EFFECTS OF TWO TYPES OF SELF-REGULATORY INSTRUCTION PROGRAMS ON STUDENTS WITH LEARNING DISABILITIES IN WRITING PRODUCTS, PROCESSES, AND SELF-EFFICACY

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Abstract. **We examined the differential effects of the social cognitive model of sequential skill acquisition (SCM intervention) and the self-regulated strategy development model (SRSD intervention) for writing. One hundred and twenty-one 5th- and 6th-grade Spanish students with learning disabilities (LD) and/or low achievement (LA) were randomly assigned either to an experimental intervention group or the standard instruction group. Both self-regulatory interventions showed a significant improvement with a large effect size in the structure, coherence, and quality of students' writing products, as determined in terms of reader- and text-based measures. Additionally, both interventions demonstrated a substantial increase in the time students spent on writing and revising their texts; the latter was noted especially in the SCM intervention group although only the SRSD intervention showed a significant increase in the time students dedicated to planning text. Finally, with regard to writing self-efficacy, only the SCM intervention group experienced a significant improvement.**

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Since the pioneering work of Hayes and Flower (1980), considerable progress has been made in understanding the cognitive processes involved in writing. The last quarter of the 20th century provided opportunity for extensive research in writing with the appearance of new theoretical models of writing. The majority of these models describe writing as a difficult and demanding task. The process of writing a text comprises components that are employed recursively. Coordinating these processes in a way that results in a text that meets the demands of the writing task requires extensive attention control and self-regulation. Skilled writing as a self-planned, self-initiated, and self-sustained activity involves high levels of self-regulation (Graham & Harris, 1997; Zimmerman & Risemberg, 1997).

Several researchers have argued, therefore, that teaching self-regulation in general, and specifically the cognitive strategies for planning and revising text, should yield a marked improvement in the quality of the texts that students produce. Indeed, this hypothesis explains the rapid growth and development of cognitive and self-regulation strategy instruction studies in the last two decades (Wong, Harris, Graham, & Butler, 2003), especially with students with learning disabilities (LD), who have serious problems in managing writing process and demonstrate ineffective use of strategies.

A review of empirical studies shows that self-regulatory processes play an important role in developing proficiency in writing texts. Results of instructional programs based on different models, such as the Self-Regulated Strategy Development Model (Graham & Harris, 2003; Harris & Graham, 1996); the Social Cognitive Model of Sequential Skill Acquisition (Zimmerman & Kitsantas, 1999; 2002); the Cognitive Strategy Instruction in Writing Model (Englert et al., 1991; Englert, Raphael & Anderson, 1992); Strategy Content Learning Instruction (Butler, 1994; 1995); and Genre-Specific Writing Strategies Research (Wong, Butler, Ficzere, Kuperis, & Corden, 1994; Wong, Butler, Ficzere, & Kuperis, 1996; 1997), provide strong evidence for the efficacy of self-regulation writing strategies in improving writing performance.

The study reported on here extends the existing research in several ways.

First, we broaden the understanding of the effects of the cognitive and self-regulatory strategies instruction models for students with LD from a different language group and educational culture. Schunk (2005) recently suggested the need to study different language groups and educational cultures as a route for future research on self-regulation.

Second, we explore the differential effects of two cognitive and self-regulatory strategy intervention programs based on two intervention models whose individual effectiveness has been supported by existing research in students with and without LD. The instructional pattern of the first model is based on a social cognitive model of sequential skill acquisition – SCM (Schunk & Zimmerman, 1997; Zimmerman, 2000, 2002), whose efficacy in acquiring skills in writing revision and self-regulation has been proven in studies with nondisabled students (Zimmerman & Kitsantas, 1999, 2002). The second model is based on the self-regulated strategy development model – SRSD; it has great practical application in writing instruction with LD students (see Graham & Harris, 2003, for a meta-analysis of SRSD studies).

In general, the two models are very similar, given that they share key features such as the use of cognitive modelling, social feedback, and scaffolding. However, there are differences mainly associated with their general pattern of instruction and the type of cognitive modelling used; for example, the SCM model involves more extensive modeling, combining mastery and coping, and different models, such as expert (instructor) and novice (peers), which can influence the effects of the intervention on the writing product and process or on modulation variables, such as self-efficacy. Furthermore, the different patterns of instruction can reveal which pattern is more suitable for primary students with LD. With this in mind, the SRSD approach (Harris & Graham, 1996) has been used extensively in previous research on strategy-based writing instruction with LD students; however, the SCM approach has never been implemented with this population. Therefore, this study attempts to prove its usefulness with LD students, and its comparative suitability versus the SRSD approach with this population.

And third, we explore the ways in which this type of intervention affects the writing process. While the effectiveness of this kind of intervention has been broadly supported by the findings of existing research, previous studies have tended to assess the efficacy of these interventions solely in terms of changes in the end products of writing and personal variables such as knowledge of writing, self-efficacy or metacognition, based on the assumption that changes in writing products are caused by changes in writing process. It is considered pertinent to also explore the ways in which this kind of training affects the processes involved in writing. For this reason, we assess the effectiveness of these instructional programs by combining on-line measurements (writing log measurements) with writing product measurements, aiming not just to determine whether interventions result in improved text but also to explore the nature of this action. The use of on-line measurements of the writing process constitutes a significant contribution as to-date few studies have employed this type of measurement (Braaksma, Rijlaarsdam, van den Bergh, & van Hout-Wolters, 2004; Torrance, Fidalgo, & García, in press) and, to our knowledge, never with the LD population.

On the other hand, although the main objective of this study was not strictly to increase writing self-efficacy perceptions, it is worthwhile to examine the effects of both cognitive and self-regulatory interventions on this motivational factor. Researchers in the field of writing composition have focused particular attention on investigating the affective or motivational factors that influence writing, such as self-efficacy, which is assumed to be the principal component of academic motivation, based on the assumption that the beliefs that students create, develop, and hold to be true about themselves are vital forces in their academic success or failure (Linnenbrink & Pintrich, 2003; Pajares, 2003). Findings have shown that writing self-efficacy is predictive of writing performances and is associated with other motivation variables such as perceived value of writing, persistence on the writing task, and personal interest. Thus, it plays a mediational role in the effect of previous performances on actual writing performance (Bruning & Horn, 2000; Pajares & Johnson, 1996; Pajares & Valiente, 1997; Rankin, Bruning, & Timme, 1994; Shell, Colvin, & Bruning,

1995; Wachholz & Ethridge, 1996; Zimmerman & Bandura, 1994).

Moreover, on one hand, self-efficacy beliefs are expected to be linked reciprocally to students' use of self-regulatory procedures. That is to say, students who learn to use cognitive and self-regulatory strategies in writing increase their perceptions of self-efficacy to write effectively (Zimmerman & Risemberg, 1997). On the other hand, effective self-regulation depends on the extent of self-efficacy for using skills to achieve mastery (Bandura, 1986, 1997); that is, students who feel that their performance is efficient are more likely to use cognitive and self-regulatory strategies and to have increased metacognition, and are more likely to plan, monitor, control, and regulate themselves during a task (Linnenbrink & Pintrich, 2003; Pintrich, 1999; Pintrich & De Groot, 1990; Pintrich & García, 1991; Wolters & Pintrich, 1998; Wolters, Yu, & Pintrich, 1996). For these reasons it is interesting to study the role of writing self-efficacy.

METHOD

Participants

Our sample was composed of 121 fifth- and sixth-grade Spanish students with LD and/or low achievement (LA) ranging in age between 10 and 12 years old. All participants had previously been identified as having a specific learning disability in writing (Jiménez & Hernández, 1999; Ministerio de Educación y Ciencia, 1992). We excluded students who did not attend school on a regular basis and those who had a developmental disability such as mental retardation or autism – diagnosed by psychoeducational teams in Spain as having special educational needs – and students whose delay and/or difficulties could be attributed to a physical, psychological, or sensory disability, or a lack of schooling.

Participants were selected as follows. First, the teachers carried out an initial screening consisting of an interview or questionnaire about the achievement of students with difficulties in writing. Then, psychoeducational teams assessed those students using IQ and aptitude tests, parents' and teachers' reports, observations and interviews with the students, and also the students' grades. However, because in Spain there are no specific grade tests, the psychoeducational teams determined which students had LD and/or LA, but not identified as having special educational needs – a developmental disability – in order to exclude students whose difficulties could be attributed to a physical, a psychic or a sensory disability, or a lack of schooling. As a result, only students with a significant delay, compared with their peers, in writing performance were included in the study.

Moreover, every student had to complete the EAE (Writing Self-Regulation Assessment) based on the tasks of EPP and FPE (Planning Processes and Other Writing Psychological Factors Assessment) as an assessment of proficiency to establish that every student had a delay of at least two years in composition writing and other psychological aspects, such as attitudes towards writing, metacognition with regard to writing, self-efficacy in writing, and reflexivity-impulsivity towards writing related to composition writing. This test was designed by our research team, and was validated in a previous study with a sample comprised of 968 students (509 males and 459 females) from 3rd (primary school) to 11th grade (high school), ranging in age from 8 to 18 years old. The results confirmed that the EAE test fulfils the desired psychometric properties with a high reliability (α 968 = .88) for internal consistency. In addition, the construct, structural, and content validity are adequate, so we can state that the device meets with the desired psychometric properties (Fidalgo, 2005).

Students were selected without considering whether they had LD or LA. The IQ-achievement discrepancy is not established in the Spanish educational system, and both types of students are included in the same groups. This decision is justified by studies that have not found significant differences in cognitive profiles based on IQ tests (low achievement with or without discrepancy) (Fletcher et al., 1994; Stanovich & Siegel, 1994). Elimination of the aptitude-achievement discrepancy criteria in the conceptualization of LD has been broadly recommended (Aaron, 1997; Algozzine, Ysseldyke, & McGue, 1995; Fletcher et al., 1998; Stanovich & Stanovich, 1996), providing a further reason not to specify whether a student had LD and/or only LA.

Each of our participants had seriously low achievement in writing but we systematically excluded children who were diagnosed as having special educational needs by psychoeducational teams (with a type of developmental disability) to ensure that our samples consisted of children whose learning problems were more consistent with the American definition of LD. (We acknowledge that for more precise international comparison of research and treatments, in the future, we have to obtain IQ and achievement measures of every subject, as the scores obtained previously by psychoeducational teams are only accessible for administrative and placement purposes and are not available for research purposes.)

Participants were randomly allocated to either an experimental or a comparison group. The first experimental group was made up of 48 students, who were exposed to cognitive self-regulation instruction based

Table 1
Student Distribution by Group, Level, and Gender

	SRSD Intervention		SCM Intervention		Standard Curriculum		Total Level		Total Gender
	5th	6th	5th	6th	5th	6th	5th	6th	
Male	14	15	9	17	6	17	29	49	78
Female	4	15	6	9	1	8	11	32	43
Total Level	18	30	15	26	7	25	40	81	
Total Group	48		41		32		121		

Note. The three groups showed a delay in composition writing in the pretest of two years in productivity and in coherence/structure. Participants belonged to middle- and working-class families, spoke Spanish as their first language, and all were Spanish nationals.

on the self-regulated strategy development model, SRSD (Harris & Graham, 1996). The students in the second experimental group (N = 41) were taught using cognitive self-regulation based on a social cognitive model of sequential skill acquisition (Zimmerman, 2000, 2002; Zimmerman & Kitsantas, 1999, 2002). Finally, the comparison group (N = 32) received the standard curriculum. Sample details are summarized in Table 1.

The sample was drawn from 11 primary schools in León in northwest Spain. The schools were closely matched to ensure similarity. All of them were state-funded schools, with a similar educational infrastructure with regard to student-teacher ratio, as well as such aspects as resources or availability of psychologists, for example. Their populations were demographically similar as well, drawing exclusively from a middle-class native-Spanish population.

The interventions were delivered by four educational psychologists (two psychologists per program), who were specifically trained in the psychology of writing and the cognitive strategy model used. Moreover, they were explicitly trained in how to apply the assessment methods and the intervention program in weekly sessions. The sessions were carried out during the school timetable to the same small groups, extracted from different classrooms where they received their regular lessons. The psychologists were blind to the purpose and the design of the study. Furthermore, they were randomly assigned to an intervention group, counterbalanced by the schools and groups of LD and/or LA students.

Writing Tasks

Participants in the experimental groups completed two compare-contrast essay tasks prior to (pretest) and following (posttest) the intervention. Students in the comparison group completed the same tasks at the same times and with the same interval between pre- and posttest as for the experimental groups.

The topics for the tasks were based on the content delivered as part of the 4th- and 5th-grade curriculum. For all tasks students were provided with reference sheets (approximately 500 words of text) providing topic-relevant information. For pedagogic reasons topics were not counterbalanced over the time of testing, but were matched for complexity of content and extent of coverage in previous teaching. Thus, for the baseline assessment, all students wrote about the similarities and differences between demonstratives and possessives and at posttest about the similarities and differences between vertebrates and invertebrates.

For all tasks it was stressed that students should write full prose and not just lists of ideas, and that they should produce the best possible text because it would be seen by their teacher and compared with essays by students from other parts of the country. Students were free to use the reference materials and their

own ideas as they wished; they did not have to adhere to a strict time limit.

Product Measures

The quality of the completed comparative-contrast essays was assessed (a) in terms of qualitative, reader-based criteria where raters consider an essay as an entity and assign a score to indicate the degree to which it reflects the construct of interest; and (b) by more quantitative text-based criteria where raters identify certain elements or linguistic features within the essay and then count or combine those elements to arrive at the score. This type of measure included productivity, coherence, and structure measures, as used in previous research (Torrance et al., in press). A synthesis of the types of measurements used is presented in Table 2.

Text-Based Measures

Productivity. Productivity concerns the quantity of text produced for each task. It was measured by number of words, including the determiners, which in the Spanish language are the definitive and the indefinite articles, numerals, possessive and demonstrative adjectives; the content words, which in Spanish have a fixed referent, such as nouns, verbs, qualifying adjectives and interjections; the functional words, which in Spanish do not have fixed referent, such as possessive, personal and demonstrative pronouns, prepositions and conjunctions; and a total (García & de Caso, 2004; Justicia, 1995; Wong, 1998), number of paragraphs, number of sentences, and number of verbs.

Coherence. Coherence covered seven linguistic indicators of referential or relational coherence (Haliday &

Table 2
Assessed Aspects of Writing Products

Type of Measures	Assessed aspect	Parameters
Text-based	Productivity	• Number of paragraphs
		• Number of sentences
		• Number of verbs
		• Number of words (determiners, content, functional, and total)
	Coherence	• Number of ties: anaphoric, lexical, metastructural, structural, connectives, argumentational, reformulation
		• Referential coherence: anaphoric and lexical ties
		• Relational coherence: metastructural, structural, connectives, argumentational and reformulation ties
		• Total coherence: referential and relational coherence
		• Density of coherence: number of ties per 100 words
	Structure	• Number of main parts of text: introduction, main body and conclusion
Reader-based	Structure	• Score (1-4)
	Coherence	• Score (1-4)
	Quality	• Score (1-6)

Table 3
Types of Linguistic Coherence Indicators

Ties	Description	Examples
Anaphoric	Pronouns and other devices for anaphoric reference	John is a teacher. *He* works at a school.
Lexical	Semantic overlap or exact lexical repetition between words (subjects or objects)	John is a teacher at a school. *John* got this job in 1990.
Meta-structural	Phrases linking sentences or pointing out previous or subsequent text content	*Now, I will describe …;* *The previous paragraph talks about …*
Structural	Specific linguistic markers for structuring the information. For example: at first, second, later	*First …; second …; finally …; later …; eventually …*
Connective	Specific linguistic markers that link different parts of text. For example: and, besides, as well as, also, etc.	*And …; also …; as well as…*
Reformulation	Specific linguistic markers that summarize (in conclusion, finally), explain (that is), or reiterate a point in a different form (in other words)	*In conclusion …; that is to say…; in other words…*
Argumentational	Specific linguistic markers that persuade (however, despite this) or provide evidences (for example)	*For example …; however …; despite this …*

Hassan, 1976; Sanders, Spooren, & Noordman, 1992), whose function is to tie together the different components of the text (sentences or paragraphs).

Referential coherence includes two types of ties: anaphoric and lexical. Relational coherence includes five types of linguistic indicators, based on a classification by Bosque and Demonte (1999): metastructural, structural, connective, reformulation, and finally, argumentational ties. All are summarized and described with examples in the Table 3.

Scores for these coherence measures were based on the counts of the following linguistic markers: referential coherence (anaphoric and lexical ties); relational coherence (metastructural, structural, connective, reformulation, argumentational ties); total coherence (referential and relational coherence); and density of coherence (calculated as the number of ties per 100 words of text), which considers the amount of the text written.

Structure. This involved recording whether or not the text included the three main parts of text: introduction, main body, and conclusion.

Reader-Based Measures

This assessment was based on measures for structure, coherence, and general quality described by Spencer and Fitzgerald (1993). Table 4 summarizes the descriptive information about each measure.

Structure measure. This was assessed on a 4-point scale, from 1 = unstructured to 4 = well structured. Ratings were based on the extent to which readers perceived that the text included (a) background information introducing the text, (b) cues indicating text structure, (c) an introductory topic or thesis sentence, (d) clear organisation of ideas based around a definite scheme, (e) unity of theme within paragraphs and across the whole essay, and (f) a conclusion that reiterated the purpose of the paper.

Coherence measure. This was also assessed on a 4-point scale, from 1 = incoherent to 4 = very coherent, with ratings based on the extent to which the reader perceived that (a) a topic or theme was identified and remained a focus throughout the essay, (b) the text included a context that orientated the reader, (c) information was organized in a discernible pattern that was

Table 4

Descriptive Criteria of Reader-Based Measures of Comparative-Contrast Essay

Measure	Procedure Used	Score Range
Structure	**The rater considered the presence and development of six characteristics:** • Background information to present the text • Structural cues • An introduction: a topic or thesis sentence that establishes the general comparison-contrast • Clearly developed organization either whole by whole, part by part, or likeness-differences • Unity within individual paragraphs and, in the case of a theme, within the entire paper • A conclusion that reiterates the purpose of the paper, to show comparisons or to show contrast or to show both	**From 1 to 4 points:** • Unstructured: 1 point • Poorly structured: 2 points • Partially structured: 3 points • Well structured: 4 points
Coherence	**The rater considered the presence and development of seven characteristics:** • Topic or theme identified • Topic or theme extended without digressions • A context that oriented the reader • Details organized in a discernible plan that was sustained throughh the text • Cohesive ties linking sentences and/or paragraphs together • Discourse flowing smoothly • Conclusion statement creating a sense of closure	**From 1 to 4 points:** • Incoherent: 1 point • Nearly completely incoherent: 2 points • Somewhat coherent: 3 points • Very coherent: 4 points
Quality	**The rater considered the presence and development of seven characteristics:** • Clear sequence of ideas • Text development with little or no irrelevant ideas • Good organization • Fresh, vigorous word choice • Variety of interesting details • Correct sentence structure • Correct punctuation, capitalization, and spelling	**From 1 to 6 points:** • Inadequate; difficult to understand: 1 point • Barely adequate: 2 points • Adequate: 3 points • Good: 4 points • Very good: 5 points • Excellent: 6 points

Note. Measures were adapted from Spencer and Fitzgerald (1993).

sustained throughout the text, (d) sentences and paragraphs were cohesively tied, and (e) the discourse flowed smoothly.

Quality measure. This was assessed on a 6-point scale, from 1 = difficult to understand to 6 = excellent, with ratings based on the extent to which the text demonstrated (a) a clear sequence of ideas with little or no irrelevant detail, (b) clear organization, (c) fresh and vigorous word choice, (e) varied and interesting detail, (f) correct sentence structure, and (g) accurate punctuation, capitalization, and spelling. These criteria varied slightly from those used by Spencer and Fitzgerald to make them appropriate for a comparative-contrast expository text based on guidelines suggested by Sorenson (1997).

Self-efficacy measures. Writing self-efficacy was assessed using a self-report scale developed following a guide for constructing self-efficacy scales (Bandura, 2001). It asked students to provide self-judgments of their capability to successfully perform various writing skills in a writing task according to their academic level.

It includes four items (the same four are repeated before and after the writing task) measuring students' beliefs about how certain they are that they can (a) produce a good text (item number 1, *write your text well)*; (b) use correct punctuation and spelling (item number 2, *get your punctuation and spelling right)*; (c) include good ideas (item number 3, *include lots of good ideas)*; and (d) write a text that others (audience) understand (item number 4, *write it so that people understand)*. Four items are implemented before the writing task and four items are implemented after the writing task, allowing comparison of scores; the scores are rated on a scale from 1 to 9.

The writing self-efficacy questionnaire provides information about students' beliefs about substantial writing skills, such as quality of text, generation of good ideas, writing a text that the audience understands; and mechanical skills, such as spelling and punctuation skills; and a total writing self-efficacy belief representing the total of the questionnaire. The questionnaire has an adequate reliability (Cronbach α 121 = .876; and Standardized α 121 = .931) for all the samples in this study; both for the total of the scale, and for each of the measurements (Cronbach α from .838 to .880). Similarly, the validity of constructs is assured as every item is adapted to Bandura's guide for constructing self-efficacy scales (Bandura, 2001).

Writing process measures. These measurements were taken on-line during the writing process, using a time-sampled self-report, a method adopted in several previous studies (e.g., Kellogg, 1988; Torrance et al., in press; Torrance, Thomas, & Robinson, 1999). While performing the writing task students heard a 1-second tone played at random intervals of between 60 and 120 seconds, with a mean interval of 93 seconds. On hearing the tone students were instructed to respond by indicating in the writing log the activity in which they were currently engaged. It was stressed that they should report only the activity in which they were engaged at precisely the time that the tone sounded and not their main activity since the previous tone. Their possible activities were labelled and defined as follows: Reading references – reading information and data about the topic; Thinking about content – thinking about things to say in the essay; Writing outline – making a plan or notes about the essay that I am going to write; Writing text – writing essay; Reading text – reading through part or all of text; Changing text – making changes to writing (correcting spelling mistakes, changing words, adding words, etc.); and Unrelated – doing or thinking something unrelated to the text (talking to partner, looking for a pen, looking through the window, etc.).

These activities were collected in a writing log divided into multiple sections, each listing the seven possible writing activities, where students had to mark the activity by simple graphics so as to minimize the extent to which completing the log diverted attention from the writing task.

Students were trained in using this method prior to completing the baseline assessment. We then determined students' accuracy in using the categorization scheme by playing a videotape of a writer thinking aloud while planning and drafting text and asking them to indicate the writer's activity at each of 25 different points. Comparing students' categorization with that of an expert judge showed a kappa coefficient = .71.

Training

The experimental groups followed two specific instructional programs focusing on cognitive self-regulation strategies in writing, the SRSD model (Harris & Graham, 1996) and a model based on the social cognitive model of sequential skill acquisition (Zimmerman, 2000, 2002; Zimmerman & Kitsantas, 2002).

Instructional program based on the self-regulated strategy development model. According to the SRSD model (Graham & Harris, 1987), the instructional program followed the six general stages of training.

Stage 1. Develop and activate background knowledge. Students' background knowledge, previous knowledge, and any pre-skills are developed, because they are essential for understanding and executing the next stages.

Stage 2. Strategy goals and significance. The instructor and students discuss the writing strategy to be learned:

its purpose, benefits, importance, its steps, how, when and why to use it, and the goals of strategy instruction. In later stages, the instructor and students collaboratively evaluate the strategy and self-regulation procedures effectiveness and performance.

Stage 3. Modeling of the strategy. The instructor models the specific strategy by thinking aloud. During the modeling, the instructor explicitly includes specific regulatory statements: goal setting, self-assessment, self-instructions, self-reinforcement, etc.; later students develop their personal statements.

Stage 4. Memorization of the strategy. Students memorize and automate the steps of the writing strategy and some self-statements of their personal lists of self-regulation, sometimes by means of mnemonic rules and charts or self-regulatory list.

Figure 1. Graphic organizer of the revising strategy RED.

R READ	**E** EVALUATE			**D** DO
COMPREHENSIVE READING OF THE TEXT, PAYING ATTENTION TO ...	**... TEXTUAL STRUCTURE**	Is there an introduction?	YES NO	Continue Change it
		Is there an organized body?	YES NO	Continue Change it
		Is there a conclusion?	YES NO	Continue Change it
	... PARAGRAPHS	Is there an introduction and a concluding paragraph?	YES NO	Continue Change it
		Is there organization between the paragraphs of the text?	YES NO	Continue Change it
		Are the ideas of each paragraph organized?	YES NO	Continue Change it
	... LINKS	Are there links between the ideas of each paragraph?	YES NO	Continue Change it
		Are there inter-paragraph links?	YES NO	Continue Change it
QUICK READING, PAYING ATTENTION TO ...	**... SENTENCES**	Are the sentences of the text correct?	YES NO	Continue Change it
	... WORDS	Are the words correct?	YES NO	Continue Change it
	... PUNCTUATION	Is the punctionation correct?	YES NO	Continue Change it
	... PRESENTATION	Is the text neatly and clearly written?	YES NO	Congratulations on your text! Make a neater copy

Stage 5. Collaborative practice. Students and the instructor use the writing strategy and their self-instructions collaboratively to complete specific writing tasks. The instructor provides social feedback, support, and guidance, which is faded at an appropriate pace for individual students until effective use of the strategies was achieved and in the final stage.

Stage 6. Independent performance. Students use the writing strategy independently and their self-instructions are covert in their thoughts.

Finally, in order to promote maintenance and generalization there are three additional sessions where supportive materials, such as graphic organizers, mnemonic charts of strategies or individual lists of self-instructions were deleted. In the first session, the instructor thought aloud while planning, writing and revising a comparative-contrast text. Later, students worked in pairs, each observing and commenting while the other thought aloud while planning, drafting and revising; the instructor provided additional feedback. Finally, students worked alone, planning, drafting and revising a compare-contrast text with additional feedback from the teacher.

According to this instructional pattern, two writing strategies for planning and writing comparative-contrast essays and revising were implemented. The strategy for planning and writing comparative-contrast essays was *POD+THE VOWELS,* which comprised three general steps for planning and writing a text: POD: *P* = Pick ideas; this step encourages the writer to generate ideas related to differences and similarities of the two themes of the text; *O* = Organize your ideas following the vowels; here students follow a series of genre-specific prompts (the vowels) to organize and structure the content; *D* = Develop your text; here students are encouraged to use the plans already devised and to continue the planning process while writing, based on the *POW* strategy used in previous studies by Mason, Harris, and Graham (2002).

In addition, five steps for planning the text were developed specifically for the purposes of this research. The mnemonic *VOWELS (O+A+I+U+E)* was used to help students to remember the key words to generate, organize, and structure the content in a compare-contrast type text. The key words in the frame served as a reminder to generate writing content related to: *O = Objective* or purpose of the text; *A = Audience,* suitable content according to the audience of the text; *I = Ideas,* generation of ideas related to similarities and differences of themes; *U = United ideas,* organization of ideas into similarities vs. differences, and hierarchical structure of main and secondary ideas; *E = Essay draft*, to develop the text.

Furthermore, the specific writing strategy for revising the text was *RED,* a mnemonic developed for this instructional program. The acronym highlights the three steps of the revision process: *R = Read the text;* students have to read their text several times: several comprehensive readings paying attention to structure, paragraphs, and inter-intra paragraph links, and also quick readings, paying attention to the words and punctuation of sentences. When students are doing the first step of the revision process, they have to coordinate the other two subprocesses of evaluating and diagnosing the different aspects of the text, *E = Evaluate the different substantial and mechanical aspects of the text, to see if they are right or wrong;* and carrying out the necessary tactics *D = Do necessary changes*. This routine helped students coordinate the process of reading, evaluating, and carrying out the necessary tactics to resolve a list of possible mechanical mistakes, such as spelling, grammar, presentation and punctuation; or substantive ones, such as, structure, paragraphs, ideas, and coherence. Figure 1 includes the graphic organizer for the RED revising strategy.

Table 5 summarizes the instructional program, showing the number of sessions, stages, contents, strategies and techniques, and supportive materials.

Instructional program based on the social cognitive model of sequential skill acquisition. This instructional program was based on a social cognitive model of sequential skill acquisition. According to this model, students can acquire new writing skills optimally in four sequential levels: observation, emulation, self-control, and self-regulation (Schunk & Zimmerman, 1997; Zimmerman, 2000, 2002).

These sequential levels provide the general pattern of instruction that was implemented in the program. At the first level, observation was the focus; the instructor provides a clear image of how a specific skill, in this case a writing process, should be performed. The instructor modeled how to perform the writing process by thinking aloud while doing it. Thinking aloud was partly spontaneous, but also included specific self-regulatory statements that students had previously been trained to incorporate, corresponding to the three cyclical phases of self-regulation (Zimmerman, 2000): (a) the *forethought phase* refers to influential processes that precede efforts to act and set the stage for it, which includes statements such as What is the aim of this writing task? What are the steps that I have to follow in this task? Or if I follow the writing strategy I will not encounter any problems, or I feel capable of writing a good text; (b) *performance or volitional control* involves the self-regulation processes that occur during motoric efforts and affect attention and action, which includes self-regulation statements such as Am I following all steps? I have to read the text and assess all ideas continuously; I did the first step, now the second step is …; and (c) the *self-*

Table 5

Summary of Instructional Program Based on the Self-Regulated Strategy Development Model

Instructional Stage and session	Instructional Focus	Strategies and Techniques	Materials
Develop background knowledge 1st – 3rd sessions	Knowledge of writing products, types of texts Knowledge of writing process Self-regulation procedures Knowledge of planning process	Brainstorming Explicit and interactive explanation Stimulation of prior knowledge	Conceptual map of writing Writing process matrix Matrix and examples of different types of texts
Presentation of POD + THE VOWELS planning strategy: goals and significance 4th session	Planning strategy: POD + OAIUE P = Pick ideas O = Organize your ideas O = Object A = Audience I = Ideas U = Unite ideas E = draft Essay D = Develop your text	Explicit instruction and explanation Mnemonic rules Memory strategies	Mnemonic chart POD + THE VOWELS Example of text
Modeling of POD + THE VOWELS planning strategy 5th – 6th sessions	The instructor modeled the POD + THE VOWELS planning strategy (while thinking aloud). While planning the instructor purposefully used self-regulatory statements and self-instructions.	Cognitive modeling Think aloud Self-regulation procedures, self-instructions: problem definition, focusing of planning, strategy self-instructions, self-evaluating and self-reinforcement	Mnemonic chart POD + THE VOWELS Example of text Graphic organizer of planning strategy List of self-regulatory statements, and think aloud materials (for teacher) General list of self-instructions
Memorization of POD + THE VOWELS planning strategy 7th session	Steps of POD+VOWELS planning strategy Individual adaptation of self-regulatory statements and self-instructions	Aloud questions Social feedback Memory strategies Group discussion	Mnemonic chart POD + THE VOWELS General list of self-instructions Individual list of self-instructions
Collaborative practice 8th – 10th sessions	Collaborative application of POD + VOWELS strategy in pairs Guided practice by instructor with materials	Working in pairs Think aloud Guidance by teachers Social feedback Self-instructions	Mnemonic chart POD + THE VOWELS Graphic organizer of planning strategy Individual list of self-instructions Registration sheet of text Independent practice
11th – 12th sessions	Application of POD + VOWELS Individually Guided practice and feedback	Self-instructions explicit to encourage	Mnemonic chart POD + THE VOWELS Graphic organizer of planning strategy Individual list of self-instructions faded gradually (if they felt it was necessary) Registration sheet of text

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Table 5 continued

Instructional Stage and Session	Instructional Focus	Strategies and Techniques	Materials
Development of background knowledge 13th session	Knowledge of revising process	Explicit and interactive explanation Stimulation of prior knowledge	Writing process matrix Matrix of type of revisions: mechanical vs. substantial
Presentation of RED revising strategy: goals and significance 14th session	Revising strategy: RED R = Read text E = Evaluate text D = Do necessary changes	Explicit instruction and explanation Mnemonic rules Memory strategies	Mnemonic chart RED revising strategy Matrix of type of revisions: mechanical vs. substantial
Modeling of RED revising strategy 15th – 16th sessions	The instructor modeled the RED revising strategy (while thinking aloud) While revising the instructor purposefully used self-regulatory statements and self-instructions	Cognitive modeling Think aloud Self-regulation procedures, self-instructions: problem definition, focusing of planning, strategy self-instructions, self-evaluating and self-reinforcement	Mnemonic chart RED Graphic organizer of revising strategy List of self-regulatory statements, and think aloud materials (for teacher) General list of self-instructions
Memorization of RED revising strategy 17th session	Steps of RED revising strategy Individual adaptation of self-regulatory statements and self-instructions	Aloud questions Social feedback Memory strategies Group discussion	Mnemonic chart RED General list of self-instructions Individual list of self-instructions
Collaborative practice 18th – 20th	Collaborative application of RED strategy in pairs Guided practice by instructor and materials	Working in pairs Think aloud Guidance by teachers Social feedback Self-instructions	Mnemonic chart RED Graphic organizer of revising strategy Individual list of self-instructions Final sheet of text
Independent practice 21st – 22nd sessions	Application of RED individually guided practice and feedback faded gradually	Self-instructions explicit to encourage	Mnemonic chart RED Graphic organizer of revising strategy Individual list of self-instructions (If they felt it was necessary) Final registration sheet of text
Maintenance and generalization 23rd session	The instructor modeled planning and revising strategies (POD + THE VOWELS and RED) in the writing process	Cognitive modeling Think aloud Self-regulation procedures, self-instructions: problem definition, focusing of planning, strategy self-instructions, self-evaluating and self-reinforcement.	Final registration sheet of text
Maintenance and generalization 24th session	Collaborative application of planning and revising strategies in pairs (POD + THE VOWELS and RED) in the writing process Final registration sheet of text	Working in pairs Think aloud Guidance by teachers Social feedback Self-instructions	
Maintenance and generalization 25th session	Individual application of planning and revising strategies (POD + THE VOWELS and RED) in the writing process	Self-instructions explicit to encourage	Final registration sheet of text

reflection phase involves those processes that occur after performance efforts and influence forethought regarding subsequent motoric efforts, such as self-evaluation *(what must I do when I finish the text?);* causal attributions *(I have made a big effort and I got a good result); and* self-reactions *(I am very satisfied, my text is great).*

At this level, two types of modeling were developed: a coping model that considered one or more key errors in the process of writing; for example, the model neglects to specify some main subprocesses of planning, such as to remember the audience; or some self-regulatory strategies such as self-observation subprocesses, such as to read the text and continuously assess the included ideas, but promptly corrected these errors. Also, a mastery model was developed and executed during the writing process without errors (Zimmerman & Kitsantas, 2002). Coping models are effective in teaching students to identify and eliminate errors, and mastery models provide positive standards of performance that students can use to make self-judgments regarding errors. For these reasons their incorporation in the instructional program was appropriate (Kitsantas, Zimmerman, & Cleary, 2000).

The second level covered emulation. At this level, students learned to emulate a model's performance that had been previously developed. Students worked in pairs, using a cognitive model that incorporated modeled explanations and demonstrations with verbalization of the model's thoughts and reasons for performing actions. This modellng was based on the exemplary performances implemented by the instructor in the previous sessions. Furthermore, it was based on the specific graphic organizers and list of self-regulatory statements (see Table 6). The students changed roles to play both observer and model. This type of emulative experience provides aspiring writers with behavioural and social feedback to refine their performance and to develop self-regulative standards that are essential for higher levels of learning (Zimmerman & Kitsantas, 2002).

At the third level, which dealt with self-control, students learned from self-directed and individual practice to achieve automation in their behavioral writing process, focusing on the process rather than on its outcomes; that is, the quality of written text (Zimmerman & Kitsantas, 2002). At this level, students worked individually using a cognitive model based on the exemplary performances implemented by the instructor and the students themselves in the previous sessions. They were guided by graphic organizers and a previously used list of self-regulatory statements.

Finally, at the fourth level, which considered self-regulation, the students learned to adapt their performance to changes in contextual environment, either internal or external. Thus, students shifted their attention from modeled processes to performance outcomes (Zimmerman & Kitsantas, 2002); for this reason, they were not guided by materials such as graphic organizers or lists of self-regulation self-instructions that support the specific modeled process, but adapted their writing process to get an adequate performance outcome.

Table 6 summarizes this instructional program. In order to understand the similarities and differences between both types of experimental instruction, consult Table 7.

Standard curriculum. Students in the comparison group followed the standard curriculum in their everyday settings. In Spain, a normative curriculum sets the objectives, content, and methodological rules for all subjects. For this reason, the language curriculum is similar in all Spanish schools. Standard instruction could be summed up in the following general pattern: students do not receive any process-oriented or cognitive-strategy instruction; they receive specific instruction about the mechanical writing process, such as spelling, grammar, or handwriting. They also receive specific instruction about the substantial characteristics of writing, such as structural features of different textual genres. After this instruction, students practice writing different texts, which are later corrected by the teacher who highlights their marks and their mistakes in organization, spelling, grammar, or handwriting. The three groups received similar and comparable practices, and the teaching was accomplished during ordinary lessons.

Procedure

This intervention study was carried out during the second term of the 2003/04 academic year. The experimental students were exposed to the intervention program three times a week in groups of 6-8. They received 25 sessions in all, lasting about 50 minutes each.

Before the program, students in the experimental and comparison groups were tested during the same week in composition writing and writing self-efficacy. Later, the program was delivered. In the meantime students in the comparison group continued with their ordinary lessons. Finally, students of the comparison and experimental groups were tested during the same week in the same way as before the program.

To ensure that the implementation of instructional programs and assessment were conducted correctly, we held a weekly meeting with the instructors. We interviewed them individually about their practice and experience from the previous week, and trained them for the sessions coming up. Besides, we collected all the materials and checked the student portfolios generated during training to ensure that all students had

Table 6

Summary of Instructional Model Based on the Social Cognitive Model of Sequential Skill Acquisition

Instructional Stage and session	Instructional Focus	Strategies and Techniques	Materials
Knowledge of writing: general and planning process 1st – 4th sessions	Writing functionality Types of texts Writing products Importance of writing Writing process Self-regulation procedures Processes directly involved in planning	Brainstorming Group discussion Direct and explicit instruction Previous knowledge Interactive explanation Functionality examples	Conceptual writing map Writing process matrix Matrix and examples of different types of texts Matrix of self-regulation procedures Matrix of writing planning process
Observation level of planning process 5th – 6th sessions	Self-regulation of writing planning processes	Cognitive modeled – coping model – mastery model Think aloud Self-regulation procedures Group discussion	Example of think aloud Coping model of planning process Mastery model of planning process Registration planning sheet
Emulation level of planning process 7th session	Self-regulation of writing planning processes	Emulative performance Think aloud Self-regulation procedures Feedback social Working in pairs	Graphic organizer and control list: planning process sheet List of self-regulation procedures in planning process
Self-control - self-regulation levels of planning process 8th – 9th sessions	Self-regulation of writing planning processes	Individual performance Think aloud Self-regulation procedures Feedback social	Graphic organizer and control list: planning process sheet List of self-regulation procedures in planning process
Knowledge of writing – editing process 10th session	Knowledge of writing editing process Textual structure Coherence Links	Direct and explicit instruction Previous knowledge Interactive explanation Functionality examples	Writing process matrix Example of text Matrix of writing editing process Organizer
Observation level of editing process 11th – 12th sessions	Self-regulation of writing editing processes	Cognitive modeled – coping model – mastery model Think aloud Self-regulation procedures Group discussion	Example of think aloud Coping model of editing process Mastery model of editing process Registration edition sheet
Emulation level of editing process 13th session	Self-regulation of writing editing processes	Emulative performance Think aloud Self-regulation procedures Feedback social Working in pairs	Graphic organizer of editing process sheet List of self-regulation procedures in editing process
Self-control – self-regulation levels of editing process 14th – 15th sessions	Self-regulation of writing editing processes	Individual performance Think aloud Self-regulation procedures Feedback social	Graphic organizer of editing process sheet List of self-regulation procedures in editing process

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Table 6 continued

Instructional Stage and session	Instructional Focus	Strategies and Techniques	Materials
Knowledge of writing – revising process 16th session	Knowledge of writing revising process Mechanical and Substantive revision	Direct and explicit instruction Previous knowledge Interactive explanation Functionality examples of mechanical and substantive revision	Writing process matrix Matrix of writing revising process Organizer
Observation level of revising process 17th – 18th sessions	Self-regulation of writing revising processes	Cognitive modeled – coping model – mastery model Think aloud Self-regulation procedures Group discussion	Example of think aloud Coping model of revising process Mastery model of revising process Final registration sheet Matrix of writing revising process: mechanical and substantial
Emulation level of revising process 19th session	Self-regulation of writing revising processes	Emulative performance Think aloud Self-regulation procedures Feedback social Working in pairs	Matrix of writing revising process: mechanical and substantial List of self-regulation procedures in revising process
Self-control – self-regulation levels of revising process 20th – 21st sessions	Self-regulation of writing revising processes Self-regulation procedures Feedback social	Individual performance Think aloud	Matrix of writing revising process: mechanical and substantial List of self-regulation procedures in revising process
Observation level of writing process 22nd session	Self-regulation of writing process	Cognitive mastery model Think aloud Self-regulation procedures Group discussion	Graphic organizer of planning process sheet Graphic organizer of editing process sheet Matrix of writing revising process: mechanical and substantial
Emulation level of writing process 23rd session	Self-regulation of writing process	Emulative performance Think aloud Self-regulation procedures Feedback social Working in pairs	Graphic organizer of planning process sheet Graphic organizer of editing process sheet Matrix of writing revising process: mechanical and substantial List of self-regulation procedures in revising process
Self-control – self-regulation levels of writing process 24th – 25th sessions	Self-regulation of writing process	Individual performance Think aloud Self-regulation procedures Feedback social	No materials

Table 7

Summary of Similarities and Differences Between SRSD and SCM Instructional Programs and Between Both Instructional Programs and the Standard Curriculum

	Similarities Between		Differences Between	
Dimensions	**SRSD – SCM Interventions**	**Interventions – Standard Curriculum**	**SRSD – SCM Interventions**	**Interventions – Standard Curriculum**
Mechanicals	Students received the same number of instructional sessions (25 sessions, 50 minutes each) during the same term period	Students received the same number of instructional sessions (25 sessions), with the same length (50 minutes) covering the same period of school year		
Knowledge of Writing	Students were taught necessary metacognitive (declarative, procedural and conditional) knowledge about: writing process and written products (background knowledge – SRSD or knowledge of writing – SCM)	Students were taught metacognitive, declarative, and conditional knowledge about written products	Number of sessions dedicated to knowledge of writing: • SRSD 4 sessions of background knowledge • SCM 6 sessions of knowledge of writing	Students of the comparison group did not receive instruction about metacognitive knowledge (declarative, procedural or conditional) of writing processes or procedural metacognitive knowledge of written products
Instructional Strategies and Procedures	Both instructional programs used cognitive modeling		Number of sessions that used the cognitive modeling: SRSD 3 sessions SCM 11 sessions Different types of cognitive modeling: SRSD mastery model (3 sessions) SCM mastery (8 sessions) and coping models (3 sessions) Different models: SRSD instructor (3 sessions) SCM instructor (7 sessions) and peers (4 sessions).	Standard curriculum did not use cognitive modeling
	Students in both interventions were taught to use different types of self-regulation procedures. Both instructions used self-questioning and self-speech in thinking aloud			Students of the comparison group were not taught to use different types of self-regulation procedures. They did not use self-questioning or self-speech

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Table 7 continued

Dimensions	Similarities Between SRSD – SCM Interventions	Similarities Between Interventions – Standard Curriculum	Differences Between SRSD – SCM Interventions	Differences Between Interventions – Standard Curriculum
Practice	Students of both interventions followed collaborative practice with the instructor and received feedback		Type of practice and sessions: SRSD individual practice of writing process (5 sessions), collaborative practice with peers (1 session) SCM individual practice of writing process (8 sessions) and collaborative practice with peers (4 sessions)	Students of comparison group always write individually
Pattern of Instruction	Both interventions followed maintenance and generalization sessions		Their general patterns of instruction were different: SRSD intervention followed six general stages: background knowledge; presentation of cognitive writing strategy; modeling; memorization of cognitive writing strategy; collaborative practice and independent practice. SCM intervention followed four general levels of instruction: observation, emulation, self-control and self-regulation	They did not receive any process-oriented or cognitive strategy instruction They received direct instruction about different textual genres and mechanical writing process Later they practiced writing the text which was taught individually Teacher corrects the texts and provides feedback about the results: spelling, handwriting, organization, etc.
Written Products	Both interventions combined texts written by instructors and students. Students composed the same number of texts, six texts Instructors composed the same number of texts: three texts	Students wrote approximately the same number of texts		The texts always were written by students and revised/ corrected by teacher
Materials	Both interventions used materials such as graphic organizers, knowledge matrix, list of self-regulatory procedures, etc.			Standard instruction did not use support materials such as graphic organizers, knowledge matrix, list of self-regulatory procedures, etc.
Cognitive Writing Strategies			Students in the SRSD intervention were taught specific cognitive writing strategies to planning and revising but students in the SCM intervention were not	They did not use cognitive writing strategies

Table 8

Results of 2 x 3 Factorial Design of Repeated Text-Based Measures in Written Products

	SRSD Intervention (*N* = 48)				SCM Intervention (*N* = 41)				Standard Curriculum (*N* = 32)				BA - Time			BA - Time X Group		
Variables	***M*** **Pre**	***SD*** **Pre**	***M*** **Post**	***SD*** **Post**	***M*** **Pre**	***SD*** **Pre**	***M*** **Post**	***SD*** **Post**	***M*** **Pre**	***SD*** **Pre**	***M*** **Post**	***SD*** **Post**	$F_{(1, 118)}$	p	η^2	$F_{(2, 118)}$	p	η^2
Productivity (*N* Words)	46.23	25.15	79.56	22.52	48.10	17.33	82.12	42.88	58.19	22.59	35.25	22.27	23.48	<.001	.16	34.31	<.001	.37
Referential Coherence	4.48	4.46	10.27	3.99	5.12	4.18	1.80	7.46	6.06	5.19	4.31	3.88	34.38	<.001	.22	17.21	<.001	.22
Relational Coherence	2.10	1.83	11.15	3.29	3.46	2.49	7.71	6.76	3.25	2.46	1.94	1.74	107.56	<.001	.47	59.39	<.001	.50
Total Coherence	6.58	5.86	21.42	6.19	8.59	5.29	19.51	12.57	9.31	6.82	6.25	4.57	74.40	<.001	.38	35.54	<.001	.38
Density of Coherence	13.19	6.97	27.46	5.46	16.17	7.30	23.27	6.09	16.20	8.25	16.82	7.59	65.59	<.001	.37	19.25	<.001	.26
Total Structure	0.92	0.27	3.00	0.00	1.05	0.63	1.95	1.18	0.88	0.49	0.91	0.64	159.16	<.001	.57	56.40	<.001	.49

Note. We include both the effect produced by time alone and the effect produced by interaction between the repeated measure, the moment of the assessment (BA: before-after), and the type of treatment (Self-regulated Strategy Development – SRSD; Social Cognitive Model – SCM; stanfard curriculum). We only represent the statistically significant results ($p < .05$).
η^2 (eta-squared statistic) = Estimates of effect size. The Cohen (1988) rule signals = .01-.06 (small effect); > .06-.14 (medium effect); > .14 (large effect).

completed all the tasks appropriately. Evidence from the instructor interviews and portfolios was converged to enable the researchers to assess the fidelity of the interventions programs and to ensure that they were administered in an equivalent manner across all participating schools.

RESULTS

Effects on Written Products

To analyze the improvement in students' texts, we carried out a 2 x 3 multivariate analysis of variance with repeated measures, taking the same variables into account (within-between) with the same values for each (before-after; comparison-experimental 1 SRSD-experimental 2 SCM).

Text-based measures. There was a statistically significant improvement with a large effect size in all text-based measures for students in intervention conditions compared with students in the comparison group. The text-based measures are reported in Table 8.

The pre/post differences in interaction with the treatment (comparison-experimental groups) for the comparative-contrast task showed statistically significant contrasts in the total indicators of productivity (number of words), $F(2,118) = 34.31$; $p < .001$; $\eta^2 = .36$; referential coherence, $F(2, 118) = 17.21$; $p < .001$; $\eta^2 = .22$; relational coherence, $F(2, 118) = 59.39$; $p < .001$; $\eta^2 = .50$); total coherence, $F(2, 118) = 35.54$; $p < .001$; $\eta^2 = .37$; and density of coherence, $F(2, 118) = 19.25$; $p < .001$; $\eta^2 = .26$); as well as total structure, $F(2,118) = 56.40$; $p < .001$; $\eta^2 = .48$; with a large effect size.

The post hoc analysis showed a significant improvement in all text-based measures of the experimental groups compared to the comparison group. However,

Figure 2. Results of the text-based measures.

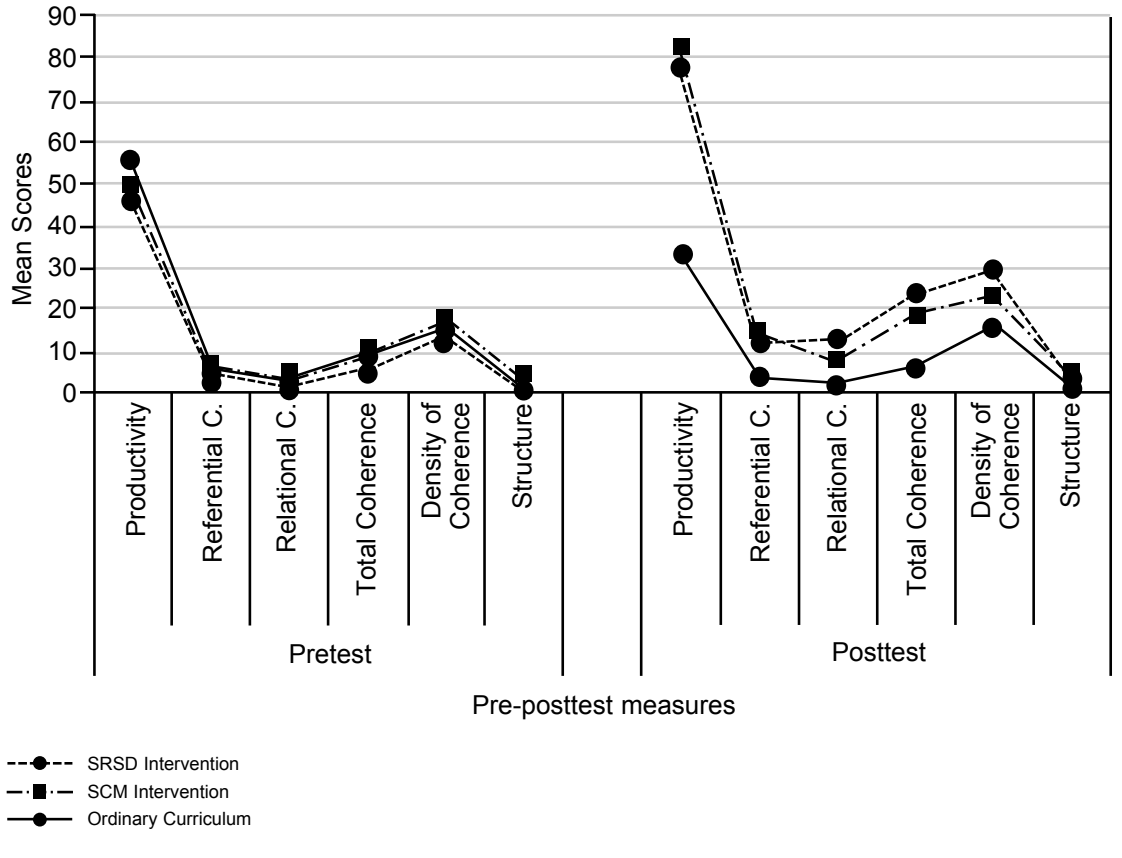
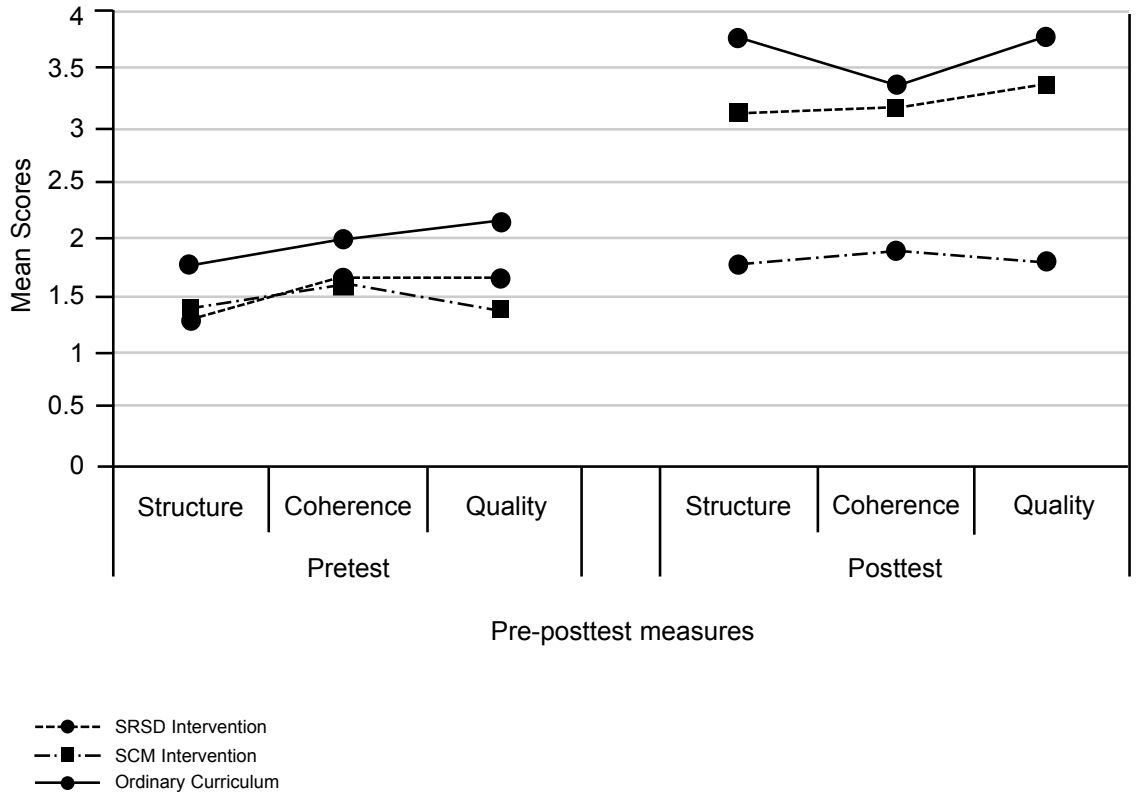


Figure 3. Results of the reader-based measures.



only the structure measure showed significant differences between the experimental conditions ($p < .001$), with SRSD conditions getting greater improvement versus the SCM condition. Figure 2 illustrates the differences in the text-based measures for each group (SRSD intervention, SCM intervention, standard curriculum) and the moment of the assessment (pre-post). The effect size is large, in general, when we compare one of the experimental groups with the comparison group (for this analysis we used the Cohen *d*, and "the family effect size index;" see Onwuegbuzie, Levin, & Leech, 2003). For example, in productivity we reached a $d = 1.989$ comparing the SRSD group with the ordinary curriculum group; in total relational coherence we reached a $d = 1.054$ comparing the SCM group with the ordinary curriculum group; in density of relational coherence we reached a $d = 1.058$ when we compared the SCM group with the ordinary curriculum group. Moreover, in total structure we reached a $d = 0.879$ when we compared the SCM group with the comparison group. Finally, when we compared the experimental group, in general, we obtained a small or medium effect size; for example, in productivity ($d = .113$), in total relational coherence ($d = .308$), but a large or nearly large effect size in density of relational coherence ($d = .766$), and in total structure ($d = .888$).

Reader-based measures. The results showed a substantially significant improvement in all reader-based writing measures for students in both experimental groups versus students in the comparison group, as well as a large effect size: structure, $F(2,118) = 57.63$; $p < .001$; $\eta^2 = .51$; coherence, $F(2,118) = 34.90$; $p < .001$; $\eta^2 = .39$; and quality, $F(2,118) = 34.53$; $p < .001$; $\eta^2 = .38$. Moreover, post hoc analysis showed statistically signifi-

cant differences between both the experimental groups and the comparison group. For example, when we compared one of the experimental groups with the standard curriculum group, we found a large effect size in structure (d = 1.308) comparing the SCM and ordinary curriculum groups, in coherence (d = 1.948) comparing the SRSD and ordinary curriculum groups, and in quality (d = 1.173) comparing the SCM and the standard curriculum group. However, post hoc analysis did not show statistically significant differences between both experimental groups. Table 9 summarizes the results related to the reader-based measures.

Figure 3 provides an overview of the difference scores for each group (SRSD intervention, SCM intervention, ordinary curriculum) and moment of the assessment (pre-post). As illustrated, there was no evidence of systematic differences between both intervention groups.

Effects on self-efficacy measures in writing. To analyze improvement in students' self-efficacy of writing, we performed a 2 x 3 multivariate analysis of variance with repeated measures, taking into account the same variables (within-between) with the same values for each (before-after; comparison-experimental 1 SRSD-experimental 2 SCM). Table 10 and Figure 4 summarize the results in relation to self-efficacy writing measures.

The results showed statistically significant differences between the groups in self-efficacy measures in relation to: general quality of written text (item 1); audience (item 4), and total writing self-efficacy previous to and after the writing task performance.

However, the post hoc analysis showed that only the SCM experimental condition made statistically significant or nearly significant improvements versus the comparison group in total writing self-efficacy previous (p = .010) and after (p = .080) and audience previous (p = .042). However, there were no significant differences in either the SRSD experimental group or the comparison group. In general, the effect size is large, or nearly large, when we compare SCM experimental group with the ordinary curriculum group. For example, in total writing self-efficacy after the writing task, we found a d = 1.38 comparing the SCM with the standard curriculum group, and reached a d = .931 when we compared the SCM group with the comparison group in the self-efficacy total.

Effects on writing process. The time spent on each of the seven writing log activities was estimated by multiplying the frequency of each activity in the writing log by the mean inter-tone interval (1.5 min). We calculated the time per activity along all writing processes and their temporal organization distributed over the three moments.

Table 9
Results of 2 x 3 Factorial Design of Repeated Measures in Reader-Based Measures of Written Products

	SRSD Intervention (N = 48)				SCM Intervention (N = 41)				Standard Curriculum (N = 32)				BA - Time			BA - Time X Group		
Variables	*M* Pre	*SD* Pre	*M* Post	*SD* Post	*M* Pre	*SD* Pre	*M* Post	*SD* Post	*M* Pre	*SD* Pre	*M* Post	*SD* Post	$F_{(1, 118)}$	p	η^2	$F_{(2, 118)}$	p	η^2
Structure	1.31	0.51	3.71	0.61	1.41	0.55	3.14	1.03	1.74	0.65	1.79	0.66	219.58	<.001	.66	57.63	<.001	.51
Coherence	1.63	0.70	3.35	0.60	1.57	0.76	3.19	0.93	2.00	0.78	1.85	0.77	122.39	<.001	.52	34.90	<.001	.39
Quality	1.65	0.86	3.71	0.89	1.43	0.60	3.35	1.33	2.07	0.95	1.78	0.69	101.84	<.001	.48	34.53	<.001	.38

Note. We include both the effect produced by time alone and the effect produced by interaction between the repeated measure, the moment of the assessment (BA: before-after), and the type of treatment (intervention based on Self-Regulated Strategy Development – SRSD; Intervention based on Social Cognitive Model – SCM; standard curriculum). We only represent the statistically significant results ($p < .05$).
η^2 (eta-squared statistic) = Estimates of effect size. The Cohen (1988) rule signals = .01-.06 (small effect); > .06-.14 (medium effect); > .14 (large effect).

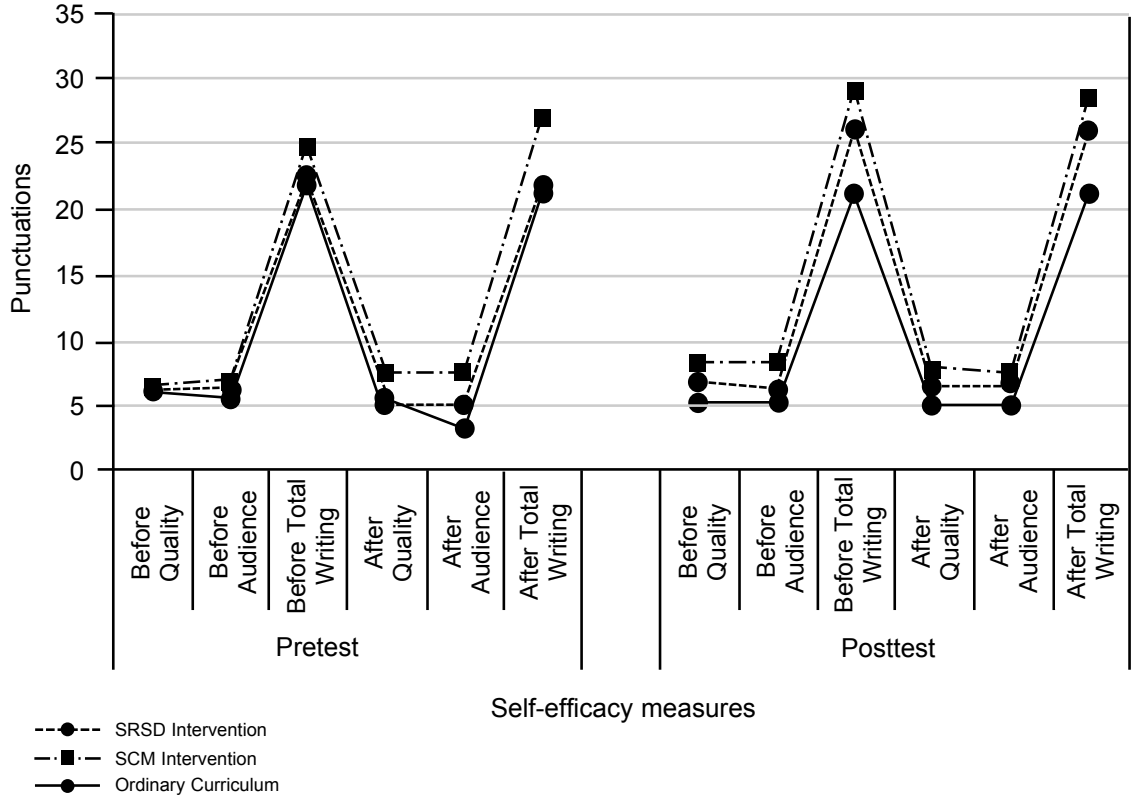
Table 10

Results of 2 x 3 Factorial Design of Repeated Measures in Writing Self-Efficacy

	SRSD Intervention (*N* = 48)				SCM Intervention (*N* = 41)				Standard Curriculum (*N* = 32)				BA - Time			BA - Time X Group		
Variables	***M*** **Pre**	***SD*** **Pre**	***M*** **Post**	***SD*** **Post**	***M*** **Pre**	***SD*** **Pre**	***M*** **Post**	***SD*** **Post**	***M*** **Pre**	***SD*** **Pre**	***M*** **Post**	***SD*** **Post**	$F_{(1, 118)}$	*p*	η^2	$F_{(2, 118)}$	*p*	η^2
Quality	5.71	1.90	7.23	1.65	5.78	2.58	7.73	1.44	6.23	2.30	6.12	2.81	0.83	<.001	.16	0.90	.005	.09
Audience	6.67	1.99	7.02	1.83	6.43	1.89	7.78	1.78	5.88	3.06	6.04	2.44	6.99	.009	.06	2.51	.086	.04
Total Writing Self-Efficacy Previous	23.06	6.29	26.31	6.03	24.46	7.30	28.67	5.11	22.19	8.76	21.61	8.24	12.14	.001	.10	4.18	.018	.07
Quality	5.50	2.24	6.96	1.55	6.00	2.41	7.62	1.51	6.12	2.81	5.64	2.64	13.56	<.001	.11	6.92	.001	.11
Audience	5.66	2.35	6.72	1.63	3.65	2.76	7.32	2.14	5.40	3.09	5.52	2.29	30.45	<.001	.22	12.84	<.001	.19
Total Writing Self-Efficacy After	22.13	7.34	26.39	5.91	21.73	7.25	28.05	5.88	21.12	9.35	21.32	7.63	27.61	<.001	.20	5.94	.004	.10

Note. We include both the effect produced by time alone and the effect produced by interaction between the repeated measure, the moment of the assessment (BA: before-after), and the type of treatment (Self-regulated Strategy Development – SRSD; Social Cognitive Model – SCM; ordinary curriculum). We only represent the statistically significant results ($p < .05$) η^2 (eta-squared statistic) = Estimates of effect size. The Cohen (1988) rule signals = .01-.06 (small effect); > .06- 14 (medium effect); > .14 (large effect).

Figure 4. Significant results of students' self-efficacy in writing.



These data were analyzed using a multivariate analysis of variance for the writing process measures among the groups. Table 11 summarizes the significant results related to time spent on activities during the writing process.

The *time on writing task* for each of the SRSD interventions and of the SCM interventions in post-test was significantly higher than for the comparison group, $F(2,118) = 21.00$; $p < .001$, with a large effect size ($\eta^2 = .26$). Specifically, this significant improvement was due to an increase in both experimental groups versus the comparison group in the category *writing full text time,* $F(2,118) = 13.92$; $p < .001$; $\eta^2 = .19$; in planning activities such as *reading references time,* $F(2, 118) = 5.77$; $p = .004$; $\eta^2 = .08$; or thinking about content time, although it is not significant statistically, we found a tendency towards significance in the SRSD intervention group versus the others, $F(2,118) = 2.66$; $p = .074$; $\eta^2 = .04$. And finally, revising activity categories such as *reading text time* and *changing text time* were also statistically significant, being higher in both intervention groups versus the comparison, $F(2,118) = 3.15$; $p = .046$; $\eta^2 = .05$; and $F(2,118) = 3.60$; $p = .030$; $\eta^2 = .05$, respectively. Figure 5 summarizes these significant results.

With regard to the temporal organization of the writing process, the analysis also showed statistically significant differences between the experimental groups versus the comparison group. We analyzed the distribution of the writing process activities throughout the whole writing process, divided into three distinct moments.

In the first stage of the writing process, we found that time spent on *reading references,* $F(2, 118) = 5.83$; $p = .004$; $\eta^2 = .09$; and *writing full text,* $F(2,118) = 11.50$; $p < .001$; $\eta^2 = .16$, was statistically significant, being higher in the experimental groups than the comparison.

Table 11

Results of a Multivariate Analysis of the Variance in Time Spent in Activities of Writing Log (as a Whole and Divided into Three Moments) Between the Groups

	SRSD Intervention (N = 48)		SCM Intervention (N = 41)		Standard Curriculum (N = 32)				
	M Post	*SD* Post	*M* Post	*SD* Post	*M* Post	*SD* Post	*F*	*p*	η^2
Writing Process as a Whole									
Time on Task	1085.00	375.61	998.04	439.67	531.84	336.75	21.00	<.001	.26
Time on Reading References	153.06	130.80	142.90	121.43	66.84	85.93	5.77	.004	.08
Time on Thinking About Content	149.18	177.63	83.92	111.60	87.18	143.56	2.66	.074	.04
Time on Writing Full Text	618.06	288.71	585.21	284.55	305.15	240.00	13.92	<.001	.19
Time on Reading Text	89.12	128.63	102.07	124.43	37.78	61.86	3.15	.046	.05
Time on Changing Text	54.25	81.01	74.85	108.49	20.34	56.56	3.60	.030	.05
First Stage of Writing Process									
Time on Reading References	81.37	90.12	80.90	61.95	31.00	45.23	5.83	.004	.09
Time on Writing Full Text	223.45	117.73	189.02	111.08	105.59	89.03	11.50	<.001	.16
Second Stage of Writing Process									
Time on Thinking About Content	57.47	81.13	29.48	66.83	24.21	52.07	2.79	.065	.04
Time on Writing Full Text	217.00	121.16	205.65	118.80	109.46	100.83	9.36	<.001	.13
Time on Reading Text	20.02	37.00	31.75	49.25	6.78	21.89	3.75	.026	.06
Time on Changing Text	3.87	18.78	24.19	52.56	10.65	37.44	3.21	.044	.05
Third Stage of Writing Process									
Time on Writing Full Text	177.60	139.62	188.26	140.93	90.09	89.90	6.12	.003	.09
Time on Changing Text	46.50	79.09	45.36	66.88	6.78	23.37	4.35	.015	.06

Note. We include both the effect produced by time alone and the effect produced by interaction between the repeated measure, the moment of the assessment (BA: before-after), and the type of treatment (Self-Regulated Strategy Development – SRSD; Social Cognitive Model – SCM; standard curriculum). We only represent the statistically significant results ($p < .05$) or near statistically. η^2 (eta-squared statistic) = Estimates of effect size. The Cohen (1988) rule signals = .01- 06 (small effect); > .06-.14 (medium effect); > .14 (large effect).

In the second stage of the writing process, both experimental groups devoted more *writing full text time,* $F(2,118) = 9.36$; $p < .001$; $\eta^2 = .13$, than the comparison. In relation to the planning activities categories, the SRSD experimental group demonstrated statistically significantly more *thinking about content* time than the rest, $F(2,118) = 2.79$; $p = .065$; $\eta^2 = .04$. However, in relation to revision activity categories, the SCM intervention group devoted significantly more time. Specifically, *reading text time* and *changing text time* were statistically significant, being higher in the SCM intervention group than in the others, $F(2,118) = 3.75$; $p = .026$; $\eta^2 = .06$, and $F(2, 118) = 3.21$; $p = .044$; $\eta^2 = .05$, respectively.

Finally, in the third stage of the writing process, both experimental groups devoted statistically significantly more time to revision activity categories than the comparison group, such as *changing text,* $F(2,118) = 6.12$; $p = .033$; $\eta^2 = .09$. The same pattern was observed in relation to *writing full text time,* which was significantly higher in the experimental groups than the comparison one, $F(2,118) = 4.35$; $p = .015$; $\eta^2 = .06$. Figure 6 shows these results.

DISCUSSION AND IMPLICATIONS FOR PRACTICE

The present findings provide empirical evidence for the effectiveness of training cognitive and self-regula-

Figure 5. Significant results of the total writing process measures in posttest between the groups

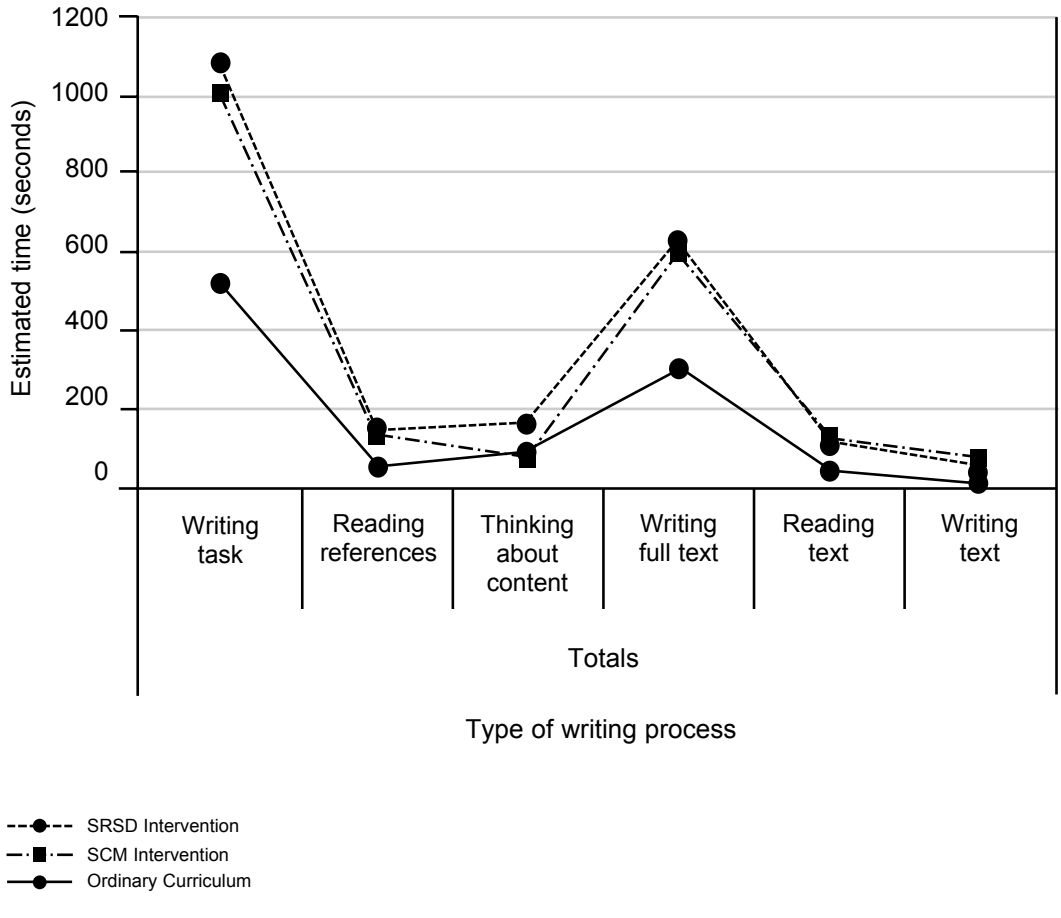
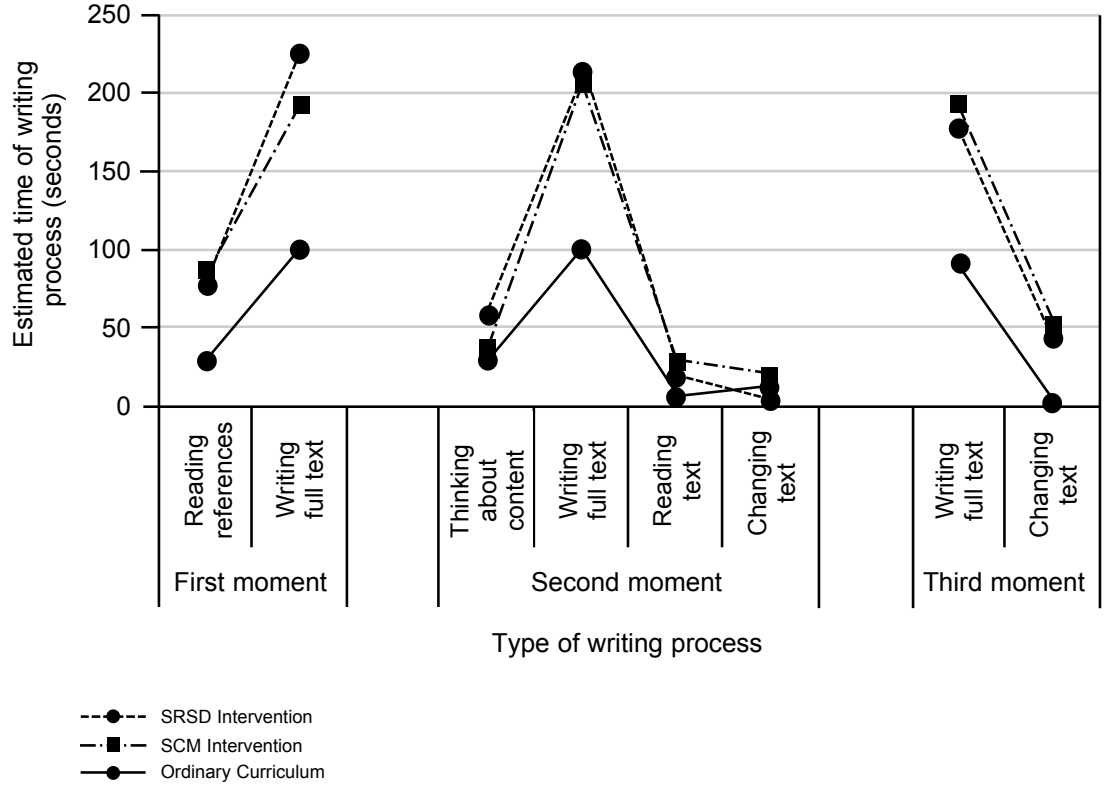


Figure 6. Significant results in the posttest writing process measures per moment, between groups.



tory strategies to improve the writing outcomes of students with LD and/or LA. Both interventions, the SRSD-based and the SCM-based models, enhanced the global quality of written products, whether they were reader-based measures or text-based. Nevertheless, it is necessary to consider some limitations in relation to their effectiveness in improving the writing competence of students with LD in this study.

A major issue in strategy instructional research, especially for students with LD, concerns whether the effects of the program are maintained over time and are generalized to new tasks and situations (Graham & Harris, 1997). To satisfy this requirement, it would have been necessary to collect data about the generalization or maintenance of the results in this comparative study. This is especially important for the social cognitive model of sequential skill acquisition, because no previous study has investigated whether the effects are maintained and generalized. On the contrary, several researchers have proven maintenance and generalization of writing effects following the self-regulated strategy development model (see a meta-analysis of the SRSD model in Graham & Harris, 2003).

The findings do not allow us to confirm differential effects on written texts between the two cognitive and self-regulatory strategy interventions implemented. Both the instructional patterns were equally effective. This finding is explained by the fact that the two intervention programs share key instructional features, which may be the true reason behind the improvement of written products rather than their different instructional patterns.

One key feature of effective instruction in writing shared by the intervention programs may be the cognitive modeling, which incorporates modeled explanations and demonstrations with thinking aloud of the

models for performing the actions of the writing process. This technique has proven effective in previous studies and in other disciplines, such as mathematics (Schunk, 1998). This type of learning by observation has been shown to be more effective than direct instruction or step-by-step instruction (Couzijn & Rijlaarsdam, 1996). Students who learn by observation "step back" from the writing task and can focus on the learning task, creating a learning opportunity to broaden their knowledge about writing (Braaksma, van den Bergh, Rijlaarsdam, & Couzijn, 2001; Braaksma et al., 2004; Couzijn, 1999).

Another feature shared by the intervention programs that could explain their effectiveness in improving writing skills is the use of self-speech to regulate the students' behavior. For example, *self-instruction* allows students to engage and implement writing or self-regulation procedures; *problem definition* allows students to determine the nature of a writing task; *focusing of attention* and planning helps students to focus on the writing task and generate a plan; *self-evaluating* assists students in evaluating their performance and spotting and correcting mistakes; and *self-reinforcement* rewards students for progress, persistence, and the quality of their written products (Harris & Graham, 1996). In general, this self-dialogue can guide performance and can improve self-awareness and self-regulation thinking, and thereby improve writing performance (Hartman, 2001).

There was also support for the efficacy of the instructional models across different student populations. While a body of self-regulation studies have been conducted in North American settings, there is a shortage of this kind of studies with other populations. This article provides empirical support to generalize this type of instruction in European student populations with LD and/or LA.

As for the labels of LD and/or LA, it would have been necessary to provide more information about their operational definition (e.g., IQ measures or achievement operational data) to characterize the specifics of the participating students (size of discrepancy, or severity of achievement gap between their peers). These measures were only taken into account in the prior assessment of the psychoeducational teams and were not available to the researchers, which poses a limitation.

However, there has been much debate related to the incongruence and incapability of the discrepancy model based on IQ measures to distinguish between IQ and achievement-discrepant low achievers (LD children) and non-discrepant ones (LA). Moreover, in Spain, we do not have the official category of LD; we have only the category *special educational needs* where we include any student who cannot learn with the standard resources of the educational system, and only children with severe problems are taken into account for special treatment. Whatever the cause of the learning difficulty (for example, a developmental disability), the students are considered as having special educational needs. In general, the majority of students with LD in Spain are educated by general education teachers, with the LD condition being treated as a type of *common final pathway* produced by different causes and not necessarily a specific problem, similar to the U.S. conceptualization as advanced by the National Joint Committee on Learning Disabilities (NJCLD) (García, Fidalgo, & Arias-Gundín, 2005; Jiménez & Hernández, 1999). However, this situation is about to change due to a new educational law in Spain (April 6, 2006) that promulgates the inclusion of the category of LD as a condition meriting different educational attention.

With regard to the writing process, both interventions showed significant changes compared to the comparison group. Specifically, both experimental groups showed a substantial increase in the time students spent on editing and revising their text. Nevertheless, despite the fact that all writing processes were trained similarly, the findings in relation to planning activities were not very clear; only reading references time substantially increased in both experimental conditions. On the other hand, only the SRSD intervention showed a substantial increase in the time students spent thinking about content, which denoted some planning process. However, neither of the intervention groups demonstrated a significant increase in the time students spent outlining, which would show a greater metacognitive and self-regulated planning process pattern. This finding is contrary to cognitive-development studies suggesting that revision tends to emerge later than preplanning in developing writers (Berninger & Swanson, 1994). Nevertheless, these results confirm that revising processes are susceptible to intervention in 5th- and 6th-grade students with LD and/or LA, which has been supported in previous intervention studies with older students (De la Paz, Swanson, & Graham, 1998). Another explanation for these different effects on planning and revising processes could be related to personal variables. Students with LD and/or LA commonly make mistakes and errors in their written texts. Perhaps this prior experience involves a natural tendency to revise and make changes in their texts, because they rarely produce an acceptable draft at the first attempt.

As for the temporal organization of writing processes, defined by several researchers as orchestration (Braaksma et al., 2004; Graham & Harris, 2000; McCuthen, 2000), other conclusions are possible. From this point of view, we can claim that the editing process (writing full text) is dominant throughout the writing process, although it increases during the second stage

and decreases in the third. As for the planning processes, they were introduced in the initial and second stages of the writing process, although their presence was slight, specifically in the SCM group. Finally, the revision processes were mainly introduced in the final stage of the writing process, although in the SCM intervention they were already established as they were presented in the second stage. Given these results, it would be interesting to do additional research to correlate the different distributions of writing processes during a writing task with different outcomes, for example, in line with previous research that has shown that orchestration of the writing processes is a decisive factor contributing to text quality (Breetvelt, van den Bergh, & Rijlaarsdam, 1994; Van den Bergh & Rijlaarsdam, 1999, 2001; Van der Hoeven, 1997).

The importance of these on-line methods of investigation appear to be generally accepted for studying and analyzing the processes involved in writing, for estimating the general temporal organizing of these processes, for analyzing the recursiveness of writing, and for analyzing the different patterns of the writing process and their impact on the written products (Levy & Olive, 2002; Olive, Kellogg, & Piolat, 2002). However, their conclusions must be formulated carefully because of a critical issue in on-line techniques – whether they disrupt or misrepresents the writing processes of interest; that is, the reactivity of the on-line techniques. In this study we used a time-sampled self-report instead of a think-aloud method. This method was adopted in previous studies with adult writers (e.g., Kellogg, 1988; Torrance et al., 1999) and with primary-aged children (Torrance et al., in press) due to evidence that obtaining on-line writing-processes measures in this way is less reactive than think-aloud methods, particularly for younger writers (Piolat & Olive, 2000; Stratman & Hamp-Lyons, 1994). Nevertheless, the choice of the interval tone may negatively affect writers' performance as a function of their expertise or the presence of learning disabilities. For this reason, additional studies are necessary with a focus on the reactivity of on-line methods in composition writing.

Finally, with regard to writing self-efficacy it is possible to claim other relevant conclusions for cognitive and self-regulatory instruction because effective self-regulation depends on feeling self-efficacious in using the skills to achieve mastery (Bandura 1997; Schunk & Zimmerman, 1997). The findings suggest that both cognitive and self-regulatory instruction in writing resulted in an increase in students' writing self-efficacy. However, only the intervention based on a social cognitive model or sequential skill acquisition showed a statistically significant improvement in writing self-efficacy versus the other groups.

One plausible explanation for these different results for the two interventions may be related to the modeling processes that were implemented. One of the sources of self-efficacy perceptions is vicarious experience (Bandura, 1997). Obviously, the effects of modeled consequences on observers' self-efficacy depend on factors such as age, sex, status, or type of modeling (Bandura, 1997; Schunk & Zimmerman, 1997). From this point of view, the cognitive modeling of the SCM intervention may be more suitable than the SRSD intervention for several reasons: cognitive modeling was implemented by instructors and peers, whose similar characteristics can explain a bigger effect in the development of self-efficacy because students may believe that they also can plan and manage writing process effectively, creating a high sense of self-efficacy for writing and motivating them to engage in these activities (Schunk & Zimmerman, 1997). In sum, the perceived similarity between model and observer is conjectured to be an important source of self-efficacy beliefs. Another positive effect of the cognitive modeling of SCM in writing self-efficacy is due to the combination of two types of cognitive models: a coping model and a mastery model; the latter was implemented in isolation in SRSD intervention. Observing a mastery model succeed can raise observers' efficacy and motivate them to try the task because they may believe that if others can succeed they can too (Schunk & Zimmerman, 1997). Similarly, a coping model in which one or more key errors or mistakes are initially made but are promptly self-corrected (Zimmerman & Kitsantas, 2002) can improve the writing competence beliefs of students with LD and/or LA, as they may believe that if others can overcome their mistakes or errors so can they.

Nevertheless, with regard to the improved writing self-efficacy found for students with LD, it must be taken into consideration that empirical revisions have shown that LD and/or LA students tend to overestimate their self-efficacy beliefs about writing (Klassen, 2002a, 2002b). For this reason, it would have been interesting to assess the calibration or the accuracy of their beliefs about writing competence and to know how close their self-efficacy beliefs are to their writing performances. Another interesting focus of research would be to explore the degree of congruence between efficacy beliefs and actual performances of students with LD, and to assess the influence of instructional programs in the accuracy of calibration in students with LD, who tend to overestimate their efficacy to a much greater degree (Klassen, 2002a, 2000b), which hinders improvement of performance. By comparison, optimal efficacy judgments are those that slightly overestimate what actually can be accomplished (Bandura, 1986, 1997).

In light of the arguments presented above, we can extract some obvious implications for educational practice in teaching composition writing to students with LD. First, we have facilitated both reflection and analysis of those instructional aspects that may be essential to improve composition writing. These aspects may also suit a more self-regulated or metacognitive approach in students with LD in composition writing, and these elements are those teachers should incorporate into their practice. One of the effective instructional practices present in both approaches used here was the cognitive model (emulation) and the development of the students' self-efficacy, mainly through partner work (Bandura, 1997), either the exemplary type or the incomplete one. Similarly, the procedures that increment self-regulation are those that contribute to the development of the writing in the children, thus coinciding with findings in previous studies (Graham & Harris, 2003). Moreover, the instructional approaches presented in this study strengthen the metacognitive knowledge of a declarative type, as well as of procedural and conditional ones, of the writing task and its process, such as the self-regulated mastery of composition writing of students with LD. They also facilitate the achievement of a greater congruence between the students' self-efficacy in the task and their actual achievement; this is, the calibration of students' abilities and achievements, which is a key aspect in the case of students with LD (Klassen, 2002a; Pajares, 1996).

In conclusion, teachers should be aware of the importance of these instructional strategies and procedures and try to incorporate them into the curriculum. All of them share the aim of helping students with LD become strategic learners (Wong et al., 2003). Moreover, if we consider the results of previous studies, which confirm that when instructional approaches are developed by teachers rather than researchers or specialized professionals, maintenance and generalization of the results are greater (Graham & Harris, 2003). On many occasions teachers are reluctant to carry out this kind of strategic instruction. This could be overcome through, for example, joint work between university researchers and classroom teachers to develop ways to teach cognitive and metacognitive strategies, as suggested by Wong et al. (2003).

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