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Structural relations among implicit theories, achievement goals, and performance in writing☆

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ABSTRACT

Implicit theories have important implications for students' achievement goals and academic achievement. The Writer(s)-within-community model by Graham (2018) postulates that motivational beliefs stored in the long-term memory, such as implicit theories and achievement goals, influence how one approaches a writing task. Notwithstanding, few empirical studies examined the relations among implicit theories, achievement goals, and writing performance. In this study, we sought to examine the structural relations among implicit theories, achievement goals, and writing performance of Portuguese students in grades 5 to 8 ($M_{age} = 11.80$, $SD = 1.5$). In addition, we aimed to test whether the relations among implicit theories, achievement goals, and writing performance varied across two text genres, and for girls and boys. Our results showed that more incremental theories in writing were associated with a greater pursuit of mastery goals as well as with higher text quality. Moreover, a greater endorsement of mastery goals was associated with higher text quality, whereas a greater adoption of performance-approach goals was linked to lower text quality. These relations remained stable for girls and boys and across narrative and opinion texts. Overall, these findings confirm the pivotal role of motivation-related variables in predicting students' writing performance.

1. Introduction

Teaching how to write effectively is a crucial goal of today's education. Yet, empirical studies along with national and international reports stress that many students do not achieve age-appropriate writing proficiency levels (e.g., Carpentieri, 2012; European Commission, 2019; Graham et al., 2015). This fact is worrisome as students who perform poorly in writing may be at higher risk to drop out of school and may face more obstacles to fully participate in the society (Graham et al., 2015; Graham & Harris, 2019).

Writing is a particularly complex and demanding activity as it requires the coordination of several cognitive and linguistic processes simultaneously, such as attention, working memory, long-term memory resources, and mental and physical operations involved in text production (Graham, 2018; Graham et al., 2013). Consequently, the complex nature of the writing process creates motivational challenges for students (Bruning & Horn, 2000).

In this study, we focused on two conceptually related motivational constructs—implicit theories and achievement goals—and their structural relations with middle school students' writing performance. The importance of writing for students' academic achievement and lifelong learning is apparent in several official Portuguese guidelines (e.g., Direção-Geral da Educação, 2018) as well as in international reports by the European Commission and the Organization for Economic Cooperation and Development (e.g., European Commission, 2019; OECD, 2018). A critical issue is that, although the importance of writing is acknowledged across these national and international documents, many students still fail to develop robust writing skills and report low motivation to engage in writing (Boscolo & Hidi, 2007; Graham et al., 2015). In specific, the role of writing motivation and directions on how teachers

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can motivate students to write are matters that deserve further attention from both researchers and practitioners. Therefore, understanding how different motivational factors are associated with students' writing performance and whether these relations vary or remain stable across text genre and student gender is of the utmost importance.

1.1. Conceptualizing writing

Over the last decades, writing has been mainly studied by cognitive and sociocultural approaches (Boscolo & Hidi, 2007; Graham, 2018), which proceeded more or less orthogonally (Deane, 2018). The cognitive perspective generated multiple models that emphasize the cognitive processes involved in writing, while the sociocultural approach highlighted the sociocultural, political, and historical factors that enable participation in writing.

Aiming to bring together both perspectives, Graham (2018) developed the Writer(s)-within-community (WWC) model. In this model, writing is conceptualized as "simultaneously shaped and constrained by the context, the capabilities, and perceptions of writers and collaborators, and the interaction between the two" (Graham, 2018, p. 258). This model grants a pivotal role to motivational beliefs, which determine whether and how a student engages in writing.

Specifically, Graham (2018) identified seven sets of motivational beliefs about: (1) the value and utility of writing; (2) whether one likes to write or views writing as an attractive task; (3) the writing competence; (4) why one engages in writing; (5) why one is or is not successful; (6) identities as writers; and (7) writing communities. In this study, we focused on two motivational beliefs featured in the WWC model (Graham, 2018): implicit theories (embedded in the third set of beliefs) and achievement goals (included in the fourth set of beliefs).

The third set of beliefs identified by Graham's WWC model (2018) encompasses self-efficacy beliefs, which are influenced by previous experiences as well as by writers' implicit theories. Implicit theories refer to the beliefs that people hold about the malleable or fixed nature of personal attributes or skills, such as intelligence or writing.

The fourth set of beliefs includes intrinsic versus extrinsic motivation and achievement goals. Regarding achievement goals, Graham's model (2018) included mastery goals (i.e., engaging in a writing task to gain competence), performance-approach goals (i.e., displaying more writing competence than others), and performance-avoidance goals (i.e., avoiding doing worse in writing than others). Therefore, Graham (2018) adopted the trichotomous goal framework in the WWC model, which was one of the theoretical rationales underpinning our study. In addition, the WWC model assumes that the same person may vary in capabilities across different types of writing, which was another of the focuses of this study.

In line with the WWC model, Deane (2018) conceptualized writing as both an individual performance and a social practice. Additionally, he contended that gender differences may have consequences for writing motivation. For instance, girls tend to perform better in school writing assignments and report more motivation to write, which in turn may strengthen future writing performance. Deane related these differences to achievement goals since girls tend to pursue mastery goals, while boys endorse more often performance-approach goals.

Over the next sections, we elaborate on the definitions and empirical research about implicit theories and achievement goals, and on gender and text genre differences.

1.2. Conceptualizing implicit theories

Implicit theories pertain to students' beliefs about the nature of their intelligence (Dweck & Master, 2009). Students who endorse an entity theory believe that intelligence is a fixed, innate attribute, whereas students who endorse an incremental theory believe that intelligence is a malleable attribute, which can be developed over time through hard work and effort. Implicit theories can be domain-specific as one student may believe that ability in one school domain is malleable (e.g., writing), while ability in another domain is innate (e.g., math; Dweck & Master, 2009).

Endorsing different implicit theories (entity vs. incremental) results in different motivational meaning systems, which in turn can affect achievement, self-esteem, and stress over time (Dweck & Molden, 2017). For instance, in mathematics, an incremental theory encourages the adoption of mastery goals, positive effort beliefs, and low helplessness attributions, which in turn are associated with mastery-oriented strategies, thereby contributing to higher grades (Blackwell et al., 2007).

1.3. Relations between implicit theories and writing performance

Few studies explored the relations between implicit theories and students' writing performance (see Camacho, Alves, & Boscolo, 2021), and contradictory results emerged: one study showed that implicit theories were not significantly related to self-reported grades in reading and writing (Gunderson et al., 2017), while another study indicated that students endorsing incremental theories in writing performed better in an opinion essay (Limpo & Alves, 2017). Limpo and Alves (2017) also found that implicit theories of writing contributed indirectly to persuasive essay quality via mastery goals and self-efficacy for self-regulation in a path-analytic model.

Additionally, implicit theories may boost the beneficial effects of writing instruction. Specifically, incremental beliefs in writing were found to be associated with greater increases in text quality during a Self-Regulated Strategy Development intervention (Limpo & Alves, 2014).

1.4. Conceptualizing achievement goals

Achievement goals have been defined as "the purpose for which a person engages in achievement behavior" (Elliot & Thrash, 2001, p. 140). Initially, researchers proposed a two-factor goal model comprised of mastery goals and performance goals (Ames & Archer, 1988; Dweck, 1986; Nicholls, 1984). The former referred to learning and improving one's own competencies, while the latter pertained to demonstrating one's competence or avoiding showing incompetence (Wirthwein et al., 2013).

As research on achievement goals progressed, researchers proposed a trichotomous goal framework, which encompassed three goal types (i.e., mastery goals, performance-approach goals, and performance-avoidance goals). Performance-related goals were thus divided: while students adopting performance-approach goals focus on displaying competence and outperforming their peers, students holding performance-avoidance goals focus on avoiding incompetence in front of others. Afterward, achievement goals theorists proposed the 2×2 framework, which postulates the existence of a fourth achievement goal: students adopting mastery-avoidance goals avoid task-based or intrapersonal incompetence (Elliot & McGregor, 2001). More recently, derived from the 2×2 goal approach, Elliot et al. (2011) proposed a 3×2 goal model, which is ingrained in the definition (task, self, or other) and valence (positive or negative) components of competence, encompassing six goals (i.e., task-approach, task-avoidance, self-approach, self-avoidance, other-approach, and other-avoidance).

In the writing domain, researchers have mostly grounded their studies on the trichotomous goal framework (e.g., Pajares et al., 2000; Pajares & Cheong, 2003; Pajares & Valiante, 2001; Soylu et al., 2017; Troia et al., 2013), whereas studies relying on the 2×2 and 3×2 goal frameworks are scarcer. Accordingly, a person may write to: learn more, attain deep understanding, and self-improve writing skills (mastery goals); maximize the appearance of competence in writing and feel better than others (performance-approach goals); or avoid failure such as avoiding the worst writing grade (performance-avoidance goals; Graham, 2018; Soylu et al., 2017). In the current study, we adopted the trichotomous goal framework for two reasons. First, Graham (2018)

referred to the trichotomous goal framework in the WWC model of writing. Second, Soylu et al. (2017) developed a highly reliable writing achievement goal scale grounded on the trichotomous goal framework, which we use in this study.

1.5. Relations between achievement goals and writing performance

Overall, studies indicated significant associations between achievement goals and writing performance as measured by text quality, prior writing achievement, and teachers' ratings of students' writing competence (see Camacho, Alves, & Boscolo, 2021).

Regarding mastery goals, several studies showed a positive association with writing performance across different text genres (Kaplan et al., 2009; Pajares & Cheong, 2003; Soylu et al., 2017; Troia et al., 2013). Specifically, Pajares and Cheong (2003) found that mastery goals were positively correlated with teachers' ratings of fourth to eleventh grade students' writing competence. In a similar study, mastery goals were positively correlated with narrative text quality of fourth to tenth graders (Troia et al., 2013). Soylu et al. (2017) conducted a study on the relations between achievement goals and eleventh graders' persuasive writing performance—which was part of a statewide writing assessment. This study showed that mastery goals were positively correlated with persuasive writing performance. However, mastery goals did not significantly contribute to text quality in the path-analytic model tested by Soylu et al. (2017). A plausible explanation is that classroom writing may be more connected to students' goals and, therefore, a statewide writing assessment may have been perceived as a task disconnected from the classroom context (Soylu et al., 2017). A study by Kaplan et al. (2009) revealed that only mastery-approach goals were significantly correlated with the essay quality of ninth graders.

Concerning performance-approach goals, mixed evidence emerged across studies. The study by Pajares and Cheong (2003) showed these goals were not associated with rated writing competence. By contrast, in the study by Troia et al. (2013), performance-approach goals were negatively correlated with narrative text quality. In addition, Troia and colleagues found that only performance-approach goals made a direct, negative contribution to narrative text quality. In the opposite direction, the study by Soylu et al. (2017) revealed that performance-approach goals contributed positively to students' self-efficacy for conventions (i.e., feeling competent to apply language and writing conventions while writing), which in turn made a positive contribution to persuasive essay quality. In the study by Kaplan et al. (2009), using smallest space analysis, students did not distinguish between performance-approach and performance-avoidance goals, which suggests a perceived integration of these conceptually different goals.

As for performance-avoidance goals, previous studies indicated a negative association with writing performance across text genres. The study by Pajares and Cheong (2003) revealed that performance-avoidance goals were negatively correlated with rated writing competence. In the same line, the study by Troia et al. (2013) showed that performance-avoidance goals were negatively correlated with narrative text quality. Finally, the study by Soylu et al. (2017) showed that performance-avoidance goals did not contribute directly to students' persuasive essay quality but made a negative contribution to students' self-efficacy for conventions.

1.6. Relations between implicit theories and achievement goals

Dweck (1999) postulated that different implicit theories lead to the pursuit of different goals in achievement settings. As incremental theorists want to pursue challenging tasks to maximize their learning, they prefer mastery goals over performance goals (Dweck & Master, 2009). Conversely, entity theorists want to exhibit their abilities, therefore they tend to choose performance goals over mastery goals. In this regard, a meta-analysis of 85 empirical studies by Burnette et al. (2013) indicated that incremental theories are positively correlated with mastery-oriented goals and negatively correlated with performance-based goals. In a recent study using the 2 × 2 goal framework, Liu (2021) found that incremental theories predicted mastery-approach goals and mastery-avoidance goals, whereas entity theories predicted performance-approach goals and performance-avoidance goals.

In the writing domain, there is little research relating implicit theories with achievement goals. An exception was the study of Limpo and Alves (2017), which showed that more incremental theories in writing were associated with greater adoption of mastery goals, whereas more entity theories in writing were associated with a greater endorsement of performance-avoidance goals.

1.7. Gender differences in implicit theories and achievement goals

In a previous work, we found that 22 out of 82 studies examined differences in writing motivational constructs—including implicit theories and achievement goals—between female and male students (see Camacho, Alves, & Boscolo, 2021). Of the 22 studies, only two focused on implicit theories and four focused on achievement goals.

As for implicit theories, both studies showed no gender differences in implicit theories of writing (Limpo & Alves, 2014) nor implicit theories of reading and writing (Gunderson et al., 2017). By contrast, research on achievement goals has revealed gender differences. Specifically, studies by Pajares and associates showed that girls adopted mastery goals more often than boys. In turn, boys adopted both performance-approach and performance-avoidance goals more often than girls (Pajares et al., 2000; Pajares & Cheong, 2003). In the same line, a study by Troia et al. (2013) indicated that girls reported pursuing mastery goals more often and pursuing performance-avoidance goals less frequently than boys.

These results need to be interpreted with caution as other individual variables—such as gender stereotypic beliefs—may also help to explain gender differences. Noticeably, Pajares and Valiante (2001) found that when students' femininity orientation beliefs were controlled, the difference between girls and boys in mastery goals was rendered non-significant, while the difference in performance-approach goals remained significant.

Of note, none of the abovementioned studies inspected whether the structural relations among implicit theories, achievement goals, and writing performance vary or remain stable across girls and boys using multiple-group structural equation modeling. However, at least one previous study focused on a different motivational construct (i.e., self-efficacy) examined whether its relationship with writing performance varied across girls and boys (e.g., De Smedt et al., 2017). Therefore, we included gender as a grouping variable in our multiple-group structural equation models.

1.8. Text genre differences in implicit theories and achievement goals

As far as we know, no study to date explored whether the relations between implicit theories and achievement goals generalize across different text genres. Notwithstanding, in the WWC model, Graham (2018) stated that an individual may differ in the capabilities of different types of writing. Graham further exemplifies that a person may like to write entertaining stories but may not be adept at poetry writing. Moreover, three prior writing studies on implicit and/or achievement goals encouraged researchers to examine whether students hold different implicit theories and achievement goals towards different text genres (Limpo & Alves, 2017; Soylu et al., 2017; Troia et al., 2013).

In this regard, Soylu et al. (2017) suggested that future research could explore whether students pursue different achievement goals for specific writing genres. Likewise, Limpo and Alves (2017) recommended that the studied path-analytic model involving implicit theories and achievement goals could be tested with different student groups and text genres.

1.9. The current study

In this study, we sought to address three research gaps. First, there is a dearth of writing research on implicit theories, which is in sharp contrast with the more widespread study in other domains such as science, mathematics, or general academic achievement (Blackwell et al., 2007; Costa & Faria, 2018; Mason et al., 2013). Second, even though more studies focused on writing achievement goals, none of these studies examined how students pursue different achievement goals across specific text genres (Soylu et al., 2017; Troia et al., 2013). Third, to the best of our knowledge, no study to date examined whether the structural relations among implicit theories, achievement goals, and writing performance varied across students' gender.

Stemming from these research gaps, this study had a twofold goal: (a) to examine the relations among two conceptually related motivational constructs (i.e., implicit theories and achievement goals) and writing performance using structural equation modeling; (b) to analyze whether the relations among these variables vary across girls and boys (i.e., gender) as well as across narrative and opinion texts (i.e., text genre).

In a previous study (Camacho, Alves, De Smedt et al., 2021), we showed that self-efficacy and especially attitudes were significantly linked to how frequently middle school students wrote and how well they performed across text genres and grade levels. Based on the same sample of students, this study sought to extend the findings of the previous one in two meaningful ways. First, we focused on two comparatively less studied motivational constructs—implicit theories and achievement goals—to understand if they also make a positive contribution to middle school students' writing performance. Second, in the present study we shifted our attention to students' gender as a means to understand whether the relations between motivational variables and writing performance vary or remain the same for girls and boys.

Based on the findings described in the literature (Burnette et al., 2013; Pajares & Cheong, 2003; Troia et al., 2013; Soylu et al., 2017), we formulated five hypotheses (see Fig. 1). These hypotheses should be interpreted considering that lower scores in the implicit theories scale indicated more incremental theories, whereas higher scores represented more entity theories:

Hypothesis 1. Implicit theories are negatively associated with mastery goals.

Hypothesis 2. Implicit theories are positively associated with both performance-approach and performance-avoidance goals.

Hypothesis 3. Implicit theories are negatively related—directly or indirectly via achievement goals—to writing performance.

Hypothesis 4. Mastery goals contribute positively to writing performance.

Hypothesis 5. Performance-approach and performance-avoidance goals contribute negatively to writing performance.

Finally, we sought to test whether the formulated hypotheses generalize across text genres (i.e., narrative and opinion text quality) and student gender (i.e., female and male students).

2. Method

2.1. Portuguese educational context

In Portugal, compulsory education encompasses basic education (grades 1–9) and secondary education (grades 10–12). Basic education includes three cycles of education: primary school (grades 1–4), lower middle school (grades 5–6), and upper middle school (grades 7–9). Students in our study were enrolled in lower and upper middle school.

Regarding writing instruction guidelines, a process-oriented approach to writing is recommended as well as the establishment of a supportive writing atmosphere (Direção-Geral da Educação, 2018). Notwithstanding, there are limited guidelines on how Portuguese teachers can promote writing motivation in the classroom. Middle school students are expected to write several text genres for a variety of purposes, including narrative and opinion texts (Directorate-General for Education, 2018, 2021).

2.2. Participants

Students were recruited from three public schools located in a city of the Northwest region of Portugal. Initially, we sent invitations to teachers in charge of 47 fifth to eighth grade classes. Of these, three teachers did not agree to participate, and therefore we did not involve

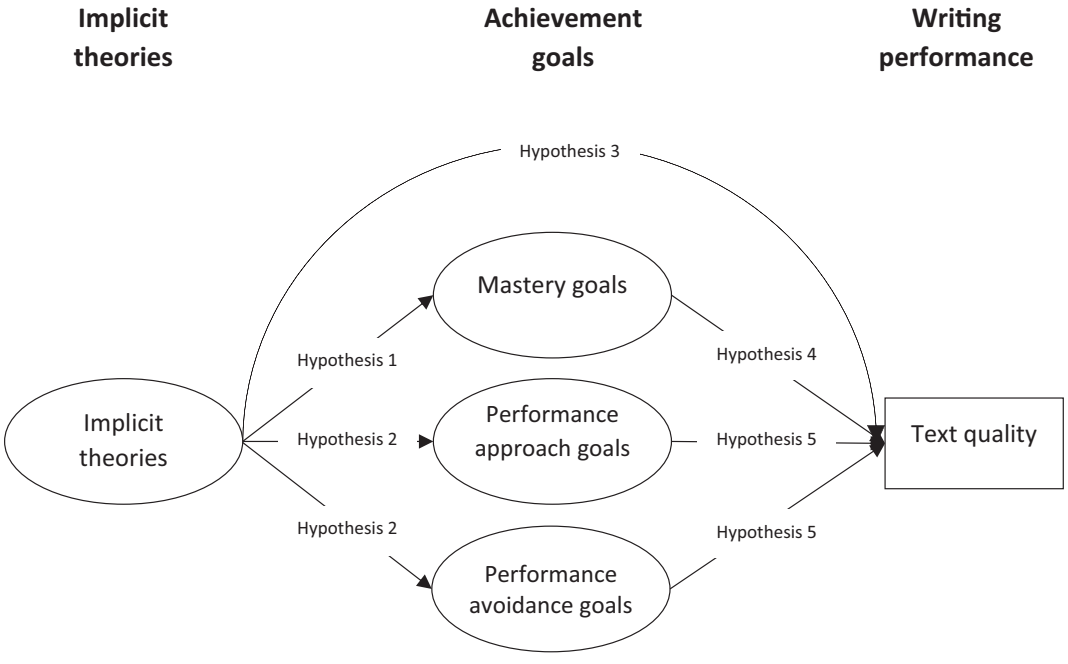

Fig. 1. Hypothesized relational model relating implicit theories and achievement goals to writing performance.

their students in this study. Our final sample included 605 students (n_{female} = 310, n_{male} = 295) with a mean age of 11.80 (*SD* = 1.5), belonging to 44 classes (see Table 1).

2.3. Measures

We used motivational and writing performance measures. At the motivational level, we assessed implicit theories of writing and achievement goals in writing using self-report scales. At the performance level, students were instructed to write a narrative and an opinion text. Each text was assessed in terms of overall text quality. All measures, including their factor structure and internal consistency, are presented below.

2.3.1. Motivational measures

2.3.1.1. Implicit theories. Implicit theories of writing were assessed using the Implicit Theories of Writing scale (ITW; Limpo & Alves, 2014), a self-report scale adapted to writing based on the Implicit Theories of Intelligence self-form scale for children (Dweck et al., 1995). The ITW is originally Portuguese and includes three items wherein students indicate their agreement with statements about the malleability of their writing skills (e.g., "My texts will always have the same quality, no matter how much I try to change it"). Students rate the level of agreement with each sentence on a six-point Likert response scale, ranging from complete disagreement to complete agreement. As the items are phrased in an entity direction, lower scores indicate more incremental beliefs about writing (i.e., a growth mindset) and higher scores indicate more entity beliefs about writing (i.e., a fixed mindset). The original ITW scale validation study conducted with fifth and sixth graders indicated an excellent fit of the data to a single-factor model and an adequate internal consistency (α = 0.69 and 0.73; Limpo & Alves, 2014).

In the current study, we conducted a Confirmatory Factor Analysis (CFA) for the ITW scale considering a single-factor solution. The tested model was just identified due to the presence of three observed variables and one latent variable (i.e., model with zero degrees of freedom). Therefore, we fixed the latent variable variance to 1. After this adjustment, the CFA showed a good fit to the data, Satorra–Bentler (SB) $\chi^2(1) = 4.313$, $p < .001$, CFI = 0.99, RMSEA = 0.08, SRMR = 0.06. In addition, the internal consistency of the implicit theories scale was high (Bentler's ρ = 0.80). Notwithstanding the short length of the ITW scale, it proved to be valid and highly reliable in the present study, thus replicating the findings from the original study.

Table 1
Student demographic characteristics.

Demographic variable	Girls (*n* = 310)		Boys (*n* = 295)		Total (*N* = 605)	
	M	*SD*	*M*	*SD*	*M*	*SD*
Age in years	11.73	1.4	11.86	1.6	11.80	1.5
School mark in Portuguese (1–5)	3.44	0.7	3.20	0.8	3.32	0.8

Demographic variable	Girls (*n* = 310)		Boys (*n* = 295)		Total (*N* = 605)	
	n	%	*n*	%	*n*	%
Special educational needs	4	1.3	7	2.4	11	1.8
Portuguese as the native language	306	98.7	294	99.7	572	94.5
Mother's educational level						
No educational level	5	1.6	2	0.7	7	1.2
Grade 4 or less	25	8.1	15	5.1	40	6.6
Grade 6 or less	42	13.5	31	10.5	73	12.1
Grade 9 or less	63	20.3	65	22	128	21.2
Grade 12 or less	72	23.2	91	30.8	163	26.9
University degree	74	23.9	65	22.1	139	22.9
Unknown	29	9.4	26	8.8	55	9.1

2.3.1.2. Achievement goals. Achievement goals were measured using the Writing Achievement Goals Scale (WAGS; Soylu et al., 2017), which was translated and adapted to the Portuguese language. The WAGS is a 12-item scale, which asks students about their intentions or goals when they write. Students rate how well the statements apply to them on a five-point Likert response scale, ranging from "Does not apply to me" to "Applies to me perfectly".

The WAGS is based on the trichotomous goal framework, thus covering three factors, corresponding to mastery goals (e.g., "When I am in my Portuguese language classes, I am trying to improve how I express my ideas"), performance-approach goals (e.g., "When I am in my Portuguese language classes, I am trying to be a better writer than my classmates"), and performance-avoidance goals (e.g., "When I am in my Portuguese language classes, I am trying to hide that I have a hard time writing"). A higher score on a given factor indicates that the student adopts that specific goal more often. In the original validation study, the WAGS showed a good fit to the hypothesized three-factor model as well as high internal consistency coefficients (αs between 0.86 and 0.92; Soylu et al., 2017).

In the present study, a first CFA showed an adequate fit to the hypothesized three-factor model, SB $\chi^2(51) = 205.57$, $p < .001$, CFI = 0.92, RMSEA = 0.08, SRMR = 0.07. However, an inspection of modification indices (MI) showed measurement error covariance between items 4 and 12 of the performance-approach scale (MI = 89.57), which could be lowering the model fit indices. The wording of items 4 and 12 was similar: "When I am in my Portuguese language classes, I am trying to be a better writer than my classmates" (item 4) and "When I am in my Portuguese language classes, I am trying to be the best writer in my class" (item 12). In a subsequent CFA, we correlated the error terms of items 4 and 12, based on three criteria: (1) both items pertained to the performance-approach factor; (2) the items conveyed the same idea; and (3) the error terms of the same items were correlated in a previous study (Limpo & Alves, 2017). Indeed, the new CFA showed a better model fit, SB $\chi^2(50) = 142.20$, $p < .001$, CFI = 0.96, RMSEA = 0.06, SRMR = 0.06. Additionally, reliability analysis showed that the three achievement goals subscales were reliable (Bentler's $\rho_{mastery}$ = 0.82; Bentler's $\rho_{performance\text{-}approach}$ = 0.81; Bentler's $\rho_{performance\text{-}avoidance}$ = 0.73).

2.3.2. Writing performance

2.3.2.1. Text quality. Students wrote one narrative ("Tell a story about a child who found a wounded animal") and one opinion text ("What is your opinion about children practicing sport every day?") one week apart to prevent fatigue. Handwritten texts were typed with a word processor. During this process, we corrected spelling, punctuation, and capitalization errors to reduce presentation biases (Graham et al., 2011). Text quality was then assessed by means of a holistic scoring procedure (Cooper, 1977; Graham et al., 2017; Huot, 1990). Eight independent research assistants, grouped into four pairs of judges, assessed text quality.

The first author trained eight judges (four pairs) to read each text carefully and then assign a holistic score using a seven-point scale, varying from 1 (low text quality) to 7 (high text quality). The judges had to consider four quality criteria with equal weight to determine the holistic score: (1) ideas and arguments (i.e., originality of ideas for narrative texts and relevance of reasons to support the opinion for opinion texts); (2) coherence (i.e., clarity, organization, and structure of the text); (3) syntax (i.e., syntax accuracy and diversity of sentences); and (4) vocabulary (i.e., variety, interest, and appropriate use of words). Judges were also provided with benchmark texts, representing narrative and opinion texts with low, average, and high quality for each grade-level.

Each pair of judges independently scored 30 narrative texts and 30 opinion texts, compared the scores, and resolved discrepancies under the guidance of the first author. Each judge then assessed the remaining

texts independently. We distributed each pair of judges to a specific grade-level: (a) a first pair of judges assessed 164 narrative texts and 164 opinion texts written by fifth graders; (b) a second pair of judges assessed 178 narrative texts and 178 opinion texts written by sixth graders; (c) a third pair of judges assessed 111 narrative texts and 111 opinion texts written by seventh graders; and (d) a fourth pair of judges assessed 152 narrative texts and 152 opinion texts written by eighth graders. We put forth this procedure to ensure that judges would not assign lower quality scores to younger students. Interrater reliability, based on Pearson *r*, was high for both narrative ($r_{\text{grade 5}} = 0.89$; $r_{\text{rade 6}} = 0.83$; $r_{\text{grade 7}} = 0.87$; $r_{\text{grade 8}} = 0.80$) and opinion texts ($r_{\text{grade 5}} = 0.87$; $r_{\text{rade 6}} = 0.86$; $r_{\text{grade 7}} = 0.90$; $r_{\text{grade 8}} = 0.84$). The text quality score was the average across the two judges.

2.4. Data collection procedure

All measures were collected during the Winter of 2019. Two research assistants administered the motivational and writing performance measures in two 50-minute lessons, one week apart. During the first lesson, one research assistant read the instructions and all students performed the tasks independently and silently. Students filled in a demographic questionnaire, completed the achievement goal scale, wrote the narrative text, and responded to other motivational questionnaires. During the second session, students filled in the scale about implicit theories, wrote the opinion text, and completed another writing-related task for a different study.

We adopted the following ethical procedures to collect the data, according to the European Union's General Data Protection Regulation guidelines and the University of Porto ethical code: (a) our study was approved by the Pedagogical Committees of the three participating schools; (b) teachers, students, and their parents (or legal guardians) were informed about the goals of this study, the voluntariness nature of students' participation, and the anonymous and confidential nature of the data; (c) prior to any data collection, we obtained written informed consent from both teachers and students' parents (or legal guardians); (d) prior to any data collection, we obtained students' assent to participate, who were also informed that they could withdraw from the study at any time; (e) the first author, a certified psychologist and member of the Portuguese Board of Psychologists, supervised the data collection in schools carried out by the two trained research assistants. An ethic approval statement by our faculty ethical committee was not warranted as per the current institutional guidelines.

2.5. Data analytic plan

We used the R environment (R Core Team, 2019) to compute the statistical analyses. Specifically, we used the lavaan package (Rosseel, 2012) to conduct multiple group structural equation modeling (MG-SEM). We also controlled for the nested nature of the data, considering that the 605 students were distributed across 44 classes. Regarding the method of estimation, we used maximum-likelihood with a Satorra-Bentler correction (Chou et al., 1991; Oberski, 2014; Yuan & Bentler, 2000).

We did preliminary analyses before the MG-SEM. More specifically, we computed Confirmatory Factor Analyses (CFA) to examine the factorial structure of the motivational scales and estimated the Bentler's rho to inspect the reliability of the same scales (see the Method to check the factor structure and reliability coefficients of the motivational scales). In addition, we tested the measurement invariance of both motivational scales across girls and boys.

Regarding the principal analyses, we computed two MG-SEM models—one for narrative texts and another for opinion texts—to analyze the relations among implicit theories, achievement goals, and text quality between girls and boys. Two models were compared: a model with fixed factor loadings and intercepts across gender (i.e., Model 1) versus a model with fixed factor loadings, intercepts, and regressions across gender (i.e., Model 2). The regression coefficients would vary between girls and boys if the comparison between Model 1 and Model would reveal significant differences.

We used the following statistic measures to determine model fit: (a) the chi-square test statistic (χ^2) and *p*-value (*p*); (b) the comparative fit index (CFI); (c) the root-mean-square error of approximation (RMSEA); and (d) the standardized root-mean-square residual (SRMR). We considered that the MG-SEM model showed an acceptable model fit when the following statistical criteria were simultaneously fulfilled: (a) CFI was >0.90 (Browne & Cudeck, 1992); (b) RMSEA was lower than 0.10 (Hu & Bentler, 1999); and (c) SRMR was equal to or lower than 0.08 (Hu & Bentler, 1999; Schreiber et al., 2006).

3. Results

3.1. Preliminary analyses

3.1.1. Measurement invariance

We inspected multiple-group measurement invariance of implicit theories and achievement goal scales considering students' gender. Specifically, we compared the following statistical models: (a) a model with no constraints across gender (i.e., configural invariance); (b) a model with equal factor loadings across gender (i.e., weak invariance); (c) a model with equal factor loadings and intercepts across gender (i.e., strong invariance).

The delta comparative fit index (ΔCFI) showed values equal or lower than 0.01 (Cheung & Rensvold, 2002; see Appendix F), indicating that boys and girls interpreted implicit theories and achievement goal scales similarly. Therefore, we were able to proceed with the multiple-group structural equation models using gender as the grouping variable.

3.1.2. Descriptive results

Table 2 depicts gender differences in the mean structure of the factors. Boys reported significantly lower scores on mastery goals when compared with girls ($p < .001$). No significant differences were found between girls and boys in implicit theories, performance-approach goals, and performance-avoidance goals ($ps > .05$).

Table 3 displays bivariate correlations between all variables. Implicit theories were significantly and negatively correlated with mastery goals, narrative text quality, and opinion text quality (*r*s between −0.19 and −0.21, $ps < .01$). In other words, entity theories in writing were negatively correlated with the adoption of goals focusing on self-improvement as well as with higher scores on both narrative and opinion text quality. Conversely, entity theories in writing correlated positively with the adoption of performance-avoidance goals ($r = 0.11$, $p < .01$). No significant correlation was found between implicit theories and performance-approach goals ($p > .05$). Regarding achievement goals, we found a moderate correlation between mastery goals and performance-approach goals ($r = 0.48$, $p < .01$), and a weak correlation between mastery goals and performance-avoidance goals ($r = 0.23$, $p < .01$). Performance-approach goals were moderately correlated with performance-avoidance goals ($r = 0.53$, $p < .01$). Mastery goals were positively correlated with both narrative and opinion text quality scores

Table 2
Gender differences in the structure of the factors for implicit theories and achievement goals.

Variable	Mean factor score	*SE*	*p*	Standardized factor score
Implicit theories	0.12	0.11	.276	0.12
Mastery goals	−0.31	0.07	.000	−0.49
Performance-approach goals	0.02	0.09	.864	0.02
Performance-avoidance goals	−0.04	0.07	.586	−0.07

Note. Girls were the reference category.

Table 3
Bivariate correlations between motivational and performance variables.

	1	2	3	4	5	6
1. Implicit theories	–					
2. Mastery goals	−0.21**	–				
3. Performance-approach goals	−0.04	0.48**	–			
4. Performance-avoidance goals	0.11**	0.23**	0.53**	–		
5. Narrative text quality	−0.19**	0.33**	0.10*	0.04	–	
6. Opinion text quality	−0.20**	0.32**	0.06	0.02	0.56**	–

** $p < .01$.
* $p < .05$.

(*rs* between 0.32 and 0.33, *ps* < .01). Of both performance-oriented goals, only performance-approach goals were significantly correlated with narrative text quality ($r = 0.10$, $p < .05$).

3.2. Principal analyses

3.2.1. Multiple group structural equation model for narrative texts across gender

3.2.1.1. Model fit. The comparison between Model 1 (i.e., equal factor loadings and intercepts across gender) and Model 2 (equal factor loadings, intercepts, and regressions across gender) showed no significant differences in the regression coefficients between girls and boys, SB $\chi^2(7) = 9.03$, $p = .251$. We further inspected potential gender differences by adapting Model 2. Specifically, we allowed one specific regression to vary across gender (De Smedt et al., 2018; Satorra & Bentler, 2001). The difference between the log-likelihood values associated with both models has approximately a chi-square distribution with one degree of freedom, subject to the scaling correction factors of the two models (Satorra & Bentler, 2001). Again, no gender differences emerged in the regression coefficients (see Table 4). Consequently, we proceeded with Model 2 (i.e., equal intercepts, factor loadings, and regressions across gender) as the final MG-SEM model for girls and boys. The MG-SEM model relating implicit theories and achievement goals to narrative text quality showed a good fit to the data, SB $\chi^2(220) = 390.67$, $p < .001$, CFI = 0.94, RMSEA = 0.06 [0.05 to 0.07], SRMR = 0.07. This model accounted for 17 % of the variance of narrative text quality for girls and 21 % for boys (see Fig. 2).

3.2.1.2. Relations between implicit theories and achievement goals. Implicit theories were significantly and negatively related to mastery goals ($\beta = -0.17$, $p = .001$). This negative relation should be interpreted considering that the scale on implicit theories was phrased in the entity form, which implies that lower values indicate more incremental theories (i.e., a growth mindset) and higher values indicate more entity theories in writing (i.e., a fixed mindset). By contrast, implicit theories did not make a significant contribution to both performance-approach and performance-avoidance goals (*ps* > .05).

3.2.1.3. Relations between implicit theories and writing performance. Implicit theories were negatively and directly associated with narrative text quality ($\beta = -0.13$, $p = .018$).

3.2.1.4. Relations between achievement goals and writing performance. Mastery goals were significantly and positively related to narrative text quality ($\beta = 0.61$, $p < .001$). Conversely, performance-approach goals were significantly and negatively associated with narrative text quality ($\beta = -0.48$, $p = .030$). Performance-avoidance goals were not related to narrative text quality ($p > .05$).

Table 4
Multiple-group structural equation modeling: comparison of different models across gender for narrative text.

Model	SB χ^2	*df*	Compared models	ΔSB χ^2	Δ*df*	*p*
1[a]	381.64	213	–	–	–	–
2[b]	390.67	220	Model 1 vs. Model 2	9.03	7	.251
Adaptions of Model 2: allowing one specific regression to vary across gender						
Implicit theories → achievement goals						
Implicit theories → mastery goals	389.75	219	vs. model 2	0.92	1	.338
Implicit theories → performance-approach goals	388.57	219	vs. model 2	2.10	1	.147
Implicit theories → performance-avoidance goals	390.86	219	vs. model 2	0.19	1	.665
Implicit theories → writing performance						
Implicit theories → narrative text quality	390.26	219	vs. model 2	0.41	1	.521
Achievement goals → writing performance						
Mastery goals → narrative text quality	390.36	219	vs. model 2	0.31	1	.579
Performance-approach goals → narrative text quality	390.36	219	vs. model 2	0.32	1	.574
Performance-avoidance goals → narrative text quality	390.15	219	vs. model 2	0.52	1	.470

[a] Equal factor loadings and equal intercepts across gender.
[b] Equal factor loadings, equal intercepts, and equal regression coefficients across gender.

3.2.2. Multiple group structural equation model for opinion texts across gender

3.2.2.1. Model fit. No significant gender differences emerged when comparing Model 1 with Model 2, SB $\chi^2(7) = 2.66$, $p = .914$. Again, we adapted Model 2 by enabling one specific regression to vary across gender. These additional analyses indicated no significant differences in the regression coefficients between girls and boys (see Table 5). Hence, we adopted Model 2 (i.e., equal intercepts, factor loadings, and regressions across educational levels) as the final MG-SEM model for girls and boys. The final MG-SEM model linking implicit theories and achievement goals to opinion text quality showed a good fit to the data, SB $\chi^2(220) = 384.97$, $p < .001$, CFI = 0.94, RMSEA = 0.06 [0.05 to 0.07], SRMR = 0.07. This model explained 14 % of the opinion text quality for girls and 17 % for boys (see Fig. 3).

3.2.2.2. Relations between implicit theories and achievement goals. In line with the narrative text model, implicit theories were negatively related to mastery goals ($\beta = -0.17$, $p = .001$) and did not contribute significantly to the performance-oriented goals (*ps* > .05).

3.2.2.3. Relations between implicit theories and writing performance. Consistent with the narrative text model, implicit theories were negatively and directly associated with opinion text quality ($\beta = -0.12$, $p = .011$).

3.2.2.4. Relations between achievement goals and writing performance. Mastery goals were significantly and positively associated with opinion text quality ($\beta = 0.50$, $p < .001$). The negative contribution of performance-approach goals to opinion text quality was marginally significant ($p = .06$). Performance-avoidance goals were not

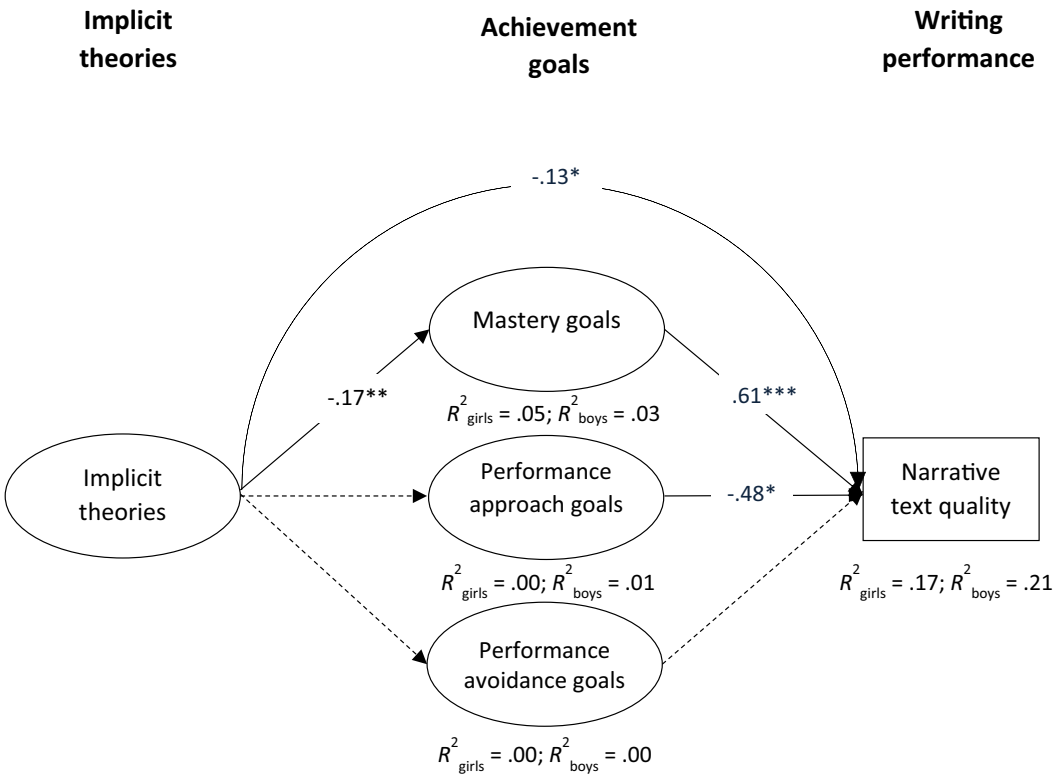

Fig. 2. Significant standardized parameter estimates of the structural model for narrative texts for girls and boys.
Note. Dark arrows represent significant paths and dashed arrows represent non-significant paths. Implicit theories scale items were phrased in the entity format; lower values indicate incremental theories (i.e., a growth mindset) and higher values indicate entity theories (i.e., a fixed mindset).
***$p < .001$; **$p < .01$.

significantly related to opinion text quality ($p > .05$).

4. Discussion

In the current study, we delved into the relations among implicit theories, achievement goals, and writing performance of students in grades 5–8. We further tested whether these relations differed or remained stable across narrative and opinion text as well as student gender. To that end, we conducted a cross-sectional study with Portuguese middle school students enrolled in grades 5–8. The hypotheses depicted in Fig. 1 were partially corroborated as discussed below.

4.1. Relations between implicit theories and achievement goals

In accordance with hypothesis 1, the results indicated that more incremental beliefs were associated with greater adoption of mastery goals in writing. Therefore, students who believe that writing is a malleable skill are also more prone to pursue goals that emphasize learning and self-improvement. From a theoretical standpoint, Dweck and colleagues postulated that when students hold an incremental theory about intelligence (or about other personal attribute), they believe their intelligence is malleable. Consequently, these students engage in learning to expand and improve their intelligence, which encourages them to adopt mastery goals over performance goals (Dweck, 1999; Dweck & Master, 2009; Dweck & Molden, 2017). Our finding also corroborates a large body of empirical research, which shows that incremental theories are positively associated with or predict a greater orientation towards mastery goals (Bråten & Strømsø, 2004; Lee & Seo, 2019; Limpo & Alves, 2014).

Contrary to what we predicted in hypothesis 2, implicit theories were not significantly associated with performance-oriented goals. Dweck claimed that entity theorists want to show off their competence, thus they tend to choose performance-approach goals over mastery goals (e.g., Dweck & Master, 2009). In our study, however, we did not find a relation between entity theories in writing and a greater endorsement of performance-oriented goals across text genres for girls and boys. This result does not concur with a previous meta-analysis of empirical studies, which showed that incremental theories were negatively associated with performance-approach and performance-avoidance goals (Burnette et al., 2013). In our study, we used a writing performance measure which was only scored for research purposes and had no influence for students' grades, which may partially explain the non-significant relations between performance-based goals (either approach or avoidance) and writing performance.

4.2. Relations between implicit theories and writing performance

As anticipated in hypothesis 3, our study showed that incremental theories were associated with higher text quality across text genres and student gender. This result adds to prior research (Gunderson et al., 2017; Limpo & Alves, 2017) by showing that implicit theories of writing are directly—and not indirectly—related to writing performance. As such, teachers need to be aware that the implicit beliefs that both female and male students hold about the nature of their writing skills are directly associated with how well they perform in both narrative and opinion text writing.

As stated by Dweck and Master (2009), "sometimes without realizing it, teachers may be sending subtle messages to their students supporting one theory or the other" (p. 134). Teachers can consequently explicitly encourage the development of students' incremental theories when teaching writing. For instance, process feedback that focuses on students' effort and strategies—rather than on their traits or abilities—fosters incremental theories and may contribute to putting students on the pathway to hard work. Teachers can also explicitly share

Table 5
Multiple-group structural equation modeling: comparison of different models across gender for opinion text.

Model	SB χ^2	*df*	Compared models	ΔSB χ^2	Δ*df*	*p*
1[a]	382.30	213	–	–	–	–
2[b]	384.97	220	Model 1 vs. model 2	2.67	7	.914
Adaptions of Model 2: allowing one specific regression to vary across gender						
Implicit theories → achievement goals						
Implicit theories → mastery goals	384.62	219	vs. model 2	0.34	1	.558
Implicit theories → performance-approach goals	384.14	219	vs. model 2	0.83	1	.363
Implicit theories → performance-avoidance goals	385.24	219	vs. model 2	0.27	1	.602
Implicit theories → writing performance						
Implicit theories → opinion text quality	384.37	219	vs. model 2	0.60	1	.439
Achievement goals → writing performance						
Mastery goals → opinion text quality	384.95	219	vs. model 2	0.02	1	.900
Performance-approach goals → opinion text quality	384.71	219	vs. model 2	0.26	1	.613
Performance-avoidance goals → opinion text quality	384.49	219	vs. model 2	0.48	1	.490

[a] Equal factor loadings and equal intercepts across gender.
[b] Equal factor loadings, equal intercepts, and equal regression coefficients across gender.

with students how their personal struggles in writing urged them to mobilize new strategies and to work harder. Considering that students' implicit theories tend to be stable over time (Robins & Pals, 2002), conveying to students the idea that writing is a malleable skill that can be developed through extended and deliberate practice (Graham, 2018; Kellogg, 1994) is important.

4.3. Relations between achievement goals and writing performance

In line with hypothesis 4, mastery goals made a positive contribution to narrative and opinion text quality for both girls and boys. This result confirms previous research, which has consistently shown positive correlations between mastery goals and different writing performance measures, namely narrative and persuasive text quality (e.g., Kaplan et al., 2009; Pajares & Cheong, 2003; Soylu et al., 2017; Troia et al., 2013). Notwithstanding, none of the prior path-analytic models revealed a direct relation between mastery goals and writing performance (Limpo and Alves, 2017; Soylu et al., 2017; Troia et al., 2013). Therefore, our study extends these structural models by identifying a direct relation between mastery goals and writing performance across text genres and student gender.

In accordance with hypothesis 5, performance-approach goals made a negative contribution to narrative text quality across gender. This result concurs with the study by Troia et al. (2013), which indicated a direct, negative relation between performance-approach goals and narrative text quality. In the case of opinion text quality, the relation with performance-approach goals was also direct and negative although only marginally significant. In contrast to our results, Soylu et al. (2013) showed that performance-approach goals were positively and indirectly related—via self-efficacy—to persuasive text quality in older students. Even though the achievement goal measure was the same in both studies, the fact that Soylu and colleagues sampled older students and used a graded writing assignment with influence for grades may explain the positive (albeit indirect) association between performance-approach goals and text quality, which was not replicated in our study.

The adaptive or maladaptive nature of performance-approach goals remains open to debate (Midgley et al., 2001; Troia et al., 2013). Interestingly, Hulleman et al. (2010) found that among performance-approach goals, normative goals (i.e., trying to outperform others) were positively associated with academic achievement, whereas appearance goals (i.e., trying to appear competent) or evaluative goals (i.e., a combination of both normative and appearance goals) were negatively associated with it. In our study, we focused on evaluative goals, which may explain the negative relation with writing performance.

Finally, contrary to hypothesis 5, performance-avoidance goals were unrelated to writing performance across text genre and gender. Overall, research on performance-avoidance goals has been consistent in pointing out its harmful effect on learning outcomes (Elliot & Hulleman, 2017; Maehr & Zusho, 2009). However, our finding is consistent with Limpo and Alves' study (2017), which found a lack of relation—either direct or indirect—between performance-avoidance goals and quality of opinion essays. They argued that a short writing assignment without implications for students' grades possibly may have not threatened students' self-worth and consequently did not trigger the self-protective responses typically related to students' performance-avoidance goals (Limpo & Alves, 2017). Indeed, in our study we used a writing performance measure which was only scored for research purposes and had no influence on students' grades.

In sum, these findings suggest that teachers need to encourage their students to pursue mastery goals rather than performance-based goals in writing instruction.

4.4. Gender and text genre differences

Although descriptive statistics showed that girls pursue more mastery goals in writing than boys, which corroborates prior evidence (see Camacho, Alves, & Boscolo, 2021), structural equation modeling analyses further indicated that the relations among the studied variables were the same for girls and boys. Moreover, these relations remained stable for both narrative and opinion texts. These findings suggest that teachers should be aware that the promotion of incremental theories and mastery-oriented goals is equally important for female and male students as well as across different text genres. Nevertheless, this finding does not downplay the importance of further examining the relations among motivation-related variables and writing performance across text genres other than narrative and opinion texts (e.g., Soylu et al., 2017; Troia et al., 2013).

4.5. Limitations

We acknowledge at least six limitations of this study. First, we employed a cross-sectional rather than a longitudinal research design, which precludes us to draw conclusions about causality. Second, we used a short scale to measure implicit theories in writing. Nonetheless, this measure was valid and reliable in the current study. Moreover, in a comprehensive book on writing motivation research, Latif (2020) noticed that all scales on implicit theories of writing were short, ranging from two to six items. Third, we used an achievement goal measure based on the trichotomous goal framework rather than on the latest goal frameworks. Fourth, we relied on convenience sampling, hence our findings should not be generalized to all Portuguese middle school students. Fifth, our sample has a moderately large age span. We decided not to split our sample because we sought to examine the relations between motivational variables and writing performance specifically in Portuguese middle school grades. Moreover, a robust sample size is required to perform CFA, measurement invariance, and structural equation modeling. Sixth, we did not include other preceding-achievement

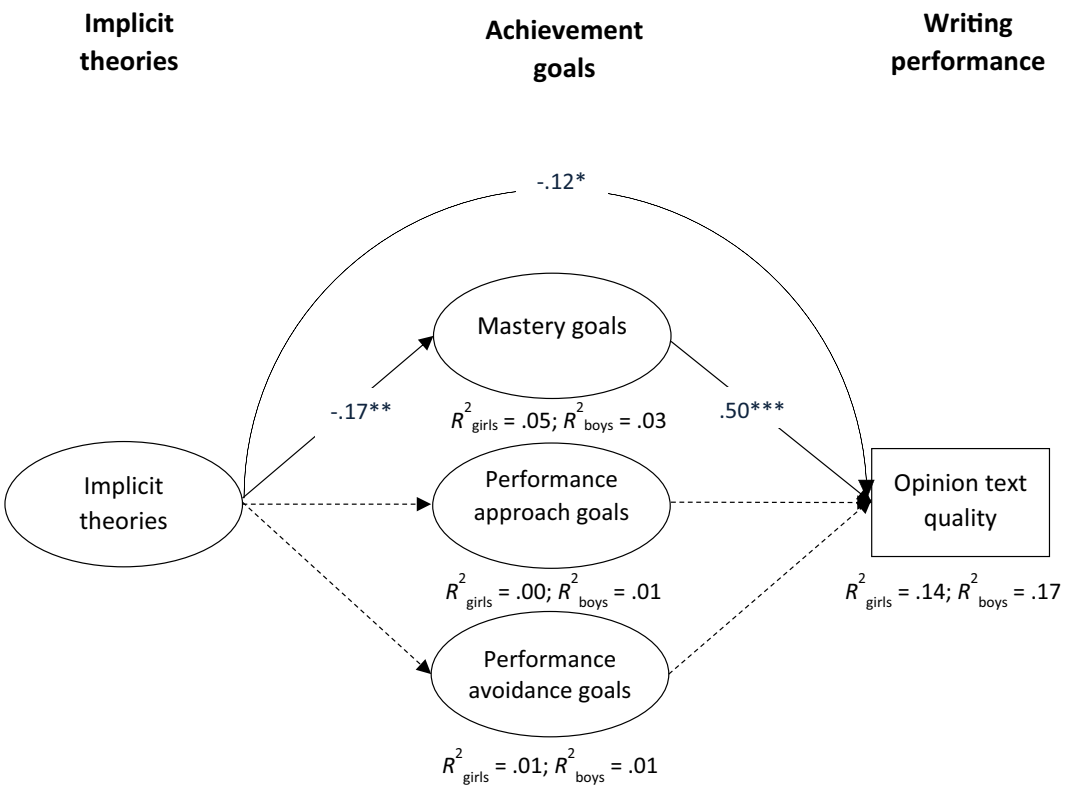

Fig. 3. Significant standardized parameter estimates of the structural model for opinion texts for girls and boys.
Note. Dark arrows represent significant paths and dashed arrows represent non-significant paths.
***$p < .001$; **$p < .01$; *$p < .05$.

variables that may be related to implicit theories, achievement goals, and writing performance (e.g., effort, interest, self-regulation).

4.6. Implications for practice

The findings of this study indicate that teachers need to be mindful of the role that motivation plays in students' writing performance. Considering the significant, positive associations among incremental theories, mastery goals, and students' performance across text genre and student gender, we suggest that teachers need to receive training not only on how to teach writing skills, strategies, and knowledge, but also on how to enhance students' writing motivation. Teachers may foster students' incremental theories and mastery goals in writing by: providing process feedback focused on students' effort and strategies (Dweck, 1999); conveying the idea that writing is a malleable skill (Limpo & Alves, 2014); sharing personal struggles in writing, and how to overcome them (Dweck & Molden, 2017); and establishing a mastery goal classroom structure (Murayama & Elliot, 2009).

Even though we did not conduct a document analysis, we realized that writing motivation is not explicitly mentioned in the latest Portuguese curricular guidelines (Direção-Geral da Educação, 2018). Therefore, we contend that policymakers need to know why being motivated to write is important and why including such milestone in school curricular guidelines matters (Graham, 2019). If policymakers are aware of the positive association between motivation and students' writing performance, they can have an important role in disseminating motivation-enhancing practices to teachers, for instance, via webinars and massive open online courses.

4.7. Directions for future research

We emphasize at least five important directions for future research. First, we underline the need for longitudinal studies to shed light on the causal relations among implicit theories, achievement goals, and writing performance. Second, the study of intraindividual patterns of implicit theories (entity versus incremental theories) and achievement goals (low versus high mastery, performance-approach, and performance-avoidance goals) will allow us to identify which individual patterns are associated with higher and lower text quality. Third, future writing research needs also to follow the latest conceptual developments of achievement goal theory, such as the 2 × 2 (Elliot & McGregor, 2001) or the 3 × 2 goal frameworks (Elliot et al., 2011). Fourth, more research is warranted to examine whether instructional programs—such as the Self-Regulated Strategy Development (Harris & Graham, 1992, 2017)—promote incremental theories and the adoption of mastery goals in writing. In this respect, an interesting endeavor would be to test the added value of motivation-related modules embedded in key relevant theoretical frameworks—such as a growth mindset component. The inclusion of such motivational components may be especially useful in the scope of interventions that were shown to enhance writing performance but failed to make a positive impact on students' motivational beliefs (Klassen, 2002). Fifth, in addition to gender, future research can include gender stereotypic beliefs as a grouping variable in structural models relating motivational variables and writing performance.

4.8. Conclusion

Our study shed light on the structural relations among implicit theories, achievement goals, and writing performance. Specifically, we have shown a positive role of both incremental theories and mastery goals as well as a potentially harmful role of performance-approach goals to middle school students' writing performance. Overall, these findings confirm the pivotal role that motivation-related variables play in writing performance across text genres for both girls and boys. As such, teachers need to incorporate motivation-enhancing practices in writing instruction, and policymakers need to ensure that these practices

are included in school curricula and properly disseminated.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.lindif.2022.102223.

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