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Implicit Theories of Writing and Their Impact on Students' Response to a SRSD Intervention

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Abstract

Background. In the field of intelligence research, it has been shown that some people conceive intelligence as a fixed trait that cannot be changed (entity beliefs), whereas others conceive it as a malleable trait that can be developed (incremental beliefs). What about writing? Do people hold similar implicit theories about the nature of their writing ability? Furthermore, are these beliefs likely to influence students' response to a writing intervention?

Aims. We aimed to develop a scale to measure students' implicit theories of writing (pilot study), and to test if these beliefs influence strategy-instruction effectiveness (intervention study).

Sample. In the pilot and intervention studies participated, respectively, 128 and 192 students (Grades 5-6).

Method. Based on existing instruments that measure self-theories of intelligence, we developed the Implicit Theories of Writing (ITW) scale that was tested with the pilot sample. In the intervention study, 109 students received planning instruction based on the Self-Regulated Strategy Development model, whereas 83 students received standard writing instruction. Students were evaluated before, in the middle, and after instruction.

Results. ITW's validity was supported by piloting results and their successful cross-validation in the intervention study. In this, intervention students wrote longer and better texts than control students. Moreover, latent growth curve modelling showed that the more intervention students conceived writing as a malleable skill, the more the quality of their texts improved.

Conclusion. The present research is of educational relevance because it provides a measure to evaluate students' implicit theories of writing and shows their impact on response to intervention.

Keywords: writing beliefs; implicit theories of writing; self-regulated strategy development; latent growth models

Implicit Theories of Writing and Their Impact on Students' Response to a SRSD Intervention

The development of writing expertise is a long and challenging process, heavily dependent upon four ingredients: skills, strategies, knowledge, and motivation (Alexander, Graham, & Harris, 1998). To transform language representations into written text, developing writers need to master the low-level transcription skills of handwriting and spelling (Berninger et al., 1992). At the same time, they need to acquire a repertoire of strategies, such as planning or revising, that must be at their disposal for managing the complexity of the writing process (Pressley & Harris, 2006). These strategies are used in conjunction with writers' content and discourse knowledge that is stored in their long-term memory (McCutchen, 1986, 2006). A last ingredient that helps writers to persist in such a challenging task as writing, is motivation to write, which is affected by goals, predispositions, beliefs, attitudes, and cost-benefit estimates (Boscolo & Hidi, 2007; Hayes, 1996). Contrasting with the substantial amount of evidence about the role of skills, strategies, and knowledge in writing (for a review, see Graham, 2006a), the role of motivational factors has been neglected (Alves, 2012). Additional investigations are warranted to deepen our understanding about the motivational components of writing and their relation to cognitive ones.

A cornerstone of motivation to write is a set of beliefs that writers hold about themselves and about writing (for a review, see Bruning & Horn, 2010). The present research focuses on children's implicit theories of writing, which comprise beliefs about the malleability of their writing ability. We sought to contribute to extant research, first, by providing an instrument to measure these implicit theories and, then, by testing their predictive effect on students' response to a strategy-focused intervention.

Implicit Theories

People organize their world on the basis of meaning systems that emerge from their fundamental assumptions, or implicit theories, about the nature of the self and the social world (Molden & Dweck, 2006). These implicit theories have been largely studied in the intelligence domain, in which individuals were found to endorse different implicit theories about the nature of

their intellectual ability (Dweck & Leggett, 1988). People holding an entity theory view intelligence as a fixed entity that cannot be changed, whereas people holding an incremental theory conceive it as an increasable quality that can be developed. Empirical research has found that these implicit theories impact academic achievement in challenging situations by setting up distinct motivational frameworks of goals and learning patterns (Baird, Scott, Dearing, & Hamill, 2009; Blackwell, Trzesniewski, & Dweck, 2007; Dweck, 1986; Robins & Pals, 2002). Entity theorists tend to be focused on demonstrating their ability (performance goals). As a result, they are prone to show a helpless pattern, which involves challenge avoidance, strategies withdraw, negative affect, and ability-based attributions. This maladaptive, helpless pattern has negative consequences for learning outcomes by constraining skills acquisition and development. By contrast, incremental theorists tend to be focused on developing their ability (learning goals). These goals are liable to create a mastery-oriented pattern, which is characterized by challenge seeking, strategic behaviour, positive affect, and effort-based attributions. This adaptive, mastery-oriented pattern may foster competence gains and result in improved achievement. In sum, the two conceptions of intelligence create diverging motivational frameworks that impact students' achievement in academic tasks demanding hard work and persistence. In here, we proposed that these motivational frameworks could hold for writing as well.

Writers' beliefs about the malleability of their writing ability have received little attention in the writing domain (Bruning & Horn, 2010), even though they are likely to impact such a challenging process. Indeed, several years of deliberate practice and sustained effort seem to be necessary to effectively master all ingredients involved in writing (Kellogg, 2008; Kellogg & Whiteford, 2009). Therefore, thinking of it as a fixed or incremental skill is likely to shape how students experience and respond to writing instruction. Endorsing an entity theory of writing may have a deleterious effect on the process of learning to write. If students believe that writing ability is not subject to improvement, any endeavour to develop it will be seen as futile. On the contrary, endorsing an incremental theory of writing may set in motion a series of adaptive thoughts and

behaviours that are at the root of writing proficiency. If students believe that writing ability can be cultivated, they will work hard and seek constructive strategies to improve it. It is noteworthy that this mastery-oriented pattern is aligned with the purposes of strategy instruction, which aims to enhance effortful, goal-directed, and conscious processing in writing (Pressley & Harris, 2006).

Strategy Instruction: Self-Regulated Strategy Development

Strategy instruction was found to be one of the best teaching practices to promote writing quality in Grades 2–12 (for meta-analyses, see Graham, McKeown, Kiuhara, & Harris, 2012; Graham & Perin, 2007; Rogers & Graham, 2008). A particularly effective model of strategy instruction is the Self-Regulated Strategy Development (SRSD; Graham, 2006b; Graham & Harris, 2003; Harris, Graham, Brindle, & Sandmel, 2009), which comprises six instructional stages: develop background knowledge, discuss it, model it, memorize it, support it, and independent performance. The SRSD provides explicit and systematic teaching of writing strategies combined with self-regulation procedures (Harris & Graham, 1996, 2009). The writing strategies contain the procedural knowledge to help students in carrying out writing-specific processes. The self-regulation procedures, such as goal setting, self-monitoring, and self-instructions, are critical for regulating strategies usage and writing behaviour (Alexander et al., 1998). Several studies have shown that the teaching of planning strategies coupled with self-regulatory training is a highly effective practice to increase writing quality (Brunstein & Glaser, 2011; Glaser & Brunstein, 2007; Graham, Harris, & Mason, 2005; Harris, Graham, & Mason, 2006; Limpo & Alves, 2013a; Torrance, Fidalgo, & García, 2007; Wong, Hoskyn, Jai, Ellis, & Watson, 2008; Zumbrunn & Bruning, 2013).

A set of beliefs that have received considerable attention under the SRSD framework is self-efficacy, which refers to writers' confidence in their writing ability. Self-efficacy seems to be one of the strongest motivational predictors of writing performance. At different school levels, these beliefs predicted writing quality, above and beyond several motivational constructs such as writing apprehension, perceived usefulness of writing, self-efficacy for self-regulation, writing self-concept,

and goals (Pajares, 2003; Pajares, Miller, & Johnson, 1999; Pajares & Valiante, 1997, 1999). This consistent finding might be explained by the close link between self-efficacy and self-regulation (Zimmerman, 1995). In particular, the successful use of self-regulation strategies results in strengthened self-efficacy beliefs, which help writers to maintain the self-regulated behaviour needed for effective writing (Zimmerman & Risemberg, 1997). Indeed, it has been found that, besides writing quality, SRSD interventions also enhance students' self-efficacy (Graham, 2006a; Graham & Harris, 2003; Harris et al., 2009). Brunstein and Glaser (2011) provided strong evidence on the relationship between these beliefs, self-regulation, and writing performance. These authors have examined the underlying mechanisms of a successful self-regulation-based intervention. Of great interest was their finding that the SRSD intervention was associated with stronger self-efficacy beliefs, and that this enhanced self-efficacy contributed to a proper implementation of the taught strategies, which resulted in better texts. Although this study shed some light on the role of writing beliefs in strategy-focused interventions, more research is needed to increase knowledge about child writers' beliefs and their relationship to self-regulated behaviors and writing performance.

Present Research

Notwithstanding that SRSD has been found to enhance students' writing performance and self-efficacy, there is little research focusing on other types of beliefs and exploring their role in students' progress over SRSD interventions. Nevertheless, if one wants to maximize students' success throughout the learning process, uncovering some of these factors is as important as demonstrating interventions' effectiveness. The main purpose of the current research was to test whether the expected growth in writing performance of Portuguese students receiving a SRSD strategy-focused intervention was influenced by their implicit theories of writing. For that we conducted a pilot study and an intervention study.

Pilot Study

Despite the little attention that writing motivation has received, writing researchers have made efforts to develop instruments that measure different types of writing beliefs, such as self-efficacy beliefs (Bruning, Dempsey, Kauffman, McKim, & Zumbrunn, 2013; Pajares, 2003; Shell, Murphy, & Bruning, 1989), beliefs in the perceived usefulness of writing (Pajares & Valiante, 1997), transmissional and transactional beliefs (White & Bruning, 2005), and beliefs in giftedness (Palmquist & Young, 1992). Besides these several types of beliefs may be related to implicit theories of writing, they are not the same. Indeed, to the best of our knowledge, there are no instruments explicitly tapping writers' beliefs about the malleability of their writing skills, particularly, in children. As an attempt to fill this gap, we conducted a pilot study aimed to develop and test the Implicit Theories of Writing scale, which was cross-validated in the study described below.

Intervention Study

In this study, fifth and sixth graders participated in a SRSD intervention that taught them a planning strategy plus self-regulation procedures. Instructional effects were assessed on the length and quality of opinion essays written before, in the middle, and after instruction. On the strength of the well-documented effectiveness of SRSD (Graham, 2006b; Graham & Harris, 2003; Graham & Hebert, 2010; Graham & Perin, 2007; Harris et al., 2009; Rogers & Graham, 2008), we expected that intervention students would write longer and better texts than control students. Importantly, we have also examined whether intervention students' implicit theories of writing influenced their expected growth throughout the intervention. Because incremental theorists believe in the value of effort and strategies to improve their skills (Dweck, 1999) and because SRSD aims to boost writing performance through effortful and strategic behaviours (Harris & Graham, 1996, 2009), we predicted that the more students endorsed incremental beliefs, the more they would benefit from strategy instruction. To test this hypothesis we used latent growth curve (LGC) modelling.

Although ANOVA-based models allow the description of average group changes, they neither examine individual differences in growth nor potential explanatory factors. These

limitations can be overcome with LGC analysis, which is a powerful technique to study longitudinal change (Bollen & Curran, 2005; Duncan, Duncan, & Strycker, 2006). It allows the modelling of intra-individual change across time and inter-individual differences in those changes. Modelling growth not only at the group but also at the individual level is an asset to study writing development since children may display different developmental trajectories. Also important, is to examine the underlying factors that may account for this variability. Why some students progress faster than others? LGC modelling helps to answer this kind of questions by allowing the inclusion of potential predictors of change. Here, LGC modelling was used to examine the predictive effect of implicit theories of writing in students' growth in writing performance during a SRSD writing intervention.

Pilot Study

Method

Scale development. To create a valid measure of students' implicit theories of writing, we relied on existing scales of implicit theories of intelligence. Dweck and colleagues (Dweck, 1999) have developed a scale comprising three entity items (e.g., *You have a certain amount of intelligence, and you really can't do much to change it*). Several studies have supported the validity of this instrument ($\alpha > .93$, 2-weeks test-retest, $r = .80$; for a review, see Dweck, Chiu, & Hong, 1995). Based on it, Faria (2003; 2006) have developed the Personal Conceptions of Intelligence scale for the Portuguese context, which was also found to have good psychometric qualities ($\alpha > .76$, 1-month test-retest, $r = .56$). Based on the scales of Dweck (1999) and Faria (2003, 2006), we created five Portuguese items that were gathered in the Implicit Theories of Writing (ITW) scale.

Participants and procedure. Participants were 128 Portuguese students in Grades 5-6 ($M_{\text{age}} = 10.7$ years, $SD = 0.8$; 57 girls). The ITW was administered to groups of 15 students, before they were asked to perform several writing tasks for a larger research project, using online methods to study writing dynamics. Students were asked to rate their level of agreement with each sentence using a Likert scale ranging from 1 (*Completely disagree*) to 6 (*Completely agree*). As the items

were phrased in their entity version, lower scores indicate incremental beliefs and higher scores indicate entity beliefs.

Results and Discussion

To test for ITW's validity, we used Confirmatory Factor Analyses (CFA). In the CFA model, all items were specified to load on the ITW latent variable. Before model evaluation, the variance of the latent factor was constrained to 1.0, so that all items' factor loadings could be freely estimated. To evaluate model fit we used the chi-square statistic (χ^2), the confirmatory fit index (CFI), and the root-mean-square error of approximation (RMSEA). CFI values greater than .95 and .90, and RMSEA values less than .06 and .10 are considered good and adequate fits, respectively (Hu & Bentler, 1999). The Akaike information criterion (AIC) was used for models comparison, considering smaller AIC values as indicative of better fits.

The absolute values of skewness and kurtosis did not exceed 3.0 and 10.0, respectively, indicating no distributional problems (Kline, 2005). Descriptive statistics for each item are displayed in Table 1 along with their inter-item and item-total correlations. Although a first evaluation of the model revealed an excellent fit to the data, $\chi^2(15, N = 128) = 1.77, p = .88$, CFI = 1.00, RMSEA = .00, $P(\text{rmsea} \leq .05) = .93$, AIC = 31.77, items 3 and 4 seemed problematic: They had the smallest inter-item and item-total correlations, and factor loadings were lower than accepted (see Tables 1-2). Besides all items seem related to implicit theories of writing, they might be measuring different facets of it. Items 1, 2, and 5 are focused on improving writing quality through effort, whereas items 3 and 4 are about writing well as an innate ability. We also believe that the conditional phrasing of these two items might have posed some understanding problems to children. Therefore, we decided to remove items 3 and 4, and tested the fit of a model with the three remaining items. As this model was just-identified, error variances of the residual errors were constrained to be equal. Despite the slight decrement in some goodness-of-fit statistics, this new model fitted the data very well, $\chi^2(4, N = 128) = 4.18, p = .12$, CFI = .97, RMSEA = .09, $P(\text{rmsea} \leq .05) = .21$, AIC = 12.18. Actually, the decrease in AIC, the moderate inter-item and item-

total correlations, and the good factor loadings suggested that this model was better than the five-item model (see Table 2). The internal consistency of scale was adequate, $\alpha = .69$ (Kline, 2005). Similarly to what have been found with measures of implicit theories of intelligence (Dweck et al., 1995), ITW did not differ between Grade 5 and 6, $t(126) = -0.81, p = .42$ ($M_{\text{Grade 5}} = 2.06, SD = 1.09$ vs. $M_{\text{Grade 6}} = 2.22, SD = 1.06$), and between boys and girls, $t(124) = 1.13, p = .26$ ($M_{\text{boys}} = 2.23, SD = 1.14$ vs. $M_{\text{girls}} = 2.02, SD = 0.96$). Overall, these piloting results provided preliminary evidence about the validity of the ITW to measure students' implicit theories of writing. Although it could be argue that the reduced number of items is a threat to ITW's validity, we do not think this is the case. Indeed, as stated by Messick (1995, p. 741) "validity is not a property of the test or assessment as such, but rather of the meaning of the test scores". We believe that these results, along with those obtained in the following study, support reliable interpretations of ITW scores.

Tables 1 and 2 about here

Intervention Study

Method

Participants and design. Participants were 213 Portuguese native speakers in Grades 5-6. Three students with special education needs plus 18 students that missed one or more evaluation moments were excluded from data analyses. Results were thus based on 192 students. The study involved a pre-test, mid-test, post-test quasi-experimental design. Within each grade level, each class was randomly assigned to a planning (5 classes) or control (4 classes) condition. Table 3 provides participants' demographic data.

Table 3 about here

SRSD intervention. Two Portuguese language teachers, who were 44 and 53 years old, and had, respectively, 16 and 24 years of teaching experience, implemented the intervention in their classes, during 12 90-min weekly lessons. The youngest teacher delivered the intervention to three

classes, and the other to two classes. Students were taught a strategy to plan opinion essays, along with the necessary skills and knowledge to properly use it. This strategy helped students to generate and organize ideas following the opinion essay structure. To promote strategy memorization, they were taught the mnemonic CRÊS, which stands for: tell what you believe, give 3 or more reasons, explain each reason, and wrap it up (this is the Portuguese adaptation of the mnemonic TREE developed by Harris, Graham, Mason, & Friedlander, 2008). In line with the SRSD model, this strategy was coupled with self-regulation procedures. *Goal setting* helped students to guide their behaviour in a writing task. Students' goal was to write a complete opinion essay. *Self-monitoring* helped students to obtain concrete and visible evidence of their progress. Students were given a "self-monitoring sheet" where they: (a) set their goal, (b) registered and counted the number of essay parts, and (c) wrote a self-reinforcement statement. *Self-instructions* helped students to manage the planning strategy and the other self-regulation procedures. Using a "writing flowchart" they develop self-instructions to set goals, use the planning strategy, and check goals attainment. The following SRSD practices were used for teaching the writing and self-regulation strategies: development of knowledge for writing and self-regulation; explicit instruction, discussion, and modelling of the planning strategy and self-regulation procedures; promotion of strategies memorization; collaborative practice supported by teachers and guidance materials gradually faded; independent practice with minimal teacher support (see the Appendix for an overview of instructional procedures).

Several procedures were implemented to assure that planning instruction was delivered as intended. Before the intervention, teachers participated in an 8-h pre-intervention workshop in which they became acquainted with the theoretical and empirical basis of the intervention and received an instructional manual with detailed lessons' plans. During the intervention, teachers had weekly meetings with the first author to prepare the next lesson, and discuss the previous one. The rare deviations from instructional plans usually involved missed steps. Whenever possible, these were addressed in the next lesson. Teachers were also given a checklist with implementation steps

to be checked off once completed. Based on these checklists, teachers completed 99% of the proposed steps. In one third of the lessons that were observed by the first author, they completed 97% of the proposed steps. Finally, the quality of these observed lessons was evaluated regarding: (a) level of students' engagement, (b) students' responses to questions and participation in discussion, (c) teachers' responses to students' questions, (d) efficiency of instruction, and (e) pacing of instruction (based on Saddler & Graham, 2005). Averaged instructional quality was 3.8 (0 = *very low*; 4 = *very high*).

Control instruction. Control students received standard writing instruction, which was delivered by their Portuguese language teachers. These three teachers were not implementing the intervention. They reported to weekly allot between 45 and 90 min to writing instruction, which predominately involved grammar instruction and independent composing with little to no support. Although teachers refer to use the process approach recently included in the Portuguese language curriculum (Reis et al., 2009), no references were made to the explicit and systematic teaching of either writing strategies or self-regulation procedures to accomplish specific writing processes. Additionally, these students were asked to write the same number of opinion essays as intervention students.

Testing sessions. Students were evaluated before instruction, after Lesson 5, and after instruction. Students were given 8 min to plan an opinion essay plus 16 min to write it. Respectively, pre-test, mid-test, and post-test prompts were: "Do you think teachers should give homework every days?"; "Do you think children should go to bed early every days?"; "Do you think children should work out every days?". Assisted by a Portuguese Language teacher not implementing the intervention, we examined several prompts used in other studies and selected these three as the most similar across them, as well as the closest to fifth and six graders' writing assignments and daily-life concerns. The ITW scale developed in the pilot study was filled out once, at the beginning of the pre-test.

Writing measures. Opinion essay length was calculated with the Computerized Language Analysis software (MacWhinney, 2000). Opinion essay quality was assessed by two graduate students, blind to study purposes. To avoid biased judgments all texts were previously typed and corrected for spelling, punctuation, and capitalization errors (Berninger & Swanson, 1994). Using a scale ranging from 1 (*low*) to 7 (*high*), judges rated ideas quality, coherence, syntax, and vocabulary. These factors were averaged for each rater (Cronbachs' α was greater than .93 for the two judges across the three testing times). For all testing moments, inter-rater reliability was .96, using the Intraclass Correlation Coefficient. The final quality score was the average across raters.

Results

Cross-validation of the ITW. Table 4 displays descriptive statistics for each item of the ITW. The absolute values of skewness and kurtosis of the three items were below 2.0, suggesting no distributional problems (Kline, 2005). A CFA model similar to the one tested in the pilot study was then specified and evaluated. Once more, this model fitted the data very well, $\chi^2(4, N = 192) = 1.45, p = .49, CFI = 1.00, RMSEA = .00, P(rmsea \leq .05) = .63, AIC = 9.45$. At the item level, we have also found moderate inter-item and item-total correlations, as well as good factor loadings (see Table 4). The internal consistency of the scale was adequate, $\alpha = .76$. Replicating piloting results, we found neither grade differences, $t(190) = 1.33, p = .19 (M_{\text{Grade 5}} = 2.53, SD = 1.22 \text{ vs. } M_{\text{Grade 6}} = 2.32, SD = 0.96)$ nor gender differences, $t(190) = 0.96, p = .34 (M_{\text{boys}} = 2.52, SD = 1.14 \text{ vs. } M_{\text{girls}} = 2.36, SD = 1.08)$ regarding students implicit theories of writing.

Table 4 about here

Intervention effectiveness. Because this study used a quasi-experimental design, group differences at mid-test and post-test were examined with Analyses of Covariance, with the respective pre-test score as covariate. Assuring that the assumption of homogeneous regression slopes was met, we found no interactions between pre-test scores and condition ($ps > .10$). Furthermore, intervention students ($M = 2.41, SD = 1.11$) did not differ from control students ($M =$

2.47, $SD = 1.13$) regarding their implicit theories of writing at pre-test, $t(190) = 0.38$, $p = .71$. After adjusting for initial pre-test differences on text length, intervention students wrote longer texts than control students both at mid-test, $F(1, 189) = 50.01$, $p < .001$, $\eta_p^2 = 0.21$, and post-test, $F(1, 189) = 70.86$, $p < .001$, $\eta_p^2 = 0.27$. Likewise, after adjusting for initial pre-test differences on text quality, intervention students wrote better texts than control students both at mid-test, $F(1, 189) = 15.18$, $p < .001$, $\eta_p^2 = 0.07$, and post-test $F(1, 189) = 33.07$, $p < .001$, $\eta_p^2 = 0.15$. Table 5 and 6 provide, respectively, means and standard deviations for and correlations between opinion essay length and quality at the three testing moments by condition.

Table 5-6 about here

To further explore instructional effects, we examine differences between testing times within each condition (see Figure 1, for a graphical representation). For that, we conducted two 2 x 3 Analyses of Variance (ANOVAs), with repeated measures on the last factor. For opinion essay length, we found a significant Condition x Testing Time interaction, $\lambda = .75$, $F(2, 189) = 30.98$, $p < .001$, $\eta_p^2 = 0.25$. Tests of simple main effects revealed differences between testing sessions for both the intervention group, $\lambda = .66$, $F(2, 189) = 49.26$, $p < .001$, $\eta_p^2 = 0.34$, and the control group, $\lambda = .90$, $F(2, 189) = 10.01$, $p < .001$, $\eta_p^2 = 0.10$. Still, while intervention students' text length increased from pre-test to mid-test, and from mid-test to post-test, control students' text length decrease from pre-test to mid-test (all $ps < .001$). Analogous effects were found for opinion essay quality. There was a significant Condition x Testing Time interaction, $\lambda = .85$, $F(2, 189) = 16.35$, $p < .001$, $\eta_p^2 = 0.15$, with significant differences across testing sessions for both the intervention group, $\lambda = .78$, $F(2, 189) = 26.75$, $p < .001$, $\eta_p^2 = 0.22$, and the control group, $\lambda = .97$, $F(2, 189) = 3.45$, $p = .03$, $\eta_p^2 = 0.04$. Again, while intervention students' text quality increased from pre-test to mid-test, and from mid-test to post-test ($ps < .007$), control students' text quality decreased from pre-test to mid-test ($p = .03$).

Figure 1 about here

Effect of ITW on intervention students' rate of growth. LGC modelling was used to examine if implicit theories of writing influenced intervention students' rate of growth in opinion essay length and quality. These trajectories were modelled within the structural equation modelling framework (Bollen & Curran, 2005; Duncan et al., 2006). Following Hox (2010) guidelines we specified two equivalent LGC models with two latent variables: intercept and slope. The mean of the latent intercept represents the average pre-test performance. As this value is constant over time, the factor loadings of the three testing moments on the intercept factor were fixed to 1.0. The mean of the latent slope represents the average rate of change over time. These trajectories were estimated with models that imposed linear constraints. Reflecting the uneven time spacing between pre-test and mid-test (6 weeks), and pre-test and post-test (14 weeks), the slope parameters were set to 0.0, 1.0, and 2.3 (14/6). Except the means of the latent factors, which were freely estimated, all other means and intercepts were fixed to zero. Additionally, latent factors were specified to covary, and error variances of the residual errors for the three testing times were constrained to be equal. The average score on the ITW scale was included in the model as a time-invariant predictor and, for both LGC models, direct effects from ITW to the intercept and slope factors were specified.

The evaluation of the LGC model for opinion essay length revealed a very good fit to the data, $\chi^2(10, N = 109) = 4.36, p = .36, CFI = .996, RMSEA = .03, P(rmsea \leq .05) = .49, AIC = 24.36$. The LGC model for opinion essay quality have also showed an excellent fit, $\chi^2(10, N = 109) = 1.76, p = .78, CFI = 1.00, RMSEA = .00, P(rmsea \leq .05) = .85, AIC = 21.76$. The parameter estimates of these two models are displayed in Table 7. In line with the repeated measures ANOVAs' results, the significant and positive means of the slopes indicate increases in intervention students' text length and quality over instruction. Regarding the predictive effects of ITW, no effects were found for opinion essay length, but, for opinion essay quality, students' implicit theories influenced both the latent intercept and the latent slope. More incremental beliefs were associated with higher quality at pre-test ($\beta = -.24, p = .03$) and greater increases in quality over time ($\beta = -.37, p = .04$).

Table 7 about here

Discussion

A first goal of the present research was to propose a new instrument to measure students' implicit theories of writing. Preliminary validation of ITW was provided across two studies. First, ITW was based on existing and highly reliable measures of implicit theories of intelligence (Dweck, 1999; Faria, 2003, 2006), whose items were carefully adapted to the writing domain. Second, inter-item and item-total correlations, factor loadings, and scale reliability were all adequate. Third, the one-factor CFA model that fitted piloting data very well was also successfully cross-validated. Fourth, similar to what have been reported for implicit theories in other domains, ITW did not reveal gender and grade differences in implicit theories of writing. Finally, ITW influenced students' growth in writing quality in the expected direction, demonstrating its practical relevance to the study of writing development. All in all, these five sources of evidence seem to support adequate and meaningful interpretations of ITW scores as well as the usefulness of this instrument in writing research (for a discussion on validity, see Messick, 1995). It is important to highlight, however, that our research was a first step toward the establishment of ITW's validity. Validation is an on-going process and further empirical evidence is clearly warranted. For instance, establishing ITW's discriminant validity would further support the interpretability of its scores. Given the documented role of self-efficacy beliefs in writing (for a review, see Pajares, 2003), it would be particularly important to examine in which extent implicit theories and self-efficacy measures are distinct from each other. Moreover, as ITW was only tested with 10-12 years old Portuguese children, additional tests across different age groups and languages would be worthwhile.

The other main goal of the present research was to test the predictive effect of students' implicit theories of writing on the effectiveness of a SRSD intervention. This strategy-focused intervention was aimed to improve fifth and sixth graders planning skills and, as expected, it resulted in longer and better opinion essays than standard writing instruction. Improving developing

writers' planning skills is likely to enhance writing performance in several ways. Planning helps students to generate content and to create an organized structure for their compositions. Besides, the plan may function as an external memory where students store their ideas and outline action-plans to produce the text (Graham & Harris, 2007). This is expected to result in reduced planning during writing, enabling writers to focus on other key writing processes (Kellogg, 1988; Limpo & Alves, 2013a). As developing writers seem to struggle with such a core cognitive writing process as planning (Bereiter & Scardamalia, 1987; Limpo & Alves, 2013b; Limpo, Alves, & Fidalgo, 2013; McCutchen, 2006), it is of the utmost importance that evidence-based practices for boosting planning skills reach out to school settings.

Confirmed intervention effectiveness, we sought to examine if it was influenced by students' implicit theories of writing. As predicted, the more intervention students conceived writing as an increasable skill, the more the quality of their texts has improved. This result is likely to be explained by the motivational framework that stems from holding incremental beliefs (for a meta-analytic review, see Burnette, O'Boyle, VanEpps, Pollack, & Finkel, 2013). Incremental theorists were found to set goals focused on learning and to believe in the efficacy of effort to reach them (Blackwell et al., 2007; Robins & Pals, 2002). Consequently, they have been shown to engage in positive, mastery-oriented strategies (Doron, Stephan, Boiché, & Le Scanff, 2009; Grant & Dweck, 2003). This constellation of goals, beliefs, and strategies form a self-regulatory system that may work as catalyst for learning in challenging academic situations such as writing instruction (Zimmerman, 2000; Zimmerman & Risemberg, 1997). Therefore, we suppose that incremental theorists' willingness to improve their writing skills through effortful and strategic behaviours might have played a pivotal role in potentiating strategy-instruction effects. As this hypothesis was not empirically tested, writing researchers should delve into the cognitive and motivational factors that mediate the effect of writing beliefs on interventions' effectiveness. Finally, it is worth mentioning that implicit theories of writing contributed neither to the latent intercept nor to the latent slope for opinion essay length. Thus, these results imply that these beliefs contribute to

qualitative aspects of text production but not to quantitative ones. Future research should ascertain whether these findings are replicable. In this case, it would be important to address the underlying factors of the differential effects of writing beliefs on text quality and length.

Although some limitations of the presented findings were already discussed, three additional concerns are worthy of notice. First, rate of growth was measured using only three testing times. Despite it was enough to model the growth in writing during 12 weeks, using only three occasions could have produced less precise estimates (Willett, 1989). Writing researchers may consider examine the effects of implicit theories on growth throughout longer interventions and using more data points. This would also allow the modelling of more complex, non-linear trajectories, probably, more suitable to describe students' improvement in writing.

Second, ITW was only administered once, precluding us to test temporal stability. Future research should administer ITW over different time intervals not only to further inform on its psychometric properties, but also to answer questions about the role of age and schooling in shaping implicit theories of writing. Actually, although we did not test it, the intervention might have changed these writing beliefs. SRSD instructional procedures aim to highlight the role of strategies and effort in writing, to focus students' attention on their improvement, and to encourage strategy- and effort-based attributions for success and failure (Harris & Graham, 2009). Because these are the underlying ingredients of incremental theories (Blackwell et al., 2007), one would expect that SRSD would promote incremental views of writing. Further studies are needed to corroborate this hypothesis and to examine whether this expected change in implicit theories also contributes to intervention effectiveness.

Third, because we only have access to the final versions of the written materials produced during the intervention, which resulted from a close teachers-students' collaboration, we were not able to reliably relate implicit theories to students' self-regulated behaviours. It would have been particularly valuable to examine whether writing beliefs impacted writing goals, self-monitoring accuracy, and self-reinforcement statements. Future SRSD interventions should be planned to

guarantee the reliability of such process materials, which may carry critical information to understand the impact of implicit theories on writing growth.

Educational Implications

By stressing the role of writing beliefs in the learning-to-write process, the present research has significant implications for writing instruction. In particular, teachers should be mindful of students' beliefs as well as nurture incremental views of writing. Through their pedagogical practices, teachers have the power to influence their students' beliefs. For instance, Mueller and Dweck (1998) have studied how teachers' praise acts on students' motivation and performance. They found that, compared to students praised for effort, those praised for ability were more likely to adopt performance goals, to explain failure in terms of low ability, to display less task persistence and enjoyment, to perform worse, and to endorse entity beliefs about intelligence. Besides pinpointing the damaging effects of ability-based praise, this research showed that implicit theories and accompanying thoughts, behaviours, and affects can be primed with smart, brief manipulations (see also Thompson & Musket, 2005). Albeit these effects' stability might be questionable, they hinted at the possibility of changing students' implicit theories. Several studies have already reported on effective programs to teach incremental views of intelligence (e.g., Blackwell et al., 2007; Donohoe, Topping, & Hannah, 2013; Good, Aronson, & Inzlicht, 2003). These results look to be very encouraging for writing researchers and practitioners. The use of similar programs, mainly if combined with strategy instruction, could be especially advantageous to raise developing writers' incremental beliefs and, ergo, boost their writing performance.

References

- Alexander, P. A., Graham, S., & Harris, K. R. (1998). A perspective on strategy research: Progress and prospects. *Educational Psychology Review*, 10, 129-154. doi: 10.1023/A:1022185502996
- Alves, R. A. (2012). The future is bright for writing research. In V. W. Berninger (Ed.), *Past, present, and future contributions of cognitive writing research to cognitive psychology* (pp. 593-599). New York, NY: Psychology Press.
- Baird, G. L., Scott, W. D., Dearing, E., & Hamill, S. K. (2009). Cognitive self-regulation in youth with and without learning disabilities: Academic self-efficacy, theories of intelligence, learning vs. performance goal preferences, and effort attributions. *Journal of Social and Clinical Psychology*, 28, 881-908. doi: 10.1521/jscp.2009.28.7.881
- Bereiter, C., & Scardamalia, M. (1987). *The psychology of written composition*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Berninger, V. W., Yates, C. M., Cartwright, A. C., Rutberg, J., Remy, E., & Abbott, R. D. (1992). Lower-level developmental skills in beginning writing. *Reading and Writing: An Interdisciplinary Journal*, 4, 257-280. doi: 10.1007/BF01027151
- Blackwell, L. S., Trzesniewski, K. H., & Dweck, C. S. (2007). Implicit theories of intelligence predict achievement across an adolescent transition: A longitudinal study and intervention. *Child Development*, 78, 246-263. doi: 10.1111/j.1467-8624.2007.00995.x
- Bollen, K. A., & Curran, P. J. (2005). *Latent curve models: A structural equation perspective*. Hoboken, NJ: Wiley-Interscience.
- Boscolo, P., & Hidi, S. (2007). The multiple meanings of motivation to write. In S. Hidi & P. Boscolo (Eds.), *Writing and motivation* (pp. 1-14). Amsterdam: Elsevier.
- Bruning, R. H., Dempsey, M., Kauffman, D. F., McKim, C., & Zumbrunn, S. (2013). Examining dimensions of self-efficacy for writing. *Journal of Educational Psychology*, 105, 25-38. doi: 10.1037/a0029692

- Bruning, R. H., & Horn, C. (2010). Developing motivation to write. *Educational Psychologist*, 35, 25-37. doi: 10.1207/S15326985EP3501_4
- Brunstein, J. C., & Glaser, C. (2011). Testing path-analytic mediation model of how self-regulated writing strategies improve fourth graders' composition skills: A randomized controlled trial. *Journal of Educational Psychology*, 103, 922-938. doi: 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, 655-701. doi: 10.1037/a0029531
- Donohoe, C., Topping, K., & Hannah, E. (2013). The impact of an online intervention (Brainology) on the mindset and resiliency of secondary school pupils: A preliminary mixed methods study. *Educational Psychology: An International Journal of Experimental Educational Psychology*, 32, 641-655. doi: 10.1080/01443410.2012.675646
- Doron, J., Stephan, Y., Boiché, J., & Le Scanff, C. (2009). Coping with examinations: Exploring relationships between students' coping strategies, implicit theories of ability, and perceived control. *British Journal of Educational Psychology*, 79, 515-528. doi: 10.1348/978185409X402580
- Duncan, T. E., Duncan, S. C., & Strycker, L. A. (2006). *An introduction to latent variable growth curve modeling: Concepts, issues, and application*. Mahwah, NJ: Laurence Erlbaum Associates.
- Dweck, C. S. (1986). Motivational processes affecting learning. *American Psychologist*, 41, 1040-1048. doi: 10.1037/0003-066X.41.10.1040
- Dweck, C. S. (1999). *Self-theories: Their role in motivation, personality, and development*. Philadelphia, PA: Psychology Press.
- Dweck, C. S., Chiu, C., & Hong, Y. (1995). Implicit theories and their role in judgements and reactions: A world from two perspectives. *Psychological Inquiry*, 6, 267-285. doi: 10.1207/s15327965pli0604_1

- Dweck, C. S., & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review*, 95, 256-273. doi: 10.1037/0033-295X.95.2.256
- Faria, L. (2003). Escala de concepções pessoais de inteligência (ECPI). In M. M. Gonçalves, M. R. Simões, L. S. Almeida & C. Machado (Eds.), *Avaliação psicológica: Instrumentos validados para a população portuguesa* (pp. 131-144). Coimbra: Quarteto Editora.
- Faria, L. (2006). Escala de concepções pessoais de inteligência (ECPI): Novos estudos. In M. M. Gonçalves, M. R. Simões, L. S. Almeida & C. Machado (Eds.), *Avaliação psicológica: Instrumentos validados para a população portuguesa* (pp. 121-133). Coimbra: Quarteto Editora.
- Glaser, C., & Brunstein, J. C. (2007). Improving fourth-grade students' composition skills: Effects of strategy instruction and self-regulation procedures. *Journal of Educational Psychology*, 99, 297-310. doi: 10.1037/0022-0663.99.2.297
- Good, C., Aronson, J., & Inzlicht, M. (2003). Improving adolescents' standardized test performance: An intervention to reduce the effects of stereotype threat. *Applied Developmental Psychology*, 24, 645-662. doi: 10.1016/j.appdev.2003.09.002
- Graham, S. (2006a). Writing. In P. A. Alexander & P. H. Winne (Eds.), *Handbook of educational psychology*. Mahwah, NJ: Erlbaum.
- Graham, S. (2006b). Strategy instruction and the teaching of writing. In C. A. MacArthur, S. Graham & J. Fitzgerald (Eds.), *Handbook of writing research* (pp. 187-207). New York, NY: The Guilford Press.
- 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. 383-402). New York, NY: The Guilford Press.
- Graham, S., & Harris, K. R. (2007). Best practices in teaching planning. In S. Graham, C. A. MacArthur & J. Fitzgerald (Eds.), *Best practices in writing instruction*. New York, NY: The Guilford Press.

- Graham, S., Harris, K. R., & Mason, L. H. (2005). Improving the writing performance, knowledge, and self-efficacy of struggling young writers: The effects of self-regulated strategy development. *Contemporary Educational Psychology, 30*, 207-241. doi: 10.1016/j.cedpsych.2004.08.001
- Graham, S., & Hebert, M. (2010). *Writing to read: Evidence for how writing can improve reading. A Carnegie Corporation Time to Act Report*. . Washington, DC: Alliance for Excellent Education.
- Graham, S., McKeown, D., Kiuahara, S., & Harris, K. R. (2012). A meta-analysis of writing instruction for students in the elementary grades. *Journal of Educational Psychology, 104*, 879-896. doi: 10.1037/a0029185
- Graham, S., & Perin, D. (2007). A meta-analysis of writing instruction for adolescent students. *Journal of Educational Psychology, 99*, 445-476. doi: 10.1037/0022-0663.99.3.445
- Grant, H., & Dweck, C. S. (2003). Clarifying achievement goals and their impact. *Journal of Personality and Social Psychology, 85*, 541-553. doi: 10.1037/0022-3514.85.3.541
- Harris, K. R., & Graham, S. (1996). *Making the writing process work: Strategies for composition and self-regulation*. Cambridge, MA: Brookline.
- Harris, K. R., & Graham, S. (2009). Self-regulated strategy development in writing: Premises, evolution, and the future. *British Journal of Educational Psychology Monograph Series, II(6)*, 113-135. doi: 10.1348/978185409X422542
- Harris, K. R., Graham, S., Brindle, M., & Sandmel, K. N. (2009). Metacognition and children's writing. In D. J. Hacker, J. Dunlosky & A. C. Graesser (Eds.), *Handbook of metacognition in education* (pp. 131-153). Mahwah, NJ: Erlbaum.
- 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*, 295-340. doi: 10.3102/00028312043002295

- Harris, K. R., Graham, S., Mason, L. H., & Friedlander, B. (2008). *Powerful writing strategies for all students* Baltimore: Brookes.
- Hayes, J. R. (1996). A new framework for understanding cognition and affect in writing. In C. M. Levy & S. Ransdell (Eds.), *The science of writing: Theories, methods, individual differences, and applications* (pp. 1-27). Mahwah, NJ: Lawrence Erlbaum Associates.
- Hox, J. J. (2010). *Multilevel analysis: Techniques and applications* (2nd ed.). New York, NY: Routledge.
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6, 1-55. doi: 10.1080/10705519909540118
- Kellogg, R. T. (1988). Attentional overload and writing performance: Effects of rough draft and outline strategies. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 14, 355-365. doi: 10.1037/0278-7393.14.2.355
- Kellogg, R. T. (2008). Training writing skills: A cognitive developmental perspective. *Journal of Writing Research*, 1, 1-26.
- Kellogg, R. T., & Whiteford, A. P. (2009). Training advanced writing skills: The case for deliberate practice. *Educational Psychologist*, 44, 250-266. doi: 10.1080/00461520903213600
- Kline, R. B. (2005). *Principles and practice of structural equation modeling* (2nd ed.). New York, NY: The Guilford Press.
- Limpo, T., & Alves, R. A. (2013a). Teaching planning or sentence-combining strategies: Effective SRSD interventions at different levels of written composition. *Contemporary Educational Psychology*, 38, 328-341. doi: 10.1016/j.cedpsych.2013.07.004
- Limpo, T., & Alves, R. A. (2013b). Modeling writing development: Contribution of transcription and self-regulation to Portuguese students' text generation quality. *Journal of Educational Psychology*, 105, 401-413. doi: 10.1037/a0031391

- Limpo, T., Alves, R. A., & Fidalgo, R. (2013). Children's high-level writing skills: Development of planning and revising and their contribution to writing quality. *British Journal of Educational Psychology*, Advance online publication. doi: 10.1111/bjep.12020
- MacWhinney, B. (2000). *The Childes project: Tools for analyzing talk*. Mahwah, NJ: Lawrence Erlbaum Associates.
- McCutchen, D. (1986). Domain Knowledge and linguistic knowledge in the development of writing ability. *Journal of Memory and Language*, 25, 431-444. doi: 10.1016/0749-596X(86)90036-7
- McCutchen, D. (2006). Cognitive factors in the development of children's writing. In C. A. MacArthur, S. Graham & J. Fitzgerald (Eds.), *Handbook of writing research* (pp. 115-130). New York, NY: The Guilford Press.
- Messick, S. (1995). Validity of psychological assessment: Validation of inferences from persons' responses and performances as scientific inquiry into score meaning. *American Psychologist*, 50, 741-749. doi: 10.1037/0003-066X.50.9.741
- Molden, D. C., & Dweck, C. S. (2006). Finding "meaning" in psychology: A lay theories approach to self-regulation, social perception, and social development. *American Psychologist*, 61, 192-203. doi: 10.1037/0003-066X.61.3.192
- Mueller, C. M., & Dweck, C. S. (1998). Praise for intelligence can undermine children's motivation and performance. *Journal of Personality and Social Psychology*, 75, 33-52. doi: 10.1037/0022-3514.75.1.33
- Pajares, F. (2003). Self-efficacy beliefs, motivation, and achievement in writing: A review of the literature. *Reading and Writing Quarterly*, 19, 139-158. doi: 10.1080/10573560390143085
- Pajares, F., Miller, M. D., & Johnson, M. J. (1999). Gender differences in writing self-beliefs of elementary school students. *Journal of Educational Psychology*, 91, 50-61. doi: 10.1037//0022-0663.91.1.50

- Pajares, F., & Valiante, G. (1997). Influence of self-efficacy on elementary students' writing. *The Journal of Educational Research*, 90, 353-360. doi: 10.1080/00220671.1997.10544593
- Pajares, F., & Valiante, G. (1999). Grade level and gender differences in the writing self-beliefs of middle school students. *Contemporary Educational Psychology*, 24, 390-405. doi: 10.1006/ceps.1998.0995
- Palmquist, M., & Young, R. (1992). The notion of giftedness and student expectations about writing. *Written Communication*, 9, 137-168. doi: 10.1177/0741088392009001004
- Pressley, M., & Harris, K. R. (2006). Cognitive strategies instruction: From basic research to classroom instruction. In P. A. Alexander & P. H. Winne (Eds.), *Handbook of educational psychology* (pp. 265-286). New York: Macmillan.
- Robins, R. W., & Pals, J. L. (2002). Implicit self-theories in the academic domain: Implications for goal orientation, attributions, affect, and self-esteem change. *Self and Identity*, 1, 313-336. doi: 10.1080/1529886029010680 5
- Rogers, L. A., & Graham, S. (2008). A meta-analysis of single subject design writing intervention research. *Journal of Educational Psychology*, 100, 879-906. doi: 10.1037/0022-0663.100.4.879
- Saddler, B., & Graham, S. (2005). The effects of peer-assisted sentence-combining instruction on the writing performance of more and less skilled young writers. *Journal of Educational Psychology*, 97, 43-54. doi: 10.1037/0022-0663.97.1.43
- Shell, D. F., Murphy, C. C., & Bruning, R. H. (1989). Self-efficacy and outcome expectancy mechanisms in reading and writing achievement. *Journal of Educational Psychology*, 81, 91-100.
- Thompson, T., & Musket, S. (2005). Does priming for mastery goals improve the performance of students with an entity view of ability? *British Journal of Educational Psychology*, 75, 391-409. doi: 10.1348/000709904X22700

- Torrance, M., Fidalgo, R., & García, J.-N. (2007). The teachability and effectiveness of cognitive self-regulation in sixth-grade writers. *Learning and Instruction, 17*, 265-285. doi: 10.1016/j.learninstruc.2007.02.003
- White, M. J., & Bruning, R. H. (2005). Implicit writing beliefs and their relation to writing quality. *Contemporary Educational Psychology, 30*, 166-189. doi: 10.1016/j.cedpsych.2004.07.002
- Willett, J. B. (1989). Some results on reliability for the longitudinal measurement of change: Implications for the design of studies of individual growth. *Educational and Psychological Measurement, 49*, 587-602. doi: 10.1177/001316448904900309
- Wong, B. Y. L., Hoskyn, M., Jai, D., Ellis, P., & Watson, K. (2008). The comparative efficacy of two approaches to teaching sixth graders opinion essay writing. *Contemporary Educational Psychology, 33*, 757-784. doi: 10.1016/j.cedpsych.2007.12.004
- Zimmerman, B. J. (1995). Self-regulation involves more than metacognition: A social cognitive perspective. *Educational Psychologist, 30*, 217-221. doi: 10.1207/s15326985ep3004_8
- Zimmerman, B. J. (2000). Attaining self-regulation: A social-cognitive perspective. In M. Boekaerts, P. R. Pintrich & M. Zeidner (Eds.), *Self-regulation: Theory, research, and applications* (pp. 13-39). Orlando, FL: Academic Press.
- Zimmerman, B. J., & Risemberg, R. (1997). Becoming a self-regulated writer: A social cognitive perspective. *Contemporary Educational Psychology, 22*, 73-101. doi: 10.1006/ceps.1997.0919
- Zumbrunn, S., & Bruning, R. (2013). Improving the writing and knowledge of emergent writers: The effects of self-regulated strategy development. *Reading and Writing: An Interdisciplinary Journal, 16*, 91-110. doi: 10.1007/s11145-012-9384-5

Table 1

Descriptive Statistics and Correlations among the Five Items of ITW (Piloting Sample, N = 128)

Items	Descriptive statistics			Correlations				
	<i>M (SD)</i>	<i>Sk</i>	<i>Ku</i>	2.	3.	4.	5.	Item-Total
1. My texts will always have the same quality, no matter how much I try to change it.	2.37 (1.48)	1.02	0.13	.51	.26	.26	.38	.52
2. No matter how many texts I write, their quality will always be the same.	2.03 (1.26)	1.25	1.22		.29	.26	.38	.54
3. If I write well, it's because I was born like that.	2.52 (1.67)	0.81	-0.61			.15	.17	.30
4. If I do not write as well as I wish, I can't do much to change it.	2.09 (1.46)	1.26	0.53				.29	.33
5. I can't change the quality of my texts.	2.06 (1.37)	1.44	1.48					.44

Note. These items are English translations of the Portuguese ones. Thus, they should not be used in other languages before adaptation and validation.

Table 2

Parameter Estimates of the CFA Models of the ITW with Five Items and Three Items (Piloting Sample, N = 128)

Items	5-item model			3-item model		
	<i>B</i>	<i>SE</i>	β	<i>B</i>	<i>SE</i>	β
1. My texts will always have the same quality, no matter how much I try to change it.	1.04	0.14	.71	1.06	0.13	.72
2. No matter how many texts I write, their quality will always be the same.	0.89	0.12	.71	0.79	0.12	.61
3. If I write well, it's because I was born like that.	0.63	0.17	.38			
4. If I do not write as well as I wish, I can't do much to change it.	0.57	0.15	.39			
5. I can't change the quality of my texts.	0.74	0.13	.54	0.81	0.12	.62

Note. All factor loadings were statistically significant at $\alpha = .001$.

Table 3

Demographic Data of Students Participating in the Intervention Study by Condition

Measure	Condition	
	Intervention	Control
<i>N</i>	109	83
Gender (<i>Ns</i>)		
Girl	57	43
Boy	52	40
Age (in years)		
<i>M</i> (<i>SD</i>)	11.1 (0.7)	11.2 (0.6)
Min–Max	9.1–13.8	10.1–12.7
Mother's educational level (%)		
Grade 4 or below	7.3	7.2
Grade 9 or below	20.2	27.7
High school	36.7	24.1
College or above	27.5	36.1
Unknown	6.4	4.8
School marks (1-5)		
<i>M</i> _{Portuguese} (<i>SD</i>)	3.5 (0.8)	3.4 (0.9)
<i>M</i> _{Mathematics} (<i>SD</i>)	3.4 (0.9)	3.5 (1.0)

Note. Mother's educational level was used as an index of students' socio-economic status. For school marks, 1 = *lowest score* and 5 = *highest score*.

Table 4

Descriptive Statistics and Parameter Estimates of the CFA Model of ITW with 3 Items (Cross-Validation Sample, N = 192)

Items	Descriptive statistics			Parameter estimates		
	<i>M (SD)</i>	<i>Sk</i>	<i>K</i>	<i>B</i>	<i>SE</i>	β
1. My texts will always have the same quality, no matter how much I try to change it.	2.69 (1.5)	0.67	-0.47	1.17	0.10	.78
2. No matter how many texts I write, their quality will always be the same.	2.51 (1.30)	0.91	0.46	0.89	0.09	.69
3. I can't change the quality of my texts.	2.13 (1.26)	1.41	1.86	0.85	0.09	.67

Note. All factor loadings were statistically significant at $\alpha = .001$.

Table 5

Means, Standard Deviations, and Means Adjusted by Pre-Test Scores for Opinion Essay Length and Quality by Condition and Testing Time

	Length		Quality	
	Intervention	Control	Intervention	Control
Pre-test				
<i>M</i>	86.08	84.41	3.68	3.88
<i>SD</i>	41.80	40.66	1.24	1.25
Mid-test				
<i>M</i>	99.92	68.94	4.00	3.57
<i>SD</i>	37.28	41.25	1.18	1.27
Adjusted <i>M</i>	99.46	69.54	4.05	3.50
Post-test				
<i>M</i>	128.38	78.86	4.49	3.74
<i>SD</i>	44.23	45.54	1.21	1.27
Adjusted <i>M</i>	128.01	79.34	4.54	3.68

Table 6

Correlations between Opinion Essay Length and Quality at Pre-test, Mid-Test, and Post-Test by Condition.

Measures	Pre-test		Mid-test		Post-test	
	Lenght	Quality	Lenght	Quality	Lenght	Quality
Pre-test						
Length	–	.59	.72	.49	.58	.57
Quality	.56	–	.50	.65	.67	.65
Mid-test						
Length	.64	.53	–	.62	.60	.62
Quality	.37	.57	.55	–	.64	.59
Post-test						
Length	.39	.44	.53	.28	–	.77
Quality	.33	.50	.41	.63	.49	–

Note. Correlations for the control condition ($n = 83$) are above the diagonal and correlations for the intervention condition ($n = 109$) are below the diagonal. All correlations, except the one between length at post-test and quality at mid-test ($p = .004$), are significant at $\alpha = .001$.

Table 7

Parameter Estimates for LGC Models of Prediction of Change in Opinion Essay Length and Quality (Intervention Students, $n = 109$)

Parameter	Coefficient	<i>SE</i>	<i>p</i>
Opinion essay length			
Intercept mean	97.51	9.19	< .001
Intercept variance	1155.01	221.12	< .001
Slope mean	23.69	4.69	< .001
Slope variance	216.45	61.70	< .001
Intercept ↔ Slope	-245.44	93.72	.009
ITW → Intercept	-5.41	3.46	.12
ITW → Slope	-2.23	1.77	.21
Opinion essay quality			
Intercept mean	4.19	0.27	< .001
Intercept variance	0.89	0.19	< .001
Slope mean	0.56	0.12	< .001
Slope variance	0.06	.04	.17
Intercept ↔ Slope	-0.10	0.07	.15
ITW → Intercept	-0.21	0.10	.03
ITW → Slope	-0.09	0.44	.04

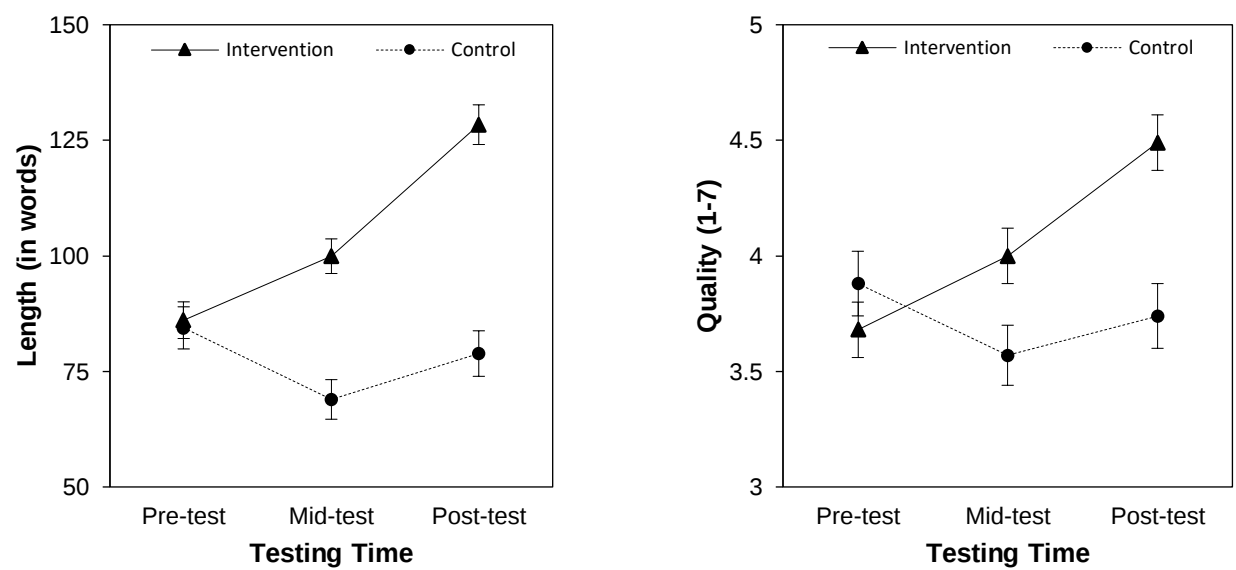


Figure 1. Opinion essay length (on the left) and quality (on the right) by condition and testing time.

Error bars represent standard errors.

Appendix

Overview of the Instructional Procedures of each Lesson of the Intervention

Lesson 1

- Students set the goal for the program (viz., write good opinion essays) and discussed the importance of planning ahead of writing to achieve it.
- Teachers told them that they were going to learn a strategy to make good plans.
- Students committed to try hard to learn the strategy by signing a learning contract.

Lesson 2

- Teachers presented the CRÊS strategy and discussed the meaning of each letter.
- Students were introduced to the self-monitoring sheet. They had to find and register the essay parts included, first, in an exemplar opinion essay and, then, in their own pre-test essays.
- Students registered their pre-intervention performance by filling out their progress sheet (from this session on, they filled it out anytime they worked individually).

Lesson 3

- Teachers modelled how to plan an opinion essay with the CRÊS strategy.
- The whole class discussed what the teachers had said to themselves.
- Students came up with self-instructions for each of the three steps of the writing flowchart (viz., before writing, during writing, and after writing)

Lesson 4

- The whole class emulated the teachers' modelling to plan an opinion essay with CRÊS.
- Students were asked to repeat the procedure as homework.

Lesson 5

- Students planned an opinion essay with CRÊS individually, but under teachers' guidance.

Lesson 6

- Teachers modelled how to use CRÊS to plan and write an opinion essay.
 - Students discussed what teachers had said to themselves and how it differed from Lesson 3.
 - Students came up with updated self-instructions for the writing flowchart.
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Lesson 7

- The whole class emulated the teachers' modelling to plan and write an opinion essay with CRÊS.
 - Students were prompted to apply the writing and self-regulation strategies in different situations once per week (from this session on, they discussed each situation where they applied them)
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Lesson 8

- Students planned and wrote an opinion essay with CRÊS individually, but under teachers' guidance.
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Lesson 9

- Teachers grouped students facing similar difficulties and gave them individualized feedback.
 - Students generated a special self-instruction to overcome their main difficulty.
 - For homework, they planned and wrote an opinion essay with CRÊS, paying particular attention to the special self-instruction.
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Lessons 10-11

- Students planned and wrote an opinion essay with CRÊS individually, with minimal support.
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Lesson 12

- Students examined their progress sheet and discussed how the strategy and their effort helped them to write good opinion essays.
 - Teachers gave students "quality certificates" to stick on their learning contracts.
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Note. CRÊS is a Portuguese mnemonic for the key parts of an opinion essay: tell what you believe, give 3 or more reasons, explain each reason, and wrap it up.