

## Writing Self-efficacy Changes after Cognitive Strategy Intervention in Students with Learning Disabilities: The Mediation Role of Gender in Calibration

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This study examines the mediational role of gender in the effects of two patterns of cognitive and self-regulatory strategy interventions in the writing self-efficacy calibration of students with learning disabilities (LD). 121 5th and 6th Primary grade students with LD (43 girls and 78 boys), ranging in age from 10 to 12 years old were randomly allocated either to one of the experimental intervention groups, ( $n = 48$ , 19 girls and 29 boys), and followed a intervention program based on the Self-Regulated Strategy Development Model, or they received training based on the Social Cognitive Model of Sequential Skill Acquisition ( $n = 31$ , 15 girls and 26 boys), or alternatively they were allocated to the ordinary instruction group ( $n = 32$ , 9 girls and 23 boys). Writing performance was assessed using two types of writing evaluation: a reader-based score concerned with structure, coherence and quality, and a text based score regarding productivity, coherence and structure. Writing self-efficacy beliefs were also assessed using a self-report scale including eight items about the students' confidence in completing a writing task and to gain specific writing skills. The results suggest that the miscalibration of writing self-efficacy in girls with LD was significantly modified to a more realistic calibration of their writing competence after experimental intervention. However, the findings do not confirm the same clear statement for boys.

*Keywords:* writing self-efficacy, calibration, cognitive strategy intervention, learning disabilities, gender differences

Este estudio examina el papel mediacional del género en los efectos de dos patrones de intervenciones de estrategias cognitivas y auto-reguladoras en la calibración de la autoeficacia escritora de alumnos con dificultades de aprendizaje (DA). Se asignaron al azar a 121 alumnos de educación primaria de 5º y 6º con DA (43 chicas y 78 chicos), edades entre 10 y 12 años, o a uno de los grupos de intervención experimental ( $n = 48$ , 19 chicas y 29 chicos), y recibieron un programa de intervención basado en el modelo de desarrollo de estrategia auto-regulada o un entrenamiento basado en el modelo cognitivo de adquisición secuencial de habilidades ( $n = 31$ , 15 chicas y 26 chicos), o alternativamente, fueron asignados a un grupo de instrucción normal ( $n = 32$ , 9 chicas y 23 chicos). Se evaluó la ejecución de escritura con dos tipos evaluación: una puntuación basada en el lector, ligada a la estructura, la coherencia y la calidad, y una puntuación basada en el texto, ligada a la productividad, la coherencia y la estructura. Las creencias de autoeficacia sobre la escritura también se evaluaron con una escala de auto-informe que incluía ocho ítems acerca de la confianza de los alumnos al completar una tarea de escritura y al ganar habilidades de escritura específica. Los resultados sugieren que la calibración errónea de la autoeficacia de escritura en chicas con DA se modificó significativamente a una calibración más realista de su competencia en escritura después de la intervención experimental. Sin embargo, los resultados no confirman lo mismo para los chicos.

*Palabras clave:* autoeficacia de escritura, calibración, intervención cognitiva de estrategia, dificultades de aprendizaje, diferencias de género

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Since 1977, when Bandura introduced self-efficacy as a key component in social cognitive theory, this construct has received considerably more attention from educational researchers. It has been defined as the beliefs one holds about their capabilities to organize and execute the courses of action required to produce given attainments (Bandura, 1997). More than two decades of research have clearly established that self-efficacy influences academic motivation, learning and achievement (Pajares & Schunk, 2005; Zimmerman, 2000). According to the task-specific nature of self-efficacy, it has received extensive support from diverse fields as concerns the predictive and mediational role of self-efficacy (Bandura, 1997; Stajkovic & Luthans, 1998).

In difficult tasks such as writing which includes many recursively employed cognitive processes, self-efficacy plays a key role. The demanding nature of writing requires student engagement to develop both writing competence and skills. Writing demands a level of behavioral engagement, which incites students to exert more effort and persist longer at tasks, and seek instrumental help if necessary. Moreover, writing tasks require extensive attention control and self-regulation, because skilled writing as a self-planned, self-initiated and self-sustained activity entails high levels of self-regulation (Graham & Harris, 1997; Zimmerman & Risemberg, 1997); that is to say, writing also requires students' cognitive engagement. Finally, the development of writing competence also demands the engagement of the students' motivation in the task, in terms of interest, value, and feelings towards writing. In this sense, self-efficacy is key to promoting students' cognitive, behavioral and motivational engagement and learning (Linnenbrink & Pintrich, 2003), which supports the importance of its role in the development of writing competence.

The interest in affective factors that influence writing process has increased considerably (Hidi & Boscolo, 2006). Some of the most prominent theoretical models of writing include the component related to motivation and emotions affording it as much importance as the other individual components of the writing process (Hayes, 1996). Within this motivational component, self-efficacy offers a particularly promising avenue of research in writing (Pajares & Valiente, 2006).

Research in the field of composition writing has shown that writing self-efficacy plays a mediational role in writing performance (for a review see Pajares, 2003; or Klassen, 2002b). A central issue in the study of self-efficacy is calibration, which, for this research study, is considered as the degree of congruence between efficacy beliefs and actual performance, and is assessed by comparing the mean efficacy ratings with task performance (Klassen, 2002a).

It is hypothesized that optimistic estimates of one's efficacy can increase effort and persistence in tasks and promote achievement, that is, a certain degree of optimism or positive bias in one's calibration is thought to be advantageous (Bandura, 1997).

However, considerable misjudgment in the accuracy of one's beliefs about potential performance can be detrimental and create problems (Bandura, 1989). A high level of self-confidence as regards writing competence is not sufficient to produce success if the requisite knowledge and self-regulation skills are absent and this can be a potential problem in students with LD. The majority of studies that have analyzed writing self-efficacy calibration showed consistent results and revealed that students with LD were overly optimistic about their writing abilities (Graham & Harris, 1989; Graham, MacArthur, Schwartz, & Page-Voth, 1992; Graham, Schwartz, & MacArthur, 1993; Sawyer, Graham, & Harris, 1992). This elevated level of confidence in their writing competence can be negative if the necessary prerequisite writing skills are lacking. Findings from a review about students with LD's metacognitive variables and writing skills showed that they possess limited metacognitive awareness of domain-specific knowledge, skills and strategies, and procedural knowledge about how to apply, self-regulate and control them for effective and efficient writing task performance (Troia, 2002; 2006). For this reason, if there is a lack of necessary knowledge and writing skills, an overestimation of their writing self-efficacy of students with LD can be harmful, and lead to poor preparation, ineffective self-advocacy, and a lack of awareness of one's strengths and weakness (Klassen 2006; 2002a; 2002b).

Therefore, an instructional approach that fosters the self-knowledge and self-regulation functions associated with writing metacognition in students with LD would be preferable (Butler, 1998a; 1999; Meltzer, Roditi, Houser, & Perlman, 1998) to focusing on the writing self-efficacy of these students (Pajares, 1996) in order to improve the writing competence and the accuracy in the calibration of writing self-efficacy beliefs in students with LD. This is because the deficits in metacognitive knowledge and self-regulation of writing may adversely influence the accuracy in calibration (Klassen, 2002a). A cognitive and self-regulation strategy instruction which promotes a more substantive knowledge of the writing processes helps students with LD to develop a more self-regulated approach to composing. Therefore it can be a potential technique of achieve more accurate and positive writing self-efficacy beliefs in these students, and of improving their writing competence as well (for a review see Graham & Harris, 2003; or Wong, Harris, Graham, & Butler, 2003).

A considerable number of research studies have demonstrated that instruction in self-regulatory strategies increases writing self-efficacy and performance (Pajares, 2003). The influence of this kind of instruction on the writing self-efficacy of students with LD could be explained by the fact that the cognitive and self-regulation interventions share key features in their instructional pattern (Fidalgo & García, 2007) which are related to the four primary information sources of self-efficacy perceptions.

One step in the instructional pattern must be the development of the necessary background knowledge so that the learner can later develop the specific cognitive writing strategies and self-regulation procedures of writing. This will help the students to develop a substantive knowledge of writing process, and a more self-regulated approach to composing, specifically as concerns the cognitive strategies for planning and revising text. The new knowledge and writing skills help students with LD to achieve success in the writing task and raise their self-efficacy beliefs about writing according to the interpreted result of their successful performance or mastery experience.

Another key instructional technique that is important for the acquisition of self-regulation skills and strategies in writing, and encourages students to transfer their previous procedural knowledge into practice is modeling. In writing, cognitive modeling consists of an explicit representation and explanation with verbalizations of the models' thoughts and the reasons for performing the different actions during the writing process. This technique is based on Bandura's (1986) social-cognitive theory and refers to other sources of self-efficacy information, the vicarious experience of observing models perform writing tasks.

Further sources of self-efficacy information are the verbal messages and social persuasions students receive from others. Teachers' feedback about students' writing process is highly significant in writing instruction. Feedback reinforces greater effort and persistence on the task, valuing not only the performance that is the written text, but also the writing process. Positive verbal messages and social persuasions from the instructor may encourage and empower writing self-efficacy beliefs (Pajares, 2003).

The fourth source of self-efficacy information is the physiological state of the student. This is also connected to cognitive and self-regulation instruction, where the use of self-questioning or self-instructions during the writing process is common as it guides students' performance before, during, and after the writing process. This self-dialogue improves self-awareness and self-control over their thoughts and can improve the development of a positive emotional state in students through the different self-regulation processes. For example, self-motivational beliefs include a set of personal variables such as self-efficacy, outcome expectations, intrinsic interest or valuing, and goal orientation. Self-judgment concerns self-evaluating one's performance according to an evaluation criterion, such as previous performance, peer's performance, normative performance, or mastery; and attributing causal significance to the results and the process, and self-reactions that includes self-satisfaction which concerns the perceptions of satisfaction with the performance. In short, the four main sources of self-efficacy perceptions are explicitly present in cognitive and self-regulation writing instruction, which explains their direct effects in writing self-efficacy.

However, a review of the literature on the writing self-efficacy beliefs of students with LD from an instructional

point of view shows 13 intervention studies that did not report consistent results referring to self-efficacy changes. While some of them did not show changes in writing self-efficacy after intervention (García & de Caso, 2006b; Graham, Harris, & Mason, 2005; Page-Voth & Graham, 1999; Sawyer et al., 1992; Wong, Butler, Ficzero, & Kuperis, 1997), others reported significant increases in the writing self-efficacy beliefs of students with LD after intervention (Butler, 1995; García & Fidalgo, 2006; Graham & Harris, 1989; Graham et al., 1992; Nicolas, Menchetti, & Nettles, 2005; Wong, Butler, Ficzero, & Kuperis, 1996), or nearly significant increases (García & de Caso, 2006a). As for the calibration of writing self-efficacy, occasionally, instructional research studies have considered the changes in calibration of students with LD after a specific intervention program. The intervention studies by Graham and Harris (1989) and Sawyer et al. (1992) reported that students with LD overestimated their writing self-efficacy after intervention. However, the conclusions reached by the intervention program by Graham et al. (1992) showed that male students with LD became more realistic after treatment but not in female students with LD. This finding highlighted the possibility of the mediational role that gender plays in modifying the writing self-efficacy calibration in students with LD, although the size of the sample was reduced (four participants).

The relationship between gender and academic confidence has been a focus for research in the area of writing. A considerable number of research studies have concentrated on the role of gender in writing self-efficacy beliefs (Pajares, 2003; Pajares & Valiente, 2006; Pajares, Valiente, & Cheong, 2006). However, their findings have not been consistent.

Some studies have reported that girls showed higher writing self-efficacy beliefs than boys across different levels of schooling (Pajares & Valiente, 1997; Pajares et al., 2006). On the other hand, others informed that boys showed stronger writing self-efficacy than girls, in a high school sample (Pajares & Johnson, 1996). At the same time, other studies reported that there were no gender differences in writing self-efficacy across grades (Pajares, Miller, & Johnson, 1999; Pajares & Valiente, 1999; Shell, Colvin, & Bruning, 1995). Although, comparisons of students' writing ability by gender showed that girls considered themselves better writers than boys, and boys agreed with them across elementary and middle school levels (Pajares et al., 1999; Pajares & Valiente, 1999).

These conflicting findings show the complex explanation of the gender differences in self-efficacy beliefs, which could be explained by different factors: different ways of assessing self-efficacy, response bias by gender, or the beliefs about the gender orientation of task (Pajares, 2002, 2003; Pajares & Valiente, 2001). The possible gender differences in writing self-efficacy may be a function of previous success with writing (Pajares, 2002; Pajares &

Valiente, 2006). However, when previous achievement is controlled, differences favouring girls in writing self-efficacy are not significant (Pajares, 2003). Although girls score more highly than boys in writing competence, both reported equal writing self-efficacy (Pajares et al., 1999; Pajares & Valiente, 1999). In this sense, it would be interesting to analyze the differences between genders in self-efficacy calibration, that is, the degree of congruence between efficacy beliefs and performance or writing competence. Gathering data on gender differences in writing self-efficacy calibration in students with LD is interesting as they are characterized by an overestimation of their writing self-efficacy beliefs (Klassen 2002a; 2002b). It would help to further the understanding of the nature and development of self-efficacy in special populations by gender, and to continue exploring the complex role of gender in writing self-efficacy.

Therefore, the purpose of this study was to examine the effects of two types of writing cognitive strategy intervention programs in achieving a more accurate calibration of writing self-efficacy in students with LD by gender. Calibration is estimated as the degree of congruence between efficacy beliefs and actual performance, assessed by comparing mean efficacy ratings with task performance. We analyze, by gender, the effects of two writing cognitive and self-regulated instruction in writing self-efficacy, writing competence and calibration in students with LD.

Method

Participants

The participants were 121 fifth and sixth primary grade Spanish students with LD, ranging between ten and twelve years old (43 girls, 78 boys). The participants were randomly allocated to either an experimental or the comparison group. The first experimental group was formed by 48 students (19 girls, 29 boys), who were exposed to a specific program of cognitive self-regulation instruction based on the self-regulated strategy development model – SRSD (Harris & Graham, 1996). The second experimental group was formed by 31 students (15 girls, 26 boys), and they received a

specific program of cognitive self-regulation based on a social cognitive model of sequential skill acquisition (Zimmerman, 2000; 2002; Zimmerman & Kitsantas, 1999; 2002). The comparison group 32 students (9 girls, 23 boys) received the ordinary curriculum. No statistically significant differences were observed between the groups of participants, whether by age,  $\chi^2 = 11,134, p = .084$ ; by school grade,  $\chi^2 = 2,467, p = .291$ ; or by gender,  $\chi^2 = 1.13, p = .568$ . Table 1 summarizes the sample details.

All the participants were previously identified as having a writing specific learning disability (García, Fidalgo, & Arias-Gundín, 2006; Jiménez & Hernández, 1999). In order to identify the participants we carried out the following process. Firstly, the teachers carried out an initial screen which comprised an interview or questionnaire about the achievement of students with greater difficulties in writing tasks, and this opinion was confirmed by a writing achievement task. For this, every student had to accomplish a part of the EPP y FPE (Planning Processes and other Writing Psychological Factors Assessment), to assess writing proficiency –to establish that every student had a delay of at least two years in composition writing; this assessment has been used in preview studies (García & de Caso, 2007). The results confirmed that the tasks fulfill the desired psychometric properties with a high reliability ( $\alpha_{.968} = .88$ ) for internal consistency; the validity of construct, structural and of content is adequate and so, we can state that the device meets with the desired psychometric properties (Fidalgo, 2005). Furthermore, the psycho-educational teams assessed those students using IQ and aptitude tests, parents’ and teachers’ reports, observations and interviews with the students, and the students’ grades. However, because in Spain there are no specific grade tests, the psycho-educational teams determined which students really had LD without being identified as having special educational needs, a developmental disability. This was done to exclude students whose difficulties could be attributed to a physical, a psychic or a sensory disability or a lack of schooling, and as a result only students with a significant delay in writing performance, compared with their peers, were included in the study.

All of participants were Spanish natives and their socioeconomic status was largely middle class. The sample

Table 1  
Student Distribution by Group, Gender, and Level

	SRSD Intervention		SCM Intervention		Ordinary Curriculum		Total Gender	
	Male	Female	Male	Female	Male	Female	Male	Female
5 <sup>th</sup> -graders	14	4	9	6	6	1	29	11
6 <sup>th</sup> -graders	15	15	17	9	17	8	49	32
Total Gender	29	19	26	15	23	9	78	43
Total Group	48		41		32		12	

was drawn from 11 primary schools in León, in northwest Spain. The schools were closely matched to assure similarity as regards the type of school (all were state-funded Spanish primary schools), educational infrastructure, resources such as psychologists, etc.

The specific self-regulatory instruction programs were delivered by four educational psychologists (two psychologists per experimental group) who were specifically trained in the psychology of writing and their specific cognitive strategy model. Moreover, they were explicitly trained in how to apply the assessment methods and the specific intervention program in weekly sessions, carried out during the school timetable, to the same small groups. The psychologists were randomly assigned to an intervention group, counterbalanced by the schools and groups of LD students. The psychologists were blind to the aim and the design of the study

### *Instruments and Variables*

The assessment instruments were administered to the groups during the Spanish language classes prior to the experimental instruction (pre-test) and also following the experimental intervention (post-test). Students in the comparison group completed the same assessment instruments at the same time and with the same interval of time between pre and post-test as for the experimental groups.

Prior to the intervention (experimental or ordinary) and following the intervention the students wrote a compare-contrast type essay. For the baseline assessment, all the students wrote about the similarities and differences between demonstratives and possessives and at post-test they wrote about the similarities and differences between vertebrates and invertebrates. All the students were encouraged to write full prose and not just lists of ideas, and they were told to produce the best possible draft. They did not have to adhere to a strict time limit. To assure that pre and post writing tasks were similar in difficulty topics that had been dealt with in students' previous teaching in fourth and fifth grade curriculum were chosen. For all the tasks students were given reference sheets (approximately 500 words of text) providing topic information, which were matched for length and detail of content. Nevertheless, the students were free to use the reference materials and their own ideas as they wished. For pedagogic reasons the topics were not counterbalanced over the time of testing, but were matched for complexity of content and extent of coverage with previous teaching.

Before starting to write the compare contrast essay, the students completed the writing self-efficacy scale which was developed following a guide for constructing self-efficacy scales (Bandura, 2001), which asked students to provide self-judgments about their capability to successfully perform various writing skills in these writing task.

*Writing competence.* The students' writing competence was assessed using two types of writing product measures. Firstly, subjective reader-based measures were used and these refer to the instances where a rater considers an essay as a whole entity and assigns a score to indicate the degree to which the essay reflected the construct of interest. They refer to subjective aspects of the texts considered as a whole that were assessed by expert raters who show a high degree of agreement among them (Spencer & Fitzgerald, 1993). Secondly, more objective formal text-based measures were employed, where a rater specifically identified certain elements or linguistic features within the essay and then counted or combined those elements to arrive at the score. The coincidence between both approaches, the reader-based and the text-based measures, in the writing products, supports their validity, as evidenced by different types of studies in the same field (see the example of the Spencer & Fitzgerald study, 1993).

*Text-based measures.* This type of measure included productivity, coherence and structure measures, which have been used in previous studies (Fidalgo, Torrance, & García, in press; Torrance, Fidalgo, & García, 2007).

Productivity concerns the quantity of text that is produced for each task. It was measured by the number of words and number of sentences. Coherence covered the tally of seven different linguistic indicators of referential or relational coherence (Haliday & Hassan, 1976; Sanders, Spooren, & Noordman, 1992) whose function it is to tie together the different components of the text (sentences or paragraphs). Referential coherence includes two types of ties: namely anaphoric and lexical. Relational coherence covers five types of linguistic indicators based on a classification by Bosque and Demonte (1999): meta-structural, structural, connective, reformulation, and finally, argumentational ties (see Table 2). Scores for these various coherence measures were all based on the counts of these linguistic markers: referential coherence (anaphoric and lexical ties); relational coherence (meta-structural, 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 involved recording whether the text included the three main parts of text: introduction, main body and conclusion.

*Reader-based measures.* This assessment was based on the measures for structure, coherence, and general quality described by Spencer and Fitzgerald (1993). This approach has been used in previous studies with very high agreement among raters –for examples from .83 to .91 depending on measures- and also with different languages as English, Spanish, etc., (Fidalgo et al., in press; Torrance et al., 2007). The distinction among the three parameters, structure, coherence and quality has to be considered as a whole, and no individual indicator can be counted independently of the

Table 2  
*Different Types of Linguistic Coherence Indicators*

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

others within each of three parameters, therefore only a unique total score for each ones is found.

As concerns the measures of structure, they were assessed using a four point scale from 1 (unstructured) to 4 (well structured). The ratings were based on the extent to which readers perceived that the text included six features: (a) background information introducing the text, (b) cues indicating text structure, (c) an introductory topic or thesis sentence, (d) clear organization 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.

With regard to the measures of coherence, they were also assessed on a four point scale, from 1 (incoherent) to 4 (very coherent) with ratings based on the extent to which the reader perceived seven features in the text: (a) a topic or theme that was identified and remained a focus throughout the essay, (b) a topic was extended without digression; (c) the text included a context that orientated the reader, (d) the information was organized in a discernible pattern which was sustained throughout the text, (e) the sentences and paragraphs were cohesively tied, (f) the discourse flowed smoothly, and (g) a conclusion that completed the text.

A six point scale was employed for the measure of quality, from 1 (difficult to understand) to 6 (excellent) with ratings based on the extent to which the text demonstrated seven characteristics: (a) a clear sequence of ideas, (b) with

little or no irrelevant detail, (c) clear organization, (d) 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). Table 3 summarizes the descriptive information about each reader-based measure.

*Writing Self-efficacy.* We measured writing self-efficacy by asking students to provide self-judgments of their capability to successfully perform various writing skills in a writing task according to their academic level. The writing self-efficacy scale consisted of eight items asking students how certain they were that they could perform specific writing skills on a scale from 1 to 9. The skills listed were substantial writing skills, such as, quality of text, generation of numerous good ideas, writing a text that the audience understands; and mechanical skills, such as, spelling and punctuation; and a total writing self-efficacy belief that gives the total of the questionnaire. The questionnaire demonstrated an adequate reliability (Cronbach  $\alpha_{121} = .876$ ; and standardized  $\alpha_{121} = .931$ ) for all the samples in this study; both for the total of the scale, and for each of the measurements (Cronbach  $\alpha$  from .838 to .880). Similarly, the validity of constructs is assured, as every item is adapted from Bandura's guide for constructing self-efficacy scales (Bandura, 2001).

Table 3  
*Descriptive Criteria of Reader-Based Measures of Comparative-Contrast Essays*

Measure and Scores range	Procedure used
Structure (1 -4)	<ul style="list-style-type: none"> <li>• The rater considered the presence and development of six characteristics:               <ul style="list-style-type: none"> <li>– Background information to present the text.</li> <li>– Structural cues</li> <li>– An introduction: a topic or thesis sentence which establishes the general comparison-contrast.</li> <li>– Clearly developed organization either whole by whole or part by part or likenesses-differences.</li> <li>– Unity within individual paragraphs and in the case of a theme within the entire paper.</li> <li>– A conclusion which reiterates the purpose of the paper, to show comparisons or contrasts or both</li> </ul> </li> </ul>
Coherence (1 – 4)	<ul style="list-style-type: none"> <li>• The rater considered the presence and development of seven characteristics:               <ul style="list-style-type: none"> <li>– Identification of the topic or theme</li> <li>– The extension of the topic or theme without digressions</li> <li>– A context which orients the reader</li> <li>– The organization of details in a discernible plan which is sustained through the text.</li> <li>– Cohesive ties linking sentences and / or paragraphs together</li> <li>– Discourse which flows smoothly</li> <li>– Conclusion statement creating a sense of closure.</li> </ul> </li> </ul>
Quality (1 – 6)	<ul style="list-style-type: none"> <li>• The rater considered the presence and development of seven characteristics:               <ul style="list-style-type: none"> <li>– Clear sequence of ideas</li> <li>– Text development with little or no irrelevant ideas.</li> <li>– Good organization</li> <li>– Fresh, vigorous word choice.</li> <li>– Variety of interesting details</li> <li>– Correct sentence structure</li> <li>– Correct punctuation, capitalization and spelling</li> </ul> </li> </ul>

### *Training*

Two specific instructional programs focusing on cognitive self-regulation strategies in writing were implemented. One of them was based on the self-regulated strategy development - SRSD model (Harris & Graham, 1996) and the other was based on the social cognitive model of sequential skill acquisition - SCM (Zimmerman, 2000; 2002; Zimmerman & Kitsantas, 2002). Both instructional programs shared the same objective features, such as duration, comprising 25 sessions; frequency, at least 3 times a week, lasting approximately 1 hour each. Both comprised specific features of instruction and a pattern of intervention, which are analyzed below.

*Instructional program based on self-regulated strategy development model.* This program was based on the self-regulated strategy development model developed by Graham and Harris, which has been widely used to teach writing strategies and self-regulation procedures to students with LD (see Graham, 2006; Graham & Harris, 2003 for a review).

This instructional program followed six general stages of training. Stage 1; Develop and activate background knowledge, during this stage students' background

knowledge, prior knowledge and any pre-skills are developed, because they are essential to understand and execute the subsequent stages correctly. Stage 2; Strategy goals and significance, in this stage the instructor and students discuss the writing strategy to be learned, its purpose, benefits, importance, the steps it comprises, 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 the strategy, during this stage, the instructor models the specific strategy by thinking aloud. During this modeling exercise, 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, during this stage, students memorize and automate the steps of the specific writing strategy and some self-statements from their personal list of self-regulation, sometimes by means of mnemonic rules and charts or a self-regulatory list. Stage 5; Collaborative practice, at this stage both the 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 was faded out at an appropriate pace for individual students until an effective use of the strategies was achieved and 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.

According to this instructional pattern, two specific writing strategies for planning and writing comparative-contrast essays and revising were implemented. The specific writing strategy for planning and writing comparative-contrast essays was POD+THE VOWELS that comprised three general steps for planning and writing a text: POD: P. = Pick ideas; O. = Organize your ideas following the vowels; D. = Develop your text; based on the POW strategy used in previous studies by Mason, Harris and Graham (2002). In addition, five specific steps for planning the text were developed specifically for the purposes of this study. The mnemonic VOWELS (O+A+I+U+E) is 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 serve 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 the similarities and differences of the themes; U. = United ideas, organization of the ideas in similarities vs., differences, and the hierarchical structure of the main and secondary ideas; E. = Essay draft, to develop the text. Furthermore, the specific writing strategy for revising the text was RED, which was developed specifically for this instructional program. The acronym highlights the three steps of the revision process: R. = Read 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; and D. = Do necessary changes.

Table 4 summarizes this instructional program. It includes the number of sessions, the stages, and the organization of the instructional focus.

*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 it, students can acquire new writing skills optimally in four sequential levels: observation, emulation, self-control and self-regulation (Schunk & Zimmerman, 1997; Zimmerman, 2000; 2002).

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

Table 4  
*Summary of the Instructional Program Based on the Self-Regulated Strategy Development Model*

Instructional stage	Session	Instructional focus
Develop background knowledge	1 <sup>st</sup> - 3 <sup>rd</sup>	Writing process, writing products; types of texts; self-regulation procedures.
	13 <sup>th</sup>	Knowledge of the planning process. Knowledge of the revision process: mechanical and substantive revision
Presentation of strategy	4 <sup>th</sup>	Planning strategy (POD + OAIUE)
	14 <sup>th</sup>	Revision strategy RED
Modeling of strategy	5 <sup>th</sup> - 6 <sup>th</sup>	Mastery model of the planning strategy POD + OAIUE
	15 <sup>th</sup> - 16 <sup>th</sup>	Mastery model of the revision strategy LEA Explicit self-regulation
Memorization of strategy	7 <sup>th</sup>	Steps of the planning strategy POD + OAIUE
	17 <sup>th</sup>	Steps of the revision strategy RED Individualization of self-regulation
Collaborative practice	8 <sup>th</sup> - 10 <sup>th</sup>	Planning the process of writing
	18 <sup>th</sup> - 20 <sup>th</sup>	Revising the process of writing
Independent practice	11 <sup>th</sup> - 12 <sup>th</sup>	Planning process
	21 <sup>st</sup> - 22 <sup>nd</sup>	Revision process, self-regulation
Maintenance and Generalization	23 <sup>rd</sup> - 25 <sup>th</sup>	Writing process, self-regulation



instructor modeled how to perform the writing process by thinking aloud whilst doing it. The thinking aloud strategy was partly spontaneous, but also included specific self-regulatory statements that the instructors had previously been trained to incorporate, corresponding with the three cyclical phases of self-regulation (Zimmerman, 2000). These phases are: (a) the forethought phase that refers to the influential processes that precede efforts to act and set the stage for it; (b) performance or volitional control that involves the self-regulation processes that occur during the motoric efforts and affects attention and action; (c) the self-reflection that phase involves those processes that occur after the performance and influences forethought regarding subsequent motoric efforts. At this level, two types of modeling were developed: a coping model that considered one or more key errors in the process of writing, but with prompt correction of these errors. Also, a mastery model was developed and executed during the writing process without errors throughout the modeling episode (Zimmerman & Kitsantas, 2002).

The second level covered emulation, students learned to emulate a model's performance that had been previously developed. Students worked in pairs during this level, using a cognitive model that incorporated modeled explanations and demonstrations with verbalization of the model's

thoughts and reasons for performing actions. This modeling was based on the exemplary performances implemented by the instructor in the previous sessions. The students changed roles to play both observer and model. This emulative performance experience provides aspiring writers with behavioral and social feedback to refine their performance and to develop the 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 the outcomes, that is to say, the quality of the 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 themselves in the previous sessions.

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. To accomplish this level, students shift their attention from the modeled processes to performance outcomes (Zimmerman & Kitsantas, 2002).

Table 5 summarizes this instructional program; including the number of sessions, stages, and the organization of instructional focus.

Table 5  
*Summary of the Instructional Program Based on the Social Cognitive Model of Sequential Skill Acquisition*

Instructional Level	Session	Instructional focus
Develop prior knowledge	1 <sup>st</sup> - 3 <sup>rd</sup>	Writing functionality; importance of writing; writing products, types of texts, self-regulation strategies; writing process.
	4 <sup>th</sup>	Planning the process of writing
	10 <sup>th</sup>	Editing process: coherence, structure
	16 <sup>th</sup>	Revision process: mechanical & substantive
Observation level	5 <sup>th</sup> - 6 <sup>th</sup>	Coping and mastery model: Planning process
	11 <sup>th</sup> - 12 <sup>th</sup>	Editing process
	17 <sup>th</sup> - 18 <sup>th</sup>	Revision process
	22 <sup>nd</sup>	Writing process
Emulation level	7 <sup>th</sup>	Emulation, working in pairs: Planning process
	13 <sup>th</sup>	Editing process
	19 <sup>th</sup>	Revision process
	23 <sup>rd</sup>	Writing process
Self-control & self-regulation levels	8 <sup>th</sup> - 9 <sup>th</sup>	Individual performance Planning process
	14 <sup>th</sup> - 15 <sup>th</sup>	Editing process
	20 <sup>th</sup> - 21 <sup>st</sup>	Revision process
	24 <sup>th</sup>	Writing process

In order to understand the similarities and differences between both types of experimental instruction program, and their possible effects in writing self-efficacy Table 6 analyzes the different features of both instructional programs related to the four main sources of experience that influence self-efficacy: enactive experiences, vicarious experiences, verbal persuasion and physiological reactions, which are summarized in Table 6. The first type of influence on self-efficacy concerns enactive writing attainments. In the instructional programs, enactive experiences refer to the number of well-written texts by students, where students achieved the performance outcomes individually or in pairs, given that the outcomes were interpreted as successfully improved self-efficacy. Another source of self-efficacy beliefs comprises vicarious experience. From this point of view, in order to facilitate improvements on writing self-efficacy, students of both experimental groups observed different types of cognitive modeling of the writing processes. Vicarious influences depend on different factors, which vary with the instructional programs, such as, the similarities between the model and observer, the observer's self-comparison with the model, the observer's judgments about outcomes, or the type of cognitive modeling, either mastery or coping modeling. The third source of writing

self-efficacy is verbal persuasion which refers to the instructor or peer feedback about the students' writing process or products. Its effectiveness on students' self-efficacy depends on the credibility and perceived value or knowledge of the persuader. Finally, the fourth source of self-efficacy concerns the students' perceived physiological reactions to the writing tasks. In relation to this source, the instructional programs include the training of explicit self-statements about positive motivational beliefs that includes a set of personal variables such as outcome expectations, intrinsic interest or valuing, and goal orientation, and about self-reflective processes such as, positive self-judgment and self-reactions, such as, the perception of satisfaction, positive emotions, etc. Moreover, in order to facilitate the improvement in writing self-efficacy both instructional programs included specific training in the metacognitive knowledge of writing and the self-regulation of writing, because the gaps in both metacognitive dimensions could be related to the miscalibration of students' writing self-efficacy.

*Ordinary curriculum.* Students from the comparison group followed the ordinary curriculum in their everyday settings. In Spain, there is a normative curriculum design that sets the objectives, content and methodological rules

**Table 6**  
*Summary of the Experimental Interventions' Features Related to the Instructional and Social Influences on Self-Efficacy Beliefs*

Instructional Features Influential Self-efficacy	SRSD Intervention	SCM Intervention
Meta-cognitive knowledge of writing	8 instructional sessions	6 instructional sessions
Self-regulation of writing	Different types of self-regulation procedures Self-questioning and self-speech Specific writing strategies of planning and revising	Different types of self-regulation procedures Self-questioning and self-speech
Enactive experiences	7 texts were written correctly by students. 3 texts were written individually 4 texts were written in collaboration	5 texts were written correctly by students 3 texts were written individually 2 texts were written in collaboration by peers
Vicarious experiences	3 texts were written by instructor Mastery model (5 sessions)  Instructor as model (5 sessions)	2 texts were written by instructor Mastery model (4 sessions) Coping model (3 sessions) Instructor as model (7 sessions) Peers as models, collaboration (4 sessions)
Verbal persuasion	Instructor's feedback (12 sessions)	Instructor's feedback (7 sessions) Peers' feedback (4 sessions)
Physiological reactions	Self-instructions such as self-evaluating; self-reinforcement. Individual self-instructions	Self-instructions such as self-evaluating; self-reinforcement. General self-instructions

for all subjects. For this reason, the language curriculum is similar in schools. In general, ordinary instruction could be summed up as follows. 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 mistakes in organization, spelling, grammar, or handwriting.

### Procedure

The intervention study was carried out during the second term of 2003/04. The experimental students received the training program 3 times a week in groups of 6 to 8 students. They received 25 sessions in all, each lasting approximately 1 hour each.

Prior to commencing the program, students of both the experimental and comparison groups were tested during the same week in composition writing and writing self-efficacy. Then, the program was delivered, while students of the comparison group continued with their ordinary lessons over this period of time. Finally, students from the comparison and experimental groups were tested during the same week in the same way as prior to the program. We monitored the implementation of instructional programs and assessment to ensure a correct realisation of the program. We had weekly meeting with the instructors and we interviewed them individually about their practice and experience from the

previous week, and trained them for the sessions for the following week. Moreover, we collected all the materials and checked the students' portfolios that were generated during the program to ensure that all students had appropriately completed all the tasks.

## Results

### *Results of the Differences in Writing Self-Efficacy and Written Product Measures by Gender*

Firstly, we carried out a multivariate lineal analysis of the product measurements and the self-efficacy measurements in pre and post test by gender. With the aim of controlling for the differences in variability, potentially linked to ceiling or floor effects, we standardized every variable introduced in the analysis. We compared the boys and girls at pre-test, and then at post-test. The results of the multivariate lineal analysis showed that there were no significant differences in any variable, or in self-efficacy or in writing products.

Table 7 provides the ratings for the writing self-efficacy and text and reader-based measurements for the pre and post-test results by gender.

### *Results in Changes of Writing Self-Efficacy Calibration by Gender*

Subsequently, in order to analyze the calibration of writing efficacy beliefs with the subsequent performance in writing tasks, we carried out a lineal regression analysis of writing self-efficacy measurements predicting writing

Table 7  
*Mean and Standard Deviation Measures for Writing Self-Efficacy, Reader- and Text-Based Measures of Texts in Pre- and Post-Test by Gender*

	Pretest				Post-test			
	Girls ( <i>n</i> = 39)		Boys ( <i>n</i> = 72)		Girls ( <i>n</i> = 39)		Boys ( <i>n</i> = 72)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Writing self-efficacy	48.37	12.02	42.85	12.02	53.79	11.68	50.61	13.07
Text-based Measures								
Nr. Paragraphs	2.56	1.76	1.77	1.06	3.28	1.37	3.03	1.39
Nr. Sentences	3.84	2.43	3.13	2.07	5.33	2.14	4.75	2.45
Nr. Words	56.49	22.29	46.46	21.89	83.03	30.17	69.57	32.82
Referential Coherence	6.14	4.96	4.55	4.28	11.87	4.19	9.95	5.81
Relational Coherence	3.47	2.35	2.54	2.23	9.28	5.49	7.5	4.99
Total Coherence	9.6	6.51	7.09	5.56	21.15	8.53	16.42	10.33
Total Structure	1	.57	.92	.41	2.33	.95	2.21	1.03
Reader-based Measures								
Quality	1.84	.84	1.64	.82	3.41	1.31	2.96	1.25
Coherence	1.86	.83	1.69	.74	3.15	.9	2.81	1
Structure	1.56	.62	1.45	.59	3.18	1.07	2.94	1.13

competence through the text and reader-based measurements in the pre and post-test assessment of the both groups overall by gender. This statistical analysis showed significant results for gender and for time (pre and post-test assessment).

*Text-based measures.* In the pre-test scores, the writing self-efficacy measurements of the girls only predicted significantly referential and total coherence of text-based measures (See Table 8). As for the writing self-efficacy measures of the boys, they did not significantly predict any text-based measure of composition writing.

However, after the intervention program the prediction of writing self-efficacy measures of girls improved

significantly. At post-test, all the text-based measures were significantly predicted in all the writing self-efficacy measures for the girls, as Table 8 illustrates.

It is not possible to confirm the same clarity in the tendency of accuracy of the writing self-efficacy beliefs in boys after instruction. Only the number of words were predicted,  $F(8, 30) = 2.903, p = .008$ , and, although the prediction was statistically significant it showed a low prediction coefficient ( $R^2$  corrected = .177).

*Reader-based measures.* In the pre-test assessment, no reader-based measures were significantly predicted by writing self-efficacy in girls or boys.

Table 8  
*Results of the Lineal Regression Analyses for the Writing Self-Efficacy Measures Predicting Writing Competence through Text-Based Measures in Pre and Post-Test Assessment by Gender (Girls) in Comparison and Experimental Groups Overall*

Predicted variables of text-based measures of written composition	Predicting variables of writing self-efficacy				$\beta$	<i>t</i>	<i>p</i>
	$R^2$ corrected	<i>F</i> (8, 30)	<i>p</i>				
Total Coherence – Pre	.205	2.354	.039				
Referential Coherence – Pre	.214	2.426	.034				
Total Productivity – Post	.273	2.785	.020	Total of writing self-efficacy	5.738	3.452	.002
				Item 1a self-efficacy on substantive skills	-1.185	-2.371	.024
				Item 3a self-efficacy on substantive skills	-.900	-2.712	.011
				Item 4a self-efficacy on substantive skills	-.690	-2.030	.051
				Item 3d self-efficacy on substantive skills	-1.359	-3.388	.002
				Item 4d self-efficacy on substantive skills	-1.445	-3.337	.002
Productivity- Nr. paragraphs – Post	.291	2.947	.015	Total of writing self-efficacy	3.375	2.056	.049
				Item 4d self-efficacy on substantive skills	-1.126	2.632	.013
Total Coherence – Post	.265	2.711	.022	Total of writing self-efficacy	4.551	2.723	.011
				Item 1a self-efficacy on substantive skills	-.985	-1.960	.059
				Item 3a self-efficacy on substantive skills	-.705	-2.113	.043
				Item 3d self-efficacy on substantive skills	-1.103	-2.734	.010
				Item 4d self-efficacy on substantive skills	-1.098	-2.522	.017
Referential Coherence – Post	.182	2.059	.073	Total of writing self-efficacy	3.974	2.255	.032
				Item 3d self-efficacy on substantive skills	-1.101	2.588	.015
				Item 4d self-efficacy on substantive skills	-1.014	2.207	.035
Relational Coherence – Post	.195	2.151	.062	Total of writing self-efficacy	4.033	2.306	.028
				Item 3a self-efficacy on substantive skills	-.700	2.003	.054
				Item 3d self-efficacy on substantive skills	.872	2.066	.048
				Item 4d self-efficacy on substantive skills	-.931	2.044	.050
Structure – Post	.294	2.978	.014	Total of writing self-efficacy	4.727	2.886	.007
				Item 1a self-efficacy on substantive skills	-1.036	-2.104	.044
				Item 3a self-efficacy on substantive skills	-.885	-2.707	.011
				Item 3d self-efficacy on substantive skills	-.915	-2.313	.028
				Item 4d self-efficacy on substantive skills	-1.099	-2.577	.015

*Note.* Predicting variables included in the regression model were the total measures and all the individual items of writing self-efficacy measures, we only the included statistically significant or nearly significant results from the regression analysis model.

However, in relation to the reader-based measures in the post-test assessment all the reader-based measures in girls, that is, quality, coherence and structure, were significantly predicted by all the writing self-efficacy measures (see Table 9). On the contrary, none of the reader-based measures were significantly predicted by the boys' writing self-efficacy measures in post-test assessment.

In general, these results suggest that after instruction there was a certain tendency in girls to be more accurate as regards their writing self-efficacy beliefs according to their writing competence. In order to explore the differential effects of the intervention programs in the calibration of writing self-efficacy in girls, we also carried out additional statistical analysis.

#### *Results of Changes in Writing Self-Efficacy and Written Product Measures by Group and Time in the Sub-Sample of Girls*

We carried out a multivariate lineal analysis of the writing self-efficacy and the writing product measures in the pre and post test by control and both experimental groups in the sub-sample of girls. We did not present a multivariate analysis pre-post with the boys sample alone

because when we carried out the prediction (lineal regression analysis) of writing from the self-efficacy, we do not find any predicted writing measure of the text (except productivity) nor of the reader measures with the boys sample alone. And the same is true for the whole sample, where we found, in general, no statistical significant differences (García & Fidalgo, 2006).

Table 10 shows the significant or nearly significant changes in pre and post assessment on the total writing self-efficacy and all the written product measurements between the girls by group (both experimental and comparison groups).

*Writing self-efficacy measures.* The results showed a tendency for greater writing self-efficacy measures in the post results for the two experimental groups (SRSD,  $M_{pre} = 52.84$ ,  $M_{post} = 57.36$ , SCM,  $M_{pre} = 43.69$ ,  $M_{post} = 53.84$ ), but not for the comparison group ( $M_{pre} = 44.14$ ,  $M_{post} = 44$ ) with nearly significant difference between them ( $p = .073$ ;  $\eta^2 = .135$ ). Specifically, post hoc analysis showed a nearly significant higher increase in the girls' writing self-efficacy in the SRSD experimental group than in the comparison group ( $p = .06$ ).

*Text-based measures.* Statistically reliable differences between the pre and post text-based measures were found for the two experimental conditions but not for the comparison

Table 9

*Results of the Lineal Regression Analyses for the Writing Self-Efficacy Measures Predicting Writing Competence through Reader-Based Measures in Pre- and Post-Test Assessment by Gender (Girls) in Comparison and Experimental Groups Overall*

Predicted variables of text-based measures of written composition	Predicting variables of writing self-efficacy				$\beta$	$t$	$p$
	$R^2$ corrected	$F(8, 30)$	$p$				
Quality – Post	.223	2.365	.042	Total of writing self-efficacy	5.563	3.238	.003
				Item 1a self-efficacy on substantive skills	-1.500	-2.902	.007
				Item 2a self-efficacy on mechanical skills	-.635	-2.077	.046
				Item 3a self-efficacy on substantive skills	-.844	-2.461	.020
				Item 3d self-efficacy on substantive skills	-1.202	-2.900	.007
				Item 4d self-efficacy on substantive skills	-1.334	-2.981	.006
Coherence – Post	.238	2.484	.034	Total of writing self-efficacy	5.642	3.316	.002
				Item 1a self-efficacy on substantive skills	-1.550	-3.029	.005
				Item 3a self-efficacy on substantive skills	-.729	-2.145	.040
				Item 2d self-efficacy on mechanical skills	-.776	-2.107	.044
				Item 3d self-efficacy on substantive skills	-1.241	-3.022	.005
				Item 4d self-efficacy on substantive skills	-1.273	-2.872	.007
Structure – Post	.282	2.867	.017	Total of writing self-efficacy	6.158	3.728	.001
				Item 1a self-efficacy on substantive skills	-1.674	-3.371	.002
				Item 3a self-efficacy on substantive skills	-.829	-2.512	.018
				Item 4a self-efficacy on substantive skills	-.799	-2.367	.025
				Item 2d self-efficacy on mechanical skills	-.773	-2.163	.039
				Item 3d self-efficacy on substantive skills	-1.263	-3.169	.004
Item 4d self-efficacy on substantive skills	-1.374	-3.194	.003				

*Note.* Predicting variables included in the regression model were the total measures and all the individual items of writing self-efficacy measures, we only the included statistically significant or nearly significant results from the regression analysis model.

Table 10

Results of the Multivariate Linear Analysis for the Written Product and Writing Self-Efficacy Measures in Pre- and Post-Test by Groups in the Female Gender Sub-Sample

	SRSD group (n = 19)				SCM group (n = 13)				Comparison group (n = 7)				BA - Time			BA - Time × Group			
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	F <sub>(1, 36)</sub>	p	η <sup>2</sup>	F <sub>(2, 36)</sub>	p	η <sup>2</sup>	
Writing self-efficacy	52.84	8.3	57.36	7.09	43.69	12.88	53.84	12.66	44.14	17.92	44	15.49	8.354	.006	.188	2.812	.073**	.135	
Text- based Measures																			
Nr. Words	57.58	28	89.11	23.65	50.53	17.3	77.53	46.28	64.11	13.59	42.44	27.71	5.668	.022	.124	9.047	.001	.311	
Relational Coherence	2.79	2.22	12.79	2.89	3.67	2.05	7.07	5.71	4.56	2.83	1.44	1.74	35.034	<.001	.467	42.152	<.001	.678	
Density Total Coherence	14.64	8.03	29.06	4.89	16.56	6.01	23.16	3.96	19.92	8.95	20.89	4.89	20.591	<.001	.364	6.245	.005	.258	
Total Structure	.89	.31	3	.0	1.27	.79	1.73	1.22	.78	.44	.89	.60	51.194	<.001	.561	27.861	<.001	.582	
Reader- based Measures																			
Quality	1.79	.78	4.11	.87	1.46	.66	3.23	1.42	2.43	1.13	1.86	.37	26.260	<.001	.422	12.488	<.001	.410	
Coherence	1.68	.74	3.53	.61	1.77	.92	3.23	.92	2.29	.95	2	.57	32.368	<.001	.473	11.366	<.001	.387	
Structure	1.37	.59	3.84	.37	1.54	.51	3	1.07	1.86	.69	1.71	.48	54.577	<.001	.603	18.526	<.001	.507	

Note. \* These measures did not show statistically significant results ( $p < .05$ ); \*\* these measures showed nearly significant results;  $\eta^2$  (eta-squared statistic) = Estimates of effect size. The Cohen (1988) rule states that = .01 - .06 (small effect); > .06 - .14 (medium effect); > .14 (large effect).

group. A statistically reliable improvement in text-based measures with a large effect size was found for the two experimental groups, but not for the comparison group as regards the total indicators of productivity (number of words),  $F(2, 36) = 9.047, p < .001, \eta^2 = .311$ ; and relational coherence,  $F(2, 36) = 42.152, p < .000, \eta^2 = .678$ . Also, the increase of density of coherence,  $F(2, 36) = 6.245, p < .005, \eta^2 = .258$ ; and total structure measures,  $F(2, 36) = 27.861, p < .000, \eta^2 = .582$ , was larger for both experimental groups than it was for the comparison group.

The post hoc analysis showed that girls in the experimental groups (SRSD and SCM) yielded significantly higher increases than the comparison group in the structural text-based measures ( $p = .000, p = .022$ , respectively). As

for relational coherence the SRSD group yielded significantly higher scores than the comparison group ( $p = .000$ ), and the SCM group ( $p = .044$ ).

*Reader-based measures.* In all the reader-based writing measures, statistically reliable differences between the pre and post reader measures were found for the two experimental groups, but not for the comparison group as concerns quality,  $F(2, 36) = 12.488, p < .000, \eta^2 = .41$ ; coherence,  $F(2, 36) = 11.366, p < .000, \eta^2 = .387$ ; and structure,  $F(2, 36) = 18.526, p < .000, \eta^2 = .507$ . The results showed substantially significant improvement in all the reader-based measures for both experimental groups, but not for the comparison one, showing a large effect size. Specifically, the post hoc analysis showed statistically

Table 11

Results of the Linear Regression Analyses for the Writing Self-Efficacy Measures Predicting Writing Competence through Reader-Based Measures in Post-Test Assessment by Gender (Girls) and by Groups (Comparison and Experimental SRSD and SCM)

Predicted variables of text-based measures of written composition	Predicting variables of writing self-efficacy						
	R <sup>2</sup> corrected	F(8, 10)	p	β	t	p	
Quality – Post – SRSD	.634	4.896	.011	Total of writing self-efficacy	-4.142	2.889	.016
				Item 3a self-efficacy on substantive skills	1.054	3.129	.011
				Item 4a self-efficacy on substantive skills	.803	2.178	.054
				Item 1d self-efficacy on substantive skills	2.099	4.435	.001
				Item 2d self-efficacy on mechanical skills	1.528	3.904	.003
Coherence – Post – SRSD	.628	4.795	.012	Total of writing self-efficacy	-3.860	2.671	.023
				Item 3a self-efficacy on substantive skills	1.194	3.515	.006
				Item 1d self-efficacy on substantive skills	1.939	4.064	.002
				Item 2d self-efficacy on mechanical skills	.893	2.262	.047

Note. Predicting variables included in the regression model were the total measures and all the individual items of writing self-efficacy measures, we only included the statistically significant or nearly significant results from the regression analysis model.

significant higher scores for the SRSD experimental group than for the comparison group for quality ( $p = .034$ ) and structure ( $p = .001$ ) reader-based measures. Furthermore, the results of the post hoc analysis gave nearly significant higher scores in the quality measurement of the SRSD group than the SCM experimental group ( $p = .055$ ).

### *Results in Changes of Writing Self-Efficacy Calibration in Girls by Group*

As for the calibration of writing self-efficacy measures in girls by group, we carried out a lineal regression analysis of writing self-efficacy measures predicting writing competence through the text and reader-based measures in the post-test assessment in girls by group (SRSD experimental group, SCM experimental group, Ordinary curriculum group). The results did not show such a clear tendency by group.

We only obtained statistically significant differences in the prediction of writing self-efficacy by group in the reader-based measures (quality, coherence, and structure). Table 11 summarizes these results. Our analysis showed that it was the girls from the experimental group following the SRSD instruction program, who improved in the accuracy of their writing self-efficacy beliefs. All the reader-based measures were significantly predicted by all writing self-efficacy measures for the girls in the SRSD experimental group.

## Discussion

The main objective of this research was to study the role of gender on the writing self-efficacy calibration of students with LD. Also, we aimed to analyze the different effects of two types of cognitive strategy instructions on changes in writing self-efficacy calibration of students with LD considering gender as a modulating variable of the effects on calibration. The obtained results suggest several findings.

In the pre-test assessment, both genders of students with LD showed inaccuracy in their estimation of their writing competence that reflects a miscalibration of their writing self-efficacy beliefs. These results were in keeping with previous studies about the calibration of the writing self-efficacy beliefs of students with LD which have reported that students with LD overestimate their ability to complete specific writing task (Klassen, 2002a; 2002b).

However, after instruction, whilst boys continued to show the same misjudgement in their writing self-efficacy, girls demonstrated significant improvement in the precision of their estimation of writing competence. The regression analysis results of the post-test data showed that all the written product measures were significantly predicted by writing self-efficacy beliefs in the sub-sample of girls.

These different results by gender seem to suggest that writing instruction affects writing self-efficacy calibration in a different manner depending on gender. Perhaps, this modulating variable, which has been overlooked in intervention studies, could shed some light on the contradictory findings revised previously about the incidence of cognitive and self-regulated instruction in writing self-efficacy of students with LD.

Nevertheless, the findings about the role of gender in changes of writing self-efficacy or calibration must be carefully considered, because other possible variables than the modulation of gender in the instructional effects could explain the differences in the estimation of writing competence in male and female students. For example, an alternative explanation could be the different response bias between boys and girls (Pajares, 2003). Previous research studies have reported that boys and girls may follow different response trends. Boys tend to be more self-congratulatory in their responses, whereas girls tend to be more modest (Wigfield, Eccles, & Pintrich, 1996). Perhaps in accordance with the boys' congratulatory trend, they manifested at post-test a higher overestimation in their competence, more in agreement to what would be expected from a specific instructional training. And this bias supposed a miscalibration in boys' writing self-efficacy contrary to the girls' response bias which followed a modest trend as regards answering, which could have supposed a more accurate calibration in their writing self-efficacy than boys. Another possible modulation variable of the different changes in writing self-efficacy for girls and boys could have been the instructors' gender itself. The effectiveness of cognitive modeling for the development of self-regulation and self-efficacy in observers depends on the perceived similarity between the person modeling and the observer. With this in mind, and considering that most of instructors in this research were females (only one male), it may be that this fact could have increased the modeling effects on girls' self-efficacy, as they viewed themselves more comparable and similar to the models and consequently the same was not true for the boys' self-efficacy.

Nevertheless, in general, the findings of this research suggest that it is important to consider gender in writing instruction and in assessment of its efficacy in relation to the calibration of writing self-efficacy beliefs of students with LD. However, the conclusions about gender differences in writing self-efficacy calibration should be carefully noted. This is because self-efficacy is a context-specific belief about the capability to successfully complete a task. Its task-specific nature could give rise to the different gender differences in the calibration of writing self-efficacy that would not have existed if the assessment in a writing task had been different to the compare-contrast task instructed. Moreover, these gender differences may change in relation to age as well (Pajares et al., 2006). Research studies in the normally

achieving population have typically found that, from an early age, girls claim to have greater confidence in their writing capabilities than boys do (Crain, 1996; Eccles, Wigfield, Harold, & Blumenfeld, 1993). This tendency remains throughout middle school (Pajares & Valiente, 1997; 2001; Pajares et al., 1999). However, these gender differences reverse, as students get older, with boys show stronger writing self-efficacy than girls do in the higher school grades (Pajares & Johnson, 1996). Nevertheless, these findings are reported for the normally achieving population. It would be necessary to develop additional studies which focus on writing self-efficacy beliefs in students with LD (Klassen, 2002a). With this in mind, it is suggested that future research could include longitudinal or cross-sectional studies to investigate the developmental changes in self-efficacy of students with LD, that include a sufficient number of LD students of both genders to study any differences in the development of writing self-efficacy. A further suggestion could include studies that focus on the calibration of writing self-efficacy beliefs of LD students from developmental perspectives.

On the other hand, as for the different effects of the two types of intervention program which aim to achieve a more accurate calibration of writing self-efficacy in girls with LD, the results suggested that the specific self-regulation instruction based on the Self-Regulated Strategy Development Model was more effective in improving the calibration of writing self-efficacy in girls with LD than the others. All the reader-based measures were significantly predicted by all the writing self-efficacy measures of the girls in the SRSD experimental group versus the others. In this sense, if we consider the comparative analysis of the SRSD and SCM instructional programs based on the influential sources of efficacy (see Table 6), the higher incidence of SRSD instruction in girls' writing self-efficacy calibration could be explained by the fact that this instructional program included a greater number of instructional influences on self-efficacy beliefs than the SCM instructional program. The SRSD instructional program included more instructional sessions about metacognitive knowledge of writing and specific cognitive writing strategies. Furthermore, the students in the SRSD group had a greater number of enactive and vicarious experiences than those from the SCM group, and they received more verbal persuasion from the instructors. It is considered that some of these different types of sources of writing self-efficacy beliefs, such as, mastery experience and social persuasion have a greater influence on girls' self-efficacy (see Usher & Pajares, 2006).

On the other hand, other sources of self-efficacy such as individual physiological reactions or the specific self-regulation writing procedures (self-questioning and self-speech) were similar in the SRSD and SCM instructional programs. But, these instructional features seem to have a lower incidence of accuracy as concerns the beliefs of

competence in writing for girls with LD, as has been suggested by previous studies (Usher & Pajares, 2006). Nevertheless, it would be necessary to have more data about the influences of the sources of efficacy beliefs in students with LD and specifically by gender (Klassen, 2006).

In general, these findings suggest that gender is a modulation variable in the effects of writing cognitive and self-regulation strategy instruction in the writing self-efficacy beliefs of students with LD. Nevertheless, other variables should have controlled for in this study and they constitute the limitations of this research that may have prevented a more comprehensive explanation of the complex mediational role of gender. In future studies the following aspects should be included: assessing the gender orientation as regards gender stereotypical beliefs that the students holds (Pajares & Valiente, 2001), the use of complementary methods to assess the gender differences in self-efficacy (Pajares et al. 1999; Pajares & Valiente, 1999), or the use of other methods of considering writing self-efficacy calibration.

Finally, the findings of this study have practical implications for teachers' practice in the field of writing instruction. It is necessary for teachers to be aware of the importance of developing an optimal positive estimation of students' writing self-efficacy, because a certain degree of optimism or positive bias in one's writing self-efficacy calibration promotes the student's cognitive, behavioral and motivational engagement in writing, which facilitates their development in writing competence. But, in writing instruction teachers need to focus on promoting positive writing self-efficacy and simultaneously on improving the necessary writing skills and strategies, because gains in one's sense of self-efficacy are best effected by helping students be more successful through writing strategies and skills, and observing the relationship between their actions and the success they have achieved. As Pajares (1996) suggested, teachers' instruction should focus on improving the students' self-efficacy and calibration by improving their metacognitive knowledge of the tasks and their writing strategies and skills. Specifically, in the case of students with LD who manifest a considerable overestimation of their writing self-efficacy (Klassen 2002a, 2002b), despite their writing difficulties (García & Fidalgo, 2008) which can be related to a method of protection of their self-estimation or their self-concept. For students with LD, when the pre-requisite self-knowledge and self-regulation writing skills are absent (García & Fidalgo, 2008), this overly optimistic estimation of their writing self-efficacy can be a potential problem. For this reason, in writing instruction teachers should place greater emphasis not only on improving self-efficacy, but also on developing the necessary self-knowledge of writing and self-regulation strategies of students with LD. If they have the necessary metacognitive knowledge and necessary cognitive and self-regulation strategies of writing, they will come to achieve



competence in writing and higher achievement in writing, which allow them to attain a positive sense of their writing self-efficacy by means of the success of their actions. At the same time, their optimistic estimation of their writing self-efficacy will prove beneficial to achieving cognitive, motivational and behavioral engagement in writing and improve their writing competence. For this reason, in assessing the effectiveness of a writing instruction program in self-efficacy for students with LD, it is necessary not only to attain a positive bias in students' writing self-efficacy, but also essential to gain a measure of the students' self-efficacy calibration, that is, the key is to improve self-efficacy overall, but to improve self-efficacy calibration as well.

In this sense, a cognitive and self-regulation strategy writing instruction program, such as the SRSD or SCM instructional programs, may be the key to promoting a positive tendency in self-efficacy, a writing self-efficacy calibration, and also competence in writing. The promotion of writing awareness and self-regulation could improve the accuracy of students' calibration of writing self-efficacy as well as their subsequent performance (García & Fidalgo, 2006), and this has already been suggested by different researchers in this field (Butler, 1998a, 1998b; Meltzer et al., 1998). The findings of this research support that a cognitive and self-regulation strategy instruction program in writing that aims to boost LD students' meta-cognitive dimensions of writing is efficient in improving the calibration of their self-efficacy of students with LD, at least in females.

We analyzed the calibration by means of lineal regression analysis, because of the nature of the intervention implemented. Another possibility to be considered is the discrepancy between the perception of self-efficacy and the real achievement in writing product. This type of data would give us more relevant information that we do not have in our research. Therefore this constitutes a shortcoming in our research that should be addressed in future research.

At the same time, gender can influence the effects of cognitive strategy writing instruction in achieving a more accurate calibration of writing self-efficacy in students with LD. Teachers should be aware of this variable in their practice, and its incidence in writing self-efficacy according to its calibration. Some specific features of this kind of writing instruction could be more or less suitable than others with regard to gender (Usher & Pajares, 2006). Therefore, teachers should combine all sources of writing self-efficacy information in their cognitive and self-regulation writing instruction. Moreover, teachers should be conscious of the possible stereotypical gender self-conceptions in their practice, and the subsequent implications in differential effects of writing instruction for each gender. And their writing practice should modify possible specific gender orientation of students' view of writing as a female task, and improve the perception of writing as a relevant and valuable task in both genders.

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