (i.e., higher text quality and lengthier texts) compared to students who received SRSD instruction alone?
Hypothesis 3 (H3): We hypothesized that students who received SRSD instruction combined with a brief growth mindset intervention would, at least, report more incremental beliefs about writing and about intelligence more broadly compared to a SRSD solo group and an active control group at posttest. One of the assumptions of Carol Dweck's theoretical model is that teachers can shape students' implicit theories, for instance, by how they talk about ability (e.g., writing or intelligence) and the type of feedback (focused on effort or talent) they provide to students (e.g., [Dweck & Master, 2009](#)). Based on this assumption, we anticipated that students who received a brief growth mindset intervention (delivered by their teacher who conveyed that writing is a malleable skill) would report more incremental theories about writing and about intelligence, comparing to peers who did not receive this intervention.

To answer these research questions and examine each hypothesis, we recruited four Portuguese language teachers, who received professional development training to implement the SRSD instructional program and the brief growth mindset intervention to their sixth-grade students over a six-week period. We selected students in Grade 6—the second year of middle school in the Portuguese educational context—to participate in this intervention study due to two reasons. One reason is that after elementary school, opportunities to use writing as a communication and collaborative tool are scarcer, which can lead many students to perceive written production as a rigid and boring academic task merely associated with teachers' evaluation ([Boscolo & Hidi, 2007](#)). Another reason is that recent studies suggest that motivation to write may decrease over the school years ([De Smedt et al., 2020b](#)). In this respect, we found that Portuguese sixth, seventh, and eighth graders report significantly more

negative attitudes towards writing than fifth graders. Therefore, the transition from fifth to sixth grade may threaten students' motivation and achievement in writing.

2. Method

2.1. Portuguese educational context

The Portuguese school system comprises 12 years of compulsory education, divided into basic (Grades 1 to 9) and secondary education (Grades 10–12). Basic education includes primary school (first cycle, Grades 1 to 4), lower middle school (second cycle, Grades 5–6), and upper-middle school (third cycle, Grades 7–9). Our sample was composed of middle school students in Grade 6.

We focused our SRSD instructional program on the planning and composition of opinion texts, as national guidelines refer that, by the end of sixth grade, students must be able to produce opinion texts ([Direção-Geral da Educação, 2018](#)).

2.2. Pandemic context

This intervention study was conducted in the Fall of 2020, during the second wave of the COVID-19 pandemic in Portugal. During this period, the country registered a growth of COVID-19 cases (from about 2,500 cases in late October to about 7,000 cases in late November). Nevertheless, Portuguese schools maintained in-person classes during this period. Despite the pandemic-related constraints, we were able to maintain the in-person format of the study procedures (i.e., teachers' training, pretest session, school-based intervention, and posttest session).

It is worth noting that this intervention study is aligned with the national guidelines to tackle the educational challenges imposed by the COVID-19 pandemic. In 2021, the Portuguese government approved an Integrated Recovery Plan for Learning, which aimed to bridge learning gaps created by the pandemic across several domains, including in writing ([Portuguese Council of Ministers, 2021](#)). In this respect, the Portuguese government recommended the implementation of specialized school-based programs to support the development of students' reading, writing, and oracy skills, especially for primary and lower middle school students.

2.3. Participants and research design

We recruited four Portuguese language teachers and their 226 sixth-grade students, enrolled in 11 classes from a public school located in the Northwest of Portugal. A quasi-experimental pre-posttest research design was adopted considering that the randomization occurred at the class level rather than at the student level. Specifically, the 11 classes were randomly assigned to one of the three following experimental conditions (see [Table 1](#)): (a) the active control group, composed of three classes of students who received business-as-usual writing instruction combined with the instruction to write five opinion texts ($n_{\text{teachers}} = 3$, $n_{\text{students}} = 51$); (b) the SRSD group, comprising four classes of students who received Self-Regulated Strategy Development (SRSD) instruction on how to plan and compose opinion texts ($n_{\text{teachers}} = 2$, $n_{\text{students}} = 74$);

Table 1
Distribution of Instructional Components by Experimental Condition.

Instructional component	Active control	SRSD	SRSD + GM
a) Writing practice (i.e., writing five opinion texts)	✓	✓	✓
b) Self-Regulated Strategy Development (SRSD) instruction		✓	✓
c) Brief growth mindset intervention			✓

(c) the SRSD plus growth mindset intervention group (henceforth, SRSD + GM), composed of four classes of students who received SRSD instruction on how to plan and compose opinion texts in combination with a brief growth mindset intervention ($n_{\text{teachers}} = 2$, $n_{\text{students}} = 66$).

2.3.1. Teachers

Four female Portuguese language teachers implemented the interventions. Teachers' average age was 43.25 ($SD = 9.64$), ranging from 29 to 50 years, and they had an average of 17 years of teaching experience ($SD = 11.23$). On a scale ranging from 1 (not prepared at all) to 4 (very well prepared), the teachers reported being considerably well-prepared to teach writing, $M = 3.50$ ($SD = 0.58$). All teachers indicated that they spent from one to two hours per week teaching writing and they allotted the same amount of time per week to writing practice (i.e., students writing texts composed of several paragraphs).

2.3.2. Students

For ethical reasons, students with special educational needs and one student who was not fluent in Portuguese received the interventions. However, these students were excluded from the sample for data analysis purposes. Of the initial number of 226 students, 35 students were excluded from data analyses based on the following exclusion criteria: (a) students with special educational needs ($n = 8$); (b) student who did not speak Portuguese fluently ($n = 1$); (c) students absent at pretest ($n = 11$) or posttest sessions ($n = 8$); (d) students who attended less than 5 lessons of the intervention program ($n = 7$). Subsequent data analyses were based on 191 students.

Of the 191 students, 89 were girls and 102 were boys, which indicates a balanced gender distribution. Students had a mean age of 11.06 ($SD = 0.54$) and had an average school mark in Portuguese language of 3.47 ($SD = 0.83$). As for their mothers' educational level, 1.6 % had primary school, 8.9 % concluded the sixth grade, 12.6 % achieved ninth grade, 24.6 % completed secondary education, and 19.9 % had a university degree. For the remaining percentage of the students (32.4 %), the school informed us that the mother did not provide this information (see Table 2).

2.4. Measures

We used self-report motivational scales and writing performance measures prior to (pretest) and after (posttest) the interventions to examine the effectiveness of the SRSD instructional program and the added value of the brief growth mindset intervention. At the posttest, students also completed a social validity scale to assess their satisfaction with the interventions. Detailed information on each measure, including

internal consistency coefficients, is provided below.

2.4.1. Motivational measures

Self-Efficacy. Students' self-efficacy for writing was measured using the Self-Efficacy for Writing Scale (SEWS; [Bruning et al., 2013](#)). The SEWS is a 16-item scale, which comprises: five items about students' self-confidence in the ability to generate ideas (self-efficacy for ideation); five items about students' self-confidence in complying with writing conventions (self-efficacy for conventions); and six items about the self-confidence in regulating behaviors and feelings while writing (self-efficacy for self-regulation). In order, examples of items are: "I can think of many ideas for my writing", "I can spell my words correctly", and "I can avoid distractions while I write". Students rate their self-efficacy on a response scale ranging from 0 to 100, with higher scores indicating more self-efficacy. The scale showed a good internal consistency at both pretest (Bentler's $\rho_{\text{conventions}} = 0.82$; Bentler's $\rho_{\text{ideation}} = 0.78$; Bentler's $\rho_{\text{self-regulation}} = 0.76$) and posttest (Bentler's $\rho_{\text{self-regulation}} = 0.79$; Bentler's $\rho_{\text{ideation}} = 0.82$; Bentler's $\rho_{\text{conventions}} = 0.76$).

Implicit Theories of Writing. We used the Implicit Theories of Writing scale (ITW; [Limpo & Alves, 2014](#)) to assess students' beliefs about the malleability of their writing skills. The ITW is a short scale, originally developed for the Portuguese context, which asks students to indicate their level of agreement with three entity-phrased statements (e.g., "My texts will always have the same quality, no matter how much I try to change it"). The ITW includes a six-point Likert response scale, ranging from complete disagreement to complete agreement. Since the items are phrased in the entity direction, lower scores indicated more incremental theories about writing, while higher scores indicated more entity theories about writing. The scale showed a good internal consistency at both assessment points (Bentler's $\rho_{\text{pretest}} = 0.77$; Bentler's $\rho_{\text{posttest}} = 0.86$).

Implicit Theories of Intelligence. We relied on the Implicit Theories of Intelligence Scale (ITIS; [Costa & Faria, 2020](#)) to measure students' beliefs about the malleability of their intelligence. The ITIS is a 12-item scale, originally developed for the Portuguese context, which comprises six items about incremental theories (e.g., "Whenever I learn new things my intelligence increases") and six items about entity theories (e.g., "Personally I do not think I can do much to increase my intelligence"). Students rate their level of agreement with each item on a six-point Likert response scale, ranging from complete agreement to complete disagreement. For this study, the entity items were reverse-coded, which means that lower scores implied a greater endorsement of incremental theories, while higher scores implied a greater endorsement of entity theories about intelligence, in line with the Implicit Theories of Writing scale. The scale showed a good internal consistency at both assessment occasions (Bentler's $\rho_{\text{pretest}} = 0.86$; Bentler's $\rho_{\text{posttest}} = 0.88$).

2.4.2. Writing performance measures

Text Quality. Students wrote an opinion text before and after the intervention. We selected writing prompts that were developmentally appropriate for sixth-grade students, and which have been used in writing instructional studies (e.g., [Nussbaum & Schraw, 2007](#); [Limpo & Alves, 2013, 2014](#)). The prompts were as follows: "Give your opinion about children eating candy every day" (pretest) and "Give your opinion about students doing homework every day" (posttest). We ensured that the writing prompts were equivalent in terms of complexity across both testing sessions ([De Smedt, Graham, et al., 2020](#)) using two strategies. First, the writing prompts were phrased in a similar way, starting with the stem "Give your opinion about children", targeting activities familiar to children but surrounded by controversy ("eating candy" or "doing homework"), and ending with the word "everyday". Second, we asked an experienced writing researcher and a Portuguese language teacher (not enrolled in the intervention study) to examine the appropriateness of the writing prompts, which were considered highly appropriate for sixth-grade students.

Table 2
Students' Demographics.

Demographics	Active control ($n = 51$)		SRSD ($n = 74$)		SRSD + GM ($n = 66$)	
	N	%	N	%	N	%
Female students	20	39.2	34	45.9	35	53
Male students	31	60.8	40	54.1	31	47
Average age in years (SD)	11.02 (0.58)	–	11.15 (0.54)	–	11 (0.50)	–
Average school mark in Portuguese language (SD)	3.39 (0.90)	–	3.43 (0.76)	–	3.58 (0.86)	–
Mother's Educational Level						
Grade 4	1	2	1	1.4	1	1.5
Grade 6	7	13.7	7	9.5	3	4.5
Grade 9	6	11.8	10	13.5	8	12.1
Secondary school	10	19.6	18	24.3	19	28.8
College or above	8	15.7	10	13.5	20	30.03
Unknown	19	37.3	28	37.8	15	22.7

Note. Portuguese language mark ranged from 1 to 5.

These handwritten texts were later typed with a word processor, and all spelling, punctuation, and capitalization errors were corrected to prevent presentation biases, which could negatively influence the scoring procedure (Graham et al., 2011).

Three research assistants blind to the study purposes scored text quality using a holistic rating scale (Cooper, 1977; Graham et al., 2017; Huot, 1990), which we previously used in our studies (e.g., Camacho et al., 2022; Camacho, Alves, De Smedt, et al., 2021). The first author trained the raters to assign a holistic score, ranging from 1 (low text quality) to 7 (high text quality), based on four equally important criteria: (a) ideas (i.e., relevance of ideas, quality, and variety of reasons to support the opinion); (b) coherence (i.e., clarity, organization, and structure of the opinion text); (c) syntax (syntax correctness, diversity, and complexity of sentence structures); (d) vocabulary (i.e., vocabulary diversity and interest, and use of words characteristic of opinion texts). Raters were explicitly instructed to not ascribe more importance to any aspect and to equally weigh the four criteria when scoring the texts (Collins et al., 2021). Judges were also provided with three benchmark opinion texts, representing low, average, and high text quality, to aid them when making a judgment. Interrater reliability using the Intraclass Correlation (ICC) was high at both assessment occasions ($ICC_{\text{pretest}} = 0.93$; $ICC_{\text{posttest}} = 0.93$). The final text quality score was the average across the three raters.

Text Length. Text length was measured by the number of words written in the opinion text. We used the word count feature in Word to determine the length of each text.

2.4.3. Social validity

At posttest, we used an own-developed self-report scale to examine students' acceptance and perceived value of the intervention programs. This scale was developed based on social validity dimensions assessed in previous SRSD studies (e.g., Harris et al., 2006; Harris et al., 2012). Students rated their level of agreement with the following five statements on a five-point Likert response scale, ranging from complete disagreement to complete agreement: (1) The intervention program was useful; (2) The intervention program was difficult; (3) The intervention program helped me to write good opinion texts; (4) In the future, I will apply what I have learnt in the intervention program; (5) I recommend this intervention program to other sixth graders.

2.5. Procedure

We organized two separate in-person professional development training sessions for teachers: one for the SRSD teachers and another for the SRSD + GM teachers. For three hours, the first author provided a detailed description of the aims of the intervention, the lessons' contents, lesson scenarios, and the expected timeline. The teachers were also provided with both teachers' handbooks (SRSD handbook: 27 pages; SRSD + GM handbook: 34 pages) and students' workbooks (SRSD workbook: 24 pages; SRSD + GM workbook: 30 pages).

The four teachers implemented seven 50-minute lessons spread over six weeks, during the first period of the academic year 2020/2021 (i.e., Fall of 2020). The first and second lessons were implemented during the first week of the interventions and the subsequent sessions were implemented once a week. All lessons were described in detail in both the teachers' handbooks and students' workbooks, which were designed by the first, second, and third authors. Both the handbook and the workbook were designed based on the SRSD field-tested lesson plans described in the book "Powerful writing strategies for all students" by Harris et al. (2008) and inspired by the strategy-focused interventions by De Smedt, Van Keer, and Graham (De Smedt et al., 2019; De Smedt, Graham, et al., 2020).

Over the six weeks, all groups (viz., active control group, SRSD, and SRSD + GM) wrote five opinions texts on the same topics (see Table 3). We implemented this procedure to examine whether the putative gains in motivation and writing performance would be triggered by an

Table 3
Writing Prompts of the Opinion Texts Used in the SRSD Intervention.

Opinion text	Lesson	Writing prompt	Type of planning and composing
Model text	Lesson 3	Give your opinion about children eating candy everyday (pretest writing prompt).	The teacher modelled how to plan and compose the pretest text. Students copied the model text to their workbooks.
Text 1	Lesson 4	Give your opinion about children studying everyday after school.	Teacher and students jointly planned the text. Students individually composed the text with teacher support whenever needed and with access to the SRSD supporting materials.
Text 2	Lesson 5	Give your opinion about the amount of time that children spend on the phone.	Students individually planned and composed the text with teacher support whenever needed and with access to the SRSD supporting materials.
Text 3	Lesson 6	Students could choose one of two topics: Give your opinion about people abandoning pets. Give your opinion about the pros and cons of the internet.	Students individually planned and composed the text with teacher support whenever needed and with access to the SRSD supporting materials.
Text 4	Homework of lesson 6	Give your opinion about the importance of people wearing a mask during the pandemic.	Students individually planned and composed the text without teacher support, but with access to the SRSD supporting materials.
Text 5	Lesson 7	Give your opinion about children helping with the household chores.	Students independently planned and composed the text without teacher support and with no access to the SRSD supporting materials

increase in the amount of time spent writing or driven by the strategies and knowledge acquired with the interventions.

After obtaining consent from parents and assent from students, we assessed their writing motivation and performance (see Measures). The first author collected the data one week before the intervention (pretest) and one week after the intervention (posttest) during 50-minute sessions in the presence of the Portuguese language teacher. At the pretest, students filled in a short demographic survey, completed the writing self-efficacy, implicit theories of writing, and implicit theories of intelligence self-report scales, and wrote an opinion text (five minutes to plan and 15 min to compose). At the posttest, students completed the writing self-efficacy, implicit theories of writing, and implicit theories of intelligence self-report scales, wrote an opinion text (five minutes to plan and 15 min to compose), and filled in the social validity scale. During both sessions, the first author read the instructions aloud and all students performed the tasks individually. The data was collected in compliance with the General Data Protection Regulation (2016).

2.6. Interventions

2.6.1. Self-Regulated Strategy Development (SRSD) instruction

The two SRSD groups (i.e., SRSD and SRSD + GM) received SRSD instruction focused on how to plan and compose opinion texts delivered by the Portuguese language teacher in seven 50-minute lessons.

Lesson 1. The teacher introduced the writing program and supplied

the workbooks to the students. Both the teacher and the students signed a joint contract, explaining that students would learn how to write good opinion texts and they would need to learn a planning strategy and work hard to achieve the intended goal. The contract aimed at encouraging students to put into practice goal-setting. The teacher then provided students with explicit background knowledge and taught a genre-specific planning strategy. Regarding the background knowledge, the teacher explained what an opinion is, identified which parts form an opinion text, and examined the characteristics of a good opinion text. Concerning the genre-specific planning strategy, the teacher introduced the TREE mnemonic developed by Harris et al. (2008), which stands for Topic, Reason, Example, and Ending. We opted to maintain the mnemonic in English (i.e., TREE), but we associated each letter to an equivalent term in Portuguese (i.e., Tenho uma opinião, Razões, Explicações, and Encerramento). Students were taught that from then on they would need to include, at least, eight parts to achieve a complete and well-structured opinion text (i.e., Topic, Reason 1, Example 1, Reason 2, Example 2, Reason 3, Example 3, and Ending). At the end of the first lesson, students had to find the different parts in an opinion text provided by the teacher and fill in a graphic organizer based on the TREE mnemonic.

Lesson 2. The teacher asked students whether they remembered the TREE mnemonic and proposed three tasks to further practice and memorize it. In the first task, students connected each part of the mnemonic to a specific description (e.g., *Reasons* → *The paragraphs where the student indicates the reasons supporting her/his opinion. It is important to indicate, at least, three reasons to justify the opinion*). The second task was a compare-and-contrast exercise (De Smedt et al., 2019), in which students identified the differences between a low- and high-quality opinion text written by sixth-grade students from another school. In the third task, students used their opinion texts written at pretest to examine which of the eight parts of an opinion text they included and which parts they missed. Students were then encouraged to color the number of parts included in the text on a self-assessment sheet containing a rocket displaying the eight parts of an opinion text (Harris et al., 2008). This process prepared students to set goals and to self-monitor their performance in the following lessons. Indeed, the process of coloring the rocket available on the self-assessment sheet was repeated whenever students wrote an opinion text to self-monitor the writing progress throughout the intervention program.

Lesson 3. The teacher provided additional background knowledge by introducing a list of transition words and other statements characteristic of opinion texts (e.g., *In my opinion; One reason; Another reason; For example; In fact; In conclusion; To summarize*). At this point, each student received a card displaying both the TREE mnemonic and a chart with transition words, which could be completed with other transition words that students came up with. The rest of the lesson was entirely devoted to modelling the genre-specific planning strategy (i.e., TREE mnemonic) and self-regulation skills. The teacher demonstrated how to use the TREE mnemonic to plan and compose a complete and well-structured opinion text (writing prompt: “Give your opinion about children eating candy everyday”). The teacher also modelled out loud the use of self-regulation strategies, including goal-setting (e.g., “*I want to write a complete opinion text with eight parts*”), self-instruction (e.g., “*To that end, I will write a plan using the TREE mnemonic. The first T in TREE means topic. The topic is about children eating candy every day. In my opinion, children should not eat candy every day...*”), and self-assessment (e.g., “*To finish, I will read and revise my opinion text. I will check if I included the eight parts, based on the TREE mnemonic*”). While the teacher planned and composed the text, students contributed with ideas. The students also registered the plan in the TREE graphic organizer and the text in their workbooks. After modelling, the teacher discussed the importance of using self-instructions while writing and encouraged students to write down their own self-statements.

Lesson 4. The teacher and the students generated a collaborative plan for an opinion text using the TREE mnemonic (writing prompt:

“Give your opinion about children studying everyday after school”). Next, students recorded the plan in the TREE graphic organizer and individually composed the opinion text using their own words. The teacher scaffolded whenever necessary. They also wrote down their goals, self-instructions, and self-reinforcers on a self-statement sheet available in the workbooks. The lesson ended up with students self-monitoring their progress on the self-assessment sheet.

Lesson 5. Students planned and composed an opinion text individually (writing prompt: “Given your opinion about the amount of time that children spend on the phone”). The teacher scaffolded whenever necessary, especially to students with difficulties in generating ideas for the text plan. Subsequently, students self-monitored their progress on the self-assessment sheet.

Lesson 6. All students received individualized feedback from the teacher on the aspects they made progress as well as on the aspects they still needed to improve. Students then continued the individual practice of planning and composing an opinion text with teacher support whenever needed. Teacher especially provided scaffolding to students with more difficulties. In this lesson, students were allowed to select one out of two given writing prompts to sustain their motivation (“Give your opinion about people abandoning pets” or “Give your opinion about the pros and cons of the internet”). As usual, students self-monitored their progress on the self-assessment sheet. The teacher discussed how the genre-specific planning strategy and the self-regulation strategies could be maintained and generalized to other contexts. For homework, teacher required students to write an additional text individually without her support, but with access to the SRSD supporting materials, such as the graphic organizer and the list of transition words (writing prompt: “Give your opinion about the importance of people wearing a mask during the pandemic”).

Lesson 7. In the final lesson, students did not have the TREE graphic organizer; instead, they had a blank space to plan the text. In addition, they did not have access to the self-assessment sheet nor to the card with the TREE mnemonic and the list of transition words, which were available in the previous lessons. Thus, students had to plan and compose an opinion text independently without any support from the teacher and with no access to the SRSD supporting materials (writing prompt: “Give your opinion about children helping with the household chores”).

2.6.2. Brief growth mindset intervention

Only the SRSD + GM group received an additional brief growth mindset intervention, which was delivered by the Portuguese language teacher in 10-minute slots at the end of each SRSD lesson. Intervention time was equated across the groups. Over six weeks, students completed seven growth mindset-focused activities, which were embedded in their workbooks. Of the seven activities, two activities were devoted to brain plasticity, the malleability of intelligence, and the features of a growth mindset (Blackwell et al., 2007), three activities focused on the struggles of three children’s book writers (Lin-Siegler et al., 2016), and two activities prompted students to write about struggles—namely in writing—and how to deal with them (Aronson et al., 2002). The activities are described in detail below.

Activity 1. The teacher read aloud a text about brain plasticity and how to grow intelligence through effort and hard work. The teacher then asked questions to students and highlighted the key messages conveyed by the text.

Activity 2. Students were encouraged to write about a challenging moment in school—either writing-related or not—that required effort and hard work to deal with and that strengthened their brains (Yeager et al., 2016). The teacher then invited some students to share their stories with their classmates.

Activity 3. The teacher read aloud a text about what a growth mindset meant and about the strategies used by students who hold such mindsets (e.g., embracing challenges, learning from mistakes, working hard, persisting in a task, accepting feedback). The teacher then

discussed with students how they would make use of these strategies to improve their writing performance.

Activities 4 to 6. The teacher read aloud stories about famous children's book writers. Based on the study of Lin-Siegler et al. (2016), who introduced students to stories of scientists who struggled, we created stories about famous children's book writers who struggled in their personal and professional lives and ultimately achieved success through hard work. We selected stories of two Portuguese writers (Alice Vieira and António Mota) and one foreign writer (J. K. Rowling), who were familiar to Portuguese sixth graders. After each story, the teacher examined with students the strategies used by each writer to surmount their personal and professional struggles.

Activity 7. Students individually read a fictional letter by a same-age student, who reported struggling with writing and feeling demotivated. Each student had to write a reply, sharing how they overcame their difficulties in writing and what they have learned during the intervention that could be useful for the colleague.

2.7. Treatment fidelity

We used four safeguards to ensure that the intervention was delivered as planned. First, the four teachers participated in a three-hour professional development session, where the first author explained the goals of the intervention and trained them to deliver each lesson (see Procedure). The teachers were also provided with their handbooks, the students' workbooks, and other materials needed. Second, the teachers and the first author met weekly—either in-person or using remote means—to resolve glitches that might have occurred while delivering the previous lesson and to clarify doubts about the upcoming lesson. Third, the teachers were given checklists with step-by-step orientations for each lesson. The teachers were told to check each step off once it was completed. These checklists were later returned to the research team when the intervention ended. Fourth, the first author observed one-third of the lessons to ensure that the intervention was implemented as intended. To that end, the researcher filled in the same step-by-step checklist provided to teachers.

3. Results

3.1. Data analytic plan

We used multilevel models (random intercept models) to test the intervention effects considering the nested nature of data (i.e., repeated measures nested within students, which were nested within classes). Available data was unable to support a three-level model due to the reduced number of repeated measures ($n = 2$) and classes ($n = 11$). As such, we opted for a two-level model, with students' score changes (posttest score minus pretest score) nested within classes.

Motivational variables. For motivational variables, when we tested the null models and computed the ICCs, we found low ICC scores (between 0.00 and -0.039). These ICC values indicate very low level 2 (i.e., class) variability. As such and given the low number of classes available ($n = 11$), for the motivational variables we opted to do standard multivariate regression models and not proceed with multilevel analyses as initially planned. Regression models were performed using R stats package (3.6.2) in R version 4.0.5 (R Core Team, 2021).

Writing performance variables. For writing performance variables, when we computed the null models, we found that the ICC score was 0.407 for text quality and 0.250 for text length, which means that we found substantial level 2 (i.e., class) variability. Therefore, we proceeded with multilevel analyses as initially intended. Multilevel models were fitted using the lmerTest package (3.1–3) in R version 4.0.5 with REML estimation (Kuznetsova et al., 2017; R Core Team, 2021).

In both regression and multilevel models, we controlled for pretest scores centered on the mean score (i.e., to test for differential growth rates related to initial values) as well as for gender (covariate coded as

0.5 for boys and -0.5 for girls).

3.2. Descriptive results

Table 4 displays bivariate correlations for motivational and writing performance variables and Table 5 depicts means and standard deviations for motivational and writing performance measures in each condition by testing time.

Regarding bivariate correlations, all pretest variables were significantly and moderately to highly correlated with posttest variables (r s ranging from 0.42 to 0.69, p s < 0.01). Self-efficacy factors were significantly and positively associated (r s ranging from 0.37 to 0.74, p s < 0.01). Opinion text quality and text length were significantly and positively correlated with one another (r s ranging from 0.35 to 0.72, p s < 0.01).

3.3. Models for motivational and writing performance variables

Table 6 presents the summaries of the regression estimates for regression models of the motivational variables (i.e., self-efficacy for conventions, self-efficacy for ideation, self-efficacy for self-regulation, implicit theories of writing, and implicit theories of intelligence). Table 7 displays the summaries of the regression estimates for the two-level models of writing performance variables (i.e., text quality and text length).

The intercepts (β_0) in the models represent the mean scores of each motivational and writing performance variable for the average student in the active control group; β_3 estimates represent the mean difference between SRSD and the active control group for each motivational and writing performance variable (while controlling for gender and pretest scores); β_4 estimates represent the mean difference between SRSD + GM and the active control groups (while controlling for gender and pretest scores). The difference between β_3 and β_4 equals the estimated mean difference between SRSD and SRSD + GM groups.

3.3.1. Motivational variables

Fig. 1 displays a graphical representation of motivational scores by condition and testing time.

Self-Efficacy for Conventions. After controlling for students' gender and pretest score, results showed that students in both SRSD groups ($M_{\text{SRSD}} = 71.46$, $SD = 19.26$; $M_{\text{SRSD+GM}} = 75.12$, $SD = 17.83$) and in the active control group ($M_{\text{Control}} = 71.85$, $SD = 18.98$) had similar levels of self-efficacy for conventions at posttest ($\beta_3_{\text{SRSD}} = 0.37$, $p = .881$; $\beta_4_{\text{SRSD+GM}} = 2.82$, $p = .271$). No significant differences were found between SRSD and SRSD + GM groups, $p > .05$. As for gender ($M_{\delta} = 72.59$, $SD = 18.90$; $M_{\eta} = 73.10$, $SD = 18.52$), no significant difference was found at posttest ($\beta_{\delta} = -1.27$, $p = .271$).

Self-Efficacy for Ideation. After including students' gender and pretest score as covariates, regression models indicated that the SRSD group reported higher self-efficacy for ideation than the active control group ($M_{\text{Control}} = 68.37$, $SD = 23.15$) at the posttest ($\beta_3_{\text{SRSD}} = 8.17$, $p = .007$), however the same did not happen for SRSD + GMs students, who did not outperform the active control group ($\beta_3_{\text{SRSD+GM}} = 2.84$, $p = .356$). No significant differences were found between SRSD and SRSD + GM groups, $p > .05$. Regarding gender ($M_{\delta} = 72.52$, $SD = 19.93$; $M_{\eta} = 68.48$, $SD = 24.20$), no significant difference emerged at posttest ($\beta_{\delta} = 3.14$, $p = .178$).

Self-Efficacy for Self-Regulation. After controlling for students' gender and pretest score, we found that students in both SRSD groups ($M_{\text{SRSD}} = 69.56$, $SD = 19.96$; $M_{\text{SRSD+GM}} = 66.84$, $SD = 22.35$) and in the active control group ($M_{\text{Control}} = 70.43$, $SD = 20.60$) exhibited similar levels of self-efficacy for self-regulation at posttest ($\beta_3_{\text{SRSD}} = 0.59$, $p = .848$; $\beta_4_{\text{SRSD+GM}} = -1.43$, $p = .652$). No significant differences were found between SRSD and SRSD + GM, $p > .05$. Again, regarding gender ($M_{\delta} = 70.32$, $SD = 23.36$; $M_{\eta} = 67.17$, $SD = 23.36$), we did not find a significant difference at posttest ($\beta_{\delta} = 3.71$, $p = .133$).

Table 4
Correlations for Motivational and Writing Performance Variables.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Self-efficacy for conventions (pretest)	–													
2. Self-efficacy for conventions (posttest)	0.69**	–												
3. Self-efficacy for ideation (pretest)	0.65**	0.54**	–											
4. Self-efficacy for ideation (posttest)	0.45**	0.62**	0.66**	–										
5. Self-efficacy for self-regulation (pretest)	0.59**	0.54**	0.71**	0.59**	–									
6. Self-efficacy for self-regulation (posttest)	0.37**	0.59**	0.491**	0.74**	0.608**	–								
7. Implicit theories of writing (pretest)	–0.15*	–0.24**	–0.13	–0.06	–0.19**	–0.11	–							
8. Implicit theories of writing (posttest)	–0.23**	–0.39**	–0.19*	–0.32**	–0.22**	–0.29**	0.42**	–						
9. Implicit theories of intelligence (pretest)	–0.35**	–0.25**	–0.28*	–0.25**	–0.24**	–0.21**	0.29**	0.36**	–					
10. Implicit theories of intelligence (posttest)	–0.27**	–0.32**	–0.30*	–0.38**	–0.28**	–0.33**	0.27**	0.45**	0.53**	–				
11. Opinion text quality (pretest)	0.35**	0.28**	0.25**	0.12	0.24**	0.19**	–0.31**	–0.19**	–0.18*	–0.16*	–			
12. Opinion text quality (posttest)	0.17*	0.28**	0.09	0.16*	0.13	0.11	–0.29**	–0.29**	–0.15*	–0.20**	0.47**	–		
13. Opinion text length (pretest)	0.17*	0.17*	0.19**	0.15*	0.16*	0.13	–0.19**	–0.13	–0.06	–0.09	0.68**	0.35**	–	
14. Opinion text length (posttest)	0.14	0.21**	0.14*	0.21**	0.17*	0.14	–0.22**	–0.23**	–0.16*	–0.29**	0.50**	0.72**	0.60**	–

Note. *Correlations are significant at $p < .05$; **correlations are significant at $p < .01$.

Implicit Theories of Writing. After controlling for students' gender and pretest score, we observed that students in both SRSD groups ($M_{\text{SRSD}} = 2.36$, $SD = 1.39$; $M_{\text{SRSD+GM}} = 2.01$, $SD = 1.07$) and in the active control group ($M_{\text{Control}} = 2.52$, $SD = 1.10$) showed similar scores in the scale assessing implicit theories of writing at posttest ($\beta_3 \text{ SRSD} = -0.20$, $p = .327$; $\beta_4 \text{ SRSD+GM} = -0.32$, $p = .129$). No significant differences were found between SRSD and SRSD + GM, $p > .05$. Concerning gender ($M_{\delta} = 2.20$, $SD = 1.28$; $M_{\eta} = 2.38$, $SD = 1.16$), no significant difference was found at posttest ($\beta_{\delta} = -0.16$, $p = .316$).

Implicit Theories of Intelligence. After controlling for students' gender and pretest score, results indicated that students in both SRSD groups ($M_{\text{SRSD}} = 1.95$, $SD = 0.85$; $M_{\text{SRSD+GM}} = 1.96$, $SD = 0.82$) and in the active control group ($M_{\text{Control}} = 2.03$, $SD = 0.86$) had comparable scores in the scale assessing implicit theories of intelligence at posttest ($\beta_3 \text{ SRSD} = 0.02$, $p = .900$; $\beta_4 \text{ SRSD+GM} = -0.04$, $p = .772$). No significant differences were found between SRSD and SRSD + GM groups ($\beta = -0.06$, $p = .697$). As for gender ($M_{\delta} = 1.84$, $SD = 0.67$; $M_{\eta} = 2.12$, $SD = 0.98$), no significant difference was found at posttest ($\beta_{\delta} = -0.11$, $p = .313$).

3.3.2. Writing performance variables

Fig. 2 depicts a graphical representation of writing performance scores by condition and testing time.

Text Quality. After controlling for students' gender and pretest scores, results showed that students in the two SRSD groups ($M_{\text{SRSD}} = 4.84$, $SD = 0.96$; $M_{\text{SRSD+GM}} = 5.55$, $SD = 0.74$) outperformed students in the active control group ($M_{\text{Control}} = 3.88$, $SD = 0.87$) at posttest ($\beta_3 \text{ SRSD} = 1.12$, $p = .003$; $\beta_4 \text{ SRSD+GM} = 1.31$, $p = .001$). No significant differences were found between SRSD and SRSD + GM groups, $p > .05$. A marginally significant trend was found for gender ($M_{\delta} = 4.64$, $SD = 1.09$; $M_{\eta} = 5.04$, $SD = 1.02$), favoring girls' text quality at posttest ($\beta_2 = -0.21$, $p = .051$).

Text Length. Similar to text quality, after using students' gender and pretest scores as covariates, students in both SRSD groups ($M_{\text{SRSD}} = 88.86$, $SD = 28.68$; $M_{\text{SRSD+GM}} = 110.26$, $SD = 35.95$) outperformed students in the active control group ($M_{\text{Control}} = 68.08$, $SD = 28.33$) at posttest ($\beta_3 \text{ SRSD} = 19.34$, $p = .027$; $\beta_4 \text{ SRSD+GM} = 28.55$, $p = .004$). No significant differences were found between SRSD and SRSD + GM groups, $p > .05$. Regarding gender ($M_{\delta} = 86.79$, $SD = 38.13$; $M_{\eta} = 95.19$, $SD = 31.18$), we did not find a significant difference at posttest ($\beta_2 = -3.19$, $p = .390$).

3.3.3. Social validity of the interventions

Students from the SRSD and SRSD + GM groups were positive about the interventions (see Table 8): 87 % of the students agreed or strongly agreed the intervention was useful ($M = 4.40$, $DP = 0.86$); 21 % agreed or strongly agreed the intervention was difficult ($M = 2.55$, $DP = 1.28$); 89 % of the students agreed or strongly agreed the intervention helped them to write good opinion texts ($M = 4.42$, $DP = 0.88$); 79 % agreed or strongly agreed they will apply what they learned in the interventions in the future ($M = 4.19$, $DP = 0.93$); 86 % of the students agreed or strongly agreed they would recommend the intervention to other sixth-grade colleagues ($M = 4.46$, $DP = 0.92$). No differences were found between SRSD and SRSD + GM groups, all $p > 0.05$.

4. Discussion

In this study, we examined the impact of an SRSD instructional program focused on planning and composing opinion texts (Harris et al., 2008) as well as a brief growth mindset intervention to convey the message that students' writing skills can be cultivated through effort and practice. Four Portuguese language teachers received professional development training to implement these interventions with their sixth-grade students in seven lessons over six weeks during the Fall of 2020. Using a quasi-experimental pre-posttest design, we tested the effectiveness of the SRSD instructional program on students' writing

Table 5

Means (and Standard Deviations) for Motivational and Writing Performance Measures in Each Condition by Testing Time.

	Pretest			Posttest		
	Active control	SRSD	SRSD + GM	Active control	SRSD	SRSD + GM
Motivational Variables						
Self-efficacy for conventions	69.47 (23.22)	68.09 (18.74)	69.91 (21.37)	71.85 (18.98)	71.46 (19.26)	75.12 (17.83)
Self-efficacy for ideation	68.97 (22.97)	64.74 (21.99)	66.28 (24.72)	68.37 (23.15)	72.63 (21.01)	69.04 (22.31)
Self-efficacy for self-regulation	66.12 (21.95)	64.50 (21.17)	63.83 (20.83)	70.43 (20.60)	69.56 (19.96)	66.84 (22.35)
Implicit theories of writing	3.20 (1.27)	3.27 (1.27)	2.65 (1.15)	2.52 (1.10)	2.36 (1.39)	2.01 (1.07)
Implicit theories of intelligence	2.28 (0.91)	2.07 (0.71)	2.19 (0.83)	2.03 (0.86)	1.95 (0.85)	1.96 (0.82)
Writing Performance Variables						
Opinion text quality	3.02 (0.79)	2.69 (0.83)	3.71 (1.01)	3.88 (0.87)	4.84 (0.96)	5.55 (0.74)
Opinion text length	56.43 (22.73)	59.40 (28.04)	79.95 (38.64)	68.08 (28.33)	88.86 (28.68)	110.26 (35.95)

Table 6

Summaries of the Regression Estimates for Motivational Variables' Models.

	Self-efficacy for conventions			Self-efficacy for ideation			Self-efficacy for self-regulation			Implicit theories of writing			Implicit theories of intelligence		
	Estimate	SE	p	Estimate	SE	p	Estimate	SE	p	Estimate	SE	p	Estimate	SE	p
β0 Intercept	71.75	1.92	< 0.001	66.38	2.31	< 0.001	69.17	2.38	< 0.001	2.48	0.16	< 0.001	1.99	0.10	< 0.001
β1 Pretest score	0.62	0.05	< 0.001	0.63	0.05	< 0.001	0.61	0.06	< 0.001	0.39	0.07	< 0.001	0.54	0.07	< 0.001
β2 Gender	-1.27	1.99	0.271	3.14	2.32	0.178	3.71	2.46	0.133	-0.16	0.16	0.316	-0.11	0.11	0.313
β3 SRSD	0.37	2.49	0.881	8.17	2.99	0.007	0.59	3.07	0.848	-0.20	0.20	0.327	0.02	0.13	0.900
β4 SRSD + GM	2.82	2.56	0.271	2.84	3.07	0.356	-1.43	3.16	0.652	-0.32	0.21	0.129	-0.04	0.14	0.772
Adj R ²	0.47			0.45			0.37			0.17			0.27		
F(4, 186)	42.69		< 0.001	39.84		< 0.001	28.52		< 0.001	10.78		< 0.001	18.38		< 0.001

Table 7

Summaries of the Regression Estimates for The Two-Level Models of Writing Performance Variables.

	Text Quality			Text Length		
	Estimate	SE	p	Estimate	SE	p
Fixed Effects						
β0 Intercept	3.96	0.21	< 0.001	73.68	5.50	< 0.001
<i>Level 1 predictors</i>						
β1 Pretest score	0.45	0.06	< 0.001	0.55	0.06	< 0.001
β2 Gender	-0.21	0.11	0.051	-3.19	3.73	0.39
<i>Level 2 predictors</i>						
β3 SRSD	1.12	0.27	0.003	19.34	7.19	0.027
β4 SRSD + GM	1.31	0.27	0.001	28.55	7.40	0.004
Random Effects						
σ ² Class (level 2)	0.094	–	–	51.38	–	–
σ ² Student (level 1)	0.535	–	–	645.5	–	–
Null Model						
σ ² Class	0.486			316.40		
σ ² Student	0.707			950.8		
ICC	0.407			0.250		
R²						
Class	80.7 %			83.7 %		
Student	24.3 %			32.1 %		

Note. Random intercept multilevel models' equation: $Y_{ij} = \beta_0 + \beta_1 \text{Pretest}_{ij} + \beta_2 \text{Gender}_{ij} + \beta_3 \text{SRSD}_j + \beta_4 \text{SRSD.GM}_j + u_j + e_{ij}$. Cross-level interactions between intervention and pretest scores were non-significant. For parsimony they were excluded from the models.

motivation and performance and further tested the added value of the brief growth mindset intervention. The results are discussed below considering each research question.

4.1. RQ1: Do students who receive SRSD instruction increase writing motivation compared to students in an active control group?

Our first hypothesis (H1) was only partially corroborated. Both SRSD and SRSD + GM groups did not significantly differ from the active control group in self-efficacy for conventions and for self-regulation nor in implicit theories of writing at posttest. In other words, SRSD instruction did not result in students with stronger self-efficacy beliefs for applying writing conventions and self-regulating their behavior while writing nor students endorsing more incremental beliefs about writing. However, the SRSD solo group outperformed the active control group in self-efficacy for ideation, but the same did not occur with the SRSD + GM group. This may be explained by the fact that SRSD students were taught genre-specific planning strategies that helped them to generate and organize ideas for their text (Harris et al., 2008). The fact that only the SRSD group improved and not the SRSD + GM group may be partially justified by the fact that the former group exclusively focused their time on planning and composing, while the latter used the lessons to plan, compose, and perform the growth mindset tasks.

As reviewed in the introduction, while some studies showed that SRSD instruction increased students' writing self-efficacy (e.g., Brunstein & Glaser, 2011; Graham & Harris, 1989; Mason et al., 2012), other studies indicated the opposite trend (e.g., García-Sánchez & Fidalgo-Redondo, 2006; Graham et al., 2005).

Several reasons may account for the limited motivational gains after the SRSD intervention. One possible reason is that an SRSD instructional program comprised of seven 50-minute lessons was not intense enough to broadly change deeply rooted motivational beliefs (Klassen, 2002). Indeed, the systematic review by Klassen (2002) on writing self-efficacy research indicated that some strategy-focused interventions improved students' writing performance but failed to enhance students' self-efficacy. Arguably, changing deeply rooted beliefs such as self-efficacy and implicit theories with a six-week intervention was a challenging endeavor. Building students' self-efficacy through successful writing experiences (i.e., mastery experiences), observation of others' performance (i.e., vicarious experiences), suggestions and encouragements (i.

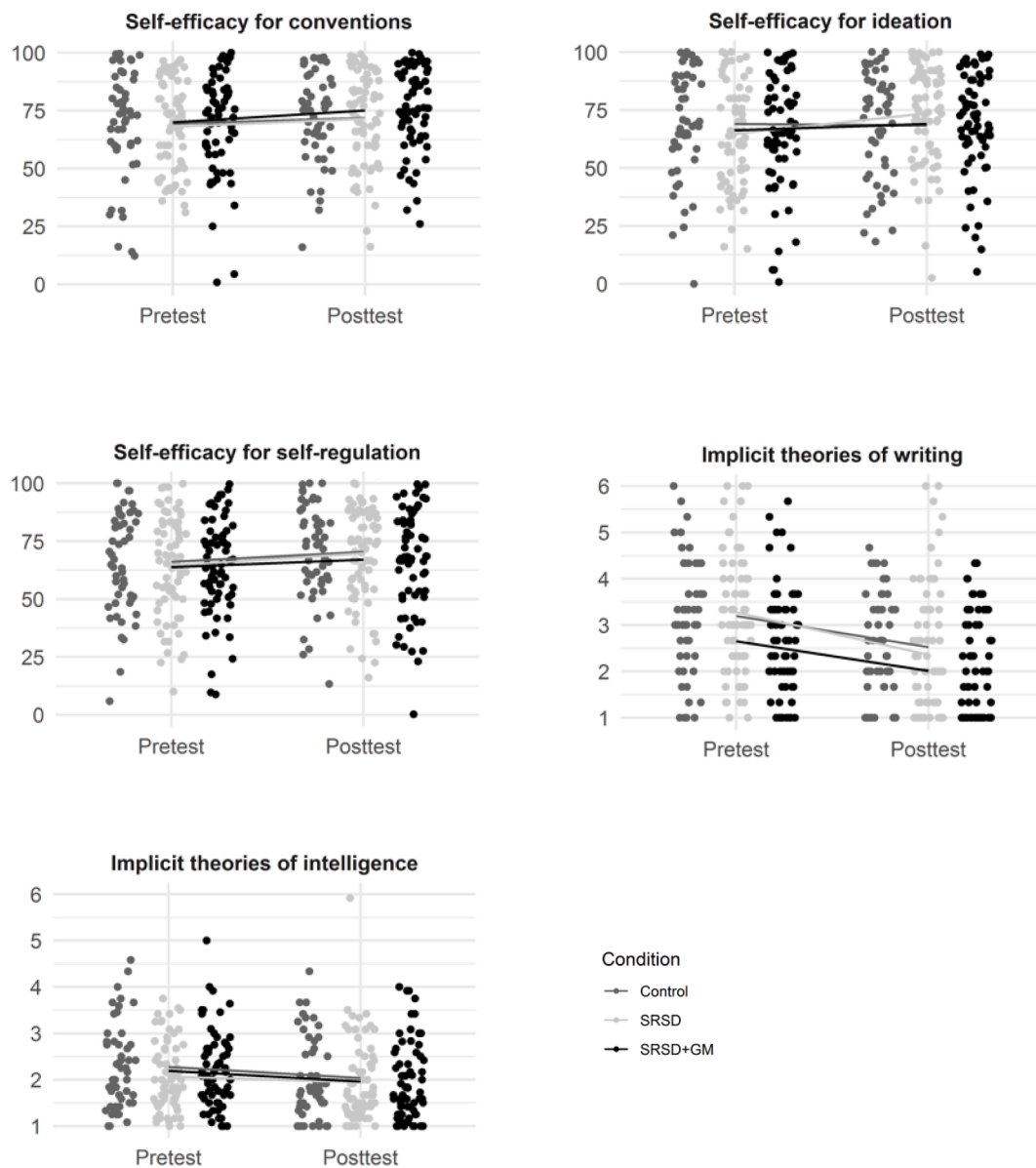


Fig. 1. Motivational Scores by Condition and Testing Time.

e., social persuasion), and awareness of one's own reactions and feelings to the act of writing (i.e., physiological and emotional states) is likely to take time (Bandura, 1997; Bruning & Kauffman, 2016; De Smedt, Graham, et al., 2020) and more than six weeks.

A second reason is that students may have overestimated both their competency in writing and endorsement of incremental theories before the intervention. Indeed, an examination of descriptive statistics showed that students reported high levels of self-efficacy for conventions and self-regulation as well as low scores in the implicit theories of writing scale¹ at pretest, which left little room to improve these motivational outcomes throughout the instruction period. The difficulty of students to accurately assess writing self-efficacy levels and other motivational aspects has been reported in prior SRSD studies (e.g., Graham et al., 2005; Harris et al., 2006).

A third reason lies in the methods that we used to assess motivational

outcomes. On the one hand, the self-report scales used to assess self-efficacy and implicit theories were not fully aligned with the contents featured in the SRSD instructional program. For instance, the self-efficacy scale asked general questions about self-efficacy for self-regulation (e.g., "I can avoid distractions while I write" or "I can start writing assignments quickly"), while students learned more specific self-regulation skills, such as goal-setting, self-instructions, and self-assessment. On the other hand, we only used quantitative methods to estimate the impact of SRSD on students' writing motivation. Nevertheless, the social validity measure indicated that students were satisfied with the SRSD instructional program. Specifically, they found the program useful and would recommend it to other sixth-grade colleagues. The use of mixed methods or qualitative approaches could help to further capture and deepen these students' perceptions, which may be more difficult to reach through a quantitative approach (Latif, 2020).

4.2. RQ2: Do students who receive SRSD instruction improve writing performance compared to students in an active control group?

In line with our second hypothesis (H2), both the SRSD and SRSD +

¹ Lower scores indicated more incremental theories (i.e., growth mindset), whereas higher scores represented more entity theories (i.e., fixed mindset) about writing.

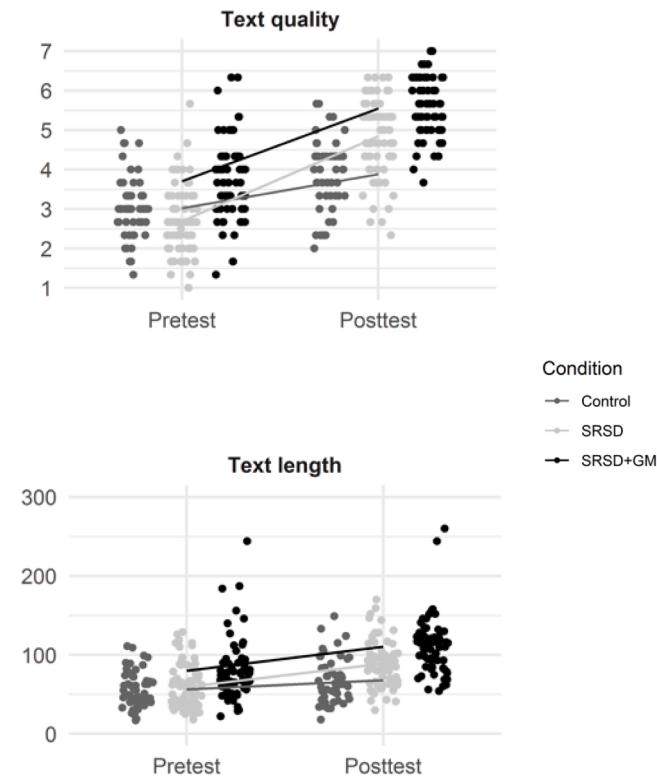


Fig. 2. Writing Performance Scores by Condition and Testing Time.

Table 8
Means (and Standards Deviations) of Scores in the Social Validity Scale Assessing Students' Satisfaction with The Interventions.

	SRSD	SRSD + GM	Both groups
1. The intervention program was useful.	4.40 (0.97)	4.41 (0.72)	4.40 (0.86)
2. The intervention program was difficult.	2.47 (1.44)	2.64 (1.09)	2.55 (1.28)
3. The intervention program helped me to write good opinion texts.	4.51 (1.02)	4.32 (0.68)	4.42 (0.88)
4. In the future, I will apply what I have learnt in the intervention program.	4.21 (1.01)	4.18 (0.84)	4.19 (0.93)
5. I would recommend this intervention program to other sixth graders.	4.48 (1.03)	4.44 (0.79)	4.46 (0.92)

GM groups significantly increased text quality compared to the active control group after the intervention. This result corroborates the findings from several *meta*-analyses conducted by Graham and colleagues, which consistently showed that strategy instruction has a moderate to strong impact on text quality and that SRSD instruction yields the largest effect size among all evidence-based writing practices (Graham & Harris, 2003; Graham et al., 2016a; Graham et al., 2012; Graham & Perin, 2007; Rogers & Graham, 2008).

In addition to the positive impact on text quality, the SRSD instruction also resulted in longer texts. Indeed, our results revealed that both SRSD and SRSD + GM groups included significantly more words in the opinion texts than the active control group at posttest. This result is consistent with past intervention studies, which indicated that students wrote longer texts after receiving SRSD instruction (Graham et al., 2005; Harris et al., 2006; Limpo & Alves, 2013; Tracy et al., 2009; Zumbunn & Bruning, 2013). In addition, previous *meta*-analyses also supported that SRSD produces large effect sizes, including for text length (e.g., Graham & Harris, 2003).

An important feature of our research design was the inclusion of an

active control group. In addition to business-as-usual instruction, the control group also wrote five opinion texts—the same opinion texts written by the two SRSD groups. We put forth this procedure since a *meta*-analysis by Graham et al. (2016b) confirmed that simply increasing the amount of time that students spend writing improves text quality. By using an active control group that practiced writing, we ensured that students in the SRSD and SRSD + GM groups improved text quality because they participated in an SRSD instructional program teaching background knowledge, genre-specific writing strategies, and self-regulation skills, and not only because they had more opportunities to write.

4.3. RQ3: Do students who receive a brief growth mindset intervention in addition to SRSD instruction improve motivational and writing outcomes compared to students who received SRSD instruction?

Contrary to our third hypothesis (H3), our results showed that the SRSD + GM group, who received a brief growth mindset intervention in addition to an SRSD instructional program, did not outperform the SRSD solo group in any of the motivational nor in writing outcomes at posttest. Therefore, the brief growth mindset intervention teaching students that writing skills are malleable did not add value to the SRSD instructional program. Several reasons may explain why this intervention was not effective.

First, the effectiveness of growth mindset interventions is surrounded by debate and controversy (Miller, 2019). As mentioned in the introduction, some studies found that growth mindset interventions produced gains in motivational and achievement outcomes especially for low-achieving students (Blackwell et al., 2007; Schrodt et al., 2019; Yeager et al., 2019), while other studies showed that interventions aimed at bolstering students' growth mindset were not effective (Foliano et al., 2019; Griffin et al., 2021; Li & Bates, 2019). Our findings seem to concur with the second set of studies. For instance, the large-scale randomized controlled trial "The Changing Mindset Project" conducted in the United Kingdom showed that a growth mindset program—teaching that the intelligence is not a fixed entity and can grow through effort—produced no gains in motivational and achievement outcomes among sixth-grade students (Foliano et al., 2019). More specifically, sixth graders who attended this program did not improve performance in literacy and numeracy tasks nor did they report progress in intrinsic value, self-efficacy, test anxiety, and self-regulation compared to a control group. In the same line, a recent study tested whether a growth mindset intervention would add value to a vocabulary instructional program (Griffin et al., 2021). The authors found that a group of students receiving a growth mindset intervention in addition to vocabulary instruction did not improve in terms of vocabulary, reading comprehension, and persistence compared to a group who only received vocabulary instruction. The authors argued that "many of the participants may have had an overall positive self-image before the intervention and may not have benefited from being instructed on how to develop a growth mindset" (Griffin et al., 2021, p. 14).

A second reason is that our growth mindset intervention did not specifically target vulnerable student populations. As shown by prior evidence, the effectiveness of growth mindset interventions seems to be limited to lower-achieving students (Yeager et al., 2019; Yeager et al., 2016) and students with low socioeconomic status (Sisk et al., 2018). These student populations are of great theoretical and policy relevance (Miller, 2019) and future research may further examine whether embedding a growth mindset intervention in writing instruction fosters the writing motivation and writing achievement of at-risk students or not.

A third possible reason is that our growth mindset intervention was too brief to have an impact on motivational beliefs. In fact, students in the SRSD + GM group only had a total duration of 70 min devoted to the growth mindset intervention. The growth mindset intervention by Schrodt et al. (2019)—which had a significant, positive impact on the

writing performance, motivation, and persistence of kindergarteners—had a total duration of 600 min. Thus, future research is needed to determine whether a longer growth mindset intervention would be effective in improving middle school students' motivation and writing outcomes.

4.4. Limitations

As expected, this study is not exempted of limitations. First, we could not recruit more than one school due to the constraints imposed by the second wave of the COVID-19 pandemic in Portugal. Second, our intervention did not specifically focus on low-achieving students, who represent the student group benefiting the most from growth mindset interventions (Yeager et al., 2019; Yeager et al., 2016). Third, we did not include a follow-up assessment, which precludes us from drawing conclusions about maintenance effects of the SRSD instructional program on students' text quality and text length. Fourth, we designed interventions composed of seven 50-minute lessons spread over six weeks, which could have been too brief to change motivational beliefs (Klassen, 2002). Fifth, our motivational and writing performance measures may have been too limited to fully capture the impact of both the SRSD instructional program and the growth mindset intervention. At the motivational level, the use of self-report measures, which prompt socially desired responses and an overestimation of competency, may have been an obstacle to assess motivational changes (De Smedt, Graham, et al., 2020; Graham et al., 2005; Harris et al., 2006; Latif, 2020). At the performance level, we only included two general measures on holistic text quality and length and did not include other potentially relevant measures (e.g., level of maturity of text plans or the number of text genre elements included). Sixth, although we explored students' acceptance of the intervention, we did not assess teachers' perceived value of the professional development sessions and of the interventions (e.g., opinion on the lessons' goals, appropriateness of instructional materials, or duration of the interventions).

4.5. Directions for future research

We highlight three major directions for future research. First, considering the brief nature of the interventions tested in this study, future research can manipulate the intervention duration (shorter vs longer) to examine whether longer SRSD instructional programs and growth mindset interventions produce gains in motivational outcomes compared to shorter programs. As noted above, motivational beliefs about writing may be hard to change with relatively brief interventions (Klassen, 2002).

Second, the use of mixed methods or qualitative approaches would allow researchers to obtain more fine-grained data about students' writing motivation experiences (Latif, 2020) during SRSD instruction and growth mindset interventions. In this regard, in a comprehensive systematic review (Camacho et al., 2021), we found that only 23 out of 82 studies focusing on writing motivation employed mixed methods or qualitative approaches. In the current study, students reported high levels of self-efficacy and incremental theories about writing at pretest, which left little room to improve from pre to posttest. The use of complementary assessment methods—such as the use of phenomenological, neuropsychological/physiological, and behavioral approaches—are highly needed to overcome the shortcomings of self-report measures, which still dominate the motivation research field (for a comprehensive review, see Fulmer & Frijters, 2009).

Third, in the future, researchers could examine whether growth mindset interventions foster the writing motivation and writing performance specifically of low-achieving students in writing, bridging the gap between these students and average- and high-achievers. To this end, a more comprehensive set of writing measures should be used to determine which students are underperforming in writing before the growth mindset intervention. Indeed, recent evidence suggests that

growth mindset interventions do not have a significant impact on literacy-related outcomes (Foliano et al., 2019; Griffin et al., 2021) for the full-range sample, however these interventions may have a significant, positive impact on low-achieving students (Yeager et al., 2019) and students with low socioeconomic status (Sisk et al., 2018). In the Portuguese context, it would be particularly interesting to test the effectiveness of growth mindset interventions in schools integrated into the TEIP program (Educational Territories of Priority Intervention)—a governmental program that allocates more financial and human resources to schools located in socioeconomically disadvantaged areas, which are attended by low-achieving students and students with low socioeconomic status.

4.6. Implications for practice

Our study joins the extensive body of evidence showing that SRSD is an effective and powerful instructional approach to improve students' writing performance (Graham et al., 2016b; Graham et al., 2012; Graham & Perin, 2007; Harris et al., 2006; Harris et al., 2008; Harris et al., 2012; Rogers & Graham, 2008). Our findings are also consistent with prior studies confirming its effectiveness in the Portuguese educational text (e.g., Araújo, 2017; Festas et al., 2015; Limpo & Alves, 2013; Limpo & Alves, 2014; Sousa et al., 2012). Importantly, our study revealed that a brief SRSD instructional program delivered in seven sessions over six weeks during an ongoing pandemic was still effective in improving sixth grade students' text quality and text length. As such, we contend that this writing instructional approach needs to be embedded into in-service and pre-service professional development programs for Portuguese language teachers. As stressed by Harris, Graham, and colleagues, SRSD is not a panacea nor a substitute for the larger writing curriculum, however it is a valuable evidence-based approach—and the most effective one as consistently shown by prior *meta-analyses*—that should be included in teachers' instructional repertoires (Graham & Harris, 2003; Graham et al., 2016b; Graham et al., 2012; Graham & Perin, 2007; Harris & Graham, 2009; Harris et al., 2008; Rogers & Graham, 2008).

Although neither the SRSD instruction nor the growth mindset intervention broadly enhanced students' motivational outcomes, this does not downplay the importance of teachers nurturing positive and accurate writing motivational beliefs in students (Bruning & Horn, 2000). On the contrary, our findings encourage both researchers and practitioners to understand why motivational beliefs may be harder to change compared to writing performance (Klassen, 2002) and which instructional practices are most effective in boosting students' self-efficacy and incremental beliefs in writing (Camacho et al., 2021). Based on prior studies, SRSD instruction is a valuable approach to accomplish this goal, especially to increase students' self-efficacy over time (Brunstein & Glaser, 2011; Graham & Harris, 1989; Harris et al., 2008). Whether a growth mindset intervention may aid in the purpose of raising motivated writers—especially in the case of lower-achieving students and students from disadvantaged backgrounds—awaits further empirical testing.

4.7. Conclusion

To conclude, our study showed that an SRSD instructional program as short as six weeks implemented during an ongoing pandemic was found to increase sixth graders' text quality and text length, which are two indicators of successful writing performance. This finding highlights the need to disseminate and embed SRSD instruction into the repertoires of Portuguese language teachers since it is an effective instructional model to improve students' writing performance. At the same time, this study indicated that both an SRSD instructional program and a brief growth mindset intervention did not have a significant impact on students' motivational outcomes, except for self-efficacy for ideation. Therefore, these findings raise the question of why motivational beliefs seem to be harder to change compared with writing performance. Does

the lack of a comprehensive impact on motivational outcomes represent a measurement matter since we employed only quantitative self-report measures that may not capture subtle changes in motivation? Or does it represent a broader trend indicating that writing performance can be swiftly enhanced with cost-effective interventions but not motivational beliefs? Future studies, relying on mixed methods approaches and using the intervention duration as a moderator, may shed further light on these issues, thus providing further directions on how teachers can nurture their students' writing motivation.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Data will be made available on request.

References

- Araújo, C. L. (2017). *Dificuldades de Aprendizagem Específicas na escrita de textos argumentativos de opinião: O papel das estratégias de autorregulação no contexto das Tecnologias de Informação e Comunicação* [Unpublished doctoral dissertation]. University of Minho.
- Aronson, J., Fried, C. B., & Good, C. (2002). Reducing the Effects of Stereotype Threat on African American College Students by Shaping Theories of Intelligence. *Journal of Experimental Social Psychology*, 38(2), 113–125. <https://doi.org/10.1006/jesp.2001.1491>
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. W H Freeman/Times Books/ Henry Holt & Co.
- Bruning, R., Dempsey, M., Kauffman, D. F., McKim, C., & Zumbunn, S. (2013). Examining dimensions of self-efficacy for writing. *Journal of Educational Psychology*, 105(1), 25–38. <https://doi.org/10.1037/a0029692>
- Blackwell, L. S., Trzesniewski, K. H., & Dweck, C. S. (2007). Implicit theories of intelligence predict achievement across an adolescent transition: A longitudinal study and an intervention. *Child Development*, 78(1), 246–263. <https://doi.org/10.1111/j.1467-8624.2007.00995.x>
- Boscolo, P., & Hidi, S. (2007). The multiple meanings of motivation to write. In P. Boscolo, & S. Hidi (Eds.), *Writing and motivation* (pp. 1–14). Oxford: Elsevier. https://doi.org/10.1163/9781849508216_002
- Bruning, R., & Horn, C. (2000). Developing motivation to write. *Educational Psychologist*, 35(1), 25–37. https://doi.org/10.1207/S15326985EP3501_4
- Bruning, R., & Kauffman, D. F. (2016). Self-efficacy beliefs and motivation in writing development. In C. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of writing research* (pp. 160–173). The Guilford Press.
- Brunstein, J. C., & 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. <https://doi.org/10.1037/a0024622>
- Burnette, J. L., O'Boyle, E. H., VanEpps, E. M., Pollack, J. M., & Finkel, E. J. (2013). Mind-sets matter: A meta-analytic review of implicit theories and self-regulation. *Psychological Bulletin*, 139(3), 655–701. <https://doi.org/10.1037/a0029531>
- Camacho, A., Alves, R. A., & Boscolo, P. (2021). Writing motivation in school: A systematic review of empirical research in the early twenty-first century. *Educational Psychology Review*, 33(1), 213–247. <https://doi.org/10.1007/s10648-020-09530-4>
- Camacho, A., Alves, R. A., Daniel, J. R., De Smedt, F., & Van Keer, H. (2022). Structural relations among implicit theories, achievement goals, and performance in writing. *Learning and Individual Differences*, 100, Article 102223. <https://doi.org/10.1016/j.lindif.2022.102223>
- Camacho, A., Alves, R. A., De Smedt, F., Van Keer, H., & Boscolo, P. (2021). Relations among motivation, behaviour, and performance in writing: A multiple-group structural equation modeling study. *British Journal of Educational Psychology*, 91(4), 1456–1480. <https://doi.org/10.1111/bjep.12430>
- Carpentieri, J. (2012). *Act now: The EU High Level Group of Experts Report on Literacy*. Publications Office of the European Union.
- Collins, A. A., Ciullo, S., Graham, S., Sigafos, L. L., Guerra, S., David, M., & Judd, L. (2021). Writing expository essays from social studies texts: A Self-Regulated Strategy Development study. *Reading and Writing*, 34(7), 1623–1651. <https://doi.org/10.1007/s11145-021-10157-2>
- Cooper, C. R. (1977). Holistic evaluation of writing. In C. R. Cooper & L. Odell (Eds.), *Evaluating writing: Describing, measuring, judging* (Vol. 1-31). National Council of Teachers of English.
- Costa, A., & Faria, L. (2018). Implicit theories of intelligence and academic achievement: A meta-analytic review. *Frontiers in Psychology*, 9(829). <https://doi.org/10.3389/fpsyg.2018.00829>
- Costa, A., & Faria, L. (2020). The impact of implicit theories on students' emotional outcomes. *Current Psychology*. Advance online publication. <https://doi.org/10.1007/s12144-020-00750-z>
- De Smedt, F., Graham, S., & Van Keer, H. (2019). The bright and dark side of writing motivation: Effects of explicit instruction and peer assistance. *The Journal of Educational Research*, 112(2), 152–167. <https://doi.org/10.1080/00220671.2018.1461598>
- De Smedt, F., Graham, S., & Van Keer, H. (2020a). "It takes two": The added value of structured peer-assisted writing in explicit writing instruction. *Contemporary Educational Psychology*, 60, Article 101835. <https://doi.org/10.1016/j.cedpsych.2019.101835>
- De Smedt, F., Rogiers, A., Heirweg, S., Merchie, E., & Van Keer, H. (2020b). Assessing and mapping reading and writing motivation in third to eighth graders: A Self-Determination Theory perspective. *Frontiers in Psychology*, 11(1678). <https://doi.org/10.3389/fpsyg.2020.01678>
- Denworth, L. (2019, August 12). *Debate arises over teaching "growth mindsets" to motivate students*. Scientific American. <https://www.scientificamerican.com/article/debate-arises-over-teaching-growth-mindsets-to-motivate-students/>
- Direção-Geral da Educação (2018). *Aprendizagens essenciais: Articulação com o perfil dos alunos* [Essential learning outcomes: Articulation with students' profile at the end of compulsory education]. http://www.dge.mec.pt/sites/default/files/Curriculo/Aprendizagens_Essenciais/2_ciclo/6_portugues.pdf
- Domingue, B. W., Hough, H. J., Lang, D., & Yeatman, J. (2021). *Changing patterns of growth in oral reading fluency during the covid-19 pandemic*. Working Paper. Policy Analysis for California Education, PACE. <https://edpolicyinca.org/publication/s/changing-patterns-growth-oral-reading-fluency-during-covid-19-pandemic>
- Dweck, C. S. (1999). *Self-theories: Their role in motivation, personality, and development*. Psychology Press.
- Dweck, C. S., & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review*, 95(2), 256–273. <https://doi.org/10.1037/0033-295X.95.2.256>
- Dweck, C. S., & Master, A. (2009). Self-theories and motivation. In K. R. Wenzel, & A. Wigfield (Eds.), *Handbook of motivation at school* (pp. 123–140). Routledge/Taylor & Francis Group.
- Dweck, C. S., & Molden, D. C. (2017). Mindsets: Their impact on competence motivation and acquisition. In A. J. Elliot, C. S. Dweck, & D. S. Yeager (Eds.), *Handbook of competence and motivation: Theory and application* (2nd ed., pp. 135–154). Guilford Press.
- Festas, I., Oliveira, A. L., Rebelo, J. A., Damião, M. H., Harris, K., & Graham, S. (2015). Professional development in Self-Regulated Strategy Development: Effects on the writing performance of eighth grade Portuguese students. *Contemporary Educational Psychology*, 40, 17–27. <https://doi.org/10.1016/j.cedpsych.2014.05.004>
- Foliano, F., Rolfe, H., Buzzeo, J., Runge, J., & Wilkinson, D. (2019). Changing mindsets: Effectiveness trial. *National Institute of Economic and Social Research*.
- Fulmer, S. M., & Frijters, J. C. (2009). A review of self-report and alternative approaches in the measurement of student motivation. *Educational Psychology Review*, 21(3), 219–246. <https://doi.org/10.1007/s10648-009-9107-x>
- García-Sánchez, J.-N., & Fidalgo-Redondo, R. (2006). Effects of two types of self-regulatory instruction programs on students with learning disabilities in writing products, processes, and self-efficacy. *Learning Disability Quarterly*, 29(3), 181–211. <https://doi.org/10.2307/30035506>
- Graham, S., & Alves, R. A. (2021). Research and teaching writing. *Reading and Writing*, 34(7), 1613–1621. <https://doi.org/10.1007/s11145-021-10188-9>
- Graham, S., & Harris, K. R. (1989). Components analysis of cognitive strategy instruction: Effects on learning disabled students' compositions and self-efficacy. *Journal of Educational Psychology*, 81(3), 353–361. <https://doi.org/10.1037/0022-0663.81.3.353>
- Graham, S., & Harris, K. R. (2003). Students with learning disabilities and the process of writing: A meta-analysis of SRSD studies. In H. L. Swanson, K. R. Harris, & S. Graham (Eds.), *Handbook of learning disabilities* (pp. 323–344). The Guilford Press.
- Graham, S., Harris, K. R., & Chambers, A. B. (2016a). Evidence-based practice and writing instruction: A review of reviews. In C. A. MacArthur, S. Graham, & J. Fitzgerald (Eds.), *Handbook of writing research* (Vol. 2, pp. 211–226).
- Graham, S., Harris, K. R., & Chambers, A. B. (2016b). Evidence-based practice and writing instruction: A review of reviews. In *Handbook of writing research* (2nd ed., pp. 211–226). The Guilford Press.
- Graham, S., Harris, K. R., & 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. <https://doi.org/10.17161/foec.v44i4.6687>
- Graham, S., Harris, K. R., Kihara, S. A., & Fishman, E. J. (2017). The relationship among strategic writing behavior, writing motivation, and writing performance with young, developing writers. *Elementary School Journal*, 118(1), 82–104. <https://doi.org/10.1086/693009>

- Graham, S., Harris, K. R., & 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. <https://doi.org/10.1016/j.cedpsych.2004.08.001>
- Graham, S., Harris, K. R., & Santangelo, T. (2015). Research-based writing practices and the common core: Meta-analysis and meta-synthesis. *Elementary School Journal*, 115(4). <https://doi.org/10.1086/681964>
- Graham, S., McKeown, D., Kiuhara, S., & Harris, K. R. (2012). A meta-analysis of writing instruction for students in the elementary grades. *Journal of Educational Psychology*, 104(4), 879–896. <https://doi.org/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. <https://doi.org/10.1037/0022-0663.99.3.445>
- Griffin, N. M., Elleman, A. M., & Oslund, E. L. (2021). The impact of growth mindset instruction on the vocabulary acquisition and comprehension of first grade students. *Reading Psychology*, 1–19. <https://doi.org/10.1080/02702711.2021.1939821>
- Harris, K. R., & Graham, S. (1996). *Making the writing process work: Strategies for composition and self-regulation*. Brookline Books.
- Harris, K. R., & Graham, S. (2009). Self-Regulated Strategy Development in writing: Premises, evolution, and the future. *British Journal of Educational Psychology*, 6, 113–135. <https://doi.org/10.1348/978185409x422542>
- Harris, K. R., & 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. <https://doi.org/10.1177/2372732215624216>
- Harris, K. R., & Graham, S. (2017). Self-Regulated Strategy Development: Theoretical bases, critical instructional elements, and future research. In R. F. Redondo, K. Harris, & M. Braaksma (Eds.), *Design principles for teaching effective writing* (pp. 119–151). Brill.
- Harris, K. R., Graham, S., Friedlander, B., & Laud, L. (2013). Bring powerful writing strategies into your classroom! Why and how. *The Reading Teacher*, 66(7), 538–542.
- Harris, K. R., Graham, S., & Mason, L. H. (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. <https://doi.org/10.3102/00028312043002295>
- Harris, K. R., Graham, S., & Mason, L. H. F. B. (2008). *Powerful writing strategies for all students*. Paul H: Brooks Publishing Co.
- Harris, K. R., Lane, K. L., Graham, S., Driscoll, S. A., Sandmel, K., Brindle, M., & Schatschneider, C. (2012). Practice-based professional development for Self-Regulated Strategies Development in writing: A randomized controlled study. *Journal of Teacher Education*, 63(2), 103–119. <https://doi.org/10.1177/0022487111429005>
- Huot, B. (1990). Reliability, validity, and holistic scoring: What we know and what we need to know. *College Composition and Communication*, 41(2), 201–213.
- Klassen, R. (2002). Writing in early adolescence: A review of the role of self-efficacy beliefs. *Educational Psychology Review*, 14(2), 173–203.
- Kuznetsova, A., Brockhoff, P. B., & Christensen, R. H. B. (2017). lmerTest package: Tests in linear mixed effects models. *Journal of Statistical Software*, 82(13), 1–26. <https://doi.org/10.18637/jss.v082.i13>
- Latif, M. M. A. (2020). *Writing motivation research, measurement and pedagogy*. Routledge.
- Li, Y., & Bates, T. C. (2019). You can't change your basic ability, but you work at things, and that's how we get hard things done: Testing the role of growth mindset on response to setbacks, educational attainment, and cognitive ability. *Journal of Experimental Psychology: General*, 148(9), 1640–1655. <https://doi.org/10.1037/xge0000669>
- Limpo, T., & Alves, R. A. (2013). Teaching planning or sentence-combining strategies: Effective SRSD interventions at different levels of written composition. *Contemporary Educational Psychology*, 38(4), 328–341. <https://doi.org/10.1016/j.cedpsych.2013.07.004>
- Limpo, T., & Alves, R. A. (2014). Implicit theories of writing and their impact on students' response to a SRSD intervention. *British Journal of Educational Psychology*, 84(4), 571–590. <https://doi.org/10.1111/bjep.12042>
- Lin-Siegler, X., Ahn, J. N., Chen, J., Fang, F.-F.-A., & Luna-Lucero, M. (2016). Even Einstein struggled: Effects of learning about great scientists' struggles on high school students' motivation to learn science. *Journal of Educational Psychology*, 108(3), 314–328. <https://doi.org/10.1037/edu0000092>
- Mason, L. H., Meadan, H., Hedin, L. R., & Cramer, A. M. (2012). Avoiding the struggle: Instruction that supports students' motivation in reading and writing about content material. *Reading & Writing Quarterly*, 28(1), 70–96. <https://doi.org/10.1080/10573569.2012.632734>
- Miller, D. I. (2019). When do growth mindset interventions work? *Trends in Cognitive Sciences*, 23(11), 910–912. <https://doi.org/10.1016/j.tics.2019.08.005>
- Nussbaum, E. M., & Schraw, G. (2007). Promoting argument-counterargument integration in students' writing. *The Journal of Experimental Education*, 76(1), 59–92. <https://doi.org/10.3200/JEXE.76.1.59-92>
- Paunesku, D., Walton, G. M., Romero, C., Smith, E. N., Yeager, D. S., & Dweck, C. S. (2015). Mind-set interventions are a scalable treatment for academic underachievement. *Psychological Science*, 26(6), 784–793. <https://doi.org/10.1177/0956797615571017>
- Resolution no. 90/2021, (2021). <https://dre.pt/application/conteudo/166569087>
- R Core Team. (2021). *R: A language and environment for statistical computing*. <https://www.R-project.org/>.
- Rogers, L. A., & Graham, S. (2008). A meta-analysis of single subject design writing intervention research. *Journal of Educational Psychology*, 100(4), 879–906. <https://doi.org/10.1037/0022-0663.100.4.879>
- Skar, G. B. U., Graham, S., & Huebner, A. (2021). Learning loss during the COVID-19 pandemic and the impact of emergency remote instruction on first grade students' writing: A natural experiment. *Journal of Educational Psychology*. <https://doi.org/10.1037/edu0000701>
- Schrodt, K. E., Elleman, A. M., FitzPatrick, E. R., Hasty, M. M., Kim, J. K., Tharp, T. J., & Rector, H. (2019). An examination of mindset instruction, self-regulation, and writer's workshop on kindergarteners' writing performance and motivation: A mixed-methods study. *Reading & Writing Quarterly*, 35(5), 427–444. <https://doi.org/10.1080/10573569.2019.1577778>
- Sisk, V. F., Burgoyne, A. P., Sun, J., Butler, J. L., & Macnamara, B. N. (2018). To what extent and under which circumstances are growth mind-sets important to academic achievement? Two meta-analyses. *Psychological Science*, 29(4), 549–571. <https://doi.org/10.1177/0956797617739704>
- Sousa, C., Inácio, M., Ferreira, S., Prata, M., Festas, M., & Oliveira, A. (2012). O modelo Self-Regulated Strategy Development no ensino da escrita do ensaio de opinião. *Actas do 12º Colóquio Internacional de Psicologia e Educação*, 1284–1295.
- Tracy, B., Reid, R., & Graham, S. (2009). Teaching young students strategies for planning and drafting stories: The impact of Self-Regulated Strategy Development. *The Journal of Educational Research*, 102(5), 323–332. <https://doi.org/10.3200/JOER.102.5.323-332>
- Yeager, D. S., Hanselman, P., Walton, G. M., Murray, J. S., Crosnoe, R., Muller, C., ... Dweck, C. S. (2019). A national experiment reveals where a growth mindset improves achievement. *Nature*, 573(7774), 364–369. <https://doi.org/10.1038/s41586-019-1466-y>
- Yeager, D. S., Romero, C., Paunesku, D., Hulleman, C. S., Schneider, B., Hinojosa, C., Lee, H. Y., O'Brien, J., Flint, K., Roberts, A., Trott, J., Greene, D., Walton, G. M., & Dweck, C. S. (2016). Using Design Thinking to Improve Psychological Interventions: The Case of the Growth Mindset During the Transition to High School. *Journal of Educational Psychology*, 108(3), 374–391. <https://doi.org/10.1037/edu0000098>
- Zimmerman, B. J., & Risemberg, R. (1997). Becoming a self-regulated writer: A social cognitive perspective. *Contemporary Educational Psychology*, 22(1), 73–101. <https://doi.org/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. <https://doi.org/10.1007/s11145-012-9384-5>

Further reading

- Camacho, A., Silva, M., Santos, M., Jacques, T., & Alves, R. A. (2020). Atitudes face à escrita em adolescentes portuguesas [Attitudes towards writing of Portuguese adolescents]. *Indagatio Didactica*, 12(2), 143–157. <https://doi.org/10.34624/id.v12i2.17466>