PROGRAMA DE DOCTORADO EN PSICOLOGÍA EDUCATIVA Y
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DOCTORAL DISSERTATION

TEACHING WRITTEN COMPOSITION AT THE START OF COMPULSORY EDUCATION: STRATEGY INSTRUCTION AND THE RESPONSE-TO-INTERVENTION MODEL
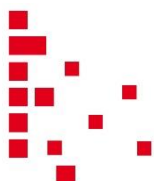
ADQUISICIÓN DE LA COMPETENCIA ESCRITA AL INICIO DE LA EDUCACIÓN OBLIGATORIA: INSTRUCCIÓN ESTRATÉGICA Y MODELO DE RESPUESTA A LA INTERVENCIÓN

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Lo hermoso del desierto es que en cualquier parte

esconde un pozo

~ El Principito ~

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Si quieres, puedes. Si puedes, sigues. Si sigues, llegas. Y si llegas, lo tienes.

Alea iacta est.

PREFACE

The doctoral dissertation presented in this volume has been developed at University of León within the Doctoral Program in Educational Psychology and Educational Sciences (Programa de Doctorado en Psicología Educativa y Ciencias de la Educación de la Universidad de León) regulated by Royal Decree 99/2011 (Real Decreto 99/2011). From 2015 to 2019 the thesis has been covered by a predoctoral grant (Beca de Formación del Profesora Universitario – FPU) awarded to the PhD candidate by the Spanish Ministry of Education, Culture and Sport (Ministerio de Educación, Cultura y Deporte, grant reference: FPU014/04467). According to the regulations established by the doctoral program, this research is the fruit of several mandatory activities aimed at improving PhD students' research career. Two of these activities are particularly relevant to understand the format of this dissertation, and therefore deserve particular emphasis in this section.

The first activity involves working with foreign research teams typically through research stays abroad taken by the PhD student. The author of this thesis took a 3-month research stay at Vanderbilt University (Nashville, U.S) under the supervision of Dr. Douglas Fuchs, partially funded by BBVA Foundation. She then completed a second research stay, also for three months, at Nottingham Trent University (Nottingham, U.K) under the supervision of Dr. Mark Torrance and funded by the Spanish Ministry of Education, Culture and Sport (Ministerio de Educación, Cultura y Deporte). Both host institutions and researchers provided invaluable support for the completion of this thesis. On the basis of these two research stays, the present dissertation has been recognised as an international thesis.

The second activity requires the publication of a minimum of three scientific articles in high status journals. At least one of the journals selected should be indexed in Journal Citation Reports (JCR) while the remaining two should be indexed in well-known data basis such as In-RECS, Google Scholar Metrics or Scopus. The present

dissertation includes four manuscripts, three of which are already published in *British Journal of Educational Psychology* (chapter 3, indexed in Q1 in JCR, impact factor: 2.481)*, Reading and Writing* (chapter 5, indexed in Q2 in JCR, impact factor: 1.942) and *Papeles del Psicólogo* (chapter 4, indexed in Q3 in Scopus, impact factor: 0.266). The four manuscript has been submitted to *Journal of Literacy Research* (chapter 6, indexed in Q2 in JCR, impact factor: 1.886). The fulfilment of this requirement makes it possible to present and defend this thesis under the modality of compendium of publications (compendio de publicaciones). This means that the main body of the thesis will comprised a collection of the four manuscripts referenced above.

The present thesis is framed within the research line on the teaching of written composition led by Dr. Raquel Fidalgo (Universidad de León) and Dr. Mark Torrance (Nottingham Trent University) both supervisors of this thesis. Specifically, this dissertation expands their research line by exploring the teaching of writing at the very beginning of compulsory education. This involves two major focuses: instruction on high-level writing processes from lower-primary grades; and prevention of writing disabilities through the Response to Intervention model. The research included in this thesis has received external funding. On the one hand, those studies addressing the use of strategy-focused instruction in early educational stages and an empirical review of writing assessment measures and instructional practices (chapters 3 and 4 of this thesis) have been funded by a competitive project awarded to Dr. Raquel Fidalgo from 2016 to 2021 by the Spanish Ministry of Economy and Competitiveness (Ministerio de Economía y Competitividad, grant reference: EDU2015-67484-P MINECO/FEDER). On the other hand, those studies related to the implementation of the first two tiers of the Response to Intervention model (chapter 5 and 6 of this thesis) have been funded by the 2016 BBVA Foundation Grant for Researchers and Cultural Creators also awarded to Dr. Raquel Fidalgo from 2016 to 2018.

According to the regulations of University of León for the presentation of doctoral dissertations as a compendium of publications, this thesis is structured in four sections: introduction, aims and method, results and conclusions. The introductory section (chapter 1) presents the state of art and sets the theoretical framework that supports the four studies included in this thesis. Chapter 2, in turn, includes a detailed description of the aim and method of each study. Information that could not be included in the method section of the papers, given the maximum length allowed by the selected journals, is provided in chapter 2. Results are presented as four chapters (chapters 3 to 6) and include the four scientific manuscripts described above. The last two chapters present the general conclusions of the doctoral dissertation both in English (chapter 7) and in Spanish (chapter 8), in response to the international nature of this thesis. These conclusions are based around instructional and preventive guidelines to support the acquisition of writing competence in early educational stages. Conclusions are presented alongside with contributions of this thesis, its limitations and future research lines.

CONTENTS

**CHAPTER 3. Effects of teaching planning strategies to first-grade
writers**

CHAPTER 4. The Response to Intervention model in writing: a review of assessment measures and instructional practices.

CHAPTER 5. Supporting first-grade writers who fail to learn: multiple single-case evaluation of a Response to Intervention approach

ABSTRACT

Mastery of writing competence constitutes an essential requirement of compulsory education, given the key role of writing in and outside the academic field. However, a significant percentage of students find difficulties in its acquisition due to the cognitive complexity entailed by the writing process. The present doctoral dissertation aims to promote a proper acquisition of writing competence from the very beginning of compulsory education through an innovative approach based on two key aspects: instruction on high-level cognitive processes of writing in early educational stages; and prevention of learning disabilities in writing through the implementation of the Response to Intervention model (RTI). This overall aim becomes more specific in four studies, three of them of empirical nature and the fourth one a review.

The first empirical study explores the efficacy of strategy-focused planning instruction before students have automatized transcription skills. This study comprised a sample of first-grade students who received an instructional program focused on text-planning, compared to a control condition. Overall text quality was measured at pretest, posttest and follow-up.

The subsequent three studies offer a theoretical and practical framework for the effective implementation of the RTI model in the teaching of written composition. At a theoretical level, the review study presents an analysis of the assessment measures and effective instructional practices that can be applied within the RTI model. At an applied level, the last two empirical studies explore the efficacy of a two-tiered RTI model for the teaching of written composition at the start of compulsory education. These two studies comprised samples of students in first and second grade who received instructional programs focused both on planning and transcription skills, in the first two tiers of the RTI model. Tier 1 was delivered by regular teachers, while students' parents participated in the implementation of Tier 2.

We assessed transcription skills, overall text quality in narrative writing and non-verbal ability through pretest, posttest, follow-up and progress monitoring measures. Parents and teachers perceptions on the RTI program implemented were also evaluated.

In view of the results, it is possible to conclude that instruction on high-level writing processes benefits students' writing performance even when transcription skills have not been automatized yet. We also provide preliminary results on the effectiveness of a multi-tiered intervention based on the first two tiers of the RTI model to improve students' writing performance and, thereby, to prevent future writing difficulties. Additionally, our results indicate good buy-in of the model from both parents and teachers. Therefore, we suggest that the RTI model can be feasibly and effectively implemented in the context of writing instruction at the beginning of compulsory education.

From a scientific perspective, our research contributes to define the nature of writing instruction at the very beginning of compulsory education, emphasizing the need to provide combined instruction in low and high-level processes and to frame this instruction within the RTI principles. From an educational perspective, it provides educators with an overall framework and explicit instructional guidelines to promote a proper acquisition of writing competence from early educational stages and prevent learning disabilities in writing. On the basis of these conclusions and contributions, we discuss limitations of our research and suggest future research lines on the field of early writing instruction.

RESUMEN

El dominio de la competencia escrita constituye un requisito fundamental de la educación obligatoria, dado el papel clave de la escritura dentro y fuera del ámbito académico. Sin embargo, un porcentaje considerable de alumnos encuentra dificultades en su adquisición, debido a la complejidad cognitiva del proceso escritor. La presente tesis doctoral pretende promover una adecuada adquisición de la competencia escrita desde el comienzo de la educación obligatoria mediante un enfoque novedoso basado en dos aspectos: la instrucción en procesos cognitivos de orden superior de la escritura en edades tempranas; y la prevención de las dificultades de aprendizaje en escritura mediante la aplicación del modelo de Respuesta a la Intervención (RTI). Este objetivo se concreta en cuatro estudios, tres de ellos de naturaleza empírica y un cuarto de revisión.

El primer estudio empírico explora la eficacia de la instrucción estratégica en el proceso de planificación textual antes de que exista un dominio autorregulado de las habilidades de transcripción. La muestra estuvo compuesta por alumnos de 1º de Educación Primaria que recibieron un programa instruccional focalizado en planificación textual, comparados con una condición control. Se evaluó la calidad textual a través de medidas pretest, postest y de seguimiento.

Los tres estudios restantes ofrecen un marco teórico-práctico para la implementación efectiva del modelo RTI en la enseñanza de la composición escrita. A nivel teórico, el estudio de revisión presenta un análisis de las medidas de evaluación de la escritura y las prácticas instruccionales efectivas susceptibles de ser aplicadas bajo el modelo RTI. A nivel aplicado, los dos últimos estudios empíricos exploran la eficacia de una intervención multinivel en los dos primeros niveles del modelo RTI para la enseñanza de la competencia escrita al comienzo de la educación obligatoria. Las muestras de estos dos estudios estuvieron formadas por alumnos de 1º y 2º de Educación Primaria con los cuales se aplicaron programas instruccionales centrados

transcripción y planificación en los dos primeros niveles del modelo RTI. El primer nivel fue implementado por los docentes mientras que los padres participaron en la implementación del segundo nivel. Se evaluaron las habilidades de transcripción, la calidad textual en composiciones narrativas y las habilidades no verbales a través de medidas pretest, postest, de seguimiento y de monitorización del progreso. Además, se evaluaron las percepciones de padres y profesores sobre el programa RTI implementado.

De acuerdo con los resultados obtenidos, es posible concluir que la instrucción en procesos de orden superior de la escritura beneficia el rendimiento escritor incluso cuando el alumnado aún no ha automatizado las habilidades transcriptoras. Además, se proporcionan resultados preliminares sobre la eficacia de una intervención en los dos primeros niveles del modelo RTI en la mejora del rendimiento escritor del alumnado y, por extensión, en la prevención de dificultades de aprendizaje en escritura. Asimismo, los resultados indican una buena aceptación del modelo por parte de padres y profesores. Por tanto, se sugiere que el modelo RTI puede ser aplicado de modo factible y efectivo al contexto de instrucción en escritura al comienzo de la educación obligatoria.

Desde una perspectiva científica, nuestra investigación contribuye a definir la naturaleza de la instrucción en escritura al comienzo de la educación obligatoria, enfatizando la necesidad de proporcionar una instrucción combinada en procesos de orden superior e inferior enmarcada dentro del modelo RTI. Desde una perspectiva educativa, proporciona a los docentes un marco global de referencia y pautas instruccionales explícitas para promover una adecuada adquisición de la competencia escrita desde los primeros niveles educativos y prevenir dificultades de aprendizaje en escritura. A partir de estas conclusiones y contribuciones, se discuten limitaciones de la investigación y se sugieren futuras líneas de investigación en el campo de la instrucción temprana en escritura.

Chapter 1

Theoretical framework

Throughout our history, writing has made it possible for facts, memories and culture to endure over time. In today's world, writing competence constitutes a critical tool for the individuals' academic and social development. From an academic perspective, research points to a high correlation between linguistic competence and school achievement (Jurkovic, 2010). Thus, as part of Linguistics, writing not only enables students to learn autonomously but also to show what they learn, since academic assessments usually adopt a written form. Consequently, the inadequate development of writing skills entails numerous difficulties in further education. Given the keystone role of writing, it is not surprising that the Spanish elementary school curricula place particular emphasis in literacy skills, where writing competence is included (Ministerio de Educación, Cultura y Deporte, 2014).

The need to master writing, however, goes beyond the school context. From a social perspective, writing allows individuals to progress in a society increasingly supported by written communication. As stated by Beddington et al. (2008), it becomes an essential tool to promote the mental health of nations and, consequently, socio-economic prosperity. It is, therefore, not in vain that the European Union defines oral and written expression and comprehension as one of the eight key competences that "all individuals need for personal fulfilment and development, active citizenship, social inclusion and development" (Education Council, 2006, p.13).

Educational institutions, therefore, take the responsibility to teach writing effectively and adapt instruction to students' specific needs, in order to promote an adequate acquisition of writing competence. Scientific research that empirically validates instructional practices and approaches should support educational agents in achieving this aim. Thus, in the first chapter of this thesis, the author reviews the literature on writing instruction at the beginning of school career, putting particular emphasis on how to support students' learning through the Response to Intervention model. Specifically, this chapter will address the cognitive processes involved in

writing, the value of strategy-focused instruction to teach high-level processes to young writers and the importance of monitoring students' progress and adapting instruction to their needs. This provides a theoretical and empirical framework for the subsequent four studies that constitute the main body of this doctoral dissertation.

Writing as a Set of Cognitive Processes

Writing is one of the most complex aspects of language proficiency. It is a cognitively demanding activity that requires the setting up and coordination of various mental processes, in order to respond effectively to the demands of the context in which the writing task takes place. In the last few decades, research has widely explored the cognitive factors that underlie written composition (Bereiter & Scardamalia, 1987; Berninger, 2000; Berninger & Winn, 2006; Hayes & Flower, 1980), in an effort to design effective teaching practices in writing. The research presented in this thesis focuses on transcription and high-level cognitive processes. A key model to explain these processes was provided by Berninger and colleagues (Berninger 2000; Berninger & Winn, 2006) in the simple and not-so-simple view of writing, which also addresses previous contributions on the models of writing.

The simple and not-so-simple view of writing (Berninger, 2000; Berninger & Winn, 2006) brings together different theoretical assumptions from a range of traditions in writing research (developmental, psychological, cognitive and educational). For this model, learning to compose text involves a set of skills. First, low-level transcription skills refer to the retrieval of orthographic symbols that allow transforming ideas into words (spelling) and to the motor execution needed to write them down on the page (handwriting) (Abbott & Berninger, 1993). Transcription has been found to significantly predict writing performance, particularly in early years of elementary school (Jiménez & Hernández-Cabrera, 2019; Limpo & Alves, 2013). As children develop as writers, transcription skills become more automatized so that

skilled writers barely need to pay them conscious attention (Scardamalia & Bereiter, 1986).

Second, writers also need high-level self-regulation skills to lead the composing process. These involve planning strategies for generating and structuring ideas and revising strategies for detecting and correcting mistakes. According to Hayes and Flower's model (1980), pioneering in defining high-level processes and therefore key in their understanding, both planning and revising are guided by a third process, executive control, in charge of monitoring which processes occur and when. In subsequent models, high-level processes are understood as executive functions necessary to self-regulate transcription and text generation (Berninger, 2000; Berninger & Winn, 2006). As writing develops, learners become more skilled in both transcription and composition and they are increasingly capable of self-regulating their writing behaviour. Though self-regulated strategies for both planning and revising have shown to predict overall text quality (Limpo & Alves, 2013; Limpo, Alves, & Fidalgo, 2014), the extent to which each high-level process influences text quality varies according to students' age. While planning contributes to overall quality from early elementary grades, revision does not seem to have an effect until secondary stages (Cordeiro, Limpo, Olive & Castro, 2019; Limpo et al., 2014). Bereiter and Scardamalia proposed a key model to understand how writing processes evolve over time. According to these authors, young writers show an initial knowledge-telling strategy, in which they write down their ideas without any overall plan or goal. This matures into a knowledge-transforming strategy, in which the writer pursues a specific goal based on connections between ideas (Bereiter & Scardamalia, 1987; Scardamalia & Bereiter, 1992).

Once these cognitive processes have been identified and understood, the next obvious step of writing research is investigating how writing instruction might

enhance mastery of them. This is addressed in the following section, with particular emphasis on strategy-focused instruction as the most effective teaching practice.

Instructional Practices in Writing: Strategy-Focused Instruction

Given the cognitive complexity of writing, it is not surprising that text composition poses a challenge for all school-aged children. A significant percentage of students, however, particularly struggle to face a writing task and are, therefore, at risk of a more serious academic failure. Low writing achievement have been well documented both in the international and national context. In 2012, the National Center for Education Statistics reported that almost 70% of the American students wrote below the expected level (National Center for Education Statistics, 2012). Prevalence of writing disabilities in elementary and middle school students is estimated between 6% and 22% in the US depending on ethnicity, state and gender (Hooper et al., 1993; Katusic, Colligan, Weaver, & Barbaresi, 2009) and around 12.5% in other countries (Mogasale, Patil, Patil, & Mogasale, 2012). In Spain, standardized assessment of writing competence has been deficient, since the national education system lacks periodical statistics on this matter. Nevertheless, the last diagnostic report conducted in fourth grade suggested that around 17% of students write at the lowest level (Ministerio de Educación, 2009). Research supports these results, estimating the prevalence of writing disabilities among Spanish students around 8.2% (Jiménez, Guzmán, Rodríguez, & Artiles, 2009).

Writing difficulties seriously impinge on students' academic tasks. Their texts are frequently incoherent and shorter than those written by typically developing students, they contain irrelevant details and structural and organizational mistakes and their overall quality is significantly lower (Graham, 1990; Graham, Harris, Macarthur, & Schwartz, 1991). Regarding high-level composing processes, students who struggle with writing typically spend significantly less time planning and generating ideas, and their revisions focus almost exclusively on mechanical aspects, paying no mind to

content or rhetoric (Gersten & Baker, 2001; Graham, Harris, & McKeown, 2014). These difficulties might lead to the development of negative attitudes towards writing and low self-efficacy beliefs (Graham et al., 2014; Klassen, 2006).

In this context, searching for effective instructional practices in writing becomes an international priority. Schools and educational institutions held responsibility for all students to master writing competence and for preventing writing difficulties. Educational research, in turn, must guide and support this aim by providing instructional procedures whose effectiveness have been empirically demonstrated. Among these procedures, meta-analysis exploring different teaching practices in writing point to strategy-focused instruction as the most effective to improve students' written compositions, with effects sizes ranging from .82 to 1.26 (Graham & Harris, 2018; Graham, McKeown, Kiuhara, & Harris, 2012; Graham & Perin, 2007; Koster, Tribushinina, de Jong, & van den Bergh, 2015; Rogers & Graham, 2008).

Strategies are explicitly-learned self-talk procedures that allow students to regulate their own writing behaviour in order to achieve specific writing goals. Alexander, Graham and Harris (1998) describe strategies as procedural, purposeful, effortful, wilful, essential and facilitative. Accordingly, strategy-focused instruction provides strategies for planning and revising texts, aiming for students to apply these strategies independently. Research has described strategy-focused instruction in detail (Fidalgo, Harris & Braaksma, 2018; Fidalgo & García, 2008) and identified several programs and models (see Robledo-Ramón & García, 2018 for a review). This instructional procedure, as operationalized, for example, in Self-Regulated Strategy Development (SRSD, Graham et al., 2014; Harris & Graham, 1999) or Cognitive Self-Regulation Instruction (CSRI, Fidalgo & Torrance, 2018), typically involves three components, that can be repeated as many times as needed depending on students' needs.

First, the writing strategy is taught by means of *direct instruction.* In this stage, the instructor provides students with explicit meta-cognitive knowledge about strategies aimed at setting product goals and shaping the writing process. At the beginning, the background knowledge needed to apply the strategy successfully is discussed. Then, the instructor explains each step of the strategy, often using mnemonic devices to help students memorize and remember them. Among planning mnemonics, research has used acronyms such as POW (P=pick ideas; O=organize your ideas; and W=write up your ideas), mostly in the English context (Harris, Graham, & Adkins, 2015; Harris, Graham, & Mason, 2006; Lane et al., 2011) or its Spanish version, POD (P=Piensa [Think]; O=Organiza [Organize]; and D= Desarrolla [Develop]) (Fidalgo, Torrance, Rijlaarsdam, Van den Bergh, & Álvarez, 2015; Torrance, Fidalgo, & Robledo, 2015). The Vowels strategy, OAIUE (O=Objetivo [Aim]; A= Audiencia [Audience]; I= Ideas [Ideas]; U= Unir [Join ideas]; and E= Esquema [Scheme]) determines the aspects that need to be considered when composing a text (Fidalgo, Torrance, & García, 2008; Fidalgo et al., 2015). Planning mnemonics are frequently tied to acronyms representing text structure. For narratives, the acronym WWW + What + How x2 (Where and When the story happen; Who the main characters are; What happens; How the characters react and How the story ends) has been widely used (Harris et al., 2015, 2006). For opinion essays, previous literature has used TREE (T= Topic sentence; R= Reasons; E= Ending, E= Examine) for compositions in English (Harris et al., 2012b; Lane et al., 2011) or TARE (T= Tesis [Thesis]; A= Audiencia [Audience]; R= Razones [Reasons]; and E= Ejemplos [Examples]) in Spanish research (López, Torrance, Rijlaarsdam, & Fidalgo, 2017). Acronyms has also been widely used to teach revision procedures. Among these, it is worth mentioning Scardamalia and Bereiter's CDO procedure (1983), based on compare, diagnose and operate (Arias-Gundín & García, 2006, 2007; De La Paz, Swanson, & Graham, 1998), and its Spanish adaptation, LEA (L= Lee [Read]; E= Evalúa [Evaluate]; and A= Actúa [Act]) (Fidalgo et al., 2008; Torrance et al., 2015).

Finally, revision is usually taught through specific adding, substituting, eliminating and reorganizing strategies (Fitzgerald & Markham, 1987; Sengupta, 2000). When explaining the steps of the strategy, instructors may also emphasize the importance of self-effort to promote students' motivation.

The second stage of strategy-focused instruction is *modelling,* in which the instructor provides a mastery model of how to use the strategies taught in the previous stage by composing a text in front of the class. The overall aim of this stage is to develop procedural knowledge about how to regulate and coordinate the writing processes. The role of students during modelling varies between strategy-focused approaches. SRSD understands modelling as a collaborative task in which students are allowed to participate, add their ideas and even act as models themselves (Harris & Graham, 2018). On the other hand, according to CSRI, students should focus their attention exclusively on observing the model (Fidalgo & Torrance, 2018). Though the first, more active approach, increases motivation, carrying several activities concurrently involves a cognitive cost that might impinge on the observational learning itself. Modelling is conducted through thinking aloud (Armengol, 2007). The instructor's self-directed talk includes statements to analyze the task and set goals (*"I have to write an opinion essay about…"),* focus and maintain attention *("I need to keep concentrated"),* remember the steps of the strategy *("First, I need to plan the introduction of my text"),* assess actions done and correct mistakes *("Does my text have all the necessary parts? Oops, no, I forgot to write a conclusion")* and motivate the writer through expectations of ability and success *("I will get it, I know I can").* According to Fidalgo & Torrance (2018)*,* successful modelling should meet several conditions. First, self-talk is not a linear monologue, but requires some dramatization to keep students from losing interest. Gestures, voice tone and rhythm become essential to enhance students' attention. Second, students need to see themselves reflected on the model. For this to be achieved, the instructor must act as a hard-working classmate, adopting students' viewpoint and verbalizing thoughts that are common for school-aged

children. Third, before, during and after the modelling, it is necessary to direct students' attention to the key parts of the writing processes, that is, the specific steps for planning and/or revising. The modelling stage ends with a group reflection on what the students have observed: important thoughts of the model, benefits and challenges of the strategy and suggestions to make modelling more efficient.

Strategy-focused instructional procedure ends with *students' practice*, in which the students write their own texts emulating what they have previously observed and showing to what extent they have internalized the strategy. At the beginning of this stage, students' performance is supported by the instructor, who provides prompts and supporting materials, guidance on how to use the strategy and feedback on whether or not the students have used it correctly. In this first phase, the SRSD model highlights the importance of collaborative writing (Graham et al., 2014), while CSRI suggests conducting an emulative practice in pairs (Fidalgo & Torrance, 2018). As this stage moves forward, scaffolding is gradually withdrawn, until students are able to use the strategy independently and correctly by means of covert self-instructions.

In the present thesis, strategy-focused instruction was conducted with students in first grade (see chapters 3, 5 and 6), when, as stated above, only planning processes seem to affect text quality (Limpo et al., 2014). Instruction, therefore, focused on planning. Strategy-focused instruction on planning seems to be important to writing success in adolescents and adults, both typically developing (MacArthur & Lembo, 2009; Limpo et al., 2014; MacArthur, Philippakos, & Ianetta, 2015) and struggling (Chalk, Hagan-Burke, & Burke, 2005; Hoover, Kubina, & Mason, 2012). With regard to school-aged students, most research has tested its efficacy in upper elementary grades. Teaching planning strategies significantly improves overall compositional quality in both average students (Fidalgo, Torrance, & Robledo, 2011; Limpo & Alves, 2014; López et al., 2017) and struggling writers (García & Fidalgo, 2006; Lushen, Kim, & Reid, 2012). Planning instruction also produces significant gains in

text structure and coherence (Fidalgo et al., 2011; López et al., 2017), writing meta-cognitive knowledge (Brunstein & Glaser, 2011; Fidalgo et al., 2011) and time spent writing (García & Fidalgo, 2006; Torrance, Fidalgo & García, 2007). Results in text length are, however, mixed, with some studies finding longer texts as a result of strategy instruction in planning (Fidalgo et al., 2011; Limpo & Alves, 2014; Lushen et al., 2012) and others finding no statistically significant differences between conditions (López et al., 2017; Torrance et al., 2007). Moreover, the effects of strategy instruction on planning might be transferred to an untaught genre (Graham, Harris & Mason, 2005; Tracy, Reid & Graham, 2009) or even a non-writing task (Glaser & Brunstein, 2007). Literature suggests that the beneficial effects of strategy-instruction in planning for students in upper-elementary grades endure over time (Fidalgo et al., 2008; Glaser & Brunstein, 2007).

Literature on the effects of strategy-focused planning instruction, however, has almost exclusively focused on students who have mostly automatized transcription skills, that is, in 3rdgrade or above. In this thesis, we wonder whether instructing on high-level planning processes would benefit compositional quality from the very beginning of compulsory education, when students have not yet automatized spelling and handwriting. Accordingly, the following section deals with early writing instruction, aiming to identify gaps in literature and, therefore, provide support for our research.

Writing Instruction in Early Elementary Grades

Writing instruction in early elementary grades has traditionally emphasized transcription skills (Cutler & Graham, 2008; Dockrell, Marshall, & Wyse, 2015). This is particularly true in the Spanish system, where writing instruction at the beginning of Primary Education mostly focuses on handwriting and spelling (Cano & Cano, 2012; Tolchinsky & Ríos, 2009). This instruction is based on the assumption that children should master low-level skills before focusing on more complex aspects, such

as content or structure. Accordingly, there is a considerable body of research reviewing effective teaching practices in handwriting (Graham & Weintraub, 1996; Hoy, Egan, & Feder, 2011; Santangelo & Graham, 2016) and spelling (Graham, 1999; Mushinski & Stormont-Spurgin, 1995; Wanzek et al., 2006). There are several reasons to support transcription-focused instruction at the start of school career. First, as noted before, writing is a set of low and high-level processes, and these must be coordinated within the limited capacity of the writer's working memory. When these processes are not carefully scheduled, they compete for the same cognitive resources and the cognitive system risks overload (McCutchen, 1996; Torrance & Galbraith, 2006). Young children devote cognitive resources mainly to ortographic and graphomotor processing, leaving little spare capacity for planning (Fayol, 1999). This may explain young writers' failure to engage in explicit planning strategies (Limpo & Alves, 2013). Second, learning and remembering a strategy demands a cognitive effort. This might diverts resources from transcription, as does the process of learning anything new. Rijlaarsdam and co-workers (Rijlaarsdam & Couzijn, 2000; Rijlaarsdam et al., 2011) describe the "double challenge" faced by students who must learn a strategy about how to write when they are already struggling with writing. Third, it may be the case that students who struggle to compose sentences are simply not able to write down their ideas, even if they have a detailed mental plan.

However, transcription alone is not sufficient. In fact, though transcription-focused instruction has proved beneficial to improve fluency, spelling, phonological awareness and even reading skills (Graham & Santangelo, 2014; Graham, Harris, & Fink, 2000), it is still open to debate whether it benefits overall text quality (see meta-analysis by Graham et al., 2012). Accordingly, there are reasons in favor of teaching planning strategies from the beginning of students' school career. First, from a cognitive perspective, planning strategies involve a series of carefully structured steps that might separate out low and high-level processing. This could potentially reduce competition between word production and planning or structuring ideas (Fidalgo &

Torrance, 2018; Kellogg, 1988, 1990). Second, teaching content and rhetoric promotes global and meaningful learning and links instruction to the social function of written language. This is likely to be motivating for children because it means that they are playing the role of authentic communicators (Nemirovsky, 2009; Teberosky & Sepúlveda, 2009). Consequently, if children are more enthusiastic towards writing, they will be willing to practice both low and high-level skills. Third, some authors suggest that focus on the text level instead of single words or sentences benefits the development of transcription skills by providing meaningful context and promoting fluency. Thus, writing instruction focused on higher-level text structure might have a significant impact on students' knowledge of small linguistic units (Elbers, 2000; Ferreiro, 2002).

There are, therefore, theoretical and practical reasons to believe that teaching planning strategies at the beginning of school career will benefit students' writing development. Some research, though limited, address planning strategies in second grade, when students have not yet automatized transcription skills. Findings from these studies highlight the positive effects of strategy-focused planning instruction on text structure and quality of narratives and persuasive essays (Harris et al., 2015, 2006; Lane et al., 2008, 2011; Lienemann, Graham, Leader-Janssen, & Reid, 2006). Most studies also found benefits in text length (Harris et al., 2006; Lane et al., 2008, 2011; Lienemann et al., 2006) and even in writing meta-cognitive knowledge (Harris et al., 2015). As in upper-elementary grades, strategy instruction in second grade produces gains in an untaught genre (Harris et al., 2015, 2006) and its effects are maintained over time (Harris et al., 2015, 2006; Lienemann et al., 2006). Evidence about the effects of teaching planning strategies at the very beginning of compulsory education, that is, in first grade, is even scarcer. Given that first-grade students have no previous experience with formal writing instruction, it might be the case that their response to strategy-focused instruction in planning is substantially different from that of second graders. To our knowledge, apart from our own research presented in this thesis (see

chapter 3), there is only one published study evaluating strategy-focused instruction in first grade (Zumbrunn & Bruning, 2013). This was a case study in which the overall quality of the stories written by six students improved significantly as a result of planning instruction. Instruction in this study was student-paced and students were deliberately selected so that they already showed considerable writing ability.

Overall, literature on strategy-focused planning instruction in early elementary grades presents some limitations. Three of the studies reviewed included a normal curriculum control condition (Harris et al., 2015, 2006; Lane et al., 2011), while the others were case studies. This makes it difficult to generalize their findings. In all cases, with the exception of Zumbrunn and Bruning' study (2013), intervention was delivered to struggling students, either one-to-one (Lane et al., 2008, 2011; Lienemann et al., 2006) or in small groups (Harris et al., 2015, 2006). There is, therefore, a gap in exploring the effects of teaching planning strategies to whole-class groups in low-elementary school grades. Aiming to shed some light on this issue, the third chapter of this thesis evaluates a strategy-focused instructional program aimed at teaching planning strategies to first-grade students (Arrimada, Torrance & Fidalgo, 2019). Results provide evidence about the efficacy of introducing high-level writing processes right from the beginning of compulsory education.

Findings from the aforementioned literature suggest that writing instruction that combines transcription and composition improves students' writing development from very early on their educational career. However, given the complexity of high-level cognitive processes, those students who particularly struggle may get left behind under instructional conditions that include planning. Accordingly, instruction that teaches both transcription and composition needs to be based on a general framework to identify and support students who learn at a significantly slower pace than their peers. The Response to Intervention model might respond to the need for early identification and support of struggling learners. The following section

describes this model in detail, providing the context in which chapters 4, 5 and 6 of this thesis are framed.

The Response to Intervention Model

The Response to Intervention model (RTI) arises in response to the high prevalence of learning disabilities, both in the international (Altarac & Saroha, 2007; Chan, Ho, Tsang, Lee, & Chung, 2007; Roongpraiwan, Ruangdarahanon, Visudhiphan, & Santikul, 2002) and national context (Jiménez et al., 2009). Traditionally, learning disabilities had been identified through criteria based on IQ-achievement discrepancy. This approach, however, waits for students to have learning disabilities before these can be identified and treated. Researchers, psychologists and school agents have widely criticised the IQ-achievement discrepancy model on the basis of two reasons. First, there seems to be no difference between the reading process of learning-disabled students and that of students who do not meet the IQ-discrepancy criteria but show poor reading (Jiménez & Rodrigo, 2000). Second, the IQ-achievement discrepancy model supports late remediation instead of prevention, increasing the number of students eligible for Special Education (Restori, Katz, & Lee, 2009).

Contrary to the IQ-achievement discrepancy model, the Response to Intervention model focuses on students at risk of learning disabilities. This approach aims to prevent learning disabilities by means of early identification of slow learning, increasingly intense intervention to support struggling learners and continuous monitoring of students' response to intervention (Fuchs, Mock, Morgan, & Young, 2003; Vaughn & Fuchs, 2003). Thus, the overall principle of RTI is that the identification of learning disabilities should be based on learners' response to intervention. This will reduce the number of students eligible for Special Education and, subsequently, its costs. The use of RTI approaches is in line with the concept of learning disabilities provided by the latest version of the Diagnostic and Statistical

Manual of Mental Disorders (DSM-5, American Psychiatric Association, 2013). According to this manual, learning disabilities are difficulties learning and using academic skills (reading, writing and mathematics) which "have persisted for at least six months despite the provision of interventions that target those difficulties" (p.66).

In the Spanish legislative framework, there is no direct reference to the Response to Intervention model as a way to identify learning disabilities. However, the current educational law indicates that the identification and treatment of learning disabilities must be based on early identification, comprehensive care, normalization and inclusion (Ley Orgánica para la Mejora de la Calidad Educativa, LOMCE, 2013). These principles point to the use of procedures that allow early identification of at-risk students and intervention to support them. Consequently, various autonomous communities are implementing educational approaches similar to the RTI model. Jiménez and co-workers' research on the implementation of the RTI model in the Canary Islands (Jiménez, 2019; Jiménez et al., 2011, 2010) is particularly relevant in the national context.

Several features define the nature of the RTI approach: the use of evidence-based instructional practices, continuous progress monitoring, multi-tiered instruction and the use of a problem-solving approach.

First, instruction under the RTI framework should be evidence-based, that is, the efficacy of the instructional practices must have been empirically demonstrated by previous literature. In order to ensure fidelity and reliability, school agents design an evidence-based intervention procedure carefully adapted to the learners' specific needs and oriented to prevention. Thus, RTI sets a clear difference between an individual's struggling cognitive profile and low achievement due to inappropriate instruction (Fuchs & Vaughn, 2012). Consequently, the development of learning disabilities, in case it occurs, cannot be attributed to the instruction received but to students' specific response to instruction. As an example of the nature of instruction

under the RTI model, the fourth chapter of this thesis presents an empirical revision of instructional practices in each cognitive process involved in writing (transcription and high-level skills) whose effectiveness has been empirically validated.

Second, it is necessary to monitor students' progress and their response to intervention through continuous assessments. Those students who do not respond to intervention will be taught by specialists and finally allocated to Special Education (Fuchs & Vaughn, 2012). Progress monitoring is a form of dynamic assessment because it measures students' rate of learning, rather than performance at a single point in time. Literature suggests various assessment procedures, ranging from norm-referenced standardized tests to criterion-referenced probes (Fletcher & Vaughn, 2009; Fuchs & Fuchs, 2006). Progress monitoring provides valuable data to make instructional decisions: materials, procedures and practices are changed as needed. As an example of how progress monitoring might be measured, in the fourth chapter of this thesis we analyse the most relevant assessment measures to keep track of students' progress in written composition. However, continuous assessment within the RTI framework is still a question that remains unclear, as pointed out by Linan-Thompson (2010). The model insists on the use of scientifically validated tools but it does not stablish specific assessment procedures. As a result, school agents run the risk of assessing global skills instead of focusing on those abilities which are affected by learning disabilities.

Third, RTI provides additional support to those students whose rate of learning is slower than their peers', and this requires a multi-tiered structure. As students move up the tiers, intervention becomes more intense. Fuchs and Fuchs (2006) suggest various ways to increase intensity: a) making the intervention longer and more frequent; b) reducing the number of students to work with, thus making instruction more homogenous; c) using more systematic and explicit instruction; and d) relaying on instructors with greater expertise to conduct the intervention.

Instructional programs based on RTI are frequently divided in three tiers of intervention (Barnes & Harlacher, 2008; Jiménez et al., 2011). All students are assessed very early on their educational career in order to identify those likely to show inadequate learning. Then, they all receive whole-class general instruction known as *Tier 1*, with the instructor paying particular attention to those students who have been classified as at-risk in the initial assessment. Tier 1 intervention is usually delivered by teachers. Progress monitoring in this first tier allows educators to differentiate between initially at-risk learners for whom general instruction is sufficient to catch up with their peers and those who do not respond to Tier 1. The latter group receive supplemental instruction, known as *Tier 2,* which runs concurrently with general classroom instruction. Tier 2 intervention is frequently conducted in small groups (3-6 students) and the specific needs of at-risk students become the focus of the instruction. This second tier has traditionally been the main focus of literature. Two reasons explain the interest in this secondary prevention: a) it is the primary mean by which at-risk students are provided with intensive intervention to catch up with their average peers; and b) it tests students' ability to learn under supportive instructional conditions (Fuchs, Compton, Fuchs, Bryant, & Davis, 2008). Chapters 5 and 6 of this thesis present an empirical example of the implementation of the first two tiers of intervention within a Response to Intervention approach. Finally, students whose rate of learning remains poor after receiving this additional support are eligible for a highly intense *Tier 3* intervention. Instruction in Tier 3 is delivered individually and its contents are tailored to each student's needs. In the US educational system, Tier 3 is typically associated with Special Education.

Fourth, and last, the RTI model follows a problem-solving approach as a tool to make instructional decisions (Illinois State Board of Education, 2009). The process starts by determining the problem comparing each student's expected achievement with their real performance. This is followed by an in-depth analysis of the problem and its causes, collecting information from the students' environment. Then, the

practitioner designs and implements and empirically-based intervention to solve the problem. While conducting this intervention, changes are made on the basis of progress monitoring data. Finally, school agents evaluate the efficacy of the intervention and plan future actions. As an example of the problem-solving nature of RTI, chapters 5 and 6 of this thesis exemplify how each student's situation is analysed and intervention is adapted to meet their needs (pass from Tier 1 to Tier 2). Though this problem-solving approach is popular among both researchers and teachers, Fuchs and Fuchs (2006) emphasize that practitioners do not always have the high level of expertise in intervention and assessment assumed by this approach.

The RTI model is becoming widely used, particularly in North America (Berkeley, Bender, Peaster, & Saunders, 2009) due to its overall effectiveness. Hattie's wide-ranging reviews of literature on educational efficacy estimated a high effect size (Cohen's d = 1.07) for RTI programs over other instructional approaches (Hattie, 2012, 2015). In a meta-analysis by Burns, Appleton and Stehouwer (2005) the authors found that RTI approaches significantly reduce the percentage of students initially identified as at-risk. Other experimental studies confirm the benefits of RTI in reading (O'Connor, Fulmer, Harty, & Bell, 2005; Simmons et al., 2008; Vaughn, Linan-thompson, & Hickman, 2003) and mathematics (Vanderheyden, Witt, & Gilbertson, 2007).

Educational institutions, particularly teachers, held responsibility for the effective implementation of the Response to Intervention model. They are in charge of identifying students' needs, providing them with instructional practices that meet these needs and monitoring their progress. Educator's attitude towards RTI approaches tends to be positive. Surveys suggest that they find RTI useful to identify struggling learners' needs and target instruction (Greenfield, Rinaldi, Proctor, & Cardarelli, 2010; Rinaldi, Averill, & Stuart, 2011). Teachers also emphasize the positive impact of RTI in their instructional practices, autonomy and self-efficacy

(Greenfield et al., 2010; Rinaldi et al., 2011). However, they also raise concerns, particularly about the lack of training and resources and RTI systems being time-consuming and overwhelming (Castro-Villarreal, Rodriguez, & Moore, 2014; Martinez & Young, 2011)

Unfortunately, RTI research and practice have focused almost exclusively on reading and mathematics. Learning disabilities, however, also affect writing development. Therefore, it makes sense to wonder whether and how writing instruction and assessment can be structured within the RTI framework. This issue will be addressed in chapters 4, 5 and 6 of this thesis.

Response to intervention in writing

To our knowledge, research linking writing development and Response to Intervention is very scarce. It is therefore difficult to make strong claims about how writing instruction would fit within the RTI framework.

From a theoretical perspective, in a reflection written by Saddler and Asaro-Saddler (2013), the authors suggest that the RTI model is suitable for identifying and supporting struggling writers. An effective RTI approach in writing would be based on the assumption that writing performance is likely to improve under appropriate instructional conditions. However, for this instruction to be effective, guidance and teachers' training on the implementation of RTI should rely on recent scientific research. Apart from this proposal, there is, to our knowledge, only one published piece of research in which more detailed guidance on RTI as a framework to teach writing is provided (Gil & Jiménez, 2019). In this book chapter, the authors present a specific set of measures to monitor students' progress and detect at-risk status, designed by the research team at University of La Laguna (Indicadores del Progreso de Aprendizaje en Escritura, IPAE). Additionally, they provide general recommendations or strategies to teach writing in elementary grades within the first two tiers of Response to Intervention. In line with this research, and aiming to expand

knowledge in the field of writing instruction within the RTI framework, the fourth chapter of this thesis (Arrimada, Torrance & Fidalgo, 2020) presents an international review of progress monitoring measures and instructional practices in writing whose effectiveness in early elementary grades has been empirically validated. Both measures and instructional procedures in chapter 4 come from meta-analysis and reviews on the field of writing assessment (Deno, 1985; McMaster & Espin, 2007) and instruction (Graham et al., 2012; Hoy et al., 2011; Wanzek et al., 2006).

The studies reviewed, however, do not test the effectiveness of specific instructional programs in writing within the RTI framework. From an empirical perspective, implementation of RTI in writing has rarely been addressed. Some studies have referred to whole-class writing instruction as Tier 1 (Harris et al., 2012a, 2012b) or to remedial instruction as Tier 2 (Harris et al., 2015; Lane et al., 2011). However, none of these studies applies subsequent tiers of intervention. They either focus on the effectiveness of Tier 1 or provide additional Tier 2 support for students who struggle under a normal curriculum where instruction is not necessarily empirically-validated. Moreover, research has tended to assess writing skills at a single point in time, while the RTI models supports continuous monitoring of students' progress. Finally, these studies sample students in second grade, when they have already acquired some degree of transcription competence. Thus, in the context of writing instruction, there has been a general failure to implement a formal RTI approach. However, we firmly believe that RTI is particularly suitable to teach written composition right at the beginning of compulsory education. Its multi-tiered instruction supports both students who progress under combined classroom instruction in transcription and planning and those who need more intense instruction. Therefore, in chapters 5 (Arrimada, Torrance and Fidalgo, 2018) and 6 of this thesis, we explored the effectiveness of various instructional programs aimed at teaching writing in first grade within tiers 1 and 2 of the Response to Intervention model. Chapter 5 is a single-subject design study in which we explore the individual

and immediate effects of remedial Tier 2 intervention for students who particularly struggle with transcription, mostly handwriting, and who do not respond to classroom instruction in transcription and planning. In chapter 6, we test the immediate and long-term group effects of a two-tiered RTI approach to written composition designed to support students whose overall rate of learning is slower than their peers' due to a variety of deficits.

Both studies were designed to be applied in typical single-teacher classroom settings. Tier 1 intervention was conducted by regular teachers, which, we believe, favors generalizability of the results to real school contexts. We recognize, however, that in the context of full-range classrooms, providing additional support for struggling learners might overwhelm the teacher. Thus, Tier 2 remedial intervention in both studies took the form of home tasks supervised by parents. Tough very few research has explored whether parental involvement fosters writing skills, literature suggests that it produces substantial gains mostly in spelling (Camacho & Alves, 2017; Karahmadi, Shakibayee, Amirian, Bagherian-Sararoudi, & Maracy, 2013; Reutzel, Fawson, & Smith, 2005) and, to a lesser extent, in text length, overall quality and the time students spend preparing a draft (Camacho & Alves, 2017; Robledo-Ramón & García, 2012; Saint-Laurent & Giasson, 2005). In the context of RTI, parents/carers have been identified as a key component to support their children's learning (Stuart, Rinaldi, & Higgins-Averill, 2011). To our knowledge, however, chapters 5 and 6 of this thesis are the first to involve parents in a formal implementation of a RTI program for writing instruction.

In this first chapter, we have reviewed the literature on writing instruction at the beginning of elementary school within the Response to Intervention model. This provides a conceptual framework as well as the rationale for the research developed in this thesis. In chapter 2, we summarize the aims and method of this doctoral dissertation, according to the regulations stablished by University of León.

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Chapter 2

Aims and method
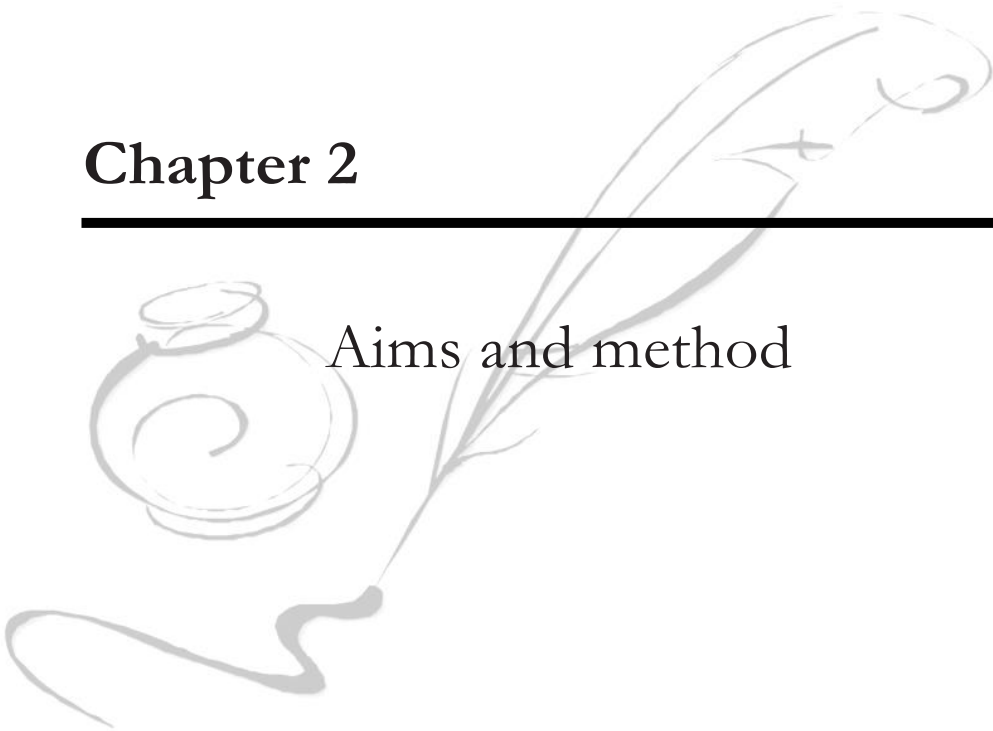
The research presented in this thesis puts the emphasis in promoting a proper acquisition of writing competence from the very beginning of compulsory education. This is achieved by means of an innovative instructional approach defined by two major contributions: a) instruction on the high-level cognitive processes of writing when transcription skills have not been automatized yet; and b) prevention of writing failure through the comprehensive application of the first two tiers of the Response to Intervention model in the context of writing instruction in Spain.

On the basis of this research line, we set four specific research aims achieved through the four studies presented in this doctoral dissertation from chapters 3 to 6. Three of these studies are instructional, focused on testing the aforementioned instructional approach. The remaining contains an empirical review of the international literature on empirically-validated writing assessment measures and instructional practices, aimed at promoting transfer of knowledge from the scientific to the educational field. According to the regulations of University of León on the presentation of doctoral dissertations by compendium of publications, this chapter summarizes the specific aim and method of each study. Subsequent chapters will present the manuscripts derived from each study (chapters 3 to 6), which adhere to the structure of scientific articles. Therefore, the content of this chapter partially overlaps with subsequent chapters.

Study 1. Effects of teaching planning strategies to first-grade writers

The first study, "Effects of teaching planning strategies to first-grade writers" (Arrimada, Torrance & Fidalgo, 2019), was published in British Journal of Educational Psychology and is presented in chapter 3 of this thesis.

Aim

This study explores whether teaching planning strategies in first grade benefits the overall quality of students' narrative compositions.

This is, to our knowledge, the first study that addresses planning instruction for whole-class groups at the very beginning of compulsory education. From a scientific perspective, our research wonders whether, with appropriate instruction, students are able to make use of high-level cognitive skills when low-level processes are still far from being automatized. More generally, it contributes to a better understanding of young students' writing performance and how this might change under strategy instruction. From an educational perspective, our research provides educators with a feasible approach to enhance writing competence by addressing skills that are typically taught at higher educational stages. Within the overall framework of this thesis, an essential principle of RTI is the use of empirically-based instructional practices. Thus, before implementing RTI approaches, it is necessary to validate the instructional practices that will be then used. However, as far as we know, strategy-focused approaches to teach planning in first grade have not been previously validated. Our study provides empirical evidence about the effectiveness of planning instruction in first grade. It is, therefore, the first step to conduct the subsequent RTI studies presented in this thesis.

Design

This study followed a quasi-experimental design in which we compared a strategy-focused instructional program on planning with a control condition based on playful activities aimed at increasing students' motivation towards writing. Conditions were practice-matched, meaning that students in both groups completed the same number of writing tasks and the same time was devoted to individual practice of written composition. Instruction was conducted over two months, in the second term of the school year. The design of this study is presented in table 1.

Table 1
Study design

Condition	Classes	Pretest	Instruction	Posttest	Follow up (7 weeks later)
Experimental (N = 62)	1ºA 1ºB 1ºC	Spontaneous narrative writing: -Text-based ratings* -Reader-based ratings* -Text length	Strategy-focused instruction	Spontaneous narrative writing: -Text-based ratings* -Reader-based ratings* -Text length	Spontaneous narrative writing: -Text-based ratings* -Reader-based ratings* -Text length
Control (N = 39)	1ºA 1ºB		Motivation towards writing		

Note: Text-based ratings include narrative framework and episode. Reader-based ratings include structure, coherence and quality.

Participants

The sample comprised 101 first-grade students distributed in 5 classes from 2 *concertados* schools in León (Spain). One of the schools had two first-grade classes, while the remaining three classes came from the other. *Concertado* is a Spanish term, with no English translation, to define schools ruled by private associations, usually

religious, but partially funded with public money. All participating students came from families living on medium or high incomes.

Though education in Spain is not compulsory until 1st grade (6 years old), all participants in our study had attended kindergarten from 3 to 6 years, as it is common for the majority of Spanish students. Consequently, they knew how to name, sound and write all the letters of the alphabet. Participating students were also able to write words with a simple syllabic structure (consonant + vowel) and regular spelling showed by direct phoneme-grapheme correspondence. Since we conducted our study in the middle of the school year, most students were familiar with the use of capital letters and could write simple sentences when these were dictated or copied from a worksheet. However, they had not received any previous formal instruction on text writing and had never faced a composition task.

Classes were randomly allocated to conditions. To maintain equivalence between both participating schools, one class from each school acted as a control group. Thus, the experimental condition comprised three class groups, while the control condition included two classes. Students in the experimental condition (N = 62, 32 female) were taught strategies for planning and narrative writing through a strategy-focused instructional program. Instruction in the control group (N = 39, 22 female) focused on playful activities to promote creativity in writing and motivation. Students' mean age at the beginning of the study was 6 years and 6 months (SD = 0.28).

Throughout the course of the study, 7 participants were removed from the analysis either because they did not complete all the assessments or they had serious deficits that prevented them from engaging in classroom activities. Of these, five students were part of the experimental condition while the remaining two had been allocated to the control group.

Measures

Students' writing performance was assessed at pretest, posttest and follow-up. Students completed a writing task during approximately 40 minutes. They were asked to write a narrative about a topic of their own choice. They could either invent the story or based their writing on one that already existed. Students were free to choose the topic because we wanted to prevent background knowledge (or lack of it) about a given topic from interfering in their writing. The instructor told the students to write as neatly as possible, so that staff at University of León were able to read their compositions. If students inquired about spelling, text structure or content during the course of the writing task, the instructor answered them to do it as they thought it should be. Compositions were scored for text length, holistic reader-based measures and text-based ratings.

Text length was the number of words written. Given the age of students, they sometimes struggled to separate the words. In these cases, when two or more strings of letters were together but it was clear that they represented different words, they were counted as separate words. For example, the expression "Once upon a time" was usually written "Onceuponatime" but counted as four words. To measure text length, we did not count the title, the expression "The end" and strings of random letters with no recognizable meaning, if these were present.

Within the *reader-based holistic ratings,* texts were scored for overall structure, coherence and quality, on the basis of the criteria suggested by Spencer and Fitzgerald (1993). Table 2 presents the holistic scale used to measure each of this constructs as well as the scoring criteria. An example of how we holistically assessed students' texts can be found in Appendix B of chapter 3 of this thesis.

Table 2

Holistic criteria for reader-based assessment

Variable	Scale	Criteria
Structure	1: Unstructured 2: Poorly structured 3: Partially structured 4: Well structured	Presence and development of these elements: • Background information to create a global context for the narrative. • Cohesion marks and structural cues, both between sentences and paragraphs. • Initial event that creates a complicated situation for the main character. • Character's actions to solve that complication • Results obtained from those actions • Casual and temporal relationships between events in the story.
Coherence	1: Incoherent 2: Nearly completely incoherent 3: Somewhat coherent 4: Very coherent	• The main topic and theme were identified. • The story was developed without digressions • The overall context of the story was clearly defined and served to orient the reader. • Details were organized according to a plan that was maintained throughout the story. • Ideas were linked by means of cohesion ties. • Discourse was fluent. • There was a conclusion or statement that created a sense of closure.
Quality	1: Inadequate, difficult to understand 2: Barely adequate 3: Adequate 4: Good 5: Very good 6: Excellent	• Clear sequence of events with little or no irrelevant details. • Good overall organization. • Vocabulary suitable to the topic. • Variety of interesting details. • Correct sentence structure. • Correct punctuation, capitalization and spelling.

Finally, compositions were scored on the basis of *text-based ratings,* referred to the presence or absence of the typical features of a narrative (Cuetos, Sánchez & Ramos, 1996). We identified two main parts of a narrative: framework and episode. Framework included references to time, space and characters. For each temporal or spatial reference, we gave 1 point. Students were given 0 points in these two variables if there was no explicit reference to where and when the story took place. There was no maximum score for time and space variables. Characters were scored from 0 to 2 points. Students received 0 points if there was no mention to any character. For example, some stories were simple sentences with no development and so short that no characters were mentioned (e.g "One day, it was sunny because the summer holidays had already started"). Students were given 1 point when they mentioned at least one character. If students provided some descriptive details about the characters' physical appearance or personality, this variable was scored with 2 points.

Episode included initial event, characters' emotional response to events, actions and consequences. Students were given 1 point if they wrote a unique, initial event that triggered the development of the story. We gave 0 points when there was no event that started the story. Then, we gave 1 point for every action that advanced the story (i.e actions necessarily included verbs) and every emotional reaction showed by the characters (i.e descriptions about their feelings, for example "was very sad", "cried in fear", etc.). There was, therefore, no maximum score for actions and reactions variables. Finally, we gave 1 point if the student wrote a final consequence to end the story and create a sense of closure. Consequences were scored 0 if they were not present.

All texts were scored by two independent raters in terms of reader-based and text-based measures (text length was considered an objective rating and was, therefore, scored by only one rater). Interrater agreement gave a mean of .94 across all measures and assessments.

Instructional programs

Intervention was conducted over 2 months during the second school term. In order to maintain equivalence between conditions, both instructional programs shared several features. They comprised three stages, as it is described below, and intervention took place in the context of whole-class groups. Instruction was practice-matched and the instructor used a puppet to deliver it, as a motivational element. Both instructional programs comprised 10 twice-weekly sessions lasting between 45 and 55 minutes each.

Strategy-focused planning instruction.

Students in the experimental condition received a strategy-focused instructional program on planning. We adapted previous strategy-focused programs, particularly Cognitive Self-Regulation Instruction (Fidalgo & Torrance, 2018; Fidalgo, Torrance, Robledo, & García, 2009), to reduce the cognitive load imposed by the use of planning processes in writing and, thus, to make instruction suitable for first graders. Two major adaptations were made. First, while others have relied on acronyms as mnemonics to remember the writing strategy, we designed a poster with the picture of a mountain that represented the structural elements of a narrative. Second, instead of teaching planning and drafting as separate writing phases, we encouraged our students to "think before write" but then promoted planning-transcription cycles in which students did not need to focus all their effort, and therefore consume their cognitive resources, on a separate planning phase.

The planning program comprised three stages. In the first phase, *direct instruction* (5 sessions), students were provided with explicit metacognitive knowledge of the planning process using a puppet as a supporting device. The puppet's name, "Pensarín" was related to the word "pensar" (in English "to think). Students were taught to always remember Pensarín's name when facing a writing task because that would remind them of the importance of thinking before writing. Students were then

taught the planning strategy using the Story Mountain mnemonic (La Montaña de los Cuentos). In this mnemonic, the structural parts of a narrative were represented as villages and houses on the road up to a mountain. Students found three villages on their way to the top of the mountain. These were called Introduction, Development and Conclusion, symbolizing the three main parts of a narrative. Introduction contained three houses, representing when and where the story happened and who the characters were. Development included one house indicating what happened in the story and how characters reacted to those events. Conclusion contained one house representing how the story ended. The Story Mountain mnemonic can be seen in Appendix A of chapter 3 of this thesis. At the end of phase 1, students identified the structural elements of a narrative in both high and low-quality texts. During the second phase, *modelling* (4 sessions), the instructor modelled how to write a narrative by composing a text in from of the class, using the mnemonic described above as a strategy. The instructor used thinking aloud to verbalize their thoughts while writing. Modelling included statements to set the goal (e.g *"I am going to write an amazing story"*), promote self-motivation and expectations of success (e.g *"with everything I have learned, I am sure I can do it. Mum will be really happy!"*), remember the strategy (e.g *"At the bottom of the mountain there was a village called Introduction and it had three houses…what was the name of the first one? When! So I have to think when my story happened"*) and evaluate their own writing (e.g *"Great! I have finished my story. I am going to read it to check everything is ok"*). Given the age of the students, modelling was combined with some guided practice. After each main part of the text was modelled (introduction, development and conclusion) students were given time to write down that part of their own story. Appendix A of this chapter shows an example of a scripted model. In the third phase, *individual practice,* students wrote their own narratives without seeing the poster of the Story Mountain. The instructor answered questions about grammar or spelling but did not comment on text content and structure.

Control instruction.

Students in the control condition received a practice-matched program focused on playful activities based around narratives. The control instructional program also comprised three stages, though these were not applied in a linear way, as it was the case for the experimental condition. All sessions were guided by the same puppet used with the experimental condition although, in this case, no meaning was attributed to its name. Children did not receive any kind of instruction on textual planning or the structural elements of a narrative. *The first phase* (6 sessions) had a strong focus on motivational aspects. Students were first presented with the aim of the program and, together with the instructor, they discussed the importance of writing both in and outside the school context. They then received some instruction on reading comprehension using a big book as guidance. The instructor read the story aloud and asked questions both about the content and the physical appearance of the book. In the remaining of this phase, students performed playful activities derived from writing. *Phase 2* (3 sessions) focused exclusively on writing performance. Students completed several copy and fill-in-the-gaps tasks aimed at developing their low-level transcription skills. In order to keep their writing practice matched with that of students in the experimental condition, they wrote two narrative texts. *In the third phase* (1 session), students visited the school library in order to understand the social function of writing. Table 3 summarizes the contents of both the experimental and the control instructional programs.

Table 3
Summary of training contents

Condition	Phase	Session	Contents
Experimental	Direct instruction	1	**Aim** of the program: learn to write narratives. **Background knowledge** about writing: what can you write (a tale, a letter, etc.) and why is writing important. **Metacognitive knowledge** about planning: meaning of Pensarín's name and importance of thinking before writing.
		2	**Previous knowledge**: recall planning process. **Direct instruction** of how to write the introduction of a story (when, where and who). **Revisit** the elements of the introduction.
		3	**Previous knowledge**: recall planning process + introduction. **Direct instruction** of how to write the development of a story (what happened and how characters reacted). **Revisit** the elements of the introduction and development.
		4	**Previous knowledge**: recall the planning process + introduction + development. **Direct instruction** of how to write the conclusion of a story (end). **Revisit** all the structural elements.
		5	**Previous knowledge:** recall the planning process + structural elements. **Analysis of high and low-quality texts.**
	Modelling	6	**Previous knowledge:** recall the planning process + introduction **Modelling** of the introduction.
		7	**Previous knowledge:** recall the planning process + introduction. **Guided practice:** individual writing of an introduction.
		8	**Previous knowledge:** recall the planning process + development + conclusion. **Modelling** of the development and the conclusion.
		9	**Previous knowledge:** recall the planning process a+ all structural elements. **Guided practice:** individual writing of the rest of their stories.

	Individual practice	10	**Individual writing** without guidance.
Control	Motivation	1	**Aim** of the program: know more things about stories. **Background knowledge** about writing: what can you write (a tale, a letter, etc.) and why is writing important.
		2	**Physical appearance of a book:** cover page, title, author, pictures and back cover. **Reading comprehension:** questions about content. **Creativity:** change the end of a story.
		3	**Playful activities:** craft project**,** games based on the characters of narratives, drawing of book characters and role playing from a story.
		5	
		6	
		10	
	Writing	4	Explicit **aim** of the session: to write a story.
		9	**Individual writing practice.**
		8	**Social function of writing:** recall library visit. **Low-level transcription skills.**
	Generalization	7	**Social function of writing**.

Procedure

Before conducting the study, the research team contacted the school headmasters to present their project and asked for permission. We provided both the school management and first-grade teachers with a detailed description of the study. All participating school agents and researchers signed an agreement stablishing the conditions under which the study would be developed. Parents were informed through the school webpage. At the end of the study, each participating class received a report with the results of the students.

Both assessment and instruction were delivered by the author of this thesis, who received training as a teacher during her degree. Assessment was conducted with

whole-class groups in one session lasting for 1 hour, in which students completed the narrative task. The whole study took part in the school context, with all but one, assessment and intervention sessions being applied in students' regular classroom. Exceptionally, we asked for permission to visit the school library to conduct one of the sessions in the control condition. All sessions took place within school hours.

As fidelity measures, the instructor was provided with scripted sessions to conduct both assessment and intervention and given time to read them several times. All sessions were audio recorded. At the end of the intervention, in order to increase fidelity, we collected and analysed all the materials and checked whether students have attended all the sessions and completed all the intervention tasks.

Data analysis

Data were analysed with the software R. We compared improvement in both conditions using mixed effects models (Quené & van den Bergh, 200) in lm4 (Bates, Mächler, Bolker and Walker, 2015), in order to fit the hierarchical structure of our data: assessments clustered within students who were, in turn, clustered within classes and schools. We tested a series of nested models with random by-student and by-classroom intercepts and test (baseline, posttest, follow-up), condition and the interaction test-condition as fixed factors. We calculated statistical significance using the F and t tests with Satterthwaite approximation. We also reported intraclass correlations and effect sizes.

Study 2. The Response to Intervention model in writing: a review of assessment measures and instructional practices.

The second study, "The Response to Intervention model in writing: a review of assessment measures and instructional practices" (Arrimada, Torrance & Fidalgo, 2020), was published in Papeles del Psicólogo and is presented in chapter 4 of this thesis.

Aim

In this study, we aim to review and analyse the two main dimensions of the implementation of the RTI model in the field of writing: assessment and instruction. Specifically, in chapter 4 we discuss a) a set of assessment measures to identify students at risk of learning disabilities in writing and to monitor their progress and b) several empirically-based instructional practices in writing focused on different cognitive processes. To achieve this aim, we reviewed the international scientific literature on the two aforementioned dimensions.

To our knowledge, this is the first study to review in detail, and group into categories, both assessment measures and instructional practices in writing that might be feasibly used under RTI approaches. From a scientific perspective, our research contributes to create a general framework to apply the RTI model to the field of writing assessment and instruction. Thus, it expands scientific knowledge on the effective implementation of RTI approaches. However, the greatest contributions of this study can be seen, we believe, in the educational field. First, it provides instructional guidelines for educational agents, in an attempt to respond to their claims that they lack sufficient training and support to face classroom diversity and learning disabilities (DeSimone & Parmar, 2006). Second, our review is, we believe, a transfer mechanism which contributes to reduce the gap between scientific knowledge and educational practice.

Within the overall framework of this thesis, this empirical review sets the basis for the instructional decisions made in the design of the subsequent two empirical studies included in chapters 5 and 6.

Search procedure

Literature search was conducted in English, using Google Scholar and ERIC as data basis. We did not set any time limit so that the readers could have an overall view of writing assessment and instruction since early writing research. We only included full text studies. Search terms were differentiated according to the two dimensions presented on the review: assessment and instruction.

To search for studies reviewing assessment measures, we initially set general terms such as "writing assessment review/meta-analysis", "writing measurement literature" or "progress monitoring + review". Once we had an overall idea of the different kinds of measures used to assess writing and to monitor students' progress, we searched for meta-analysis or reviews where different studies using the same assessment measures were compared. For this, we used terms such as "holistic/analytic scoring/CBM writing + review/meta-analysis", "rubrics + writing assessment + literature". Given the little amount of reviews (only 4 out of 21), we searched for empirical studies that provided data on the validity and reliability of specific measures. For this, we removed words such as "review", "meta-analysis" and "literature" from the previous terms and added the terms "validity" and "reliability".

In the instructional dimension, search was restricted to meta-analyses and systematic reviews in which several empirical studies were analysed and compared. The teaching of writing highly depends on the cognitive process that is under instruction. Thus, from the very beginning, we differentiated search terms according to the cognitive writing process whose instructional practices we were interested in: handwriting, spelling and high-level planning and revising. For handwriting and spelling, search terms included "meta-analysis/review spelling/handwriting"

"spelling/handwriting instruction" or "teaching spelling/handwriting". When searching for meta-analyses on instruction on high-level processes, we initially used terms such as "planning/revising meta-analysis/review" or "teaching planning/revising". However, we soon noticed that no meta-analyses addressed specific planning or revising teaching practices. Thus, we searched for meta-analysis and reviews about general effective practices in the teaching of writing, using terms such as "writing instruction meta-analysis/review", "effective instructional/teaching practices + writing". From them, we only selected those practices whose efficacy for teaching planning or revising had been tested.

Once all studies were located with the previous criteria, we read their title, summary, aim and method sections in order to check whether they fulfilled the selection criteria described below.

Selection criteria

Our review comprised 32 scientific studies divided in two categories according to the two dimensions of RTI analysed in the paper: assessment measures and effective instructional practices in writing.

For the first dimension, writing assessment, we reviewed 21 scientific studies, some of which were literature reviews (N = 4) and the others were empirical studies (N = 17) that tested the validity and reliability of the measures under study. Studies in this dimension were grouped according to the kind of measure they reviewed or validated: correct letter writing, holistic scoring, analytic approaches and Curriculum Based Measures (henceforth CBM). All studies included in this dimension met the following selection criteria: a) being systematic reviews or critical reflections of empirical studies; b) in the case of empirical studies, being conducted with school-aged students (kindergarten, elementary or secondary school); c) providing data on the validity or reliability of the measures addressed; and d) providing a detailed description of the writing tasks from which the referred measures can be taken.

For the second dimension, writing instruction, we reviewed 11 scientific papers. All studies were either meta-analyses (N = 6) or systematic reviews (N = 5) analysing the efficacy of teaching practices in writing. Studies were grouped according to the cognitive writing process that was the focus of the instructional practices presented. To our knowledge, however, no meta-analyses or reviews have been conducted on effective teaching practices aimed specifically at improving high-level cognitive processes. Thus, for these processes, we analysed meta-analyses on the effectiveness of general teaching practices in writing, since it has been proved that some of these practices are effective to teach high-level processes. Studies included in this dimension met the following selection criteria: a) being meta-analyses or systematic reviews; b) including only instructional practices in writing, not in reading or other academic areas; c) providing a detailed description of each instructional practice as well as data about its efficacy; and d) including teaching practices whose efficacy have been tested in school-aged children.

Data analysis

To analyse the data, we first conducted subsequent classifications of the studies located. These were divided according to the two dimensions, assessment and instruction. Within the assessment dimension, we classified the 21 papers in four categories on the basis of the measure they described or validated: correct letter writing, holistic scoring, analytic procedures and Curriculum Based Measures (CBM). Finally, we divided those papers focused on CBM in two categories according to whether they used productivity or accuracy measures. Within the instructional dimension, the 11 meta-analyses and reviews were classified in three categories based on the cognitive process taught through the instructional practices presented: handwriting, spelling and high-level processes.

The second step was to provide a detailed description of the features of each assessment measure and instructional practice. For this, we compared and synthesized

the information contained mostly on meta-analyses and reviews, though, given the small number of reviews in the assessment dimension, empirical studies were sometimes useful to define the measures.

Third, we compared the studies that had been previously included in each category. We did not stablish comparisons between studies in different categories. In the assessment dimension, for each measure, we drew conclusions on its reliability and validity, the advantages and limitations of its use, writing features that could be evaluated with that particular measure and writing tasks associated to its use. In the instructional dimension, we compared the teaching practices listed in each study in order to draw conclusions about their efficacy and whether they could be used to instruct on planning and/or revising.

Finally, we synthesized and presented the results in two tables, one for each dimension of the study. Each table also contained a list of the studies reviewed, classified according to the construct they addressed. Summary of the results can be seen in Tables 1 and 2 in chapter 4 of this thesis. Figure 1 below represents the data analysis procedure.
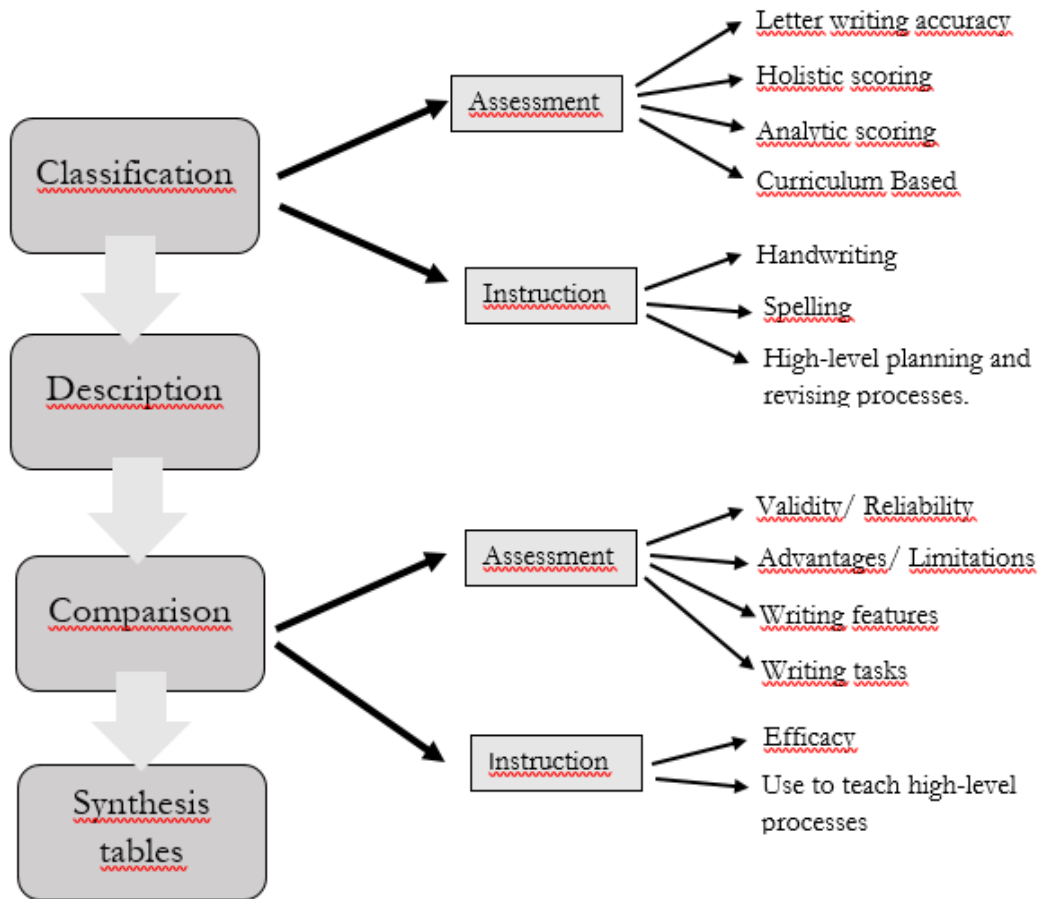
Figure 1. Data analysis procedure for study 2.

Study 3. Supporting first-grade writers who fail to learn: multiple single-case evaluation of a Response to Intervention approach

The third study, "Supporting first-grade writers who fail to learn: multiple single-case evaluation of a Response to Intervention approach" (Arrimada, Torrance, & Fidalgo, 2018), was published in *Reading and Writing* and is presented in chapter 5 of this thesis.

This study set the basis, and is therefore linked, to study 4, presented in the subsequent chapter. Both of them evaluate a two-tiered Response to Intervention approach to written composition in first grade and explore the feasibility and applicability of the Response to Intervention approach in the context of Spanish writing instruction. Although both studies derived from the same empirical work, the specific aims and other features of each study are different, as we explain below.

Aim

This research is a multiple-baseline single-subject design study that explores the immediate efficacy of Tier 2 personalized remedial instruction for students who particularly struggle with handwriting and who do not respond to Tier 1 classroom instruction in transcription and planning.

This study, along with study 4 presented in chapter 6, is, to our knowledge, the only current example of a formal implementation of a RTI multi-tiered approach in the context of writing. Both studies offer a method for identification of struggling writers based on their rate of learning instead on their performance at a single point in time, as it has usually been done. Study 3, in particular, make significant contributions specifically derived from its focus on handwriting. In this research, we compared two Tier 2 interventions focused either on transcription or a combination of transcription and planning. Thus, from a scientific perspective, it contributes to a better understanding on the relationship between high and low-level skills, particularly handwriting, at the very beginning of compulsory education. From an educational

perspective, it provides educators with instructional guidelines on how to support struggling students from very early educational stages so that they catch up with their average peers.

Within the overall framework of this thesis, this study complements the empirical review presented in study 2 and acts as a vehicle to transfer scientific knowledge into practice by providing empirical evidence on the effectiveness of some of the assessment measures and empirically-validated instructional practices presented before. Moreover, it addresses, for the first time in the present dissertation, combined instruction in the various cognitive processes involved in written composition. The instructional programs presented in this study focus not only on planning instruction, as it was done in study 1, but also in the automatisation of low-level skills, also essential in the early acquisition of writing competence. Finally, this single-subject design study set the basis for the overall group analysis on the effectiveness and feasibility of RTI conducted in study 4. When testing new educational approaches, it makes sense, we believe, to start with a small single-subject design, sampling students with particular deficits and, if findings are positive, extend this research to whole group classes with a variety of difficulties.

Design

Study 3 is a multiple-baseline single-subject design study in which we compared a small sample of first grade writers who particularly struggle with handwriting (N = 12) with a comparison group formed by typically developing writers in the same grade level (N = 7).

This study was conducted over the course of first grade and divided in two phases according to the first two tiers of the Response to Intervention model. Phase 1 lasted for 17 weeks, from the beginning to the middle of first grade. In this baseline phase, all students in our sample received Tier 1 classroom instruction designed by the researchers and delivered by their regular teachers. Instruction addressed both

low-level transcription skills and high-level planning processes. Planning instruction focused on story writing. Phase 2 lasted for 10 weeks, from the middle to the end of first grade. Over the course of this phase, all sampled students continued receiving Tier 1 classroom instruction. Additionally, students who had shown poor estimated writing performance at the end of phase 1 and poor handwriting in a narrative writing task were provided with additional Tier 2 remedial instruction in the form of homework tasks supported by parents. Tier 2 instruction was designed to meet, to some extent, the individual needs of each student, so all students received handwriting instruction. However, instruction comprised not only handwriting but either transcription (handwriting and spelling) or a combination of low and high-level skills (transcription + planning). It was applied twice a week and ran parallel to Tier 1 classroom instruction.

Students were assessed at the entrance of first grade (before phase 1), before and immediately after receiving remedial Tier 2 instruction (phase 2). At each assessment point, students completed a set of literacy tests assessing both transcription and narrative writing. Additionally, we monitored students' progress by means of weekly probe tasks applied over the whole course of the intervention. These assessed overall text quality and served to check students' rate of learning. The design of studies 3 can be seen in Figure 2.
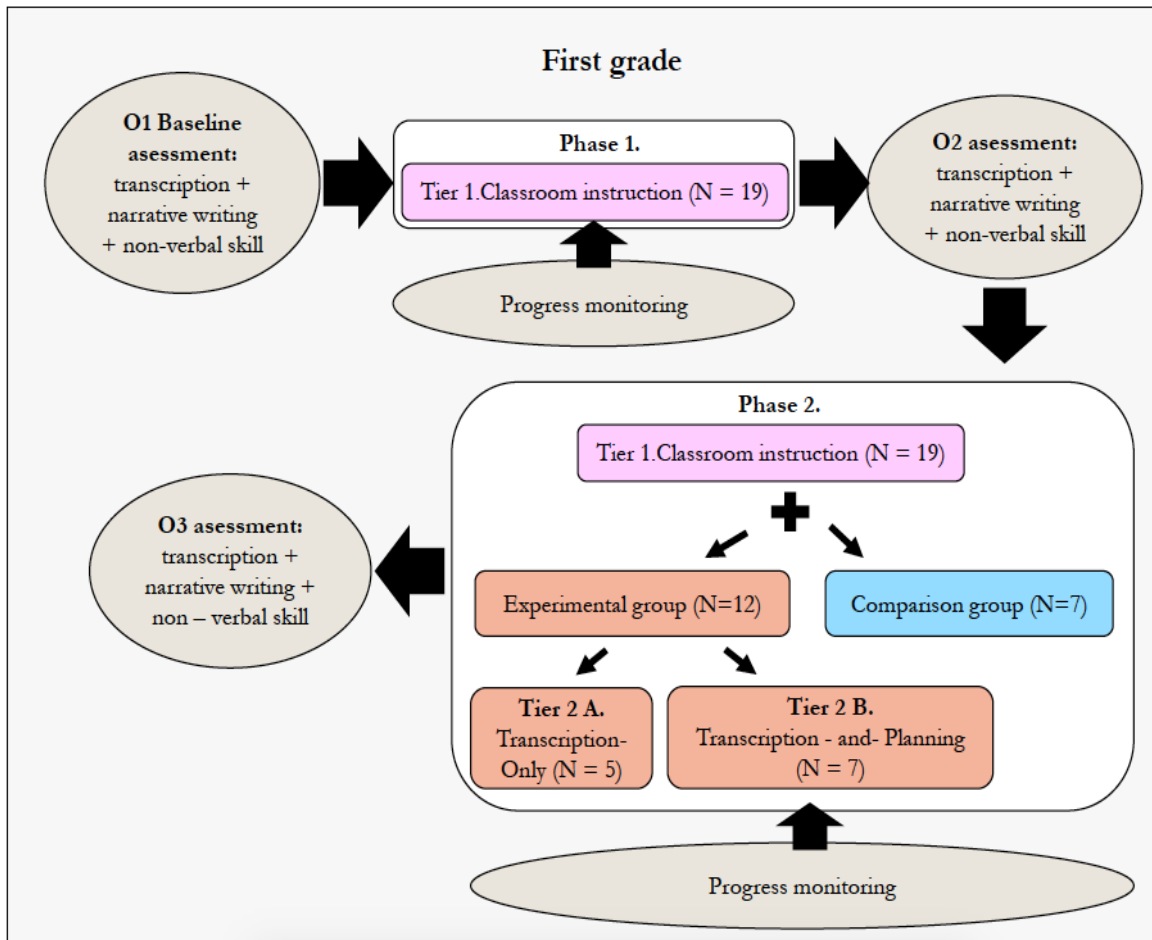
Figure 2. Study 3 design

Participants

A sample of 19 first-grade students distributed in 8 classes from 3 *concertados* schools in León (Spain) took part the study. Two participating schools included three first-grade classes, while the remaining school had two classes. All participating schools were located in middle-class areas. As it was the case for the first study presented in this thesis, all students in this study had attended kindergarten. Given that this study places particular emphasis on handwriting, 12 of the sampled students (4 female) showed poor or very poor handwriting. These were randomly allocated to two intervention conditions: Tier 2 support focused exclusively on transcription

(N=5) and Tier 2 support addressing both transcription and planning (N=7). Tier 2 individual instruction ran parallel to Tier 1 classroom instruction for these 12 students. The individual performance of these 12 students was compared with a comparison group of typically developing students (N=7). Students in the comparison group received only Tier 1 instruction. Table 4 provides sample distribution and mean ages at the beginning of the study.

Table 4
Sample characteristics

Condition	N (*N* female)	Mean age at baseline (SD)
Transcription-Only	5 (1)	6.2 years (2.4)
Transcription-and-Planning	7(3)	6 years (5.01)
Comparison	7(3)	6.1 years (3.9)
Total	19(7)	6.1 years (3.9)

Our sample was selected from an overall sample of 179 first-grade students (94 girls and 85 boys). Mean age of the whole sample was 6 years and two months at the beginning of the study (SD = 3.4 months). During phase 1 of the study, all these students received Tier 1 classroom instruction. Immediately after phase 1, all 179 students were allocated to either an experimental condition, formed by struggling students who received Tier 2 remedial intervention at home parallel to Tier 1 classroom instruction, or to a comparison group, which continued receiving only Tier 1 classroom instruction. Allocation to conditions was based on estimated performance on the progress monitoring probe tasks, measured in terms of text quality and described in the measures section (pp. 75). Estimated writing performance was calculated through linear regression models fitted separately for each child. For the specific purpose of this study, we identified a subsample of struggling students who met two inclusion criteria: a) estimated writing performance below the 15th centile at the end of phase 1 and b) poor or very poor handwriting performance.

Handwriting accuracy was assessed on the narrative task completed immediately after phase 1 on a 5-point scale ranging from "no handwriting" to "nice handwriting". The whole scale including specific criteria to score each text can be found in Appendix A of chapter 5 (table 2).

These two selection criteria provided us with a sample of 13 students. One of these students was removed from the analysis because she did not complete the Tier 2 intervention. The remaining 12 students were randomly allocated to one of the intervention conditions described at the beginning of this section (Trancription-Only or Transcription-and-Planning). Additionally, we randomly selected 7 average students who did not meet the selection criteria to act as the comparison group.

Measures

This study involved the use of two kinds of measures: progress monitoring measures that took the form of weekly probe tasks and literacy tests conducted before phase 1 and immediately after each phase of the study. Below, we describe each of these measures in turn.

Progress monitoring measures.

We monitor students' progress by means of regular probe tasks. These took place twice a week with some variation across classes and throughout the course of the study, that is, from the beginning to the end of first grade. Probes were delivered by the regular teacher and collected once a week by the author of this thesis.

Students were asked to write about events in their own lives during approximately 15 minutes (including 5 additional minutes previous to the writing to elicit ideas). Teachers were free to change the topic as often as they wished on the condition that it should be selected from a list of topics provided by the researchers. Topics were designed so that they met two criteria: a) they should be familiar and

close to students' daily lives, so that they did not require any additional knowledge from that expected of a first grader; b) they must be addressed through a narrative text (a personal narrative), not through descriptions or other text genre. Topics were frequently posed as questions, such as "what did I do yesterday?" or "how did I celebrate my last birthday?" Students' probe tasks were assessed first for overall text quality. Given their particular handwriting deficits, compositions were also assessed for productivity, spelling and handwriting accuracy.

Overall text quality.

Probe tasks were scored for overall text quality, using a holistic 6-point scale ranging from "very poor" (score 0) to "very high" quality (score 5). To create the scale, researchers observed and discussed texts written by the students over the first months of the study and determined a scoring criteria defined by the following aspects: progression of ideas, inclusion of relevant and non-repetitive details, handwriting and spelling accuracy, grammar complexity, cohesion between ideas, vocabulary and text structure. Text quality was scored by two independent raters with an interrater agreement of .91 across the two phases of the study. The scoring scale for text quality can be found in Appendix A of chapter 5 (table 3) and Appendix C1 of chapter 6 of this thesis.

Productivity and spelling.

Productivity was the total number of words in each text, independently of spelling. Given the age of the students, we considered as words any strings of letters separated from other strings and interpretable as attempted words. Spelling accuracy was measured by counting the number of correctly spelt words. Both productivity and spelling were considered objective measures so only one rater was needed.

Handwriting accuracy.

Finally, we measured handwriting accuracy by means of a holistic 5-point scale ranging from "no handwriting" (score 0) to "nice handwriting". Scores were based on the legibility of the text and the overall feeling of neatness. Handwriting accuracy was measured by two independent raters, with an interrater agreement of .95 over the two phases of the study. The scoring scale for handwriting accuracy can be found in Appendix A of chapter 5 (table 2).

Phase-end literacy tests.

Before phase 1 and before and after phase 2 we measured spelling accuracy, handwriting speed, overall text quality and non-verbal skill by means of specific literacy tests.

S*pelling.*

Students' spelling skill was measured through a spelling test delivered by members of the research team. The spelling test included 12 real words and 12 pseudowords and was applied in two different days, so as not to overwhelm students. The examiner dictated each word/pseudoword aloud two times. She stopped after each word and gave the students as much time as they needed to write it down. Real words were selected so that each two of them included one of the following six spelling irregularities: diagraph (combination QU and GU), contextual effect (combinations CE and CI), position effect (letter R at the beginning of the word and between vowels), inconsistency (use of letters G and J), unvoiced letters (letter H) and stress mark on the last syllable. For a detailed description of these inconsistencies, see Defior, Jiménez and Serrano (2009). We used bisyllabic and trisyllabic medium-frequency words selected from the Spanish dictionary of word frequency in children's writing (Martínez & García, 2004). Pseudowords were designed changing some of the letters in the real words, so that they were as similar as possible to those.

Each word and pseudoword was scored from 0 to 2 points. We gave 2 points when the word written by the student was correctly spelt or, in the case of pseudowords, when spelling was phonologically plausible; 1 point was given when the word contained one or two spelling mistakes; words with more than two spelling mistakes were given 0 points.

Handwriting speed.

To assess handwriting speed we used an adaptation of traditional sentence-copy tasks delivered by members of the research team. Previous versions of this task has given the students a written sentence to copy it. However, this involves reading ability, short-term memory, checking of spelling and other literacy skills that we were not interested in for the purpose of this study. Thus, in our task, students memorised a single sentence dictated aloud by the examiner. To support memorization, the examiner started by reading the sentence aloud. Then, all students repeated it aloud three times. Then, the examiner asked 5 students one by one to repeat the sentence aloud. Students were then given 1 minute to write the sentence as many times as they could. When the examiner told then to stop, they should put the pencil on the table and raised their hands to make sure that none of them kept writing. The sentence used in this task was "I really like going to the playground ("Me gusta mucho salir al patio")". It was designed by the researchers according to two criteria: a) it had to be meaningful for the students and, therefore, easy to remember; and b) it should contain no spelling irregularities.

Handwriting speed was rated by counting the total number of words written in one minute. Incomplete words at the end of the sentence were not counted, though we did count words with missing letters in the middle of the sentence. In order to measure handwriting speed as purely as possible, we ignored spelling mistakes as long as the word was similar to the original one.

Text quality.

Students also completed a narrative writing task to assess overall text quality. Narrative writing assessment was conducted by members of the research team. Students were told to write a narrative about a topic of their own choice and they were given approximately 40 minutes to complete the task. As we had done in previous studies (see Study 1 section in this chapter, pp. 55), students were free to invent their own story or recall one that already existed. Instructions to complete the task included emphasis on neatness and legibility and the examiner encouraged students to use everything they had learned. When students asked about text content or the spelling of a particular word, the examiner told them to write it as they thought it was right.

Compositions were scored for overall quality, measured by counting the features typically associated with good narratives. We used an adaptation of the criteria suggested by Cuetos et al., (1996). We scored each of the following narrative elements with 1 point if they were mentioned in the text and with 0 points if they were not present: time references, spatial references, main character, some description of one or more characters (at least one describing word referred either to their physical appearance or personality), initial event, character's emotional responses, any mention of action, a sequence of actions (two or more events linked together giving a sense of progression of the text), consequences and vocabulary. Thus, maximum score for text quality was 10 points. All texts were scored by two independent raters. Interrater agreement gave a mean of .95 before phase 1, .92 at the end of phase 1 and .91 at the end of phase 2.

Non-verbal skill.

Finally, we assessed students' non-verbal skill by means of an adapted version of Raven's progressive matrices (Raven, 1981), designed and delivered by the research team. Students were given a workbook containing 20 incomplete matrices. These were

grouped in three categories: patterns, sequences of identical figures and geometrical figures. For each matrix, students should select, among six options, the picture that best completed that matrix. After explaining the task, the examiner showed three example matrices and students solved them aloud together. Students were given a maximum of 20 minutes to complete the task, through the workbooks were collected earlier if they finished before the time was ended.

Students were given 1 point for each matrix correctly solved and 0 points if they had chosen the wrong option. Maximum score for this task was, therefore, 20 points. Cronbach's alpha for this test gave a mean of .69 across all three assessments and .67 when comparing assessments between them, showing reasonable test-retest reliability. We provide an example of how the matrices looked like in Appendix B of this chapter.

Instructional programs

Instructional programs fitted the multi-tiered structure of RTI approaches. Thus, students were provided with both Tier 1 classroom instruction and Tier 2 remedial instruction for struggling writers. In this study, the whole intervention lasted for one academic year, from the beginning to the end of first grade.

Tier 1 classroom instruction.

Tier 1 instruction was delivered by regular teachers over the course of the program in the context of whole-class groups. It comprised a total of 83 sessions implemented across the two phases describe in the design (54 sessions in phase 1 and 29 sessions in phase 2). Each session focused on one of the following writing cognitive processes: handwriting, spelling, sentence-combining and planning. Instruction comprised three sessions per week, each one of them focused on a different process. The remaining two days of the week were devoted to complete the progress monitoring tasks.

Handwriting instruction.

Handwriting instruction drew heavily on previous work on handwriting components and instructional sequences (Berninger et al., 1997; Graham, 1999; Graham, Harris, & Fink, 2000). Overall, it aimed to improve legibility of the text and writing fluency. Handwriting instruction comprised 28 sessions, over phases 1 and 2, which addressed the 26 letters of the Spanish alphabet. Sessions were divided in four sets, each set providing training on 7 letters (except the last one, which included only 6 letters). The instructional sequence for each set comprised 6 sessions structured as follows. First, instruction focused on letter name and the alphabetic sequence (2 sessions). Students were presented with a poster called "The Letter Clock (El Reloj de las letras)" and learned a song which associated each letter to a word that started by that letter. Activities based around this material included memorizing the song and filling an empty clock with the corresponding letters, following the alphabet sequence. Second, instruction focused on letter shape (2 sessions). Students traced the letters first following numbered arrows and then without support. Third, instruction was devoted to handwriting fluency (1 session). Students completed several time-limited tasks in which they were instructed to write as many single letters as they could. Fourth, students practiced low-level skills (1 sessions) by completing a copy-through-dictation task. To prevent spelling from interfering with handwriting, they were given a written text which was also dictated aloud by the instructor. The text was followed by a set of lines to write it down in the same worksheet.

Spelling instruction.

Spelling instruction was based on previous studies on how to teach school-aged students to recognize the graphemes that form a word (Graham, Harris, & Fink, 2002; Graham, 1999). Spelling instruction comprised 14 sessions over phases 1 and 2. Students learned three Spanish spelling rules: distinction between C and Z on the basis of the vowel these were combined with; distinction between C and QU; and the

use of G, GU and GÜ. These spelling rules were selected from the regional educational curricula for 1ˢᵗ grade. The teaching of each rule comprised 4 sessions that were divided in two stages. First, the students inferred the rule by analysing six target words controlled for frequency (2 sessions). The instructor gave them clues to support their guessing. After guessing, the teacher provided a detailed explanation of the rule. Second, students completed several tasks aimed at practicing the writing of words containing that rule (2 sessions). These included a "Writing Goose" game in which students threw a dice, moved through the playing board and obeyed the instructions contained in each cell. Instructions included orders such as "*write a word which contains letters CA*". The last two sessions of phases 1 and 2, after the three spelling rules had been learned, were devoted to revisit the contents.

Sentence-combining instruction.

On the basis of previous literature on how to combine simple sentences to form complex ones (Beers & Nagy, 2009; Berninger, Nagy, & Beers, 2011) we included some sentence-combining instruction in our program. This instruction addressed to major points: the use of cohesive words to combine two simple sentences in a complex one; and the use of punctuation marks. Sentence-combining instruction addressed the following cohesive words: linking particles (that), casual relationships (because, since, as), consequences (therefore, thus), opposition (but, though), temporal relationships (then, after), purpose (to). Additionally, students were instructed in the use of three punctuation rules: question and exclamation marks, stop and full stop. Sentence-combining instruction comprised a total of 12 sessions over phases 1 and 2. Sessions were divided in 3 sets, one for each punctuation rule. Each set comprised 4 sessions whose instructional sequence was as follows. First, the emphasis was on the use of cohesive words to form complex sentences (2 sessions). Students were provided with pairs of simple sentences and they should choose, between several options, the word that best serve to link them in a single complex

sentence. Second, students learned the corresponding punctuation rule (2 sessions). This was first explained by the teacher and students then used it in real sentences or texts.

Planning instruction.

Panning instruction focused on story writing and drew heavily on previous strategy-focused instructional programs (Arrimada, Torrance, & Fidalgo, 2019; Harris, Graham, & Adkins, 2015). It comprised 28 instructional sessions over phases 1 and 2. Planning instruction was divided in three stages, according to the three components of strategy-focused instruction described in chapter 1 of this thesis: direct instruction, modelling and students' practice.

In the ***direct instruction stage*** (12 sessions), the instructor provided students with explicit metacognitive knowledge about the planning process and the structural elements of a narrative. First, students discussed the academic importance of writing and mentioned different types of texts that could be written. The instructor also activated their background knowledge about story structure. Then, students were taught the importance of thinking carefully about the content and structure of a text before writing it, and this was associated with the planning process. To make sure they understand the concept of planning, students completed a worksheet in which they traced the word "to plan" and they chose the word that best defined it among several options. Second, once they understood the concept of planning, the instructor taught them to organize their ideas according to the different parts of a story. For this, the instructor used the Story Mountain mnemonic (see Study 1 section in this chapter for a detailed description of the strategy, pp. 58). Students were taught to structure their narratives in three main parts and to mention the elements of each part in their texts: introduction (when and where the story happens and who the characters are), development (what happens to the characters and how they react) and conclusion (how the story ends). All of these elements were represented as villages

and houses on the road up to the mountain. Particular emphasis was given to the importance of following an ascending order: the same way you start at the bottom of the mountain if you want to climb it, you should also start your text by writing the introduction. At the beginning of each direct instruction session, students recalled the meaning of planning. Then, the instructor explained the corresponding structural part of a narrative, placing stickers representing these parts in the correct section of the mountain. At the end of each session, the instructor removed the stickers and asked some students to place them again correctly. In the last two sessions of direct instruction, students were provided with a high and a low-quality text. The instructor read aloud both texts (one in each session) and the students identified the structural parts previously learned. In a worksheet, students circled the parts that were present in the texts read by the teacher. On the basis of the presence or absence of these parts, students judged the quality of each text.

In the second stage, **_modelling_** (9 sessions), the instructor wrote a story in front of the class while they verbalized their thoughts using thinking aloud. An example of a scripted model can be found in Appendix A of this chapter. Given the age of the students, each modelling session alternated with some practice in which the students wrote part of their own stories under their teacher's guidance, according to what they had previously observed on the modelling (i.e after modelling the introduction, students were given a sheet of paper and asked to write the introduction of a story). Since the development was the longest part of a story, guided practice of this part comprised 2 sessions instead of one, as it was the case for the introduction and the conclusion. The last two sessions of the modelling stage were devoted to an evaluation of the writing process. The teacher provided an incomplete model of how to write a narrative, missing some parts of it in their thinking aloud. Afterwards, students discussed the modelling on the basis of questions formulated by the teacher (e.g _"Did I write when my story happened?"_).

The last stage focused on ***students' individual practice*** (6 sessions). In this stage, students wrote two narratives. They were provided with a guide to support their writing process in the first story. This guide contained information about the structural parts of a narrative as well as ideas about the content. The second story was written without guidance and without seeing the poster of the story mountain. Two sessions were devoted to the writing of each story. Between stories, and after finishing the second one, students participated in some playful activities based around narratives, to keep the writing process from overwhelming them. At the very end of the school year, after completing all the planning sessions, the instructor devoted one last session to revisit the contents.

Tier 2 instruction.

Tier 2 instruction was delivered to the 12 struggling students over 3 months from the middle to the end of first grade. It took the form of writing tasks completed at home and supervised by parents. These tasks were presented in a workbook that contained 22 instructional sessions. The workbook was self-contained, that is, it provided all the necessary instructions to complete the exercises. Parents were not expected to provide any input beyond supporting their child's understanding of the tasks. The writing exercises were guided by an octopus who appeared in the workbook and acted as the instructor. As in Tier 1 classroom instruction, each of the 22 Tier 2 sessions focused strongly on a specific writing process. Sessions were designed to be implemented twice a week so that two different writing components were taught each week. Instructional sequences in Tier 2 intervention followed the same pattern of those in Tier 1, based on the RTI assumption that students would benefit from the same instruction when this is provided in a more intense and individualized way. However, we reduced the amount of tasks in each component so that they fitted 22 sessions.

Tier 2 instruction in this study took two different forms, according to the two intervention conditions described in the sample section (pp. 73): Transcription-Only and Transcription-and-Planning. Instruction in these two variants followed the same pattern than Tier 1 instruction, except for the fact that we removed instruction on sentence-combining due to its complexity, which might have overwhelmed struggling students. In addition, we made several adaptations in the teaching of each writing process in order to make the writing tasks more suitable for struggling students. These adaptations are described below.

Transcription-Only condition.

In the Transcription-Only condition, handwriting instruction involved three major adaptations: students traced sub-letter forms (i.e strokes, loops, etc) to practice the most basic handwriting processes; when instruction was devoted to letter shape and writing fluency students did not only traced single letters but also syllables; text-copying was removed from all Tier 2 handwriting sessions since it required a certain level of writing expertise.

Spelling instruction in this condition followed the same pattern as Tier 1 with only two minor adaptations. First, distinction between C and Z, was not taught. This was made in order to make Tier 2 as similar as possible to Tier 1 instruction which ran parallel to it. Since classroom instruction on the use of C and Z had already finished when Tier 2 intervention started, this was not included in the program. Second, the target words for each spelling rule were different from those in Tier 1 instruction though they were also controlled for frequency in children's writing.

Transcription-and-Planning.

In the Transcription-and-Planning condition, handwriting and spelling instruction matched the Transcription-Only condition, but for the fact that exercises on sub-letter forms and challenging syllables were removed to fit the 22 sessions.

Planning instruction, however, include several adaptations aimed at providing students with a higher degree of scaffolding. First, we tried to keep planning sessions as pure as possible without transcription interfering. Thus, in these sessions, parents were told to write down their child's answers when these involved writing words, sentences or whole texts. Second, direct instruction appeared written on the page instead of being orally explained. Students completed activities aimed at increasing their understanding of the planning process and of the structural parts of a narrative. Students were presented with an empty picture of the Story Mountain and wrote down the name of each part. Then, they linked several sentence with the part of a narrative they corresponded to (e.g the expression "in a huge castle" would be associated with house "Where"). Third, direct instruction, modelling and guided practice alternated. Thus, after each part was presented and modelled, students composed that part of their own narrative by tracing the sentences below some pictures. Modelling was presented through a video in which the author of this thesis provided a mastery model of how to write each part of a narrative. A final complete model was provided after individual videos for each part of a narrative. Fourth, Tier 2 planning instruction did not include any judgement of high and low-quality texts, though students did identify the structural elements of some narratives. Fifth, students' individual practice involved not only writing compositions but also evaluating them using a checklist.

Procedure

At the end of the academic year previous to the implementation of this study, the research team contacted the school headmasters and presented them with a detailed description of the project. Both parts signed an agreement listing the conditions to implement the study.

Tier 1 intervention was delivered by regular teachers. During September of the following academic year, while students were being assessed, the eight participating teachers attended a 1-hour training session where they were provided with a detailed description on the implementation of Tier 1 intervention as well as a user's manual which contained all sessions scripted. During the following days, before the start of the program, the author of this thesis met with the teachers several times to deliver the materials and solve occasional a priori questions. Once the program had started, teachers met with the researcher once a week when she came to schools to collect the probe tasks. These short meetings were maintained throughout the whole school year and served to discuss the work of the week and raise any concerns about past or future intervention sessions. Teachers also informed the researcher about changes made (or to be made) during the sessions, mostly schedule modifications due to school activities. Additionally, over the course of the study, teachers requested several meetings with the researcher to discuss how to proceed or make recommendations to improve the program on the basis of students' response. To ensure fidelity of Tier 1 intervention, teachers recorded all sessions. The author of this thesis listened to a random sample of 56 recordings and analysed them by comparing them with the scripts provided. Teachers' completion of the steps mentioned in the scripts gave a mean percentage of 87% (SD = 8%) across all teachers, though there was some variance between classes (ranging from 50% to 100%). Additionally, we collected and analysed all the written materials completed by the children and found no evidence of teachers failing to deliver the prescribed tasks. We, therefore, concluded that teachers' implementation of Tier 1 intervention was reliable.

Tier 2 intervention was supported by parents outside school hours. One month before this started, school headmasters informed all parents about the progression of the project through the school webpage. Additionally, parents whose child had been selected to receive Tier 2 training were given a letter of invitation which contained a brief explanation of what Tier 2 would consist of. Parents who accepted

to participate met individually with both the author of this thesis and her supervisor in one session of approximately 20 minutes. During this meeting, the researchers explained how Tier 2 instruction should be conducted and provided parents with a workbook containing all the activities to be completed by their child. At the beginning of this workbook, there was a list of instructions which were explained in detail by one of the researchers, encouraging parents to read through them as many times as they needed before applying the intervention. As fidelity measures, all Tier 2 tasks were paper-based and self-contained, so parents were not expected to provide any input beyond ensuring their child's understanding. All workbooks were collected and analysed by the researchers at the end of Tier 2 intervention. Students' completion of the prescribed tasks ranged from 82% to 100%, indicating fidelity of the intervention.

Data analysis

Statistical analysis was conducted with the software R. To analyse data, we tested a series of linear regression models separately for each child. In these models, we used phase, time (days from start of the year standardized within phase) and the interaction phase-time (rate of learning from baseline to posttest 1 and from posttest 1 to posttest 2) as predictors. Positive effects of the intervention were evidenced by higher scores at each assessment time and a steeper slope in phase 2 than in phase 1 (indicating more rapid learning).

Study 4. A Response to Intervention approach to teaching first-grade writing

The fourth study, "A Response to Intervention approach to teaching first-grade writing" has been submitted for publication in *Journal of Literacy Research* and is presented in chapter 6 of these thesis. It is a group study which explores the feasibility of the Response to Intervention approach in the context of writing instruction of Spanish whole-group classes.

Aim

Study 4 is group study that aims to test the immediate and sustained effects of a two-tiered writing intervention on planning and transcription for students whose rate of learning is substantially slower than that of their peers. Additionally, it explores teachers' and parents' perceptions about the implementation of our RTI approach.

Along with the previous study, this research involves a formal implementation of a RTI multi-tiered approach in the context of writing and provides the basis for identification and support of students at risk of writing difficulties. Study 4, in particular, makes significant contributions specifically derived from two features which were not present in study 3: a) its group nature and b) a more complex and complete design with three phases of intervention which allows to check, not only the immediate effects of Tier 2 instruction but also their maintenance over time. From a scientific perspective, it provides preliminary evidence on the maintenance of Tier 2 effects over time, which expands previous findings in the reading field to the context of writing. From an educational perspective, study 4 provides instructional guidelines on how to deal with a wide range of writing deficits, and, therefore how to face classroom diversity. Additionally, it supports previous findings on the beneficial effects of parental involvement in writing instruction. Finally, study 4 contributes to reinforce the feasibility of RTI approaches by analysing teachers' and parents' perceptions on the implementation of our program.

Within the overall framework of this thesis, this research goes beyond the third study. It provides preliminary evidence that previous case-study findings might extend to whole-group classes where struggling writers show a variety of writing deficits. Additionally, it provides some evidence on the maintenance of Tier 2 effects over time in early educational stages, even when this additional support has been provided for a relatively short period of time. In this study, we also provide empirical data on how parents and educational agents view the RTI approach, particularly regarding its strengths and weaknesses and their difficulties in its implementation.

Design

Study 4 followed a quasi-experimental group design in which we compared a sample of struggling writers (N= 36) with several writing deficits with a comparison group formed by average writers (N= 125).

We designed an 18-month program conducted over the course of first grade and during the first term of second grade. This was divided in three phases. Phase 1 started at the beginning of first grade and ended in the middle. During this phase, all participating students received researcher-designed Tier 1 classroom instruction focused on both planning and transcription skills. Instruction was delivered by their regular teachers. Immediately after phase 1, we identified a subsample of students whose rate of learning in writing was significantly below the average. All of these students received Tier 2 additional support over phase 2 of the study, which started in the middle of first grade and lasted to the end of the academic year. Tier 2 instruction was conducted at home, in the form of homework tasks supervised by parents. Tier 2 instruction addressed different combinations of writing processes (see description in the subsequent sample section) in an attempt to meet, to some extent, students' specific needs. Parallel to Tier 2 instruction, both struggling and non-struggling writers continued receiving Tier 1 classroom instruction over phase 2 of the study. All participating students were followed from the beginning to the middle

of second grade in a third phase. Phase 3 lasted for 15 weeks. In this phase, all students received again only Tier 1 classroom instruction, which served to check whether the effects of the Tier 2 intervention implemented in the previous phase (Phase 2) were maintained over time.

Students were assessed at the entrance of first grade (before phase 1), before and after phase 2 and at the end of phase 3. In each assessment, students completed a narrative writing task. Before phase 2, students also completed specific handwriting and spelling tests which were used as screening measures to adapt Tier 2 intervention to their specific needs. Additionally, over the course of all phases, we monitored students' rate of learning by means of weekly probe tasks. The design of study 4 can be seen in Figure 3.
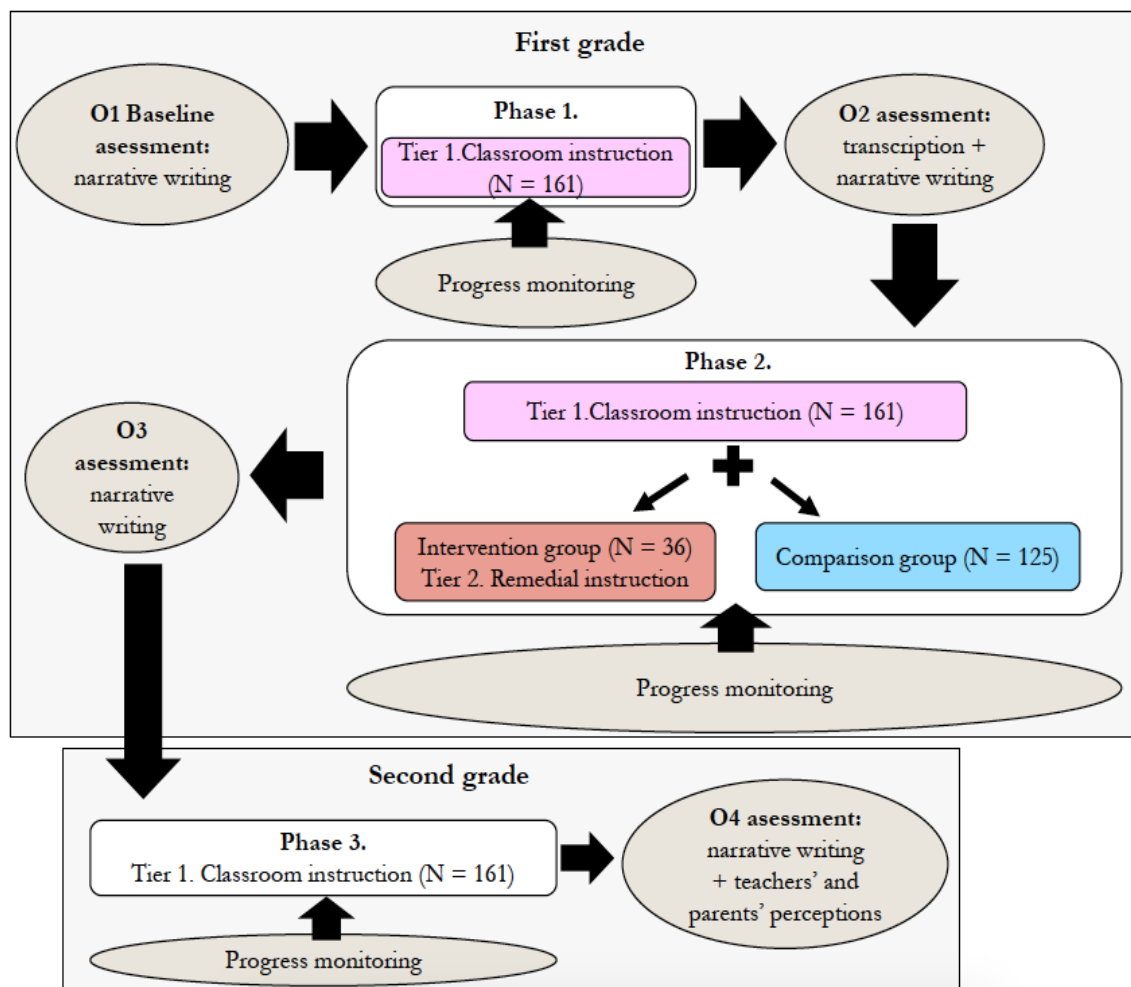

Figure 3. Study 4 design

Participants

The sample of this study comprised 161 first-grade students (83 girls and 78 boys) distributed in 8 classes from 3 *concertados* schools in León (Spain). Schools and classes were the same than those participating in study 3, so their features have already been described. The 161 participating students were allocated to either an experimental condition which received Tier 2 remedial intervention at home (N = 36) or to a comparison group, which received only Tier 1 classroom instruction (N = 125). Eight regular teachers also participated in this study by attending an interview about their views on the program. Finally, 32 out of the 36 parents that implemented Tier 2 intervention completed a questionnaire expressing their experiences. Table 5 provides sample details.

Table 5
Sample characteristics

Condition	N (*N* female)	Mean age at the beginning of Tier 2 (SD)
Intervention	36 (9)	6.6 years (3.6)
Comparison	125 (74)	6.7 years (3.4)
Total	161 (83)	6.7 years (3.4)

The sample in this study was selected from an initial sample of 179 first-grade students. On the basis on these students' text quality scores in the probe tasks completed over phase 1, we calculated individual estimated writing performance by means of liner regression models. To qualify for Tier 2 intervention, students' predicted performance at the end of phase 1 should be either below the 25th centile or between the 25th and 50th centile but with a rate of learning close to 0. According to this selection criteria, immediately after phase 1 we identified 44 struggling writers eligible to receive Tier 2 instruction and 135 average students to act as a comparison group. Of the 44 struggling writers, 8 were removed from the analysis either because

their parents declined to participate (2 students) or because they completed less that 80% of Tier 2 instructional sessions (6 students). Of the 135 average students, 10 were removed from the analysis because their teachers requested that they received Tier 2 instruction though they did not meet the inclusion criteria. This gave is a final sample of 36 struggling writers who received Tier 2 training and 125 average writers who only received Tier 1 instruction.

Tier 2 instruction in this study was tailored, to some extent, to students' specific needs. Thus, students received slightly different Tier 2 instructional programs on the basis of which cognitive processes they struggled more with. As screening measures to allocate students to different Tier 2 programs, we assessed their handwriting and spelling performance. *Handwriting accuracy* was holistically assessed in the narrative writing task completed before phase 2. The holistic 5-point handwriting scale can be found in Appendix A of chapter 5 (table 2). *Handwriting speed* was assessed by means of a specific handwriting test in which students memorised a single sentence and wrote it as many times as possible during 1 minute. Score was the number of complete words written in one minute, ignoring spelling mistakes. To assess *spelling accuracy* students wrote 12 bysillabic and trisyllabic words and pseudowords, controlled for frequency, dictated aloud by the examiner. Each two words or pseudowords included a specific irregularity of the Spanish orthographic system. Score in each word/pseudoword ranged from 0 to 2 points on the basis of whether they were correctly spelt (2 points), they contained two or less spelling mistakes (1 point) or they included more than 2 spelling mistakes (0 points). On the basis of these tasks, some students with very weak handwriting and spelling received Tier 2 instruction focused on transcription (N = 5) while others with a variety of deficits received Tier 2 instruction focused on a combination of text-planning, spelling and handwriting (N = 31).

Measures

This study involved the use of both continues progress monitoring measures applied weekly and a narrative writing task completed at the baseline and at the end of each phase of the study. Additionally, we assessed teachers' and parents' perceptions on the implementation of our RTI approach. Below, we described each of these measures in turn.

Progress monitoring measures.

Regular probe tasks to monitor students' progress were applied over the three phases of the study, from the beginning of first grade to the middle of second grade. Students completed these tasks on a bi-weekly basis during first grade (with some variation across classes) and once a week during second grade. In order to prevent students from seeing these tasks as an assessment, they were delivered by their regular classroom teacher as a typical writing practice. The main researcher of this thesis collected the probes once a week.

Students were given approximately 15 minutes (including 5 minutes at the beginning to elicit ideas) to write a personal narrative about events in their own lives. Other textual genre, such as descriptions, were not allowed in these tasks because they did not fit the scoring criteria. Topics were provided by the researchers in the form of a list at the beginning of the study but there were no instructions for teachers on when to use each topic as a prompt for students. Students were not expected to have any background knowledge to write the narrative and, for this reason, all topics were related to their daily lives, to make them as familiar as possible (e.g "what did I do in my most exciting holiday?").

Probe tasks were scored for *overall text quality,* using the holistic 6-point scale that can be found in Appendix A of chapter 5 (Table 3) and Appendix C1 of chapter 6 of this thesis. This scale ranged from 0 (very low quality) to 5 (very high quality) on the basis of the following criteria: sequences of ideas and cohesion between them,

relevance of details, transcription accuracy, vocabulary and grammar complexity and text structure. This scale was created ad hoc, after a few months of the study, by two researchers, on the basis of observations of students' texts features. The author of this thesis scored all 7228 texts collected throughout the study. Additionally, a second researcher rated 20% of the texts collected in each probe task. Interrater agreement gave a mean of .91 across the three phases of the study.

Narrative writing task.

Before phase 1 and immediately after each phase, students completed a narrative writing task. The examiner encouraged students to remember everything they had learn about how to write a story and told them to pay attention to their handwriting so that it was then legible for readers. There were no prompts or instructions on the topic and students were given permission to write an already existing narrative as long as they applied their new knowledge. The examiner did not solve doubts concerning spelling but told students to do it as they thought it should be. The task must be completed in approximately 40 minutes. Narrative compositions were assessed for overall quality, text length, spelling and handwriting accuracy.

Text quality was assessed on the basis of the presence or absence of structural elements that are commonly used in narratives: time and spatial references, presentation of characters, description of characters, initial event, character's emotional responses, any mention of action, sequences of actions, consequences and vocabulary. These 10 dimensions were adapted from the scoring criteria proposed by Cuetos et al., (1996). Each dimension was scored with either 1 or 0 points on the basis of whether the text included any reference to it or not. All texts were scored by two independent raters. Interrater agreement was .95 before phase 1, .91 at the end of phase 1, .93 immediately after phase 2 and .90 at the end of phase 3.

Text length was the total number of words written, independently of spelling. Criteria to identify words was as follows: strings of letters separated by spaces and/or

recognizable as Spanish words. The title and the expression "The end" were not counted as words. *Spelling accuracy* was measured by calculating the proportion of words correctly spelt.

Finally, we measured *handwriting accuracy* through a holistic 5-point scale ranging from 0 to 4. Handwriting assessment was based on two criteria: a) legibility of the letters, referred to whether pen strokes can be identified as real letters or they were random and unidentifiable; b) regularity of letters, referred to the extent to which strokes representing real letters were accurate. Irregularity was defined as the frequent presence of unclosed loops, shaky strokes and variation in letter size. The handwriting holistic scale was designed by two researchers on the basis of their observation of students' texts. These researchers rated all texts, obtaining and interrater agreement of .89 before phase 1, and .86 in each of phases 1, 2 and 3. One of the raters was a foreign research assistant who did not speak Spanish. This prevented understanding of the text from interfering in handwriting assessment and therefore kept handwriting scores as pure as possible. The whole handwriting scale used in this study can be found in Appendix D of chapter 6 of this thesis.

Parents' overall experience with the program.

We also collected data about parents' experiences with the implementation of our RTI approach. This data was collected at the end of the study, when participants had already completed the three intervention phases.

All participating parents were given a questionnaire asking about their overall experience in supporting their children with the completion of Tier 2 tasks. We collected 32 questionnaires back. Most questions were closed, though parents were provided space to comment on whatever aspects they considered important. The questionnaire was designed by the researchers and subjected to expert judgement. We asked for the questionnaire to be completed by the parent who had supervised their child during Tier 2 home tasks. If both parents participated, we asked them to fill in

the questionnaire together. Questions were divided in five categories. First, we included two items about *students' motivation towards writing*, which were answered on a 5 point scale ranging from "much more/all" to "much less/none". Second, we asked parents about *their feelings* when their child was selected to received Tier 2 instruction. This category included 8 items to be answered on a 5-point scale ranging from "completely agree" to "completely disagree". Third, the questionnaire included 4 items about *child-parent interaction over the course of Tier 2 intervention,* which were answered on a 5-point scale ranging from "very frequent/positive/difficult" to "no interaction/not difficult/very negative". Fourth, we included 4 more items about *child-parent interaction after Tier 2,* which were answered on a 5-point scale ranging from "definitely yes" to "definitely not". Fifth, we asked parents about their overall experience with the program through 3 yes-no items and a general question to be answered on a scale ranging from "very positive" to "very negative" experience. To assess parents' responses, we calculated the percentage of parents who selected each value of the scales. The whole questionnaire can be seen in table 1 in chapter 6.

Teachers' perceptions on the program.

To collect data on teachers' perceptions, we interviewed the eight participating teachers about their overall experience with the program and, in particular, with Tier 1 intervention. Semi-structured interviews were conducted by the author of this thesis. Questions were designed by the researchers so that they addressed the main elements of the program but, at the same time, encouraged teachers to talk about whatever aspects they wished to comment on. We stablished 5 a priori categories in which we then classified teachers' statements: *initial feelings* about the program, referred to teachers' interests and worries when they were first introduced the program, before implementing it; *perceptions about students' feelings*, referred to how teachers perceived their students' response to the program and how this changed over the course of it; *progress monitoring measures;* overall *strengths and weakness* of the program,

including teachers' opinion about the materials provided and challenges faced during the program; and *suggestions* to improve the program. A list of the questions contained in the interview can be found in Appendix E of chapter 6.

Though we have described the measures used in studies 3 and 4 separately, we are aware that some of them overlap, given the common features of both studies. Therefore, to facilitate reading, we believe it useful to include a comparative table between both studies. Table 6 summaries the measures used in each study.

Table 6

Assessment measures in studies 3 and 4

Task	Measures	Study 3. Case-study	Study 4. Group study.
Progress monitoring probes	*Text quality	X	X
	Text length	X	
	Spelling accuracy	X	
	*Handwriting accuracy	X	
Narrative writing	Text quality	X	X
	Text length		X
	Spelling accuracy		X
	*Handwriting accuracy		X
Spelling test	Spelling accuracy	X	
Handwriting test	Handwriting speed	X	
Matrix task	Non-verbal skill	X	
Interview	*Teachers' perceptions		X
Questionnaire	*Parents' perceptions		X

Specific instruments for these measures can be seen in Appendix A of chapter 5 (tables 1 and 2), appendices C1, D and E of chapter 6 and table 1 of chapter 6.

Instructional programs

Intervention in this study lasted for one year and a half, from the beginning of first grade to the middle of second grade. In accordance with the multi-tiered structure of the RTI model, we designed different instructional programs for the first two tiers of the model. Tier 1 was provided to all students while Tier 2 remedial instruction was provided only to struggling writers.

Tier 1 classroom instruction.

Tier 1 classroom instruction was delivered by regular teachers over the three phases of the study. In comprised a total of 123 sessions distributed over the course of the study as follows: 54 sessions in phase 1, 29 sessions in phase 2 and 40 sessions in phase 3. Instruction took place 3 times a week, with the remaining two days devoted to the completion of the progress monitoring tasks previously described in the measures section (pp. 95). Tier 1 intervention addressed instruction in handwriting, spelling, sentence-combining and planning, though each session was designed to focus specifically on one of these writing cognitive processes. Table 7 summaries Tier 1 training contents and distribution of sessions.

Table 7
Overview of Tier 1 training contents

Writing process	Instructional sequence	Grade 1 (phases 1 and 2)	Grade 2 (phase 3)	Sessions
Handwriting	1. Letter name and alphabet sequence 2. Letter shape 3. Writing fluency 4. Handwriting practice	24 sessions (4 sets, 6 ses. per set)	13 sessions (2 sets, 6 ses. per set + 1 ses. revisit)	41
Spelling	1. Spelling rule 2. Spelling practice	14 sessions (3 sets, 4 ses. per set + 2 ses. revisit)	9 sessions (3 sets, 2 ses. per set + 3 ses. revisit)	23
Sentence-combining	1. Cohesive words 2. Punctuation	12 sessions (3 sets, 4 ses. per set)	6 sessions (3 sets, 2 ses. per set + 3 ses. revisit)	18
Planning	1. Direct instruction (DI) 2. Modelling (M) 3. Students' practice (SP)	28 sessions (DI = 12 ses. M = 9 ses. SP = 6 ses. + 1 ses. revisit)	13 sessions sessions (DI = 4 ses. M = 3 ses. SP = 5 ses. + 1 ses. revisit)	41

*Ses.: sessions

Handwriting instruction.

Handwriting instruction was based on previous empirically-validated instructional sequences (Berninger et al., 1997; Graham, 1999; Graham, Harris, & Fink, 2000) and comprised 41 sessions. This instruction addressed both handwriting accuracy and handwriting fluency. Over the first two phases of the study (28 sessions), students learnt to trace the 26 graphemes of the Spanish alphabet. Graphemes were presented in groups of 7, except for the last one, which included only 6 letters. Each set of graphemes was studied in four stages as follows. The first stage focused on letter name and alphabetic sequence (2 sessions). Activities in this stage comprised singing an Alphabet song, associating each letter to pictures whose name started by that letter, and finding the missing letters in a picture of the alphabet. The second stage focused on letter shape (2 sessions). Students were provided with numbered and arrowed letters to guide their trace. Then, they completed activities aimed at tracing the letters without help. The third stage addressed handwriting fluency (1 session). This includes time-limited activities in which students were asked to write single letters as quickly as they could. In the fourth stage (1 session) students copied a short text written in a piece of paper and dictated aloud by the teacher. This instructional sequence was repeated for each set of graphemes. During phase 3 (13 sessions), handwriting instruction followed exactly the same pattern described before though, in this case, letters were grouped in two sets, instead of four, one including the first 14 letters of the alphabet and the other including the remaining 13. Last session was devoted to revisit the contents learned.

Spelling instruction.

Spelling instruction was designed according to previous literature on the matter (Graham, Harris, & Fink, 2002; Graham, 1999) and comprised 23 sessions. Instruction focused on learning three Spanish spelling rules: the use of C or Z,

distinction between C and QU and the use of G, GU and GÜ, all rules with a particular emphasis on the vowel that followed the targeted letters. All these rules are contents of the educational curricula for 1st and 2nd grade. In phases 1 and 2 of the study (14 sessions), each spelling rule was taught in two stages. The first stage focused on direct instruction of the targeted rule (2 sessions). First, students were provided with 6 words that met the rule, controlled for frequency, and were asked to make inferences about what aspects those words had in common. The teacher acted as a supportive resource, guiding students' inferences. Second, the teacher explained the rule aloud, drawing a concept map on the blackboard. The second stage focused on students' practice (2 sessions). Practice was achieved through a spelling "Goose game" in which students were provided with several writing orders depending on which part of the game they were in (e.g *Write one word which contains letter C and another that starts by letter Z*"). This instructional sequence was repeated for each spelling rule. At the end of phase 2, the learning of the three rules was revisited in 2 sessions. Spelling instruction in phase 3 (9 sessions) addressed the same three spelling rules, following exactly the same instructional sequence. However, the number of activities was reduced so that each rule could be taught in 2 sessions instead of four. We also included different target words, selected on the basis of the same criteria than in phases 1 and 2.

Sentence-combining instruction.

Instruction on sentence-combining drew heavily on previous literature on this matter (Beers & Nagy, 2009; Berninger, Nagy, & Beers, 2011) and comprised 18 sessions. Sentence-combining instruction focused on cohesive ties to form longer and more complex sentences from simple ones and punctuation marks. Cohesive ties included in our intervention served to establish cause-consequence relationships, to oppose ideas, to order events in time, to set a purpose and to link an idea with its antecedent. Punctuation rules, in turn, included question and

exclamation marks and the use of stops and full stops. In phases 1 and 2 (12 sessions) sessions were divided in three sets. The instructional sequence for each set comprised two stages. The first stage focused on the cohesive ties (2 sessions). Activities involved students choosing the word that best served to link a couple of sentences. The second stage addressed the corresponding punctuation rule (2 sessions). The teacher provided direct instruction in its use and students then completed the missing punctuation in sentences or short texts. During phase 3 (6 sessions), the three punctuation rules taught previously were revisited and new cohesive words were added, these included in the categories previously mentioned. We reduced the number of activities so that each set comprised only 2 instructional sessions instead of 4.

Planning instruction.

Students were also instructed on how to plan their narratives, on the basis of previous strategy-focused planning programs (Arrimada, Torrance, & Fidalgo, 2019; Harris, Graham, & Adkins, 2015). Planning instruction comprised 41 sessions (28 over phases 1 and 2 and 13 in phase 3) and was divided in three stages: direct instruction, modelling and students' practice.

The ***direct instruction stage*** comprised 16 sessions and focused on providing metacognitive knowledge about the strategy, which includes both an understanding of the planning process and the structure of a narrative. Over phases 1 and 2 of the study (12 sessions), direct instruction started with a general discussion on writing: its importance for academic success, kinds of texts and students' previous ideas on the narrative structure. The focus then was on the planning process, defined as the need to stop before writing a text and think about its rhetorical features (content and structure). This was supported by an activity aimed at checking students' understanding of the definition provided. The greatest part of the direct instruction stage focused on narrative structure using the Story Mountain

as a mnemonic (see pp. 58 for a detailed description). Each direct instruction session focused on narrative structure was structured as follows. First, students recalled the importance of planning. Second, the teacher explained one of the structural parts of a narrative by associating it with villages and houses on the road up to the top of the mountain: introduction, which included when and where the story happened and who the characters were; development, which told the events in the story and the character's reactions to those events; and conclusion, which set an end for the story. The teacher supported their explanation with stickers representing these parts. Third, stickers were removed from the mountain and some students were asked to place them back. After all structural parts had been addressed, the last two sessions were devoted to assess both low and high-quality texts on the basis of previous learning. Students listened to the texts, read aloud by the teacher, and judged them on the basis of the present or missing elements. During phase 3 (13 sessions), the direct instruction stage followed the same procedure except for the fact that final judgement of texts was removed.

The ***modelling*** stage comprised 12 sessions and focused on providing students with a mastery model on how to write a narrative following the strategy previously taught. Over the first two phases of the study (9 sessions), modelling comprised three stages. First, the teacher modelled the writing process of each structural part of a story by writing it in front of the class at the same time they verbalized self-instructions (an example of a scripted model can be found in Appendix A of this chapter). Second, students practice the writing of the modelled part by composing fragments of their own stories under the teacher's supervision. Third, the teacher provided an incomplete model of the story and students were asked to evaluate the writing process they had observed by identifying the missing parts of the model. In phase 3 (3 sessions), the modelling stage included one additional step, students' assessment of teacher's verbalizations while writing. This time they did not only evaluate whether the teacher had mentioned all the structural

parts of the story but also whether he had included positive thoughts about his own writing, statements to self-regulate his own writing process and self-evaluations of the final written product. This was done through a discussion between the instructor and the students.

The ***students' practice*** stage comprised 11 sessions and focused on students applying the previously acquired knowledge to their own writing. Over phases 1 and 2 (6 sessions) students wrote two narratives in this stage, the first one with some guidance and the second one on their own. Guidance in the first narrative was provided by: a) a picture with ideas on the content that can be included under each part of a narrative; and b) the possibility of looking at the poster of the Story Mountain mnemonic. The writing of each story took two sessions. Writing practice also comprised several playful activities based around narratives to keep students' motivation. At the end of phase 2, one session was devoted to revisit the contents. In phase 3 (5 sessions), two main changes were made in the students' practice stage. First, students wrote their stories in pairs as well as individually. Second, we included a final self-assessment session in which students evaluated their own written products. Last session of planning instruction in phase 3 was devoted to revisit the contents through playful activities.

Tier 2 instruction.

Tier 2 instruction was implemented in the second half of first grade, from the middle to the end of the academic year. The instructional program comprised 22 instructional sessions, each session with several activities to be completed at home under parents' supervision and support. Instructional sessions were provided in the form of workbooks. Parents were asked to help their students in completing two sessions per week, in separate days. Tier 2 instruction was paper-based, meaning that workbooks contained all the necessary instructions to use them and to complete the writing exercises. In order to enhance students' motivation, these

instructions were provided by an avatar. Each Tier 2 session was mainly focused on one writing process, as it was the case in Tier 1 classroom instruction. Tier instructional sequence for each writing component was designed to match Tier 1 instruction as much as possible so as not to cause controversy between classroom and individualized instruction. However, given the reduced number of sessions in Tier 2, students completed a smaller amount of writing exercises than in Tier 1. Additionally, given the deficits of the students receiving Tier 2 instruction, tasks involved an increasing focus on transcription and some adaptations were made in order to provide students with a higher degree of scaffolding. As a general adaptation, sentence-combining instruction was removed from Tier 2. Specific adaptations in the teaching of each writing component are described below.

Handwriting instruction involved three adaptations: the inclusion of sub-letter forms (i.e strokes, loops, etc) to be traced by students; tracing of meaningful syllables and not only single letters in those activities focused on letter shape and handwriting fluency; and removal of text-copying because it required some expertise with handwriting.

Spelling instruction, in turn, followed the same pattern than Tier 1 with the exception that one of the spelling rules was removed from Tier 2 instruction (distinction between C and Z). Classroom instruction on this rule had already finished when Tier 2 started so we did not include it in order to keep a balance between what students were studying at school and the focus of Tier 2 intervention. Tier 2 spelling instruction included different target words though they were selected through the same criteria as those in Tier 1.

Planning instruction was delivered in the same three stages than in Tier 1: direct instruction, modelling and individual practice. However, important adaptations were made. First, in order to keep transcription skills from interfering in planning instruction, we asked parents to write their children's responses to the planning exercises when these involved writing words, whole sentences or texts. Second, the

instructional components of strategy-focused instruction did not follow a linear way, as in Tier 1 intervention, but alternated. This means that each direct instruction session was followed by modelling and individual practice sessions. The practice session involved students tracing the text below some pictures. Third, direct instruction was presented in the form of a text written on the top of the working sheet. On the basis of this short text, students filled the gaps of an empty mountain by naming each structural part of a story and linking it to ideas expressing possible contents that corresponded to that part (e.g the expression "a stormy day" would be linked to house "When"). Fourth, modelling was presented through a video performed by the author of this thesis and whose link appeared at the top of the corresponding planning worksheet. Tier 2 transcription-and-planning instruction included 4 videos, one for each structural part (introduction, development and conclusion) and a final complete model including all of them. Fifth, as final writing practice, students did not only write a composition but also conduct a self-assessment of their own writing using a checklist.

Procedure

Implementation of this study started by providing the school headmasters with a detailed description of the project and offering them to participate. Their collaboration was corroborated by signing a research agreement.

At the very beginning of the study, before starting phase 1, all participating teachers met with the author of this thesis and one of her supervisors to receive training on the implantation of Tier 1 instructional procedure. Apart for this initial training session, each teacher was provided with a detailed script of all sessions. Teachers were given a few days to raise any initial questions, solved by the main researcher. During those days, they also became familiar with the teaching materials that corresponded to the implementation of Tier 1 intervention over phases 1 and 2 of the study, designed and delivered by the author of this thesis. Immediately after

phase 1, the main researcher and her supervisor met again with the teachers and the school headmasters to present Tier 2 intervention and get in contact with parents. At the beginning of the academic year in which students started second grade (beginning of phase 3), in September, the author of this thesis met again with school headmasters and teachers. In this meeting, they were provided with a user's manual in which all phase 3 sessions were scripted. Teachers were already familiar with the instructional procedure, so no additional training was needed. Again, they were free to raise any questions or concerns about the implementation of Tier 1. During the following days, the researcher delivered the phase 3 teaching materials so that all of them were ready to use by the time students started lessons. Over the course of the 18-month program, the main researcher came to schools once a week to collect the progress monitoring tasks. These short meetings allowed teachers to raise any concerns or suggestions about Tier 1 intervention. Additionally, over the course of the study, teachers kept several more formal and longer meetings with the main researcher to receive instructions on how to proceed.

Tier 2 intervention was completed under parents' supervision. Before phase 2 of the study started, all parents were contacted by the school headmasters who informed them about the overall structure of the study. This was posted on the school webpage. Participating parents were contacted by their children's teachers by means of individual letters and informed about the specific nature of Tier 2 intervention. All parents who accepted to participate attended a 20-minutes training meeting with the main researcher and her supervisor. This served to inform them about the contents of Tier 2 intervention and the instructional procedure and to provide them with the corresponding workbook.

Concerning fidelity of the intervention, in Tier 1 it was achieved by means of audio-recordings of all instructional sessions. Recordings were collected by the author of this thesis, who listened to a random sample of 56 and compared them with a list of bullet points concerning all aspects that should be addressed in each

instructional session. Overall, recordings analysis showed that teachers implemented Tier 1 intervention with fidelity (mean step completion = 87%). Though there was some variation across classes, minimum adherence to scripts was 50% in only one session. Analysis of all written products also contributed to ensure fidelity of the intervention by demonstrating that all teachers had implemented all the prescribed writing tasks. Tier 2 intervention, in turn, was paper-based and self-contained, which increased fidelity of the intervention. Parents' role was purely supportive and motivating and they were only asked to make sure that their child understood the writing tasks contained in the workbook. The author of this thesis collected and analysed all workbooks after Tier 2 intervention. Analysis showed that students had completed between 82% and 100% of the intervention, which also contributes to ensure fidelity.

At the end of the 18-month program, each participating class received a report with the results of the students. Also, we provided parents with individual reports of their child's progress over the course of Tier 2 training.

Data analysis

Statistical analysis was conducted with the software R. We used mixed effects models in order in lm4 (Bates et al., 2015) to fit the hierarchical structure of the data. As it was done in study 1, we tested a series of nested models with random by-student and by-classroom intercepts and test, condition, slope (rate of learning obtained from progress monitoring measurement) and their interaction as fixed factors. We calculated statistical significance using the F and t tests with Satterthwaite approximation.

In this study, we also analysed parents' questionnaires and teachers' interviews. For questionnaires, we conducted a quantitative analysis by counting the number of responses under each point of the scale for each item. The amount of responses was then turned into a percentage. Teachers' interviews were

qualitatively analysed using a method similar to content analysis (Zhang & Wildemuth, 2013). Interviews were audio-recorded and then transcribed. For each interview, we divided teachers' statements into idea units. Statements that conveyed the same idea or opinion (e.g the idea itself plus an example to support it) were grouped under the same unit. Then we categorized each idea unit under one of categories identified a priori and described before. Third, we compared the 8 interviews and identified themes that emerged from these categories and were common among teachers.

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Appendices

Appendix A: example of a scripted model

"I am going to write an amazing story. With everything I have learned, I am sure I can do it. Mum will be really happy! Let's see, before starting to write I should…oh yes! Think a lot! That is why I am called Pensarín. And now, what do I write? Let's see…how was my journey up to the mountain? First, I got to a village called…with letter I…Introduction, that is! And in that village there were three houses: the first one was called "When". Ah! So I have to think when my story happened! I want it to happen in…spring. I am going to write it. *It was a spring day…*(verbalises while writing)…what else? What was the name of the following house? "Where!" and where does my story happen? In a field full of flowers! I will add it (writes it down). Now I have: it was a spring day in a field full of flowers. What is missing? I have written when, I have written where…I know it! The following house was called "Who", and it told me about the characters. The character of my story is going to be a butterfly with lots of colours. *It was a spring day in a field full of flowers where a butterfly with lots of colours lived* (verbalises while writing). What else? Oh wow! The first village, Introduction, did not have any more houses! That means I have already finished the first part of my story. Great, I already have the introduction! But I am exhausted…what if I keep going with the story another day? Now, it is time for all these girls and boys to practice".

Appendix B: example figure of a matrix in the matrix task
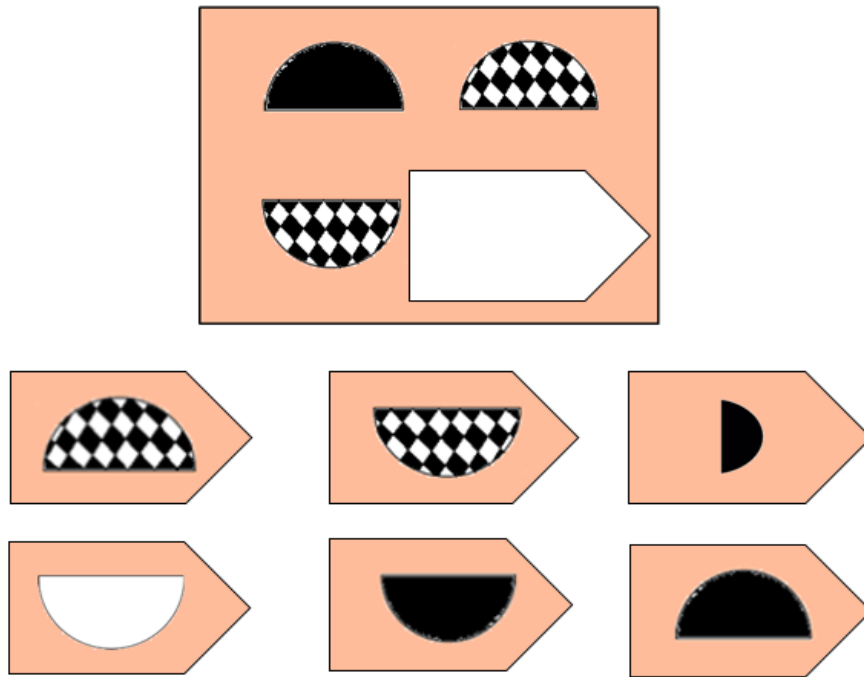
Chapter 3

Effects of teaching planning strategies to first-grade writers

This chapter faithfully reflects the content of:

*Note: this chapter has been removed from the present document in order to avoid possible conflicts with the journal where the original article was published.

Chapter 4

The Response to Intervention model in writing: a review of assessment measures and instructional practices

This chapter faithfully reflects the content of:

Abstract

Scientific evidence points to the Response to Intervention Model as a key approach to the identification and prevention of learning disabilities in writing. In order to guide teachers in the successful implementation of this model, educational psychologists need to receive training in writing instruction and how to monitor students' progress. In this study, we present an international literature review on the two key dimensions of the model: writing assessment measures that are sensitive to change and empirically validated instructional practices to improve writing competence. Based on the 33 papers reviewed, we analyze the suitability of assessment measures and tasks and discuss several instructional practices according to their focus in a specific writing cognitive process: spelling, handwriting, and high-level cognitive processes.

Key words: prevention; learning disabilities; writing; response to intervention; writing assessment; writing instruction.

Introduction

Learning difficulties (LD) are among the educational support needs with a high school prevalence, close to 10%, both internationally (Altarac & Saroha, 2007; Mogasale, Patil, Patil, & Mogasale, 2012) and nationally (Jiménez, Guzmán, Rodríguez, & Artiles, 2009).

In Spain, the educational treatment of LD experienced significant progress after 2006, when the Organic Law of Education (see Fidalgo & Robledo, 2010) was passed. LD in this law were recognized as a diagnostic category in special education. Since then, a restricted conceptualization of them has been assumed, which understands LD as specific problems that arise unexpectedly in the acquisition of reading, writing and/or mathematics, without there being any other disabling condition causing them, and that persist despite receiving appropriate instruction (APA, 2013). This conception has been endorsed in subsequent regulatory developments (LOMCE, 2013), assuming the preventive principle of LD as well as the implementation of reinforcement mechanisms as soon as these are detected. This measure is consistent with the Response to Intervention model in force internationally in the field of LD (hereafter RTI, Response to Intervention Model) (Fletcher & Vaughn, 2009; Jiménez, 2019). The National Center on Response to Intervention (NCRTI) defines this model as "a multilevel prevention system, which maximizes student performance by integrating assessment and early intervention within the school system." Thus, the model places its emphasis on the early prevention of LD through action in two complementary dimensions: evaluation and intervention. With regard to evaluation, the model advocates, first, for the use of measures whose validity and reliability has been demonstrated, which facilitates the early identification of students at risk of LD. In addition, the emphasis is on the use of change-sensitive measures that enable us to constantly monitor student progress through periodic assessments that determine their response to the intervention. The use of appropriate evaluation measures allows decisions to be

made about the intensity and frequency of the intervention each student receives. Within the intervention dimension, in turn, the use of empirically validated instructional practices is emphasized to ensure that the presence of LD is not due to inadequate instruction. Initially, students receive preventive instruction at the classroom level, implemented by the tutor (level 1). Those who do not respond adequately to this measure are referred to level 2, where the intervention, more intense and frequent, is applied in small groups. If the lack of response persists, a third level of intervention will be applied, individualized and focused on the areas where there are specific difficulties. Meta-analytic studies indicate that the combination of these two dimensions of assessment and intervention significantly reduces the diagnosis of LD (Burns, Appleton, & Stehouwer, 2005), with an effect size of 1.07 being obtained for this model (Hattie, 2012, 2015).

The effective application of this model demands great responsibility from the teaching staff, who frequently mention not having the necessary training for its implementation (Castro-Villarreal, Rodriguez, & Moore, 2014; Wilcox, Murakami-Ramalho, & Urick, 2013). In this sense, the educational psychologist plays a key role in providing advice, guidance, and supervision of educational agents in specific actions for attention to diversity (Campos i Alemani, 1995; Farrell, 2009). In the field of the prevention of LD, the counseling function of the educational psychologist must stem from a deep mastery of the principles of the RTI model, in order to meet the empirical validity requirement of assessment and instruction (Jiménez, 2019). However, at the scientific level, research around this model has been linked almost exclusively to the field of reading or mathematics difficulties (Balu et al., 2015; Jimerson, Burns, & Vanderheyden, 2015; O'Connor, Sanchez, & Kim, 2017; Zhou, Dufrene, Mercer, Olmi, & Tingstom, 2019). Research in writing, meanwhile, has been conducted separately from the RTI model, both in the assessment and instructional dimensions. To our knowledge, only the study by Saddler and Asaro-Saddler (2013) and the chapter by Gil and Jiménez (2019) have

addressed the RTI model in the field of writing. However, they only provide general guidelines for assessment and instruction or present specific writing evaluation instruments designed and validated by the authors (Gil & Jiménez, 2019). Therefore, within the assessment dimension, despite having analyzed writing measures in isolation, there is a lack of systematic reviews on the evaluation measures that can be used within the framework proposed by the RTI model based on two criteria: compliance of the psychometric properties of validity and reliability; and sensitivity not only for the identification of students at risk, but also for monitoring their progress. As for the instructional dimension, writing involves the activation of high and low-level cognitive processes (Hayes & Flower, 1980). In this sense, research shows that writing instruction is more effective if it combines both processes (Limpo & Alves, 2017). Meta-analysis, however, have addressed the efficacy of instructional practices separately, either in high-level processes (Graham & Harris, 2018; Graham, McKeown, Kiuhara, & Harris, 2012) or in transcription skills (Hoy, Egan, & Feder, 2011; Wanzek et al., 2006). Therefore, in order to fulfill the premise of effective writing instruction established by the RTI model (Jiménez, 2019), it is necessary to have systematic reviews that synthesize the empirically validated instructional practices for the instruction on each of these processes, offering a global vision of the guidelines for teaching writing.

For all these reasons, based on the two dimensions presented, an empirical review has been carried out at the international level in order to pursue a double objective. First, it is intended to analyze the evaluation measures that allow to detect students at risk of LD in writing and to monitor their learning progress, complying with the premises of the RTI model. The second objective is to analyze instructional practices that can be used within the framework established by the RTI model, since they focus on the different cognitive processes of writing and empirical evidence on their effectiveness for improving written competence have been found.

Method

Search and selection procedure

The search for sources of information was conducted in English using Google Scholar and ERIC as databases, and was differentiated according to the dimensions of the RTI model presented. Only studies available in full text were used and no time limit was established for the publication dates.

For the evaluation measures, the search started with general terms such as: "writing assessment review" or "progress monitoring + writing", later specified by using terms such as: "holistic/analytic scoring/CBM writing + review" or "rubrics + writing assessment." The paucity of meta-analyses and systematic reviews forced us to expand the search to empirical studies on the validity of these measures, adding "validity" and "reliability" to previous searches.

For instructional practices, the search was restricted to meta-analyses and systematic reviews, in which various experimental studies focusing on the validation of instructional practices in writing are synthesized and compared, presenting a classification of practices according to their efficacy. Differentiated searches were performed according to the cognitive process of writing to be enhanced. Within the transcription processes, terms such as "meta-analysis/review spelling/handwriting", "spelling/handwriting instruction", or "teaching spelling/handwriting" were used. For higher order processes, meta-analyses were sought on effective instructional practices in written composition with terms such as "writing instruction meta-analysis/review", "effective instructional/teaching practices + writing". From these, the instructional approaches used to enhance higher order processes were selected.

In each search, all entries directly related to the field of study were reviewed, which generally involved a review of the first two pages of results in each database. After the searches, the articles to be reviewed were selected by reading the title, summary,

objective, and method of the study. In the assessment dimension, the selection criteria were: a) reviews, critical reflections, or empirical studies; b) focus on school-aged students (infants, primary, or secondary); c) providing data on the validity and/or reliability of the measures presented; and d) providing a description of the writing tasks associated with these measures. According to these criteria, 22 articles were included (4 reviews, 1 meta-analysis, and 17 empirical studies). On the other hand, in the instructional dimension, the criteria used were: a) systematic reviews or meta-analysis; b) including only effective instructional practices in writing; c) presenting a detailed description of each practice with data on its efficacy; d) and covering applied practices with students of school age. According to these criteria, 12 documents were included (6 meta-analyses and 6 systematic reviews). Figure 1 represents the process of searching and selecting sources.
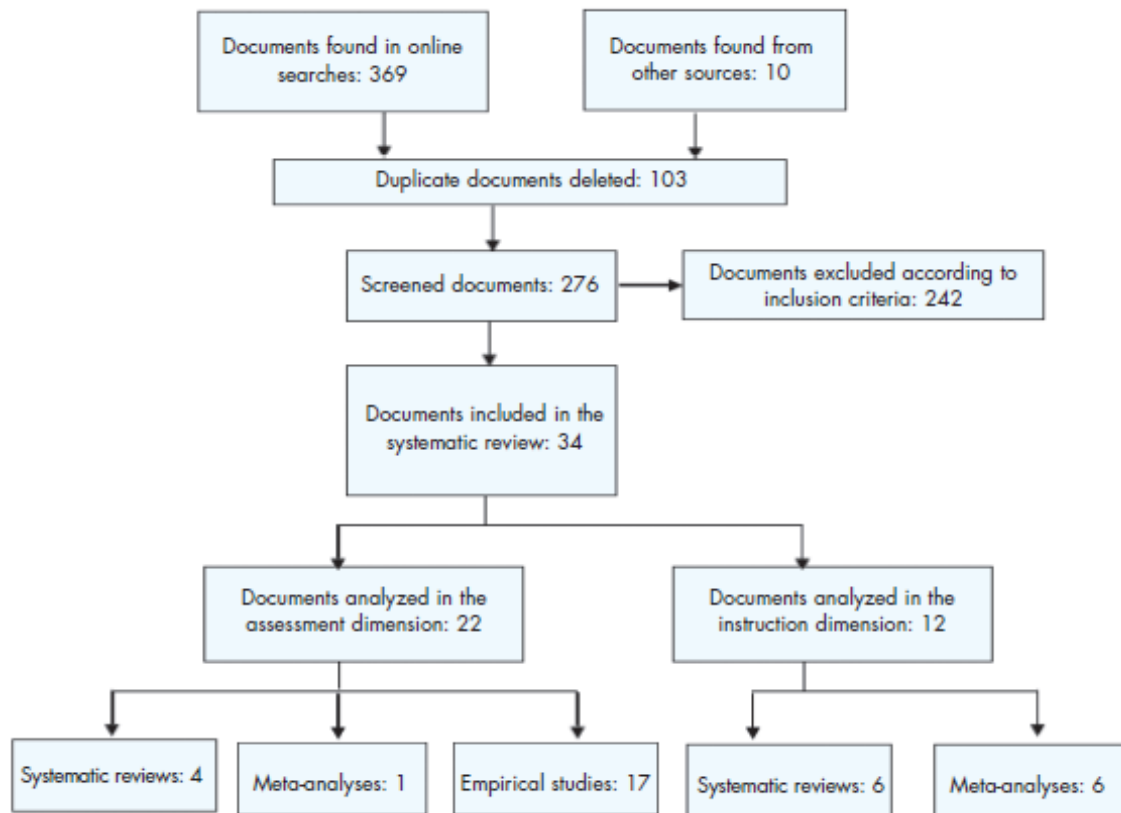
Figure 1. Search and source-selection procedure

Analysis procedure

In relation to assessment measures, after the articles were selected, they were grouped into four types, according to the type of measure presented: assessment of the legibility of letters, holistic approaches, analytical approaches, and curriculum-based measures. The main advantages and disadvantages were extracted from each type of measure. Subsequently, each empirical article was analyzed based on: the measures and tasks used, the age of the students, and findings about their validity and reliability (See Table 1 for a synthesis of results).

In relation to instructional practices, the selected articles were classified according to the cognitive process of writing on which they focused. Specifically, the various theoretical models (Berninger & Winn, 2006; Hayes & Flower, 1980) differentiate between spelling processes, handwriting processes, and skills in planning and revising a text. For each of these types, instructional practices whose efficacy has been empirically demonstrated were analyzed, presenting a comparison of results obtained in the different empirical studies (See Table 2).

Results

The results presented below are grouped according to the specific dimension of the RTI model: assessment or instruction.

Assessment measures results

From the empirical review carried out, it is possible to conclude that there are few measures of writing evaluation that allow to monitor student progress in writing skills. These, in turn, can be differentiated according to their complexity, as follows: measures that assess only the legibility of letters or measures centered on words, sentences, or texts, among which there are holistic approaches, analytical approaches, and curriculum-based measures.

The former are based on counting the letters that the student correctly reproduces in alphabet-copying or alphabet-writing tasks. This measure is especially valid at early ages (Ritchey, 2008). The Process Assessment of the Learner (Berninger, 2001) includes an example of this.

However, the assessment of written competence requires more complex measures to evaluate words, sentences, or texts. Among them, there are holistic approaches, analytical approaches, and curriculum-based measures. The first two focus on the assessment of written composition quality. However, while holistic approaches enable the establishing of a global judgment of the final text, analytical approaches evaluate the quality of different dimensions of the written composition (ideas, organization, vocabulary, etc.). Nevertheless, despite being useful in the detection of at-risk students, none of these approaches is sensitive to growth, which prevents the monitoring of student progress (Hamp-Lyons, 2016; Jonsson & Svingby, 2007). As an alternative, curriculum-based measures (CBM) are reliable, effective indexes, easy to understand and administer, sensitive to change, and valid for instructional decision making (Deno, 1985; Romig, Therrien, & Lloyd, 2016). Within these, productivity and accuracy indicators can be assessed. The former evaluate the

fluency of writing by counting the total words written, the number of words written correctly, correct word or letter sequences, and punctuation marks. The accuracy indices, meanwhile, evaluate the adequacy of the text regardless of productivity, through the calculation of percentages of correctly written words, correct word sequences, and correct minus incorrect word sequences. Both indices are obtained from tasks that are very quick to apply (3-5 minutes in primary school and 7-10 minutes in secondary) and therefore lend themselves to being used frequently to monitor student progress. Since the psychometric properties of these indices began to be analyzed, numerous studies have used them in the assessment of written proficiency at the school level (see Romig et al., 2016 for a meta-analysis).

Table 1 shows a summary of the advantages and disadvantages of the measures indicated and the writing tasks that allow these measures to be taken, presenting several studies that analyze their validity.

Table 1
Asessment measures for written composition

Measure	Positive aspects	Limitations	Aspects assessed	Writing tasks	Examples
Holistic approaches (see Hamp-Lyons, 2016 for critical insight)	- Easy application and low cost. - Useful for large-scale assessment. - High reliability with previous training of the evaluators.	-Difficulty of use at an early age due to short text length. -Low validity for detecting differences between educational levels and typologies of students. -Does not enable the detection of areas where there are specific deficits.	Holistic text quality scales.	Spontaneous text writing based on a prompt.	Subtest of Written English- Test TOEFL (Pierce, 1991)
Analytical approaches (see Jonsson & Svingby, 2007 for a review)	-Acceptable reliability for assessment at the classroom level. -Enable the detection of deficiencies and potentialities in different components of writing. -Transparent and specific evaluation. -Potential for instructional decision making.	-Insufficient research on its psychometric properties. -Contradictory results on its validity. -Low reliability in large-scale evaluations. -Laborious correction. -Difficulty in progress monitoring.	Specific scales for different dimensions of the text (e.g ideas, organization, text tone, vocabulary, cohesion and conventions).	Spontaneous text writing based on a prompt.	Lloyd-Jones, (1977) Primary Trait Scale (Spandel, 2008) Dunsmuir et al., (2015)

Curriculum-based measures: **Productivity indices** (Deno, 1985; McMaster & Espin, 2007; Romig et al., 2016)	-Validity and reliability of correct written words and correct word sequences in primary and secondary. -Moderate to high correlation with standardised tests. -Sensitivity to growth, especially correctly written words and correct word sequences. - Correlation with qualitative measures.	-Validity of the total words written and the correct letter sequences only at the beginning of primary education. -Scarce research regarding punctuation marks: some validity in the middle of primary.	-Total words written. -Words written correcty. -Correct word sequences. -Punctuation marks.	Copy and dictation (effective in first levels) Spontaneous text writing based on a prompt (effective at all levels). Narrative texts in primary school and expository texts in secondary.	Coker y Ritchey, (2010); Costa, Hooper, McBee, Anderson & Yerby, (2012); Dockrell, Conelly, Walter & Critten, (2015); Espin, De la Paz, Scierka & Roelofs, (2005); Espin et al., (2008); Gansle et al., (2004); Hampton & Lembke, (2016); Jewell & Malecki, (2005); McMaster, Xiaoqing & Pétursdóttir, (2009); McMaster et al., (2011); McMaster & Campbell, (2008).
Curriculum-based measures: **Precision indices** (see review Deno, 1985; McMaster & Espin, 2007)	-Greater validity than productivity indices in the detection of LD in writing. -High growth-sensitivity of percentage of words written correctly and correct minus incorrect word sequences.	-Percentage of words correctly written only valid at the beginning of primary education. -Correct minus incorrect word sequences: high reliability coefficients only from 3rd grade primary onwards and in secondary education.	-Percentages derived from productivity indices. -Correct minus incorrect word sequences.	Copy and dictation (effective in first levels) Spontaneous text writing based on a prompt (effective at all levels). Narrative texts in primary school and expository texts in secondary.	Costa et al., (2012); Dockrell et al., (2015); Espin et al., (2005); Espin et al., (2008); Hampton & Lembke, (2016); Jewell & Malecki, (2005); McMaster et al., (2009); McMaster & Campbell, (2008).

Instructional practices results

The review carried out demonstrates that effective instructional practices in written composition focus on the three key cognitive processes of writing: spelling, handwriting, and planning and revising skills. Instructional practices for instruction on each of these processes have been extracted from the reviewed meta-analysis (see Table 2).

Instructional practices focused on spelling processes

From the empirical review carried out it can be established that formal spelling instruction significantly improves spelling, although its effects on global quality are questioned (Graham & Santangelo, 2014). Within this dimension, eleven effective instructional practices have been identified, divided into three blocks: instructional techniques carried out by the instructor, techniques applied independently by students, and multisensory training (see Table 2). Recent studies that focus on spelling improvement use the techniques described below (Alves, Limpo, & Fidalgo, 2016; Cordewener, Verhoeven, & Bosman, 2016).

Within the techniques applied by the instructor, seven empirically validated instructional practices were identified. The first one, *modelling*, is based on the observation of a model that reproduces and corrects frequent spelling errors. The correction must occur immediately after writing each word (Graham, 1999; Mushinski & Stormont-Spurgin, 1995).

Table 2

Effective instructional practices in written composition

Cognitive process	Practices	Meta-analysis/ reviews
Spelling	• Techniques applied by the teacher/instructor -Modelling -Positive reinforcement -Goal setting -Analogies -Distributed practice -Word lists -Constant delay of time • Teachniques applied independently by the student -Peer tutoring -Systematic study of spelling strategies -Self-regulation • Multi-sensory training	Graham (1999) Mushinski & Stormont-Spurgin (1995) Wanzek et al., (2006) Williams et al., (2017)
Handwriting	-Modelling -Positive reinforcement -Self-regulation -Self-assessment -Training in motor patterns -Relaxation	Graham & Weintraub (1996) Hoy et al.(2011) Santangelo & Graham (2016)

Planning and revising	• Self-regulated strategy-focused instruction:
	-Direct instruction of the strategy (examples of strategies):
	  ✓ POW (Harris, Graham, & Adkins, 2015)
	  ✓ POD (Torrance et al., 2015)
	  ✓ OAIUE (Fidalgo et al., 2008)
	  ✓ CDO (Arias-Gundín & García, 2007; Paz, Swanson, & Graham, 1998)
	  ✓ LEA (Fidalgo et al., 2008; Torrance et al., 2015)
	
	-Modelling
	-Independent practice
	
	• Text structure (ejemplos de acrónimos).
	-Narrative texts:
	  ✓ WWW (Harris et al., 2015)
	-Argumentative texts:
	  ✓ TREE (Harris et al., 2012)
	  ✓ TARE (López et al., 2017)
		Graham & Harris (2018)
		
		Graham, Harris, & McKeown (2014)
		
		Graham, McKeown, Kiuhara, & Harris (2012)
		
		Graham & Perin (2007)
		
		Koster, Tribushinina, de Jong, & van den Bergh (2015).

Another effective practice identified is the use of immediate *reinforcement* after practice, for example, reinforcements based on making spelling work public. This is especially effective if combined with other practices. One of them is *goal setting (Graham, 1999),* establishing aims around the number of words whose spelling must be mastered at the end of each week. Few studies have applied reinforcement in isolation (Wanzek et al., 2006).

Another effective instructional practice at the spelling level is the use of *analogies* with words with complex and similar spelling patterns, through rhymes (Mushinski & Stormont-Spurgin, 1995) or word families (Wanzek et al., 2006).

Distributed practice or practicing spelling in several weekly sessions has also been effective. This consists of gradually incorporating new words and eliminating those already assimilated (Graham, 1999).

Another effective practice is the memorization of lists with a *variable number of words*, reduced in the case of students with spelling difficulties (Graham, 1999), as an effective instructional practice (Mushinski & Stormont-Spurgin, 1995).

Finally, the *constant delay of time*, that is, the progressive increase in the response time given to the student when writing a word (Mushinski & Stormont-Spurgin, 1995; Wanzek et al., 2006) has also shown instructional effectiveness.

On the other hand, within the techniques applied independently by the student, from the review carried out it is possible to identify three instructional practices of proven effectiveness. Firstly, *peer tutoring*, in which one student acts as the tutor dictating and correcting words, and the other takes the role of trainee (Graham, 1999; Wanzek et al., 2006; Williams, Walker, Vaughn, & Wanzek, 2017). Another effective practice is the *systematic study of spelling strategies* (Mushinski & Stormont-Spurgin, 1995; Wanzek et al., 2006; Williams et al., 2017). This, according to Graham (1999), consists of: pronouncing the word, writing it, naming its letters

while writing, tracing the word, and visualizing it with closed eyes. The third effective instructional practice covers *self-regulation of attention and productivity* (Mushinski & Stormont-Spurgin, 1995; Graham, 1999). The former involves periodically interrupting students while they write a list of words and asking them to indicate if they were thinking about the task when the interruption occurred. Self-regulation of productivity involves counting the times you practice a word until you manage to write it correctly.

Finally, the third block of effective techniques to improve spelling derived from the review carried out involves *multisensory techniques*, which stimulate spelling learning through different senses. Some of them include spelling words in sign language, tracing letters with the finger, or speaking words out loud at the same time as writing them (Mushinski & Stormont-Spurgin, 1995).

Instructional practices focused on handwriting processes

Handwriting instruction includes letter name and shape, writing fluency, and the position of the pencil and paper (Graham, 1999). From the review carried out, it has been empirically confirmed that formal instruction improves the readability, fluency, length, and overall quality of the texts (Santangelo & Graham, 2016). Specifically, six instructional practices in handwriting have proved effective (see Table 2), many of them being used in recent literature (Graham, Harris, & Adkins, 2018; Limpo, Parente, & Alves, 2018; Wolf, Abbott, & Berninger, 2017).

The first is *modelling*, where the instructor writes the letters in front of the class for the students to observe the order and direction of the stroke. In early childhood education and the first grades of primary, this is effective in combination with verbal instructions, while from 3rd grade onwards observation alone improves readability and fluency (Graham & Weintraub, 1996; Hoy et al., 2011). Alternative models are the use of letters with numbers and arrows to guide the stroke, although these are less effective (Graham & Weintraub, 1996; Santangelo & Graham, 2016).

Another practice is *positive reinforcement*, preferably verbal, immediately after the student completes the writing. This has certain effects on legibility, although it may have negative effects if it is not provided equally to all students (Graham & Weintraub, 1996).

Also noted is *self-regulation,* indicated by students giving themselves instructions out loud to guide their tracing of the letters. These verbalizations can refer to the steps to follow in the motor execution or to the name of the letter, syllable or word written. With young students there are certain effects on legibility and fluency, although it is difficult for them to verbalize the process (Graham & Weintraub, 1996; Hoy at al., 2011). From the middle of primary school age onwards, verbalizations decrease fluency (Graham & Weintraub, 1996).

Another noteworthy technique is *self-assessment*, in which the student issues a judgment on the legibility of the letters written in copy tasks. For this, checklists are used or the correct and incorrect letters are identified by comparing them with the model, with any incorrect letters being repeated. Graham and Weintraub (1996) state that this practice improves legibility, although recent meta-analyses have not found significant effects (Santangelo & Graham, 2016).

Training in motor patterns, meanwhile, corresponds to the tracing of sub-letter forms. In contrast with its positive effects on legibility and fluidity indicated by Graham and Weintraub (1996), recent meta-analyses question its effectiveness (Santangelo & Graham, 2016).

Finally, the efficacy of *relaxation* through audios or biofeedback-electromyogram has been studied, a technique that warms the student of their biological responses, urging them to control them. It is usually combined with explicit handwriting instruction, and it is, therefore, impossible to determine whether its effects are really due to relaxation (Graham & Weintraub, 1996; Hoy et al., 2011).

Instructional practices focused on higher order cognitive processes: planning and revising.

Based on the different meta-analyses that evaluate effective instructional practices in writing, the ones that effectively promote the processes of planning and revising have been extracted: self-regulated strategy-focused instruction and textual structure. Additionally, various techniques are presented that, while not constituting instructional practices, offer support for student writing.

Self-regulated strategy-focused instruction. This practice covers the teaching of planning and revising strategies. Recent meta-analyses (Graham & Harris, 2018; Graham et al., 2012; Graham & Perin, 2007) point to this as the most effective practice in improving text quality from the first grades of primary onwards, in students with and without difficulties. This practice is operationalized in the self-regulated strategy development model (Graham, Harris, & McKeown, 2014). This model begins by providing students with the prior knowledge necessary to use the strategy (the importance of writing and the definition of the process to be practiced). Next, the instructor describes the strategy by associating it with a mnemonic rule that facilitates its memorization (e.g., TOD = Think, Organize and Develop the text, Fidalgo & Torrance, 2018). Here, explicit declarative knowledge is provided about the meaning of the strategy, its purpose, and its benefits. Table 2 shows examples of strategies. Third, the instructor models the use of the strategy by providing procedural knowledge on how to apply it. To do this, he or she plans or revises a text in front of the class, describing how the strategy is used during the process. Subsequently, students memorize the strategy using the previous knowledge. The instructor supports the mastery of the strategy through scaffolding and the progressive withdrawal of support. Finally, students apply the strategy independently. Numerous studies have validated the efficacy of self-regulated strategy-focused instruction both in planning (Fidalgo, Torrance, Rijlaarsdam, Van den Bergh, & Álvarez, 2015; Fidalgo, Torrance, & Robledo, 2011; López, Torrance,

Rijlaarsdam, & Fidalgo, 2017; Torrance, Fidalgo, & Robledo, 2015) and revising (Arias-Gundín & García, 2007; Fidalgo, Torrance, & García, 2008; Torrance et al., 2015).

Text structure. This practice is based on the systematic instruction of the structural elements of various text genre, allowing to plan and revise a text according to its structure. Several meta-analyses indicate its effectiveness in primary school (Graham et al., 2012; Koster, Tribushinina, de Jong, & van den Bergh, 2015), although this decreases in the higher grades (Graham & Harris, 2018; Graham & Perin, 2007). In this practice, the instructor describes the meaning of acronyms that represent text structure (see Table 2 for examples of acronyms). Often, this practice is combined with the previous one, so that not only are planning and revising strategies described and modeled, but also rules that help students to memorize the structure of the text.

Previous practices include explicit instruction on higher order processes. However, within them, complementary support for student writing can be used, such as: *approaches based on the writing process*, which create routines for planning, writing, and revising texts within writing tasks where the student receives individualized support (Graham & Sandmel, 2011); *collaborative practice* with peers (Graham et al., 2012; Graham & Perin, 2007); *goal setting* prior to planning or revising the text, whether these are objectives related to textual product (Graham & Harris, 2018; Graham et al., 2012), process (Koster et al., 2015), or productivity (Rogers & Graham, 2008); *observation of exemplary text models*, high quality texts whose characteristics the students attempt to reproduce in their writing (Graham & Harris, 2018; Graham & Perin, 2007); and *research*, or observation of real situations, the data which the student uses to generate ideas about the content of his or her text (Graham & Harris, 2018; Graham & Perin, 2007).

Discussion

In response to the principles of the RTI model regarding assessment and instruction in written competence for the prevention of LD, the work of teachers and their advice and guidance by the educational psychologist must be based on scientific knowledge. On this basis, the conclusions of the review are presented and discussed around the two proposed objectives.

The first objective focused on analyzing the writing assessment measures that can be used within the framework established by the RTI model. Our study has revealed a lack of meta-analytical or review studies on assessment measures of the written composition, despite the existence of numerous empirical studies that validate these measures. In general, this review suggests that CBMs are the ones that best meet the demands of the RTI model, since their sensitivity to growth makes them ideal for monitoring student progress. Likewise, their speed of application and correction, as well as their high reliability and validity, facilitates their use compared to other measures in large-scale evaluations (McMaster & Espin, 2007). However, from the review carried out, it is possible to conclude that not all measures are valid for the evaluation of all aspects of the textual composition. Thus, it is suggested that correct letter writing makes it possible to evaluate handwriting aspects while CBMs fundamentally evaluate productivity (e.g. number of written words), spelling accuracy (e.g., words spelled correctly), and grammar (e.g., correct minus incorrect word sequences). Holistic and analytical indices, meanwhile, allow the assessment of more complex aspects related to the coherence, structure, and overall quality of the text. This supports previous research that points to the combined use of different evaluation measures, combining quantitative and qualitative evaluation and providing a more accurate description of writing skills (Ritchey & Coker, 2014). On the other hand, in relation to CBMs, this review suggests that their appropriate use requires adapting them to the age of the students. Thus, productivity rates are especially

effective with younger students (Hampton & Lembke, 2016; McMaster et al., 2011) and accuracy rates with students in the last grades of primary school and teenagers (Espin et al., 2005; Espin et al., 2008). Finally, based on the literature reviewed, it is possible to conclude that all the evaluation measures presented can be used with various types of students. In fact, only one of the studies carried out exclusively involved students at risk of developing LD in writing (Costa et al., 2012), while the rest included a heterogeneous sample with a percentage of students receiving special education services.

The second objective focused on analyzing instructional practices in writing that comply with the premise of empirical validation of their effectiveness proposed by the RTI model. In this sense, instruction must be linked to the three cognitive processes of writing. The review suggests that practices focused on spelling and handwriting processes have been validated mainly with students in the first levels of primary education, compared to the validation of practices linked to planning and revising processes with older students (in our country, Fidalgo et al., 2015; Fidalgo et al., 2011; López et al., 2017). This is consistent with the line of research that supports instruction in higher order processes once spelling and handwriting skills have been automatised (Fayol, 1999), since it is not until the intermediate educational levels that planning and revising determine the text quality in a significant way (Limpo & Alves, 2013; Limpo, Alves, & Connelly, 2017). However, recent studies suggest the efficacy of combined instruction in lower and higher order processes from the beginning of primary education (Arrimada, Torrance, & Fidalgo, 2019). Finally, the studies reviewed seem to indicate that analogies and the study of strategies are the most effective instructional practices in spelling (Mushinski & Stormont-Spurgin, 1995; Wanzek et al., 2006). As for handwriting instruction, modelling is suggested to be the most effective practice (Hoy et al., 2011). Self-regulated strategy-focused instruction,

on the other hand, is particularly effective for instruction on planning and revising texts (Graham, et al., 2012).

This study, however, presents certain limitations derived mainly from its nature as a review, which must be taken into account. First, as regards the assessment dimension, only measures related to textual product have been included. In recent years, however, there has been some interest in assessing the writing process, through online measures such as pause and execution analysis (Olive, Alves, & Castro, 2009), thinking out loud (Armengol, 2007; López, Torrance, & Fidalgo, 2019), or the triple task (Fidalgo, Torrance, Arias-Gundín, & Martínez-Cocó, 2014). However, to our knowledge, the validity of the online measures for monitoring progress has not yet been analyzed and, therefore, its effectiveness within the RTI model is unknown. Future studies should address this gap. Secondly, regarding the instructional dimension, meta-analyses focused on transcription processes analyze, almost exclusively, studies carried out on students with LD in writing or at risk of presenting these difficulties. Therefore, it is difficult to present conclusive data regarding the effectiveness of these practices with other types of students. However, given the preventive nature of the RTI model and its application with students at risk, it seems pertinent to review practices of this type.

In conclusion, consistent with the dominant international approach in the field of the prevention of LD, the adoption of the RTI model is an imperative necessity. In this context, the work of the educational psychologist is essential, as he or she is responsible for guiding teachers in the principles and implementation of the model in the academic areas in which LD can occur. In turn, scientific research will provide the psychologist with the tools and training necessary to carry out this work; hence the importance of empirical reviews such as the one

presented here, aimed at advancing the application of the RTI model in the prevention of LD in writing in our country.

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CrossMark

Chapter 5

Supporting first-grade writers who fail to learn: multiple single-case evaluation of a Response to Intervention approach

This chapter faithfully reflects the content of:

Arrimada, M., Torrance, M., & Fidalgo, R. (2018). Supporting first-grade writers who fail to learn: multiple single-case evaluation of a Response to Intervention approach. *Reading and Writing, 31*(4), 865-891. https://doi.org/10.1007/s11145-018-9817-x

Abstract

We report a multiple-baseline single-case study, based in the response to intervention framework, evaluating Transcription-Only and Transcription-and-Planning interventions for young, struggling writers. In a baseline phase, 8 classes of Spanish children at the start of their first year of primary (elementary) education completed short, probe writing tasks twice-weekly over the first 120 days of their school career. During this period, all students received researcher-developed classroom instruction in spelling, handwriting, and text-planning. Students then completed a battery of tests including measures of spelling, handwriting and composition quality. On the basis of writing probe tasks and test scores we identified 12 struggling writers for whose written composition performance was below the 15th percentile, relative to the full sample, whose spelling performance was below 25th percentile, and whose handwriting was poor. For the next 72 days, these students received twice-weekly, parent-delivered training in transcription skills (handwriting and spelling) or transcription skills plus text planning. Researcher-developed classroom instruction and regular probe tasks continued during this phase. All students, in both intervention conditions, showed improvement in handwriting quality relative to Phase 1. 10 students also showed improvement in composition quality, with 8 performing, post intervention, within normal range relative to peers. Our findings demonstrate the value of a response-to-intervention approach to identification and remediation for struggling writes in their first school year.

Keywords Handwriting: Spelling; Planning instruction; Writing learning difficulties; Strategy-focused writing instruction

Introduction

Learning to compose text requires a range of skills. According to the not-so-simple view of writing (Berninger & Winn, 2006), these involve low-level transcription skills and high-level self-regulation skills. Transcription is the ability to transform linguistic representations into written text by retrieving the orthographic symbols and executing the motor output required to produce them (Abbott & Berninger, 1993). Thus, it involves handwriting and spelling. Skilled writing also requires high- level skills to direct the composing process and meet multiple environmental demands. Among them, planning strategies for generating and structuring ideas seem particularly important in early educational stages, where children are required not only to generate but also to organize ideas to create specific text genre.

Low and high-level skills are closely interrelated. According to Berninger & Winn (2006), lack of automaticity in transcription draws cognitive resources from higher level processing, keeping writers from activating both processes concurrently (see also Limpo & Alves, 2013a; McCutchen, 1996; Olive & Kellogg, 2002). This will affect the content and rhetoric of the child's text. Struggling with transcription is also likely to constrain learning. A child who struggles with handwriting will produce less text, providing teachers with less scope for feedback: if a child struggles to form words, it is impossible to determine whether they have developed, for example, grammar knowledge or understanding of how to construct a narrative. Over time, handwriting difficulties have the potential to spiral into a serious failure to learn to compose effective text.

Several studies have examined the efficacy of interventions for supporting development of writing skills in struggling writers (Gersten & Baker, 2001; Gillespie & Graham, 2014), though very few were conducted at the beginning of compulsory education. Given that it is possible to detect early signs of future writing failure,

research supports the use of early supplementary writing interventions to prevent or alleviate problems in later grades (Graham, Harris, & Larsen, 2001). Thus, we propose a relatively low-effort intervention for early failure to learn to write.

In our contribution to this special issue we describe a Response to Intervention (RTI) approach (Barnes & Harlacher, 2008; Vaughn & Fuchs, 2003) that aims to identify and then remediate failure to learn to write at the start of school career. RTI is "a systematic and data-based method for identifying, defining and resolving students' academic and/or behavioural difficulties" (Brown-Chidsey & Steege, 2005, p. 2). All learners are initially exposed to evidence-based classroom instruction (*Tier 1*) and their learning is systematically monitored. When progress-monitoring data reveals slow learning, these students are given additional (*Tier 2*) support. Students who still struggle would receive further support (*Tier 3*). Several studies have established the value of RTI in reading (O'Connor, Fulmer, Harty, & Bell, 2005; Simmons et al., 2008; Vaughn, Linan-thompson, & Hickman, 2003) and a combination of reading and mathematics (Vanderheyden, Witt, & Gilbertson, 2007). They conclude that this approach—which combines classroom evidence-based intervention, systematic evaluation of learning in a controlled context and additional support for failing students—is particularly successful to enabling initially at-risk students to catch up with their peers.

To our knowledge, although some studies have referred to remedial instruction as Tier 2 (Harris, Graham, & Adkins, 2015; Lane et al., 2011), RTI has never been formally implemented as a strategy for identifying and supporting struggling writers. In the context of writing instruction, RTI seems particularly suitable since it allows assessing failure over time and ensures the use of standardized, evidence-based instruction before diagnosing failure to learn. Progress monitoring is needed since the literacy skills of children entering first grade are highly variable (Coker, 2006; Dunsmuir & Blatchford, 2004; Hooper, Roberts, Nelson, Zeisel, &

Kasambira, 2010) and scores on single writing tasks typically provide poor indication of writers' ability, particularly in younger students (Van den Bergh, Maeyer, van Weijen, & Tillema, 2012). Concerning instruction, Tier 1 intervention is based on current evidence, which helps to eliminate the possibility of students failing to learn due to poor instruction. There is, fortunately, a rich literature exploring the efficacy of different forms of writing instruction to inform choice of an evidence-based Tier 1 intervention (Graham & Harris, 2018; Graham, Mckeown, Kiuhara, & Harris, 2012).

A central question for writing instruction in first grade, is the relative benefit of teaching low-level (transcription) and high-level (composition) skills. In a meta-analysis, Graham & Santangelo (2014) found only one unpublished study that showed statistically significant effects of spelling instruction on compositional quality in first and second grade. Handwriting, however, has proved particularly valuable in children's writing development. Individual differences in handwriting significantly predict compositional fluency and quality (Jones & Christensen, 1999; Berninger et al., 1997) and poor handwriting hampers composition, preventing writers to engage in more complex writing processes (McCutchen, 1996). In a separate meta-analysis, Santangelo and Graham (2016) identified three studies in which handwriting instruction showed benefits for text length and fluency—as might be expected—but also for text quality, effect sizes between .54 and 1.00 (Alves et al., 2016; Graham, Harris, & Fink, 2000; Jones, 2004). There is some evidence, therefore, that, for handwriting at least, teaching low-level skills has knock-on benefits for higher-level text features. In our study, handwriting performance was the main selection criteria as a possible reason to explain early failure to develop composition skills.

There is also evidence that direct instruction in text planning, benefits young, struggling writers (Single-case studies: Lane et al., 2008; Zumbrunn & Bruning, 2013. Group comparisons: Harris, Graham, & Mason, 2006; Harris et al., 2015; Lane et al.,

2011; Lienemann, Graham, Leader-Janssen, & Reid, 2006). Except for Zumbrunn and Bruning, a case study of 6 first graders, these studies were conducted with second-grade students. Taken together, they provide evidence that teaching young struggling students how to plan their text benefits text structure, length and overall quality. To our knowledge, however, our recent research (Arrimada, Torrance & Fidalgo, 2018) is the only study that found robust effects of teaching planning strategies to fully-range first-grade classes on the quality of students' narratives.

Although transcription and planning have traditionally being taught separately, writing requires the concurrent activation of both. It, therefore, makes sense to conduct interventions addressing the early development of all core cognitive processes involved in writing. This will provide better insight into the interrelation of low and high-level skills in young writers and subsequent clues to support struggling students. Current evidence suggests that combined instruction in transcription and planning produces greater benefits on writing fluency and quality than pure planning instruction (Limpo & Alves, 2017).

In most of these studies, instruction was delivered by researchers to small groups of students. While this maximizes fidelity and effect size, it reduces generalizability to typical classroom settings. Thus, in the present study, classroom instruction (Tier 1) was conducted by teachers, increasing its applicability to real school contexts. However, in full-range classrooms, teachers will not typically have time to provide intensive additional support for students who fail to learn. We therefore implemented a Tier 2 intervention based on tasks that students completed under their parents' supervision. Evidence supports the value of parent involvement in developing students' writing skills, albeit students above first grade. This is true for spelling (Camacho & Alves, 2017; Karahmadi, Shakibayee, Amirian, Bagherian-Sararoudi, & Maracy, 2013; Reutzel, Fawson, & Smith, 2005) but also for productivity

and compositional quality (Robledo-Ramón & García-Sánchez, 2012; Saint-Laurent & Giasson, 2005).

The present study

This study involved a rigorous, year-long implementation of an RTI approach to writing instruction for first-grade students. Our aim was to explore the effectiveness of this approach to providing remedial support for students who struggle to learn to write in their first year of formal education. Slow learners in the present study were defined as those whose poor composition skills are accompanied (and possibly caused by) very poor handwriting.

The RTI approach adopted in this paper differs from previous interventions for teaching composition skills to young struggling writers (Harris et al., 2006, 2015; Lane et al., 2008, 2011; Lienemann et al., 2006; Zumbrunn & Bruning, 2013) in three important ways. First, we studied writers at the very beginning of their school career. With one exception (Zumbrunn & Bruning, 2013) all previous studies involve writers in second grade. Second, previous studies have identified students who fail under the normal curriculum, in the context of teacher-developed instruction. We, however, consistent with the RTI framework, identified failure to learn in the context of a systematic evidence-based writing instruction. This involved combined instruction in transcription and planning for all students in 8 first-grade classes (Phase 1). Evaluation under this Tier 1 intervention reduced the possibility that students failing to learn struggled simply because of deficiencies in the instruction. Struggling students were provided with Tier 2 additional remedial instruction (Phase 2). This involved regular tasks, overseen by parents, which provided additional practice in the skills taught in the Tier 1 instruction. The Tier 2 intervention took two forms: Transcription-Only and Transcription-and-Planning. A No Intervention group, which received no additional support, was compared with intervention students. Students' progress was monitored in both tiers. Within this context, we explored the benefits of additional

support (Tier 2) for 12 struggling students. Third, students in need of remediation are typically identified through assessments at a single point in time. However, consistent with the progress monitoring approach of RTI, we identified failure to learn in terms of rate of learning.

Our study addressed this research question: Is the implementation of a rigorous RTI approach to first-grade instruction effective in remediating early failure to learn written composition skills in a sample of children who specifically struggled with handwriting? We identified slow learners on the basis of scores from multiple probe tasks completed at regular intervals throughout the first half of the academic year. From these, we selected just those students who also showed poor or very poor handwriting. These children received additional, parent-supervised (Tier 2) support. We compared students' learning trajectories prior to Tier 2 intervention with their learning during Tier 2 intervention. We also compared performance on one-off, pre-post measures of spelling, narrative writing, handwriting fluency and non-verbal ability. If Tier 2 intervention was effective, we anticipated that intervention students would show improved performance and accelerated learning during Tier 2 intervention, and perform within normal range on writing posttests. Failure to find parallel improvement in non-verbal performance, and in comparison case studies of students who did not receive Tier 2 supper, would rule out maturational ("late developing") explanations for this finding.

Method

Design

Our case study was conducted in two stages over one academic year: a baseline phase (Phase 1) in which we assessed the performance of a relatively large cohort under Tier 1 classroom instruction, and an intervention phase (Phase 2) during which students who struggled in Phase 1 were given additional Tier 2 support while they continued receiving Tier 1 classroom instruction.

During Phase 1, for the first 120 days of the year, 179 first-grade students completed short text writing probe tasks twice-weekly (with some variation in regularity across classes). They also received empirically-based writing instruction 3 times a week, focused on transcription and planning (Tier 1). At pretest and Phase 1 posttest (before and after Phase 1), we measured, for the full cohort, performance on several phase-end tests: spelling, handwriting speed, narrative writing and non- verbal ability, to act as a non-verbal control. After Phase 1, we estimated performance on overall text quality on the probe tasks through linear regression models fitted separately for each child. All students whose estimated performance was below the 25th percentile received additional Tier 2 support in Phase 2. We then examined their scores on the phase-end tests. For the purpose of this paper, we identified a sub-group of 13 students who met two inclusion criteria: (a) estimated performance on the regular probe tasks below the 15th percentile and (b) handwriting in the phase-end narrative writing task rated as poor or very poor. Scores on spelling and handwriting speed at the phase-end tests were at or below the 25th percentile in 11 and 8 students respectively. In this paper, we report results for just this subset of 13 students who met the two inclusion criteria. However, all students who performed below the 25th percentile in the probe tasks received some form of Tier 2 intervention.

Phase 2 started 40 days after Phase 1, and lasted for 72 days. Children who showed slow development in Phase 1 received additional Tier 2 support. This involved twice-weekly homework tasks, overseen by parents. The intervention children were split randomly between two conditions: The Transcription-Only intervention comprised tasks focused on handwriting and spelling accuracy and automaticity; the Transcription-and-Planning intervention involved a subset of these transcription tasks, plus additional planning tasks. Additionally, we identified a No Intervention comparison group selected randomly from students whose estimated

performance in the probe tasks during Phase 1 was between the 25th and 50th percentile, just above the level that triggered intervention.

As in Phase 1, all students continued receiving Tier 1 instruction and completed bi-weekly probe writing tasks. According to RTI, Tier 1 instruction aims not only to identify struggling students, but also to continuously provide all children with evidence-based instruction (Barnes & Harlacher, 2008). At the end of Phase 2, students again repeated the phase-end tests.

Participants

An initial sample of 179 students (85 male, mean age = 6.1) from 8 first-grade classes took part in the study. They were distributed in 3 schools located in a middle-class area. All of them received Tier 1 instruction throughout the whole academic year.

A sub-group of 13 participants were selected for this study and received Tier 2 instruction. One student was removed because they did not complete the intervention. The remaining 12 were split in two conditions: Transcription-Only (N = 5, 1 female, mean age = 6.2 years) and Transcription-and-Planning (N = 7, 3 female, mean age = 6 years). None of these students had previous medical diagnosis of disabilities. Seven of the eight classes had at least one student and no more than three receiving Tier 2 instruction. A third No Intervention comparison group was added (N = 7, female = 3, mean age = 6.06).

Educational context

Compulsory education in Spain starts with children entering first grade in September of the year in which they reach 6 years old. However, all students in our sample had attended kindergarten, where writing instruction addresses handwriting and spelling. Handwriting instruction involves naming and shaping the letters, progression from left to right, following lines on the page and allographs' size. Spelling

involves regular phoneme-grapheme correspondence and the writing of simple syllables and words. Transcription is taught to the whole class, without individualized teaching or instruction taken at each child's pace. Transcription is not formally assessed. Curricula highlights the need for parents to participate in the learning process though no specific procedures are set.

Measures

We monitored students' progress and determined their rate of learning via regular text writing probe tasks, rated weekly for overall length, spelling, handwriting accuracy and overall quality. Additionally, we assessed non-verbal ability, spelling, handwriting speed and narrative writing at pretest (before Phase 1), Phase 1 posttest (after Phase 1) and Phase 2 posttest (after Phase 2).

Progress monitoring measures.

Students completed short text writing probe tasks asking for narrative descriptions of events in their own lives (e.g., "What did I do yesterday?", "How did I celebrate my last birthday?"). Across the year, students completed a minimum of 20 probes (mean = 33). Students wrote for 10 min. Word count was recorded as a measure of productivity, independent of spelling or handwriting. Letter strings were considered words if they were separated from other strings and/or phonologically interpretable as attempted words. Spelling accuracy was the number of correctly spelled words. Handwriting quality was measured on a 5 point-scale, ranging from "no real letters/words to assess handwriting" to "very neat handwriting". Global quality was rated on a 6 point-scale, ranging from "very poor quality" to "very high quality" (see "Appendix A" for scales). Handwriting and quality were scored by two independent raters. Inter-rater agreement, calculated using Pearson's correlation, gave a mean of .95 for handwriting and .91 for quality over the whole year.

Phase-end measures.

Non-verbal ability was assessed using a matrix task designed by the researchers to be completed quicker than, for example, Raven's Progressive Matrices (Raven, 1981). The task contained three sets of incomplete matrices: patterns, sequences of identical figures and geometrical figures. Students circled, among 6 options, the picture that completed each matrix. This test showed reasonable internal and test–retest reliability (Chronbach's alpha, start-of-year = .73, mid-year = .67, end-year = .66. Test–retest: start-of-year vs. mid-year, r = .65; mid-year vs. end-year, r = .68). Correlation with spelling ability, as an indicator of discriminant validity, was .40 at start of year, .36 mid-year and .29 at end of year.

Spelling ability was assessed through real and pseudo-word spelling-to-dictation tasks. Real words comprised 12 bisyllabic and trisyllabic medium-frequency words selected from the Spanish dictionary of word frequency in children's writing (Martínez & García, 2004) according to the criteria outlined by Defior, Jiménez, Fernández and Serrano (2009). Pseudo-words comprised 12 non-words with the same syllabic structure as the words. Each word/pseudo-word was scored from 0 to 2 points: 2 was given to correctly spelled words; 1 was given if no more than 2 spelling errors were made; words with more than 2 errors scored 0. For pseudo-words, spelling errors were defined as a deviation from all phonologically plausible spellings.

To assess *handwriting speed,* students memorised a single sentence and wrote it as many times as they could within 1 min. The sentence—"Me gusta mucho salir al patio" ("I really like going to the playground")—was deliberately selected since it was meaningful, easy to remember and contained no irregular phoneme-grapheme correspondences. Score was the number of words written. Spelling mistakes were ignored as long as the word was phonologically similar to the original one. This way we measured handwriting speed as purely as possible, without spelling interfering.

To assess *narrative writing*, students were asked to write a story, choosing their own topic, or relating one they already knew. They were instructed to think carefully about what they were writing and to write as clearly as possible. Forty minutes were given to complete the task. Text quality was assessed through an adapted version of the method used by Cuetos, Sánchez and Ramos (1996). This involved identifying the presence or absence within the text of 10 different narrative features: temporal references, spatial references, main characters, character description, opening event, emotional reactions, any mention of action, progression of ideas, final consequence and sophisticated vocabulary. Maximum score for a text was 10. Two raters scored the texts. Inter-rater agreement gave a mean of .95 at pretest, .92 at Phase 1 posttest and .91 at Phase 2 posttest across all measures.

Instructional programs

Tier 1 classroom instruction.

All 179 students received Tier 1 intervention in three sessions per week (15–20 min) throughout Phases 1 (54 sessions) and 2 (29 sessions). It focused on handwriting, spelling, sentence-combining and planning. These components alternated, so three of them were taught each week (one component per session).

Handwriting and spelling instruction drew heavily on previous work on transcription skills (Graham, Harris, & Fink, 2002; Graham et al., 2000). Adaptations were made to accommodate the shallow nature of Spanish orthography, and the age of the students (extensive use of games, songs and pictures).

Handwriting instruction comprised 24 sessions, each set of 6 sessions addressing 7 letters of the alphabet. The instructional sequence for each set was as follows. First, students memorised the alphabetic sequence (2 sessions). Second, students traced letters and then formed them without support (2 sessions). Third, handwriting speed was addressed through time-limited activities based on writing as many letters or

words as possible (1 session). Finally, students wrote these letters in context by copying a text from dictation (1 session).

Spelling instruction comprised 12 sessions. Three spelling rules were explained (4 sessions per rule). The instructional sequence comprised 2 stages. First, students inferred the spelling rule with teacher's support (2 sessions) by analysing six target words controlled for frequency. Second, students practiced each rule in pairs through a spelling goose game designed ad hoc (2 sessions).

Sentence-combining instruction was included since Tier 1 instruction aimed at developing general written compositions skills, which necessarily include syntax skills and the construction of complex sentences (Beers & Nagy, 2009; Berninger, Nagy & Beers, 2011). Previous literature have demonstrated the efficacy of sentence-combining instruction (Limpo & Alves, 2013b). After each 4 spelling sessions, 4 sessions were devoted to sentence-combining and punctuation rules. This comprised 12 sessions. Students practised sentence-combining by using simple connectors to write complex sentences (2 sessions). Then, they were taught a punctuation rule to be used with complex sentences or complete texts (2 sessions).

Planning instruction on story writing was based on previous strategy-focused interventions (Fidalgo & Torrance, 2018; Harris et al., 2015) including 3 instructional components: direct instruction, modelling and individual practice. It comprised 27 sessions. First, *direct instruction* (12 sessions), in which students were provided with explicit metacognitive knowledge of the planning process and the structural elements of a narrative: introduction (when and where the story happens and who the characters are), development (what happens and how the characters react) and conclusion (how the story ends). These were presented as houses on the road up to a mountain used as a mnemonic device. Students then judged high and poor-quality texts. Second, *modelling* (5 sessions) followed by students' emulative practice (4 sessions). Teachers provided students with a mastery model of the strategy use by

thinking aloud while composing a narrative in front of the class. Through thinking aloud students were explicitly taught how to self-regulate their writing behaviour: aim setting, self-motivation, steps to follow the strategy and self-assessment. After each modelling session, students emulated teacher's writing. Teachers then performed an incomplete model and students identified the missing parts of the story modelled. Third, *individual practice* (6 sessions), students wrote their own narrative first with and then without a detailed guide of the structure. This allowed them to practice the self-regulation procedures mentioned above.

Remedial (Tier 2) instruction.

Intervention students were divided in two experimental conditions: Transcription- Only and Transcription-and-Planning. Both received parent-delivered Tier 2 instruction during Phase 2. RTI assumes that those students who struggle under Tier 1 might benefit for the same instruction if taught in a more individualized way. Thus, both Tier 2 instructional programs followed the same pattern as Tier 1, with adaptations described below.

Tier 2 intervention was delivered over 22 twice-weekly sessions, on a one-to-one tutoring basis. Sessions were paper-based designed: working sheets contained all necessary explanations provided by an avatar. Both Tier 2 instructional programs matched the transcription contents in Tier 1. Planning instruction, though, was only taught in one condition. Sentence-combining was removed since it required some level of handwriting fluency and intervention children seriously struggled with handwriting. Instructional components alternated, so that two of them were taught per week.

Transcription-only condition.

Handwriting was the main focus of 11 sessions, while spelling was addressed in the remaining half. Necessarily, however, all sessions indirectly addressed spelling and handwriting processes involved in writing syllables or words.

Handwriting instruction matched Tier 1, with three adaptations aligned with students' poor handwriting: sub-letter forms were practice since the students struggled with even the most basic handwriting processes; not only single letters but syllables were traced and copied; text-copying was removed since it required some level of handwriting accuracy.

Spelling instruction followed Tier 1 sequence. Target words were different but selected through the same criteria.

Transcription-and-planning condition.

Twelve sessions were devoted to transcription skills: 5 mainly focused on handwriting and 7 on spelling. Ten sessions were devoted to planning.

Spelling and handwriting instruction followed the same pattern as the Transcription-Only condition. Given the reduced number of sessions, exercises on sub-letter forms and challenging syllables were removed.

Planning instruction followed Tier 1 instructional sequence with some adaptations. Since we designed specific transcription training, we assumed planning sessions should involve as less transcription as possible so that even students who really struggled with transcription could complete planning sessions. Therefore, when children's answers in planning sessions involved writing words, ideas or texts, parents were told to write them down. Minimum transcription skills were, however, occasionally required. Direct instruction and modelling alternated to promote a better understanding of the structural parts. Thus, modelling followed direct instruction of each part of a narrative. Direct instruction was provided by the avatar in children's workbooks. Students identified the structural elements on a written text but did not judge its quality. Modelling was presented through a video performed by the first author. After modelling, students created their own narrative by selecting pictures and tracing the text below them. A final complete modelling was provided to increase understanding of narrative structure. Individual practice was performed without

guidance, but children assessed their performance using a checklist. Given students' difficulties, all these adaptations provided a high degree of scaffolding.

Delivery and fidelity

Classroom teachers delivered Tier 1 instruction. They attended an initial training session on the instructional procedure for each writing component. A detailed script of each session was provided, and teachers kept regular meetings with the researchers. To ensure fidelity, researchers examined all the materials and found no evidence of any teacher failing to complete the prescribed tasks. Tier 1 sessions were audio-recorded. A random sample of 56 recordings were compared to the scripts given to the teachers. Although teacher's performance slightly varied across classes, steps completion gave a mean of 87%. We, therefore, found no evidence of students' failing due to poor Tier 1 instruction.

Before Phase 2, parents of the intervention students met with the school principals and researchers and were presented the Tier 2 intervention as a supporting activity to classroom instruction. They all agreed to collaborate and expressed their availability to work with their child twice a week. On teachers' request, parents were trained individually or in small groups formed according to which form of Tier 2 instruction their children were receiving. The training session lasted for 1 hour. It involved an initial overview of the study followed by a detailed explanation about general instructions on how to use the materials. Parents were then told the specific procedure to complete each writing task. Contact information of the first author was provided in case they needed support throughout the intervention. Parents were allowed to rise any objections, but no one did.

The intervention tasks were paper-based and self-contained. Parents, therefore, were not expected to provide any input beyond encouragement and making sure that their child understood. Children were given a workbook which contained all the tasks and several explanatory materials for parents.

Written products from all tasks were collected by the researchers. Analyses of these indicated that 7 students completed the 22 sessions. Four completed between 88 and 98% and 1 student completed 82% of the tasks. This indicates fidelity of the intervention.

Results

Results of the 12 intervention students and the No Intervention comparison group (N = 7) are reported below for progress monitoring and phase-end measures.

Progress monitoring

Figures 1, 2 and 3 show scores from the progress monitoring probe tasks. These data were analysed by linear regression models, evaluated separately for each child, with phase, time (days from start of year standardized within phase), and the phase-by-time interaction as predictors. A positive effect of phase (higher scores in Phase 2 than Phase 1) in intervention students represents evidence that that child performed better in Phase 2, during which they experienced Tier 2 intervention, than in Phase 1. A positive effect of the interaction between phase and time (a steeper slope in Phase 2 than in Phase 1) indicates that for this student learning rate in Phase 2 was greater than in Phase 1. Parameter estimates from these models are represented by the regression lines in Figs. 1, 2 and 3. Table 1 shows statistical significance of these effects, derived by evaluating parameter estimates against a t distribution. Standardised regression coefficients, t and degrees of freedom are presented in "Appendix B".

Regarding overall text quality (Fig. 1), 10 intervention students performed significantly better in Phase 2. This was true for only 2 students in the No-Intervention comparison group. Patterns of performance varied, however, suggesting three groups: Four students (S8, S9, S11, S15) showed little or no learning in Phase 1 but developed in Phase 2. Other students (S14, S16, S19, S20) showed some learning in Phase 1 but they still perform at or below the 15th percentile by the end of this

phase, since they started with very low ability. These continued to learn at a similar rate in Phase 2. Finally, two students (S13, S17) jumped in performance as soon as Phase 2 started, and then continued to produce texts with this higher quality.

Table 1

Significance tests for overall effect and difference in learning rate in Phase 1 and Phase 2. Negative effects shown in parenthesis

| | Overall Quality | | Handwriting | | Word count | | | |
| | | | | | Total | | Correctly Spelled | |
	Main effec	Learning rate	Main effec	Learning rate	Main effect	Learning rate	Main effec	Learning rate
No Intervention								
S1	**		**	(*)			**	
S2			**	(**)	*		**	
S3					*	*	*	*
S4	*		*	(*)	**		*	
S5			(○)	*		(*)		(**
S6				(○)				(○)
S7	(*)	(*)	**	(***				
Transcription-Only								
S8	**	○	**	*		**		*
S9	**	*	**	○		**	**	*
S10			**	○	**		**	(**
S11	**	*	**		**		**	
S13	**		**		**		**	
Transcription-and-Planning								
S14	**		**		*	(*)	**	(*)
S15	*	*	**	**		***	*	*
S16	**		**	(**)	**		**	
S17	**		**		**	*	**	*
S18	○		**	(**)	*	○	**	
S19	**		**		**		**	
S20	**		**		**	○	**	

Note: p values from phase (main effect) and phase x time (learning rate) effects from linear

Figure 1. Text quality ratings from probe writing tasks in Phases 1 and 2.

Handwriting performance (Fig. 2) followed similar patterns. All intervention students produced better handwriting in Phase 2. This was even true for the two students (S10, S18) who did not show improvements in overall quality, although neither of them showed handwriting learning throughout Phase 2 and still ended the phase performing at a low level. Comparison of learning rates in both phases indicates very similar patterns to overall quality. Four of the 7 comparison students also showed

handwriting improvement, although with smaller gains and no additional learning during Phase 2.
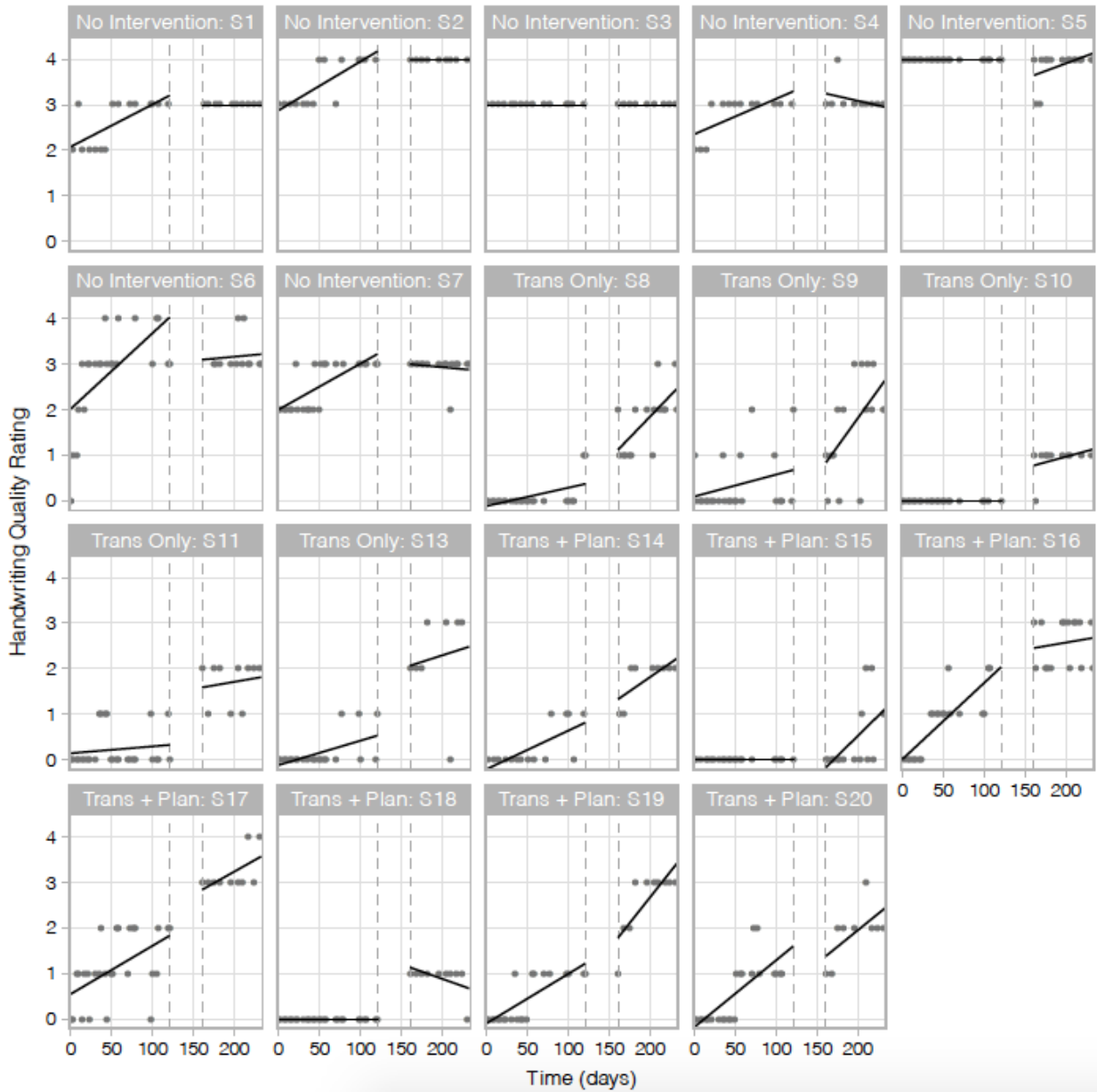
Figure 2. Handwriting quality ratings from probe writing tasks in Phases 1 and 2.

Nine intervention students wrote, on average, significantly longer texts in Phase 2, and 11 produced more correctly spelled words (Fig. 3). In the comparison group, 3 students wrote longer texts while 4 showed better spelling. Intervention

students who did not show an overall increase in text length (S8, S9, S15) showed, however, significantly higher rate of development in Phase 2.

In summary, performance during Tier 2 improved for most students on all four measures, and for all students on at least two measures. There were no differences between the Transcription-Only and the Transcription-and-Planning conditions.

Figure 3. Word count overall (points and solid regression lines) and for correctly spelled words (dashed regression lines) in Phases 1 and 2.

Phase-end measures

The analysis reported so far demonstrates that intervention students' performance improved in Phase 2. However, this is only partial evidence of success of the Tier 2 intervention. Ideally, by the end of Phase 2, previously struggling writers would perform at similar levels that their cohort.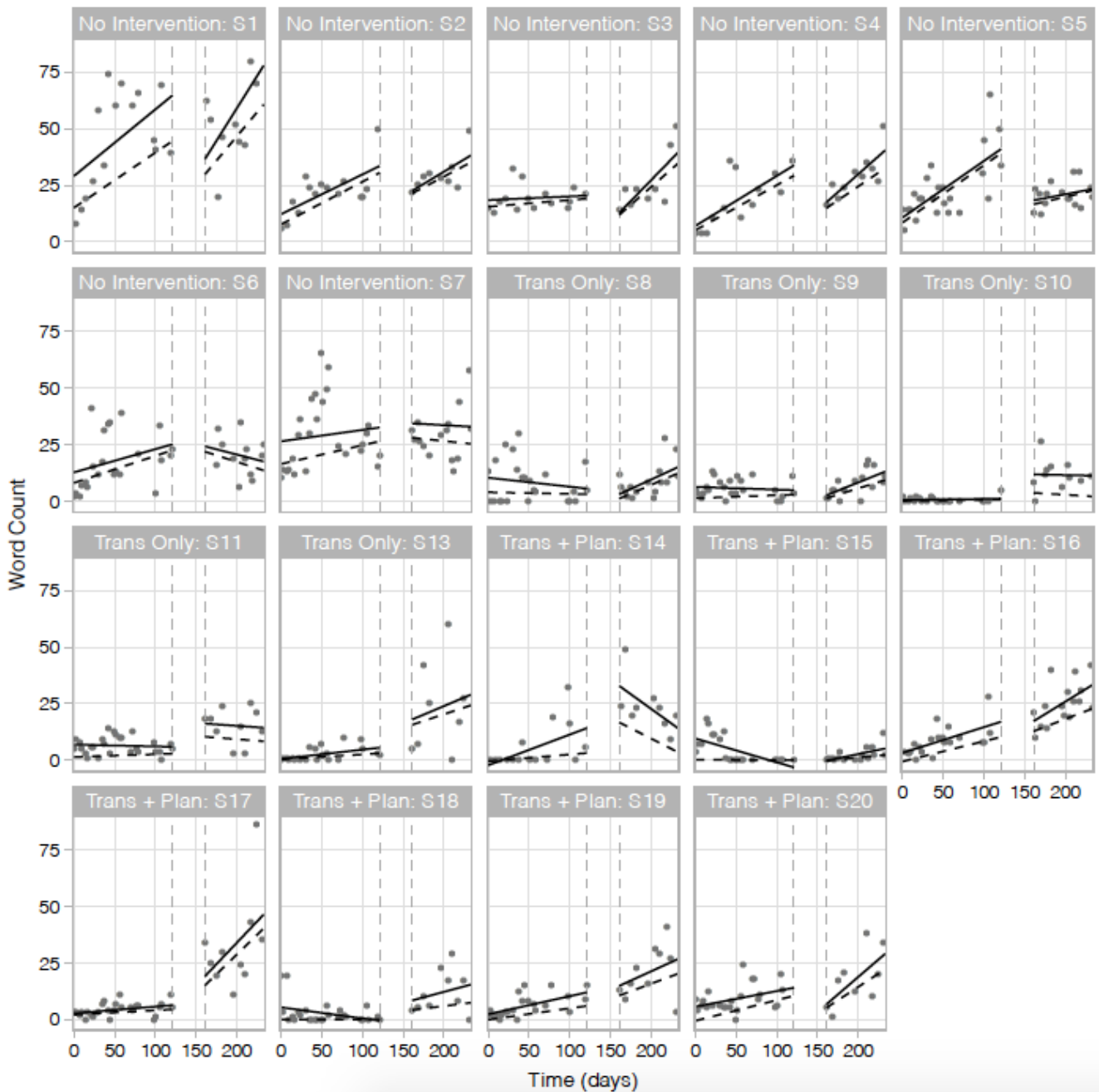 Appendix C shows the mean performance of the whole sample (N = 179) and the individual performance of each case study participant on the phase-end tests. Figure 4 plots the scores of intervention students on the tasks performed at pretest and Phase 1 and Phase 2 posttests, relative to scores from the remainder of the cohort.

Regarding scores from the phase-end narrative test (Fig. 4, column 1), there was good agreement between performance on this task and on the probes: students identified as struggling based on their probe tasks also scored badly on this narrative writing test at pretest and Phase 1 posttest. This indicates correspondence between the two quality measures used: a general researcher-designed holistic scale (probe tasks) and a more precise assessment procedure based on the specific features of narrative writing. Eight intervention students showed gains that placed them within normal range, relative to their cohort. Tier 2 intervention successfully enabled these students to catch up. Four students showed no improvement. For S10 and S18 this was expected, given their performance on the probe tasks. Tier 2 intervention was ineffective for them and they are obvious candidates for additional (Tier 3) intervention. This may also be true for S15, although they showed improvement towards the end of Phase 2. S14, however, wrote substantially better during Phase 2. This was not reflected in their performance on the narrative task, highlighting problems associated with single assessments. We found no differences between the two intervention conditions.

As expected, intervention students performed poorer than their peers on the handwriting speed task and the spelling-to-dictation task, at pretest and Phase 1

posttest (Fig. 4, columns 2 and 3). We did not find consistent improvement following Tier 2 intervention. Seven students performed around the 25th percentile on handwriting speed at the end of Phase 2, though only 3 showed gains attributed to Tier 2 (S9, S11, S17). In spelling, we observed substantial improvement only for S13.

Finally, as expected, case study students did not improve, relative to peers, their non-verbal abilities (Fig. 4, column 4). This supports the fact that improvement was an effect of Tier 2 intervention and not due to simple maturation.
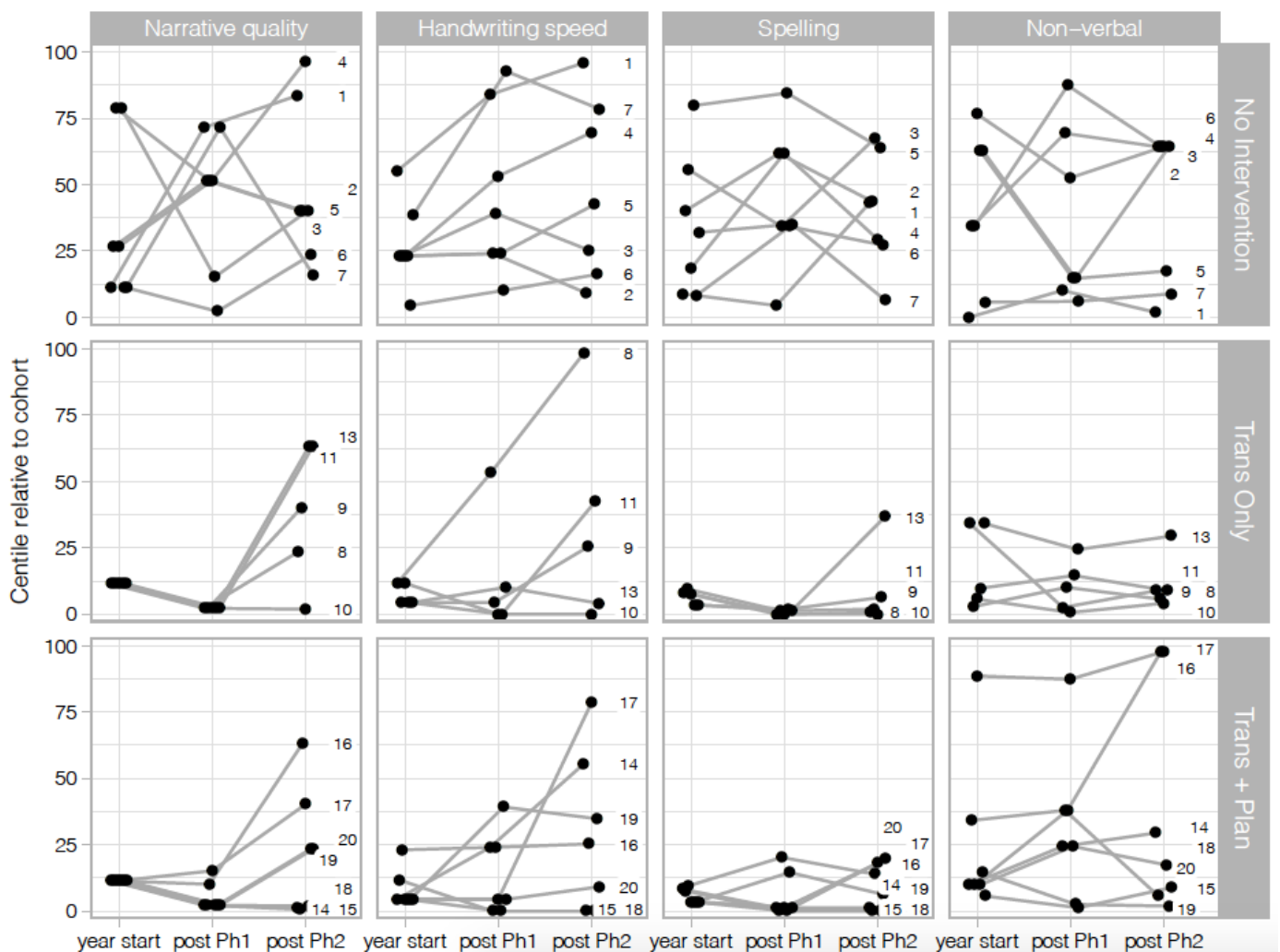

Figure 4. Performance at start of year, Phase 1 posttest and Phase 2 posttest, relative to peers.

Discussion

This research explored whether an RTI approach to first-grade instruction is effective in remediating early failure to learn to write. With some caveats discussed below, we argue that this approach is reliable for remediation.

Overall, our results confirm that Tier 2 intervention helped most slow learners catch up with their average peers: as shown by the progress monitoring measures, we found significant improvement in the handwriting of all 12 students and in the compositional quality of 10 students. These students produced longer texts with more correctly spelled words. Additionally, on the phase-end narrative task, eight students showed sufficient improvement to be placed at or substantially above the 25th percentile relative to their cohort. It might be the case that, for maturational reasons, students started to gain from Tier 1 instruction in Phase 2. However, two reasons provide evidence against this improvement having a maturational explanation: (a) the comparison group did not show consistent gains and (b) non-verbal ability did not improve.

Different patterns of response were found among participants. Some failed to learn in Phase 1 and then improved in Phase 2, as expected. Others learned slowly in Phase 1 but showed a sudden jump in performance at the beginning of Tier 2. Arguably, our approach is particularly important for these students. Without regular testing and individual attention, they might have remained hidden and developed a more fundamental failure to learn. A third group showed learning in both phases, but started from a very weak performance. For these students, it is less clear whether they were in need of intervention. Considering their learning slopes, they might have caught up without remedial intervention. However, selection criteria must involve estimated performance, which was considerably low for these students.

Unlike Limpo and Alves (2017), we did not find evidence that giving additional training in planning, alongside transcription, was necessary for our sample of

struggling writers. Note however that all students have already received planning instruction in the first part of the year and this Tier 1 intervention continued in parallel with Tier 2. Our case study students were sampled specifically because they struggled not just with narrative composition but also with handwriting. Additionally, students selected for the Tier 2 intervention seriously struggle with transcription. Within the limits of the case-study design of our research, our findings suggest that where students already have an understanding of how to plan their text, but struggle with transcription, additional support in low-level skills is, on its own, sufficient to bring the students up to speed.

We found some evidence that Tier 2 intervention resulted in improved performance on the phase-end handwriting speed task, but Tier 2 intervention did not appear to result in improved performance, relative to peers, on the spelling task. This suggests, perhaps, that although their spelling ability was adequate not to hold them back when writing narratives, it had not improved sufficiently to meet the more exacting demands of a formal spelling test.

On balance, therefore, we believe that the multi-tiered intervention implemented provides significant gains in writing ability. We believe that our approach also demonstrates a particularly effective way of identifying slow learners. Multiple probe tasks provide a substantially more robust estimate of writing skills (Van den Bergh et al., 2012) than one-off assessment. Crucially they also permit assessment of progress over time. Reliable identification must also eliminate the possibility of poor instruction causing slow learning. All participants in our study received evidence-based instruction throughout the whole year (Tier 1). Previous studies have demonstrated the efficacy of Tier 1 instruction for older students (Glaser & Brunstein, 2007; Limpo & Alves, 2013a; Torrance, Fidalgo, & García, 2007) and our recent research suggests that this extends to first grade (Arrimada et al., 2018). Additionally, studies have demonstrated the benefits of providing additional, strategy-

focused support for writers struggling under the normal curriculum (Harris et al., 2006; Lane et al., 2011; Zumbrunn & Bruning, 2013). However, to our knowledge, identification of struggling writers and remedial Tier 2 intervention have never been addressed under ongoing, researcher-designed and evidence based Tier 1 instruction. We believe, therefore, that our method demonstrates an effective and robust identification of slow learners. Moreover, repeating this combination of regular probe tasks and Tier 1 intervention over several consecutive cohorts would provide increasingly reliable norms on which to base this judgement.

Our RTI intervention was designed to be feasible in a typical, single-teacher class. Single teachers are unlikely to provide additional support to slow learners under the pressure of regular teaching. Parents, therefore, oversaw our Tier 2 intervention. Improvement confirms previous findings on the positive effects of parental involvement in writing (Camacho & Alves, 2017; Robledo-Ramón & García, 2012). This result, however, should be treated with caution. Tier 2 involved completing the tasks under parent's supervision. This was evaluated as a whole package in which some variation in how parents delivered the support was expected. Our study, therefore, does not make claims about the mechanisms explaining improvement in performance. We have just demonstrated the value of a method that teachers could apply without extra support. This was also true for Tier 1 intervention: activities did not require additional resources and provided written outputs, making it straightforward to determine fidelity. The probe tasks were, however, problematic. Teachers' attitudes towards these were considerably variable. Typical practice in the context in which we conducted this research involves a bottom-up approach to writing instruction, strongly focused on transcription (Cutler & Graham, 2008; Dockrell, Marshall, & Wyse, 2015). Thus, teachers were reluctant to accept the value of writing full texts from early educational stages.

In this paper we have presented data from a small sample of children. Findings are therefore only suggestive and clearly our study requires replication across a much larger number of classes, yielding a larger sample of struggling students. However, as we have discussed, the design of the assessment and intervention approach that we describe in this paper should make implementation on a larger scale straightforward. Within the limitations of the evidence that we present in this paper we suggest that the RTI method that we implemented provides a robust basis for remediating early failure to learn to write. Its efficacy, we believe, lies in (a) continuous progress monitoring, (b) remedial intervention under ongoing classroom instruction and (c) feasibility of implementation in regular first-grade classes.

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Appendices

Appendix A. Measurement scales

See tables 2 and 3

Table 2
Handwriting scale

Score	
(0) NO HANDWRITING	The following cases will score 0: - The child is unable to produce letters, so the sheet is either blank or with pictures or ramdom strokes on it. - The child is unable to produce any recognisable words. They just write random combinations of letters.
(1) REALLY POOR HANDWRITING	Most of the text is illegible either because letters are poorly written or words are formed by ramdom combination of letters (or both). However, there are at least 2 legible words, formed with simple letter combinations (e.g "mum", "dad", "and"…). Very short texts with 2 or 3 words will score 1 if at least 1 word is legible.
(2) POOR HANDWRITING	Between 50% and 75% of text is legible, although there can be some illegible words/letters. There should be at least one legible complete sentence, although not necessarily complex. Understanding the text requires an additional effort by the reader since some or all of these mistakes are frequently made: shaky and irregular strokes, great variety in letter size, oscillations of letters and words, big gaps between letters of the same word, overlapped letters.
(3) ACCEPTABLE/ AVERAGE HANDWRITING	The whole text is legible although there might be 1 or 2 illegible words. Understanding the text does not require any additional effort by the reader. Some of the previous mistakes are made but they hardly ever occur.
(4) NICE HANDWRITING	The text is perfectly legible and it gives a feeling of neatness, order and cleanliness. Previous mistakes do not occur, although there might be 1 or 2 slightly irregular letters.

Table 3
Quality scale

Score	Criteria
0	- There is no text or it's illegible. - The text does not respond to the topic. -The text is a list of words without clauses.
1	-Certain progression of ideas: the child mentions 1 or 2 clauses without clarifying or descriptive details. -Frequent digressions. -Handwriting is difficult to understand and there are frequent spelling mistakes. -Grammar complexity: simple sentences. -No connectors or very repetitive ones. -Basic and simple vocabulary.
2	- Certain progression of ideas with one of the following: • 1 or 2 ideas mentioned with descriptive or clarifying details. • More than 2 ideas with very few or no descriptive or clarifying details. -Repetitive and irrelevant details. -Legible handwriting with common spelling mistakes. -Grammar complexity: mostly simple sentences but there are some compound ones formed by juxtaposition (connector "and"). -Basic and repetitive connectors. - Vocabulary according to students' age.
3	-Logical progression/sequence of ideas, linked to a common topic and with descriptive and clarifying details. -Some irrelevant or repetitive details. -Correct handwriting with some spelling mistakes. -Grammar complexity: combination of simple and compound sentences (mostly juxtaposition but some formed by subordination). -Basic and repetitive connectors, although they might include a complex one. - Appropriate vocabulary.

Table 3. Continued

4	-Logical progression/sequence of ideas, linked to a common topic and with a variety of descriptive and clarifying details. - No irrelevant details although there might be some repetitions. -Correct handwriting with some spelling mistakes. -Grammar complexity: mostly compound sentences (juxtaposition, coordination and subordination) - Repetitive connectors although some complex ones. - Appropriate vocabulary with a few unusual expressions/words.
5	-Logical progression/sequence of ideas, linked to a common topic and with a variety of descriptive and clarifying details. -Variety of relevant and non-repetitive details. -Correct handwriting with very few spelling mistakes. -Grammar complexity: mostly compound sentences. -Varied connectors. -Advanced vocabulary. -Certain textual structure: introduction, development and conclusion.

Appendix B: Test statistics associated with p values reported in Table 1: Standardized regression coefficient, t, residual degrees of freedom.

	Overall Quality		Handwriting		Word count Total		Correctly Spelled	
	Main effect	Learning rate	Main effect	Learning rate	Main effect	Learning rate	Main effect	Learning rate
No Intervention								
S1	0.65, 4.01, 21	-0.2, -0.96, 21	0.49, 3.5, 21	-0.49, -2.75, 21	0.27, 1.56, 21	0.07, 0.33, 21	0.46, 2.89, 21	0.04, 0.18, 21
S2	0.25, 1.24, 20	0.04, 0.18, 20	0.56, 4.92, 20	-0.49, -3.46, 20	0.43, 2.74, 20	-0.08, -0.42, 20	0.53, 4.03, 20	-0.15, -0.93, 20
S3	0.25, 1.22, 20	-0.13, -0.52, 20	-, -, 20	-, -, 20	0.37, 2.27, 20	0.56, 2.75, 20	0.36, 2.15, 20	0.48, 2.25, 20
S4	0.47, 2.64, 19	-0.01, -0.06, 19	0.4, 2.4, 19	-0.61, -2.76, 19	0.42, 3.03, 19	-0.04, -0.19, 19	0.39, 2.67, 19	-0.1, -0.53, 19
S5	0.2, 1.3, 36	-0.25, -1.28, 36	-0.25, -1.8, 36	0.46, 2.53, 36	-0.14, -1.17, 36	-0.43, -2.73, 36	-0.11, -0.92, 36	-0.43, -2.79, 36
S6	0.15, 0.85, 31	-0.21, -1.06, 31	0.14, 0.93, 31	-0.33, -1.91, 31	0.11, 0.64, 31	-0.27, -1.28, 31	0.16, 0.9, 31	-0.35, -1.78, 31
S7	0.35, 2.44, 37	-0.37, -2.06, 37	0.42, 4, 37	-0.55, -4.17, 37	0.13, 0.79, 37	-0.09, -0.42, 37	0.19, 1.22, 37	-0.17, -0.83, 37

Transcription-Only

S8	0.61, 5.36, 36	0.26, 1.81, 36	0.88, 13.72, 36	0.2, 2.39, 36	0.05, 0.3, 36	0.41, 2.04, 36	0.29, 1.98, 36	0.46, 2.49, 36
S9	0.52, 4.58, 36	0.34, 2.33, 36	0.64, 5.68, 36	0.25, 1.72, 36	0.22, 1.52, 36	0.51, 2.75, 36	0.47, 3.73, 36	0.39, 2.42, 36
S10	-, -, 29	-, -, 29	0.97, 14.9, 29	0.14, 1.78, 29	0.8, 6.99, 29	-0.03, -0.23, 29	0.69, 5.62, 29	-0.22, -1.48, 29
S11	0.9, 13.41, 33	0.19, 2.39, 33	0.84, 8.9, 33	0.01, 0.11, 33	0.62, 4.59, 33	-0.02, -0.16, 33	0.63, 4.7, 33	-0.11, -0.7, 33
S13	0.79, 7.04, 26	-0.13, -0.99, 26	0.85, 8.48, 26	-0.03, -0.24, 26	0.67, 4.63, 26	0.08, 0.46, 26	0.71, 5.04, 26	0.09, 0.53, 26

Transcription-and-Planning

S14	0.71, 5.19, 20	-0.17, -0.97, 20	0.87, 10.81, 20	-0.01, -0.14, 20	0.69, 4.99, 20	-0.53, -3.02, 20	0.73, 6.35, 20	-0.56, -3.83, 20
S15	0.37, 2.63, 34	0.46, 2.48, 34	0.46, 3.64, 34	0.54, 3.21, 34	-0.15, -1.11, 34	0.73, 4.19, 34	0.33, 2.22, 34	0.42, 2.11, 34
S16	0.64, 6.5, 32	-0.17, -1.23, 32	0.77, 10.53, 32	-0.33, -3.24, 32	0.7, 7.14, 32	0.06, 0.43, 32	0.76, 8.65, 32	0, -0.02, 32
S17	0.87, 12.79, 33	-0.09, -1.16, 33	0.81, 9.5, 33	-0.07, -0.68, 33	0.77, 7.62, 33	0.24, 2.07, 33	0.77, 7.77, 33	0.27, 2.36, 33
S18	0.3, 1.88, 32	0.29, 1.56, 32	0.93, 16.9, 33	-0.18, -2.77, 33	0.55, 3.95, 33	0.28, 1.74, 33	0.67, 5.32, 33	0.14, 0.93, 33
S19	0.8, 12.94, 28	0.08, 1.11, 28	0.85, 15.55, 28	0.06, 0.97, 28	0.66, 5.33, 28	0.05, 0.35, 28	0.69, 5.59, 28	0.08, 0.57, 28
S20	0.54, 5.09, 29	-0.1, -0.76, 29	0.67, 7.21, 29	-0.12, -1.09, 29	0.44, 3.14, 29	0.29, 1.73, 29	0.56, 4.84, 29	0.16, 1.12, 29

Note: Values from phase (main effect) and phase x time (learning rate) effects from linear models. Dashes indicate values that could not be calculated.

Appendix C: Observed scores on phase-end tests

	Narrative Quality			Handwriting Speed			Spelling			Non-verbal		
	Pre	Tier 1 Post	Tier 2 Post	Pre	Tier 1 Post	Tier 2 Post	Pre	Tier 1 Post	Tier 2 Post	Pre	Tier 1 Post	Tier 2 Post
Cohort	3 (2.3)	5.5 (2.3)	7.1 (2.0)	3.7 (2.1)	8.1 (2.6)	11.5 (3.2)	26.9 (10.6)	37.2 (4.4)	39.7 (3.9)	14.9 (2.7)	16.5 (2.3)	16.9 (2.1)
No Intervention												
S1	0	7	9	4	11	17	9	30	39	1	13	11
S2	1	6	7	2	6	7	29	39	39	14	18	18
S3	5	6	7	2	7	9	31	36	41	14	19	18
S4	1	6	10	2	8	13	20	39	38	17	17	18
S5	5	3	7	2	6	11	35	41	41	16	14	15
S6	0	0	6	0	5	8	5	36	37	16	14	18
S7	0	7	5	3	12	14	25	36	34	10	12	14
Transcription only												
S8	0	0	6	1	8	18	8	9	24	14	11	14
S9	0	0	7	0	4	9	11	21	30	9	13	13

S10	0	0	2	1	0	0	1	0	0	10	9	12
S11	0	0	8	0	0	11	0	26	34	11	14	14
S13	0	0	8	0	5	6	0	22	39	14	15	16
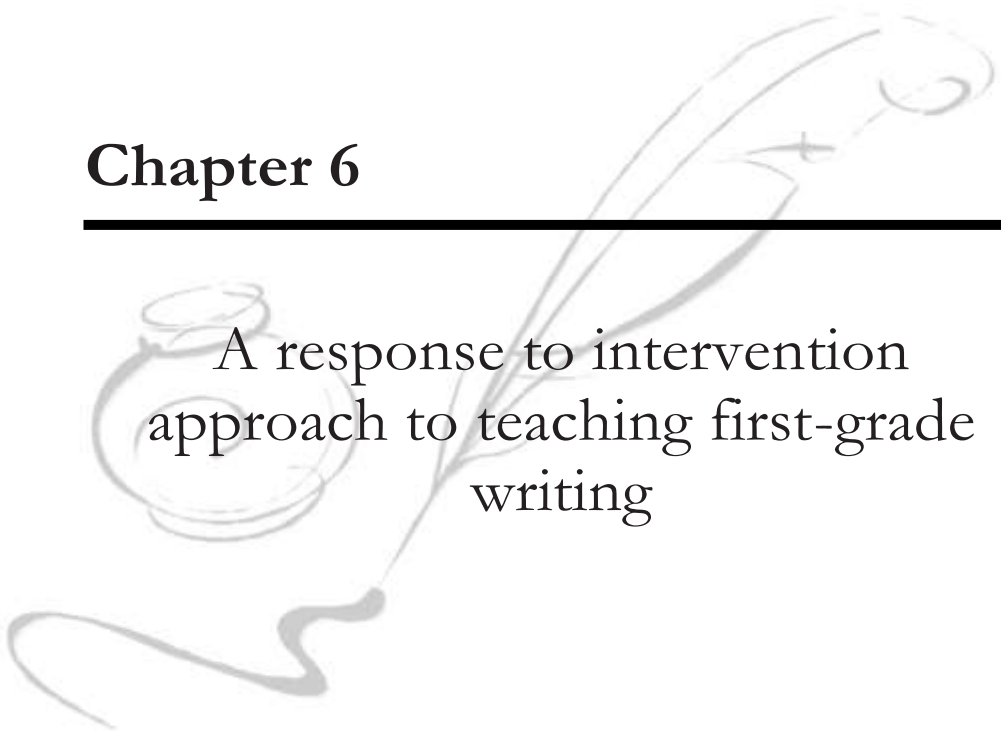
Transcription and Planning

S14	0	0	1	0	6	12	5	23	29	11	15	16
S15	0	0	0	1	0	1	2	0	0	14	16	13
S16	0	2	8	2	6	9	9	34	36	11	16	20
S17	0	3	7	0	4	14	0	24	36	18	19	20
S18	0	0	2	0	0	0	0	0	1	11	15	15
S19	0	0	6	0	7	10	0	33	34	12	11	11
S20	0	0	6	0	4	7	0	24	36	10	10	14

Chapter 6

A response to intervention approach to teaching first-grade writing

This chapter faithfully reflects the content of:

Arrimada, M., Torrance, M., & Fidalgo, R. (2019). A response to intervention approach to teaching first-grade writing. Manuscript submitted for publication in *Journal of Literacy Research*.

*Note: this chapter has been removed from the present document, in order to avoid possible conflicts with the journal where the original article has been submitted for publication.

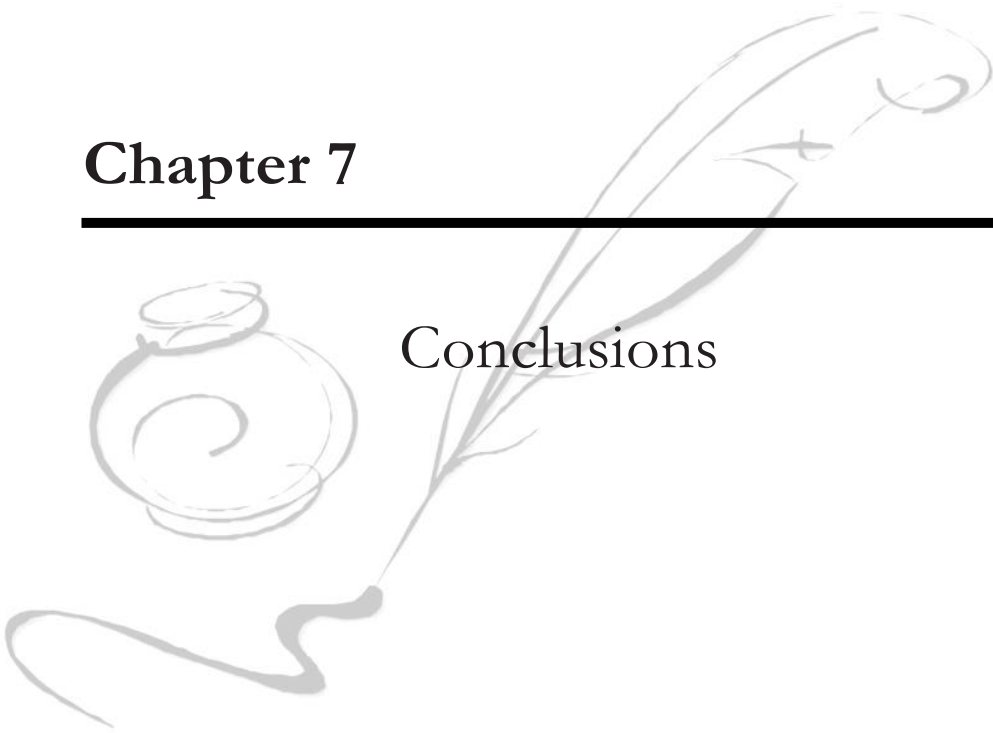# Chapter 7

Conclusions

The four studies that constitute the main body of this doctoral dissertation (chapters 3 to 6) have in common their focus on improving students' writing competence from the very beginning of compulsory education. This common focus is addressed from two complementary dimensions: on the one hand, empirically-based whole-class instruction for the teaching of written composition in early educational stages; on the other hand, intervention aimed at preventing learning disabilities (LD) in writing through the use of the Response to Intervention model.

Specific conclusions from the studies included in this thesis have already been presented and discussed in each corresponding chapter. This chapter, however, aims to present the overall conclusions and contributions of the doctoral dissertation as a whole, its limitations and future research lines. To facilitate the reading and organization of this chapter, conclusions will be structured around the two dimensions mentioned above: empirically-based general instruction in written composition at the start of compulsory education and intervention to prevent LD in writing through the RTI model. According to the regulations of University of Leon for the presentation of doctoral dissertations under the modality of International Thesis, conclusions will be presented in English and in Spanish in chapters 7 and 8 respectively.

Empirically-based instruction on written composition at the start of compulsory education

Research presented in this doctoral dissertation addresses whole-class general instruction aimed at improving written composition in early educational stages on the basis of two major considerations. First, the need to instruct on the different cognitive processes involved in the acquisition of writing competence, in order to achieve both the automatisation of transcription skills and the strategic self-regulation of high-level processes. Second, for this instruction to be effective, it must be based on

instructional approaches whose efficacy has been empirically validated. The present doctoral dissertation addresses these two considerations from both a theoretical and an empirical perspective. At a theoretical level, this is achieved through a systematic and exhaustive literature review on effective instructional practices focused on both low and high-level processes. At an empirical level, this thesis offers several instructional programs delivered to whole-class groups and based on those teaching practices to improve students' writing performance.

Within this instructional research line, it is possible to draw the following **conclusions** from the research presented in this thesis.

1ª. – Self-regulated strategy-focused instruction in the planning process at the very beginning of compulsory education significantly improves the overall quality of the texts written by students. This goes in line with the idea that teaching explicit self-regulation procedures improves students' writing performance (see meta-analysis by Santangelo, Harris, & Graham, 2016). More specifically, with regard to the planning process, previous studies demonstrate the benefits of self-regulation with populations of students with a wide range of features: adults and teenagers (Hoover, Kubina, & Mason, 2012; Limpo, Alves, & Fidalgo, 2014; MacArthur, Philippakos, & Ianetta, 2015), upper-primary students (Brunstein & Glaser, 2011; Fidalgo, Torrance, & Robledo, 2011; Glaser & Brunstein, 2007), typically developing students (Harris et al., 2012a, 2012b; Limpo & Alves, 2014) and students with learning disabilities or whose writing performance is below the average (Harris et al., 2015; Lienemann, Graham, Leader-Janssen, & Reid, 2006). Our research expands the importance of self-regulation to the very beginning of Elementary School. Additionally, it suggests that the effects of the instruction are maintained over time, in line with previous studies which provide evidence of the long-term effects of self-regulated strategy-focused instruction in higher educational stages (Fidalgo, Torrance, & García, 2008; Glaser & Brunstein, 2007; Torrance, Fidalgo, & García,

2007) and at the end of first grade (see case study by Zumbrunn & Bruning 2013). Nevertheless, effects of strategy-focused instruction in our research were particularly strong immediately after the intervention. This contradicts Zumbrunn and Bruning (2013) who found stronger effects at follow-up. A possible explanation might lay in the characteristics of the Spanish educational system: planning instruction does not exist at all in first grade, while it might be possible that students in other educational systems receive some instruction on text content or structure as part of their ordinary writing curriculum.

2ª. – Instruction on high-level cognitive processes must not necessarily be delayed until students have automatized transcription skills. Though low-level writing processes have proved cognitively demanding (Bourdin & Fayol, 1994, 1996, 2002), research presented in this thesis suggests that even young writers are capable of organizing their texts around a specific narrative structure previously set. This offers a new perspective on the development of early cognitive skills: young writers are able to comprehend and apply a certain metacognitive and procedural knowledge from very early ages without this causing cognitive overload. In this sense, we suggest that addressing planning from a strategic approach might reduce cognitive competitiveness between low and high-level processes. The use of strategies teaches students how to separate the planning process from the actual process of transcribing what has been previously planned. This would allow processing sequentially, and not in parallel, the cognitive resources devoted to planning and textual production (Kellogg, 1988, 1990), thus avoiding interference with each other. Then, our research suggests that, under strategy-focused instruction, students do not necessarily devote the greatest part of their cognitive effort to grapho-motor processing, as it would occur in the absence of that instruction (Fayol, 1999).

On the basis of these two conclusions, it is possible to highlight the first **contribution** of the research presented in this thesis. From a scientific perspective,

our research contributes to reduce the knowledge gap on instruction on high-level processes at the beginning of compulsory education, and how this might influence early writing development. In this sense, our results show that self-regulation can be trained at this age and that training favors students' writing competence even when they have not yet automatized low-level skills. This finding corroborates previous positive results obtained with small groups of struggling students in second grade (Harris et al., 2015; Harris, Graham, & Mason, 2006; Lane et al., 2008, 2011) and expands these results to whole-group first-grade classes. Thus, our research expands existing knowledge on the strategic and self-regulated control of high-level writing processes (Graham, Harris, & McKeown, 2014; Mason, Harris, & Graham, 2011).

Our research, however, is just a first step on early instruction in high-level processes. Future research should deepen in this research line, thus complementing current theories on early writing development (Berninger & Chanquoy, 2012; Shagoury, 2008). Questions to be addressed by future research derived from three key **limitations** of our research, within which conclusions mentioned above should be interpreted: assessment focused exclusively on text product, instruction based solely on narratives as a textual genre and addressing only the planning process.

First, benefits of strategy-focused instruction in planning have been explored exclusively by means of offline measured derived from the written product. Though this allows seeing how written compositions improved after the intervention, we cannot provide data about the specific mechanisms by which this improvement occurred. For this reason, it would be interesting to take online measures to know the dynamics of the writing process and how it changes as a result of the instruction provided. A first possibility would be collecting students' thinking aloud, as it has been done in previous studies (López, Torrance, & Fidalgo, 2019). However, the validity of this measure is under question due to the age of students in our sample. Though, to the best of our knowledge, there is no data on the cognitive load imposed

by thinking aloud to young writers, it is known that young writers find it difficult to activate various cognitive processes concurrently (Limpo & Alves, 2013; Olive & Kellogg, 2002). As an alternative, we suggest that future research addresses writing processes through non-intrusive online measures such as burst and executions (Alves, Castro, & Olive, 2008; Olive, Alves, & Castro, 2009) taken by means of smartpens. In this sense, the interventions proposed in this thesis might produce changes in the writing processes similar to those found in previous studies, such as: less pauses associated to transcription and longer bursts as a result of instruction in low-level processes (Alves et al., 2016) or in both low and high-level processes (Limpo & Alves, 2017); and greater amount of long pauses, traditionally associated to the activation of high-level cognitive processes (Alves, Castro, De Sousa, & Strömqvist, 2007; Chenoweth & Hayes, 2001; Wengelin, 2007). However, assessment of pauses and bursts with students so young might pose limitations about the validity of the threshold traditionally set to distinguish between pauses focused on high or low-level processes (2 seconds) and, thereby, about data interpretation. Analysis of pauses and bursts is also time-consuming, which makes it difficult to use these measures in large-scale evaluations. All of these aspects must be addressed in future research.

Second, planning instruction in our research focused exclusively on narratives as text genre. At the beginning of compulsory education, students are particularly familiar with this genre and they are likely to have certain background knowledge about its characteristics and structure. In the case of our research, this background knowledge might have facilitated the planning task, reducing the amount of cognitive resources students devoted to it. Thus, taking into account the limited capacity of working memory and the processing demands of writing (Torrance & Galbraith, 2006), the use of a well-known genre might have favoured students in activating the planning process without this resulting in cognitive overload. In this line, future research should explore the efficacy of strategy instruction focused in other textual genre to improve first-grade students' writing competence, as it has been stated in

higher levels (Harris et al., 2012a; 2012b). Also regarding extension to other text genre, we suggest addressing, in future studies, the transfer effects of strategy-focused instruction to an untaught genre, as it has been demonstrated in mid-primary grades (Graham, Harris, & Mason, 2005; Tracy, Reid, & Graham, 2009).

Third, evidence provided in this research on the efficacy of strategy-focused instruction at the beginning of compulsory education cannot be extended to the revising process. Revision is a cognitively complex process since it requires to re-read the written text, compare it with the expected text, identify discrepancies between them and make the necessary changes, all of this in a recursive manner (Chanquoy, 2009; Hayes, 2004). This cognitive complexity might explain the scarce use young writers make of revision (McCutchen, 2006) as well as their revisions being normally mechanic and superficial (Butler & Britt, 2011; Harris, Santangelo, & Graham, 2010). These arguments suggest that instructing on revision at the beginning of compulsory education might impose a cognitive overload on students that could impinge on their writing performance. However, to our knowledge, there is no empirical evidence on this matter. Thus, though benefits of revision instruction have already been demonstrated with older students (see MacArthur, 2016 for a review), we find it necessary to expand this research to early ages. It is possible that the use of a self-regulated approach allows separating the different processes involved in revision, thus reducing the cognitive overload, as it was the case with the planning process (see second conclusion, pp. 291). Also in this line, it is worth asking whether instruction focused on just one of the procedures that intervene in the act of writing (as it has been done in the present research) is as effective as combined instruction in planning and revising. Combined instruction has been previously applied with upper-primary students (Torrance et al., 2007; Torrance, Fidalgo, & Robledo, 2015). Future studies should explore its effects in early educational stages, in order to be compared with the research included in this thesis and draw conclusions about the need of instructing in the writing process as a whole.

3ª. – Research in the field of writing instruction for school-aged students has empirically validated the efficacy of instructional practices focused on both low and high-level cognitive processes to improve students' writing performance. This is brought up by the review of the literature in the field of writing instruction included in this thesis. In this sense, in the educational field and, in particular, in the teaching of writing, we emphasize the need to use instructional procedures whose efficacy has been empirically validated, in order to prevent writing failure due to inadequate instruction (Barnes & Harlacher, 2008; Brown-Chidsey & Steege, 2005). However, in spite of the great variety of empirically-validated instructional practices, teachers in elementary grades make little use of them (Brindle, Graham, Harris, & Hebert, 2016; Gilbert & Graham, 2010), maybe due to their lack of training to teach writing, as they themselves report (Sánchez-Rivero, Alves, Limpo & Fidalgo, submitted). Moreover, instruction on elementary grades is mainly focused on transcription(Cutler & Graham, 2008; Dockrell, Marshall, & Wyse, 2015), in spite of the empirical evidence on the value of instructing in high-level processes.

Previous evidence suggests a gap between the scientific and the educational field. In this sense, one of the **contributions** of our research, in the educational field, is that it promotes transfer of scientific knowledge to educational practice. In this sense, research presented in this thesis provides teachers with specific instructional programs derived from the practices reviewed and thus, based on empirical evidence. Those programs were delivered by teachers (Tier 1 intervention), who also reported positive views on them. This provides evidence that empirically-validated instructional practices can be used by regular teachers in their teaching of writing.

Also in relation to the use of empirically-validated instructional practices, it is possible to highlight another contribution of this thesis in the educational field. Our research provides teachers with a specific procedure to teach written composition based in self-regulated strategy instruction. Previous research points to this approach

as the most effective in improving students' writing competence (Graham & Harris, 2018; Koster, Tribushinina, de Jong, & van den Bergh, 2015) and, however, as the less used by teachers (Sánchez-Rivero et al., submitted). Nevertheless, this second contribution needs to be interpreted within two **limitations** of our research: validation of this approach only when the intervention was delivered by the researcher; the use of all instructional components of this approach.

First, in the study that provides evidence on the efficacy of strategy instruction for whole-group classes intervention was delivered by the researcher. Although this contributes to increase internal validity by controlling external variables that might influence the results, it also limits transfer from the scientific to the educational field. In this sense, future research should address the design and implementation of professional development programs for teachers, which will allow exploring the efficacy of strategy instruction when it is delivered by teachers. Within the RTI framework, this professional development should have an ongoing nature (Barnes & Harlacher, 2008). However, as a counterpoint to this limitation, it is worth noting that our research does provide evidence that self-regulated strategy instruction can be feasibly delivered by teachers. This can be seen in the two instructional studies on the RTI model included in this thesis (see chapters 5 and 6), where strategy instruction on planning was delivered by teachers. Subsequent analysis of audio recordings of the sessions demonstrated fidelity of the intervention, adjusting to the content of the scripted sessions provided to the teachers.

Second, our research provides evidence on the effectiveness of strategy-focused planning instruction as a whole package with all its instructional components. However, the multicomponent nature of this instructional approach makes it difficult for it to be applied in whole-class groups, and teachers tend to include only some of its instructional components in their classroom practice (De la Paz, 2007). Thus, future research must address the individual efficacy of each instructional component

(direct instruction, modelling and practice), in order to simplify the teaching process by determining which components provide greater benefits. This has been previously explored with upper-primary students (Fidalgo, Torrance, Rijlaarsdam, Van den Bergh, & Álvarez, 2015; Fidalgo et al., 2011; López, Torrance, Rijlaarsdam, & Fidalgo, 2017) but, to our knowledge, there is no research conducted at the beginning of compulsory education. Componential analysis of strategy-focused instruction in early educational stages would benefit educators, providing them with an easier instructional procedure. However, we foresee difficulties around the generalizability of the instructional components in these educational stages, so that instruction in only one component might not favour students' performance to the same extent as the whole instructional sequence would. This should be addressed in comparative studies, which determine the greater or smaller efficacy of teaching one dimension in-depth over teaching all dimensions more shallowly.

Intervention to prevent LD in writing through the RTI model

A second line explored in this thesis is the feasibility and efficacy of applying the RTI model to the teaching of writing in early ages, in order to prevent learning disabilities in this field. This research line is based on the assumption that the RTI model is the most effective and precise in the prevention and identification of learning disabilities, over other traditional approaches. From this starting point, this second section is structured around two key considerations. At an assessment level, we address the design and use of progress monitoring measures that allow detecting at-risk students on the basis of their rate of learning. At an instructional level, we address the need to adjust instruction to students' specific needs through tiers of increasing intensity and different writing components as the focus of the intervention. This ensures additional support for students whose rate of learning is significantly below the average. Finally, we reflect on the value of families as an educational resource to

support teachers and students. Research presented in this thesis expands previous literature on the use of the RTI model in the context of reading and mathematics (Simmons et al., 2008; Vanderheyden, Witt, & Gilbertson, 2007) to the writing context, thus complementing the very few previous descriptive studies on this field (Gil & Jiménez, 2019; Saddler & Asaro-Saddler, 2013).

Within this preventive line, it is possible to draw the following **conclusions** derived from the research presented in this doctoral dissertation.

4ª. – Progress monitoring measures allow identifying students whose writing performance is significantly below the average and, therefore, are likely to be used to detect risk of future learning disabilities in writing. Progress monitoring measures in our research assess students on the basis of their rate of learning and not of their performance in a specific moment. This procedure prevents researchers from collecting incomplete or partial data about young students' skills, as it is likely to occur when writing performance is assessed at a single point in time (van den Bergh, Maeyer, van Weijen, & Tillema, 2012). Additionally, progress monitoring measures proposed in our research were designed so that they are accessible and easy to be used by teachers: they can be completed in a short period of time; they are embedded in the teaching-learning process, thus preventing the students from viewing them as an assessment task; and they require no additional material to that usually present in classrooms and no further knowledge more than that one might expect of a student at this age.

5ª. – Combination of the first two tiers of the Response to Intervention approach allows a significant percentage of students with initial low achievement to catch up with their average peers. This goes in line with findings from previous meta-analysis on the use of RTI in the reading context, which emphasize the potential of this approach to reduce the percentage of students initially identified as at-risk (Burns, Appleton, & Stehouwer, 2005). In this sense, in our

research we found significant improvements both at the individual level, in students with severe handwriting deficits, and at the group level, in students with a wide range of writing deficits. These improvements were found mainly in handwriting and overall text quality. Effects on spelling were, however, less clear, with spelling improving only when it was measured in composition task and not through specific spelling tests. A possible explanation might lay in the nature of the spelling intervention implemented, based on the direct teaching of spelling rules. Though the instructional sequence drew heavily from previous studies (Graham, Harris, & Chorzempa, 2002), part of the literature supports the natural learning of spelling or spelling instruction embedded in the context (Graham, 2000; O'Flahavan & Blassberg, 1992) as opposed to the procedure used in our research. One might expect direct teaching of spelling rules to result in improvements in specific spelling tests. Since this was not found, it might be the case that natural learning of spelling is more effective in the context of our research.

6ª. – For students who struggle with handwriting, additional individualized support (Tier 2) focused on both low and high-level processes does not provide more benefits than instruction focused exclusively on low-level processes. Generally speaking, this seems to contradict previous findings on the greater efficacy of combined instruction over instruction focused solely on transcription skills (Berninger et al., 2002; Limpo & Alves, 2017). There are, however, three reasons linked to the nature of our instruction that might explain these different results. First, participants in previous studies were either typically developing (Limpo & Alves, 2017) or showed low compositional fluency (Berninger et al., 2002), as opposed to the handwriting deficits which were the focus of our research. On the contrary, students in our sample presented deficits in handwriting accuracy and, therefore, legibility of their writing. The depth of these difficulties might explain why they did not benefit from additional Tier 2 intervention that addressed high-level processes. In this sense, we suggest that response to intervention is likely to differ

according to the kind and size of students' difficulties. When deficits affect the basis of writing, instruction seems to be more effective when focused exclusively on them. Second, participants on our research received general classroom instruction focused on both transcription and planning skills (Tier 1). This instruction, provided both before and parallel to Tier 2, was not present in previous studies. As a result, all students in our sample had some planning notions derived from classroom instruction. Taking into account the handwriting deficits in our sample, this might explain that instruction focused on planning and transcription did not provide additional benefits over instruction focused solely on transcription. Thus, findings from our research should be understood in the context of a multi-tiered intervention that was not present in previous studies. Third, the sample in previous studies comprised students in higher grades and, therefore, in a different stage of writing development. Thus, it might be expected that these students had previously received formal writing instruction. Our sample, in turn, received the intervention in the first year of compulsory education, matching the very beginning of formal writing instruction.

On the basis of previous conclusions on the efficacy of the Response to Intervention model, it is possible to highlight two **contributions** of our research.

At a scientific level, research presented in this doctoral dissertation confirms the possibility of effectively applying the RTI model to the context of writing, as it has been suggested in previous studies (Gil & Jiménez, 2019; Saddler & Asaro-Saddler, 2013). Findings from our research, through preliminary, seem to promote students' writing competence and the prevention of future learning disabilities, in line with previous research on the use of RTI in reading (O'Connor, Fulmer, Harty, & Bell, 2005; Simmons et al., 2008). In this line, our research not only expands previous research on early prevention of writing difficulties, but also offers specific intervention guidelines to put prevention into practice.

At an educational level, preliminary efficacy of the RTI model found in this thesis sets the basis for the integration of the model in the school curricula in the long term. This might reduce costs and resources allocated to special educational needs, as it has been emphasized by previous literature in the international context (Fuchs & Fuchs, 2006). This is, we believe, an important contribution of our research, particularly when considering the keystone role of writing in our elementary school curricula (Decreto 26/2016 por el que se establece el currículo y se regula la implantación, evaluación y desarrollo de la Educación Primaria en la Comunidad de Castilla y León).

However, the aforementioned conclusions and contributions must be treated with care given a significant **limitation** of our research when testing the efficacy of the RTI model. Studies presented in this doctoral dissertation address the application of an RTI approach in the absence of a proper control group of struggling students who do not receive additional Tier 2 support. This would rule out the possibility of our effects being simply maturational and, therefore, would provide stronger evidence on the efficacy of multi-tiered writing interventions. Thus, **as a future research line**, our studies set the basis for fully controlled large-scale randomized studies, as it has already been done in reading (Fuchs, Compton, Fuchs, Bryant, & Davis, 2008; O'Connor et al., 2005) and in mathematics (Vanderheyden, Witt, & Gilbertson, 2007). These studies should be further extended in time, so that they can deal with the ethical dilemma of not allocating struggling students to any intervention condition.

7ª. – The RTI model in writing can be feasibly delivered by a single teacher to whole-group classes of about 25 students, in accordance with the legislation established by the Spanish educational system. This conclusion is endorsed by the overall positive view of the RTI program reported by the participating teachers. However, despite their positive opinion, teachers raised issues around lack of time, experience and resources, as it has been found in previous studies

on the feasibility of the RTI model in the field of reading (Castro-Villarreal, Rodriguez, & Moore, 2014; Greenfield, Rinaldi, Proctor, & Cardarelli, 2010; Martinez & Young, 2011; Rinaldi, Averill, & Stuart, 2011; Stuart, Rinaldi, & Higgins-Averill, 2011). Thus, we emphasize the need to integrate Response to Intervention approaches in the ordinary school curricula. Once RTI has been officially integrated in teaching plans, it would be easier to allocate funding and resources to its implementation in schools.

8ª. – The work of families as an educational resource to support teachers in the teaching of writing facilitates the implementation of the RTI model within the features of the Spanish educational system. Effective implementation of the RTI model requires funding and human resources that allow schools to provide students with attention focused on their needs in each tier of intervention (Arriaza & Rodas de Ruiz, 2014). The structure of the Spanish educational system might constraint the implementation of the model since legislation concerning elementary grades allows only one teacher per class with a ratio of around 25 students (Real Decreto 132/2010 por el que se establecen los requisitos mínimos de los centros que impartan las enseñanzas del segundo ciclo de la educación infantil, la educación primaria y la educación secundaria). In this sense, research presented in this thesis points to the educational value of families as a supportive resource for teachers. This might make it possible to overcome difficulties in the application of the RTI model derived from the features of our educational system. This goes in line with the overall principles of the model, which point to parental involvement as a key element of its successful implementation (Stuart et al., 2011). However, benefits of parental involvement in the present research must be understood within the characteristics of the intervention proposed. In the design of the intervention, we saw it important for instruction to be empirically-based and self-contained, so that parents were not expected to act as instructors but only to provide support and motivation to their child.

From the previous conclusions on the feasibility of applying the RTI model within the Spanish educational system and the role played by educators and parents, it is possible to highlight two **contributions** of the research presented. From a scientific perspective, our research contributes to expand the use of RTI approached beyond North America, where most states are already familiar with it (Berkeley, Bender, Peaster, & Saunders, 2009). On the other hand, from an educational perspective, our research provides teachers and other educational agents with valuable training on the implementation of the RTI model and, generally speaking, instructional guidelines to deal with classroom diversity. From these contributions, we emphasize the need for an effective development of the RTI model in our country, in accordance with the existing legislation, which assumes prevention and early identification as principles of attention to learning disabilities. In this line, we highlight research on the application of this model mainly to the reading and math fields in several autonomous communities such as the Canary Islands (Jiménez et al., 2010; Jiménez, 2017; Jiménez 2019).

These conclusions and contributions, however, must be interpreted within the **limitations** of this research with regard to teachers' and parents' role in the implementation of the model. Such limitations are discussed below, along with **future research lines.**

First, intervention programs in our research were designed as complementary activities to normal classroom curricula. This requires additional time and effort from teachers, who were not allowed to replace traditional instructional methods by the ones we proposed. Therefore, research is needed to explore whether our multi-level combined instruction in transcription and planning is more effective than current writing curricula that lack these features. If, as expected, empirically-based instructional practices produce greater benefits, both researchers and educational agents should make an effort to integrate these practices in their daily performance.

This proposal supports the research line focused on the need of bringing together scientific knowledge and educational practice (Biesta, 2007; Hordern, 2019).

Second, the role of parents in overseeing Tier 2 intervention might hamper fidelity. It is true that the fact that our intervention was paper-based and self-contained, since we did not expect parents to act as instructors, is, in itself, a fidelity measure. However, the intervention was conducted at home and, therefore, we were not able to directly control variables such as degree of parental involvement, kind of support provided and the temporal distribution of the intervention. In this sense, we suggest two future research lines to overcome this limitation. First, from a theoretical perspective, it would be important to conduct an empirical review on possible educational agents who can implement Tiers 2 and 3 effectively. Second, from an applied perspective, research is needed to design and conduct training courses for parents on the implementation of the RTI model. This initiative has been already set in motion in the US by the Office of Special Education Programs (OSEP), though parent training centers currently focus their efforts in informing parents about RTI but not necessarily training them in its use (Bradley, Danielson, & Doolittle, 2007).

Throughout this chapter, we have presented conclusions, contributions, limitations and future research lines derived from our research around two major issues: empirically-based general instruction in written composition at the start of compulsory education; and prevention of learning disabilities in writing through the use of Response to Intervention approaches. Bringing both lines together, it is possible to conclude that research presented in this thesis contributes to enhance students' overall communicative competence and, therefore, prepare them to their adult life and future employability. In this sense, Beddington et al., (2008) point out that communicative skills, understood as cognitive resources, constitute an essential part of the human capital of a society, which, in turn, determines the progress of

current societies. As a final reflection, to close both this chapter and the doctoral dissertation as a whole, we feel it necessary to emphasize the size and value of students' early skills and the need to enhance them as early as we can. Arthur Schopenhauer said that "every child who is born is, to some extent a genius, in the same way that every genius is, to some extent, still a child". It is our duty, as researchers and educators, to exploit children's capacities and to make sure that they continue being geniuses.

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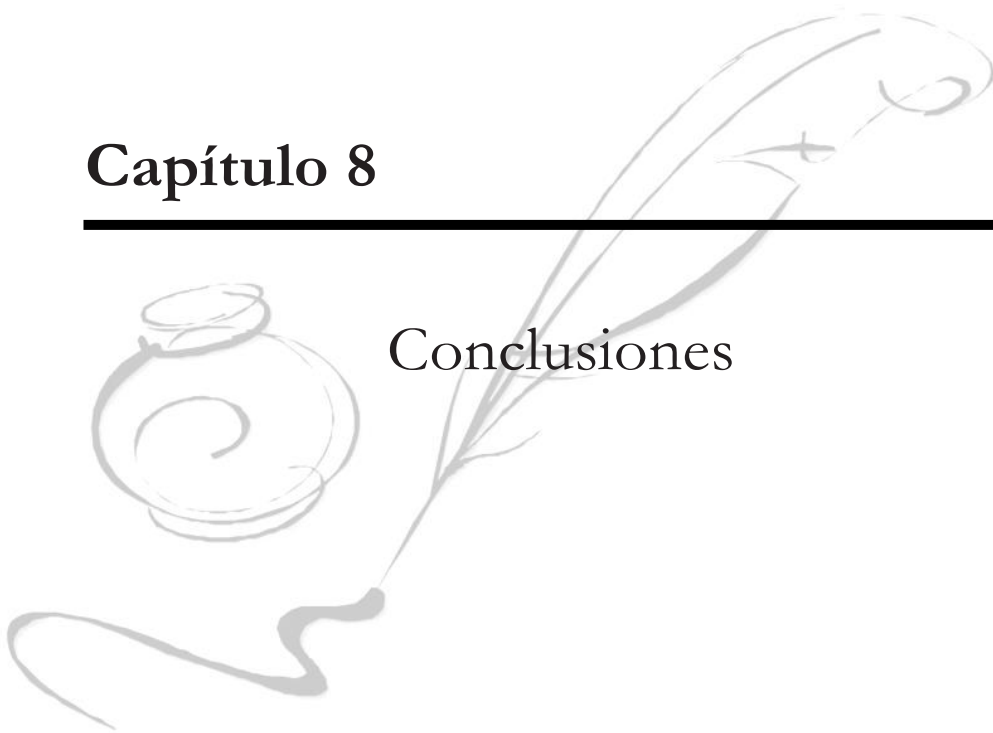*Writing and cognition: research and application* (pp. 67–82). Oxford, UK: Brill.

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Capítulo 8

Conclusiones

Los cuatro estudios que constituyen el cuerpo principal de esta tesis doctoral (capítulos 3 a 6) tienen como foco común la mejora de la competencia escrita de los estudiantes desde el comienzo de la escolarización obligatoria. Ello se aborda a través de dos dimensiones complementarias entre sí: por un lado, la instrucción general a nivel de grupo-clase dirigida a la enseñanza de la composición escrita en edades tempranas y ajustada a la evidencia científica; y, por otro lado, la intervención orientada a la prevención de las dificultades de aprendizaje (DA) en escritura mediante la aplicación del modelo de Respuesta a la Intervención.

En cada uno de los capítulos anteriores ya se han presentado y discutido las conclusiones específicas derivadas de los estudios incluidos en esta tesis. Este capítulo, sin embargo, tiene por objeto presentar las conclusiones y contribuciones de la tesis doctoral en su conjunto, sus limitaciones y posibles líneas futuras de investigación. Para facilitar la lectura y organización del mismo, las conclusiones se presentarán agrupadas en torno a las dos dimensiones mencionadas anteriormente: la instrucción general en composición escrita basada en la evidencia científica al comienzo de la educación obligatoria y la intervención preventiva de las DA en escritura mediante el modelo RTI. De acuerdo con el reglamento establecido por la Universidad de León para la presentación de tesis doctorales bajo la modalidad de Tesis Internacional, las conclusiones se presentan en inglés y en español en los capítulos 7 y 8, respectivamente.

Instrucción en composición escrita basada en evidencias científicas al comienzo de la educación obligatoria

La investigación recogida en esta tesis doctoral aborda la instrucción general a nivel de aula orientada a la mejora de la composición escrita en los primeros niveles de escolarización partiendo de dos consideraciones. En primer lugar, la necesidad de instruir en los diferentes procesos cognitivos implicados en el dominio de la

competencia escrita, con vistas a lograr tanto la automatización de las habilidades transcriptoras como la autorregulación estratégica de los procesos de orden superior. En segundo lugar, para que dicha instrucción resulte efectiva, ha de estar basada en enfoques instruccionales cuya eficacia haya sido empíricamente validada. La presente tesis aborda estas dos consideraciones desde una perspectiva tanto teórica como empírica. A nivel teórico, lo hace a través de la revisión exhaustiva y sistemática de la literatura en torno a las prácticas instruccionales efectivas focalizadas tanto en procesos de orden superior como inferior. A nivel empírico, presenta diversos programas instruccionales aplicados a nivel de aula y basados en dichas prácticas para la mejora del rendimiento escritor del alumnado.

Dentro de esta línea instruccional, es posible extraer las siguientes **conclusiones** a partir de la investigación recogida en esta tesis.

1ª. – La instrucción estratégica y autorregulada en el proceso de planificación textual al comienzo de la educación obligatoria mejora significativamente la calidad de los textos elaborados por el alumnado. Ello concuerda con la idea de que la enseñanza de procedimientos explícitos de autorregulación mejora el rendimiento escritor del alumnado (ver meta-análisis de Santangelo, Harris, & Graham, 2016). De forma más concreta, en referencia al proceso de planificación textual, estudios previos ponen de manifiesto los beneficios de la autorregulación en poblaciones de alumnos con gran variedad de características: adultos y adolescentes (Hoover, Kubina, & Mason, 2012; Limpo, Alves, & Fidalgo, 2014; MacArthur, Philippakos, & Ianetta, 2015), alumnos en los últimos cursos de Educación Primaria (Brunstein & Glaser, 2011; Fidalgo, Torrance, & Robledo, 2011; Glaser & Brunstein, 2007), alumnos con un desarrollo normalizado (Harris et al., 2012a, 2012b; Limpo & Alves, 2014) y alumnos con dificultades de aprendizaje o con un rendimiento inferior a la media (Harris, Graham & Adkins, 2015; Lienemann, Graham, Leader-Janssen, & Reid, 2006). Nuestra investigación expande la

importancia de la autorregulación al comienzo de la escuela primaria. Además, apunta al mantenimiento de los efectos de la instrucción en el tiempo, en línea con estudios previos que demuestran la eficacia de la instrucción estratégica y autorregulada a largo plazo tanto en cursos superiores (Fidalgo, Torrance, & García, 2008; Glaser & Brunstein, 2007; Torrance, Fidalgo, & García, 2007) como al finalizar el primer curso de Educación Primaria (ver estudio de caso de Zumbrunn & Bruning, 2013). No obstante, los efectos de la instrucción estratégica en nuestra investigación fueron especialmente significativos inmediatamente después de la intervención. Ello contradice los hallazgos de Zumbrunn and Bruning (2013), quienes encontraron mayores efectos en la evaluación de seguimiento. Una posible explicación puede encontrarse en las características del Sistema educativo español: la instrucción en planificación es completamente inexistente en el primer curso de Educación Primaria, mientras que en otros sistemas educativos puede ocurrir que los alumnos reciban cierta instrucción en el contenido del texto o su estructura como parte del currículo de escritura ordinario.

2ª. − La instrucción en procesos de alto nivel cognitivo no debe retrasarse, necesariamente, hasta que el alumnado haya alcanzado un dominio automatizado de las habilidades de transcripción. Si bien es cierto que los procesos de bajo nivel de la escritura han demostrado ser costosos a nivel cognitivo (Bourdin & Fayol, 1994, 1996, 2002), la investigación presentada en esta tesis sugiere que incluso los escritores más jóvenes son capaces de organizar sus textos en torno a una estructura narrativa previamente establecida. Esto ofrece una perspectiva novedosa sobre el desarrollo de las capacidades cognitivas tempranas: los escritores jóvenes parecen ser capaces de comprender y aplicar un cierto conocimiento metacognitivo y procedimental desde edades muy tempranas sin que ello conlleve una sobrecarga cognitiva. En este sentido, se sugiere que abordar la planificación a través de un enfoque estratégico puede reducir la competitividad cognitiva entre los procesos de orden superior e inferior. El uso de estrategias enseña al alumno a separar

la fase de planificación del propio proceso de transcribir lo planificado. Ello permitiría que se distribuyesen de forma secuencial, en lugar de paralela, los recursos cognitivos destinados a la planificación y a la producción textual (Kellogg, 1988, 1990), evitando así la interferencia de unos con otros. Por tanto, nuestra investigación sugiere que, bajo una instrucción estratégica, los estudiantes jóvenes no destinan, necesariamente, la mayor parte de sus esfuerzos cognitivos al procesamiento ortográfico y grafomotriz, como ocurriría en ausencia de dicha instrucción (Fayol, 1999).

En base a las dos conclusiones anteriores, cabe señalar una primera **contribución** de la investigación presentada en esta tesis. Desde una perspectiva científica, nuestra investigación contribuye a reducir la laguna de conocimiento existente en torno a la instrucción en procesos de alto nivel al comienzo de la escolarización obligatoria y cómo ello puede influir en el desarrollo temprano de la competencia escrita. En este sentido, nuestros resultados demuestran que la autorregulación es susceptible de ser entrenada en estas edades y que hacerlo favorece la competencia escrita del alumnado aun cuando no existe una automatización de los procesos de bajo nivel. Ello corrobora los resultados positivos obtenidos en 2º de Educación Primaria con pequeños grupos de alumnos con dificultades (Harris et al., 2015; Harris, Graham, & Mason, 2006; Lane et al., 2008, 2011), extendiéndolos a grupos-clase completos en 1º de Educación Primaria. Se amplía así el conocimiento existente en torno al control estratégico y autorregulado de los procesos cognitivos de orden superior de la escritura (Graham, Harris, & McKeown, 2014; Mason, Harris, & Graham, 2011).

Sin embargo, nuestra investigación constituye un primer paso en torno a la instrucción temprana en procesos cognitivos de orden superior. Por tanto, resulta necesario profundizar en esta línea en estudios posteriores, complementando con ello las teorías actuales sobre el desarrollo temprano de la escritura (Berninger & Chanquoy, 2012; Shagoury, 2008). Las cuestiones a abordar en futuros estudios

vienen marcadas por tres **limitaciones** clave de nuestra investigación, a partir de las cuales deben interpretarse las conclusiones señaladas anteriormente: la evaluación centrada exclusivamente en el producto textual, la instrucción basada únicamente en el género textual narrativo y el abordar solamente el proceso de planificación textual. A continuación, se discuten dichas limitaciones y se proponen **líneas futuras de investigación** en torno a las mismas.

En primer lugar, los beneficios de la instrucción estratégica en planificación se han estudiado exclusivamente a partir de la toma de medidas offline derivadas del producto escrito. Aunque ello permite apreciar la mejora de las composiciones escritas tras la intervención, no es posible proporcionar datos acerca de los mecanismos específicos por los que ocurre esta mejora. Como línea de investigación futura se sugiere la toma de medidas online que permitan conocer la dinámica del proceso escritor y los cambios que se producen en ella como resultado de la instrucción. Una primera posibilidad sería la recogida del pensamiento en voz alta, como ya se ha hecho en cursos superiores (López, Torrance, & Fidalgo, 2019). Sin embargo, se cuestiona la validez de esta medida debido a la edad de la muestra. Si bien no existen, desde nuestro conocimiento, datos referidos explícitamente a la carga cognitiva que supone el pensamiento en voz alta en escritores jóvenes, sí se ha demostrado la dificultad de los escritores jóvenes para activar varios procesos cognitivos de forma simultánea (Limpo & Alves, 2013; Olive & Kellogg, 2002). Como alternativa, se sugiere que investigaciones futuras aborden el proceso escritor a través de la toma de medidas online no intrusivas tales como pausas y ejecuciones (Alves, Castro, & Olive, 2008; Olive, Alves, & Castro, 2009) a través del uso de smartpens. En este sentido, las intervenciones propuestas en esta tesis podrían dar lugar a cambios en el proceso de escritura similares a los encontrados en estudios previos, tales como: menor número de pausas asociadas a la transcripción y períodos de ejecución más largos como resultado de la instrucción en procesos de bajo nivel (Alves et al., 2016) o de bajo y alto nivel (Limpo & Alves, 2017); y mayor número de pausas amplias,

tradicionalmente asociadas a la activación de procesos cognitivos de orden superior (Alves, Castro, De Sousa, & Strömqvist, 2007; Chenoweth & Hayes, 2001; Wengelin, 2007). No obstante, la evaluación de las pausas y ejecuciones con alumnos tan jóvenes podría plantear limitaciones en torno a la validez del umbral de duración tradicionalmente establecido para diferenciar entre pausas centradas en la activación de procesos cognitivos de alto y bajo nivel (2 segundos) y, por ende, problemas a la hora de interpretar los resultados. Asimismo, el análisis de pausas y ejecuciones requiere mucho tiempo, lo que dificulta el uso de estas medidas en evaluaciones a gran escala. Todos estos aspectos han de ser abordados en investigaciones futuras.

En segundo lugar, la instrucción en planificación de la investigación presentada se focalizó únicamente en la narración como género textual. Al comienzo de la educación obligatoria, los estudiantes están especialmente familiarizados con este género y es posible que tengan ciertos conocimientos previos sobre sus características y su estructura. En el caso de nuestra investigación, este conocimiento previo podría haber facilitado la tarea de planificación, reduciendo los recursos cognitivos destinados a la misma. Por tanto, considerando la limitada capacidad de la memoria operativa y las demandas que supone el proceso escritor (Torrance & Galbraith, 2006), el uso de un género tan conocido podría haber favorecido que los alumnos fueran capaces de activar el proceso de planificación sin que ello produjera una sobrecarga cognitiva. En esta línea, la investigación futura debe explorar la eficacia de la instrucción estratégica focalizada en otros géneros textuales en la mejora de la competencia escrita del alumnado de 1er curso de Educación Primaria, como ya se ha demostrado en cursos superiores (Harris et al., 2012a; 2012b). También en relación a la extensión a otras tipologías textuales, se propone abordar, en estudios futuros, la transferencia de los efectos de la instrucción estratégica a un género en el que el alumno no haya sido instruido, como se ha demostrado en los cursos intermedios de Educación Primaria (Graham, Harris, & Mason, 2005; Tracy, Reid, & Graham, 2009).

En tercer lugar, la evidencia proporcionada en esta investigación en torno a la eficacia de la instrucción estratégica al comienzo de la educación obligatoria no es extensible al proceso de revisión. La revisión constituye un proceso complejo a nivel cognitivo, puesto que implica releer el texto escrito, compararlo con el texto deseable, identificar las discrepancias entre ambos y hacer las modificaciones necesarias, todo ello de forma recursiva (Chanquoy, 2009; Hayes, 2004). Esta complejidad cognitiva justificaría el escaso uso que hacen los escritores jóvenes de la revisión (McCutchen, 2006) así como su tendencia a aplicar revisiones mecánicas y superficiales (Butler & Britt, 2011; Harris, Santangelo, & Graham, 2010). Estos argumentos sugieren que instruir en revisión al comienzo de la educación obligatoria podría suponer una sobrecarga cognitiva para el alumnado que influyera negativamente sobre su rendimiento escritor. Sin embargo, desde nuestro conocimiento, no existe evidencia empírica al respecto. Así pues, aunque los beneficios de la instrucción en revisión con alumnos de edades superiores ya han sido demostrados (ver revisión de MacArthur, 2016), se considera necesario extender esta investigación a edades tempranas. Es posible que el uso de un enfoque autorregulado permita separar los distintos procesos implicados en la revisión textual, reduciendo con ello la carga cognitiva que supone, como ocurría con el proceso de planificación (ver segunda conclusión, pp. 323). También en esta línea, cabría preguntarse si la instrucción en uno solo de los procesos que intervienen en la escritura (como se ha hecho en esta investigación) es igualmente efectiva que la instrucción combinada en los procesos de planificación y revisión. Esta instrucción combinada se ha aplicado previamente con alumnos en el último curso de Educación Primaria (Torrance et al., 2007; Torrance, Fidalgo, & Robledo, 2015). Estudios futuros deben abordar sus efectos en los primeros niveles educativos, a fin de poder ser comparados con la investigación recogida en esta tesis y establecer conclusiones en torno a la necesidad de instruir en el proceso escritor en su totalidad.

3ª. – La investigación en el campo de la instrucción en competencia escrita destinada a alumnos en edad escolar ha validado de forma empírica la eficacia de diversas prácticas instruccionales centradas tanto en procesos de bajo nivel como de orden superior para la mejora del rendimiento escritor del alumnado. Ello se pone de manifiesto a través de la revisión de la literatura a nivel instruccional incluida en esta tesis. En este sentido, en el ámbito educativo y, en particular, en la enseñanza de la escritura, se enfatiza la necesidad de utilizar procedimientos instruccionales cuya eficacia haya sido probada empíricamente, a fin de evitar que los problemas en la adquisición de la competencia escrita se deban a una instrucción inadecuada (Barnes & Harlacher, 2008; Brown-Chidsey & Steege, 2005). Sin embargo, a pesar de esta diversidad de prácticas instruccionales empíricamente validadas, el uso que los docentes de Educación Primaria hacen de las mismas es escaso (Brindle, Graham, Harris, & Hebert, 2016; Gilbert & Graham, 2010), tal vez debido a la escasa preparación para la enseñanza de la escritura manifestada por los propios docentes (Sánchez-Rivero, Alves, Limpo & Fidalgo, enviado para publicación). Además, la instrucción en los primeros niveles de Educación Primaria se focaliza en habilidades de transcripción (Cutler & Graham, 2008; Dockrell, Marshall, & Wyse, 2015), pese a la evidencia empírica en torno a la instrucción en procesos de orden superior.

Las evidencias anteriores reflejan una brecha entre lo científico y lo educativo. En este sentido, una de las **contribuciones** de nuestra investigación, en el plano educativo, es la promoción de la transferencia entre el conocimiento científico y la práctica educativa. En este sentido, la investigación presentada ofrece al profesorado programas instruccionales específicos derivados de las prácticas revisadas y, por ende, basados en la evidencia empírica. Dichos programas han sido aplicados por el profesorado (nivel 1 de intervención) y valorados positivamente, lo que ofrece evidencia de que las prácticas instruccionales empíricamente validadas son

susceptibles de ser aplicadas por el profesorado ordinario en la enseñanza de la escritura.

También en relación al uso de prácticas instruccionales empíricamente validadas, es posible establecer una segunda contribución de esta tesis en el plano educativo. Nuestra investigación ofrece al profesorado un procedimiento específico para la enseñanza de la composición escrita basado en la instrucción estratégica y autorregulada. La investigación demuestra que se trata del enfoque más efectivo en la mejora de la competencia escrita (Graham & Harris, 2018; Koster, Tribushinina, de Jong, & van den Bergh, 2015) y, sin embargo, el menos utilizado por el profesorado (Sánchez-Rivero et al., enviado para publicación). No obstante, esta segunda contribución ha de ser interpretada dentro de dos **limitaciones** de nuestra investigación: la validación de la eficacia de este enfoque únicamente siendo aplicado por la investigadora; el empleo de todos los componentes instruccionales del enfoque. Estas limitaciones se describen a continuación, junto con **futuras líneas** de estudio.

En primer lugar, en el estudio que evidencia la eficacia de la instrucción estratégica a nivel de aula, la intervención fue llevada a cabo por la propia investigadora. Aunque ello contribuye a aumentar la fidelidad de la intervención controlando variables externas que pueden mediar en los resultados, también limita la transferencia del campo científico al educativo. En este sentido, la investigación futura debe abordar el diseño y aplicación de programas de desarrollo profesional para el profesorado que permitan explorar la eficacia del enfoque estratégico siendo implementado por el profesorado. Este desarrollo profesional debe adquirir, dentro del marco del modelo RTI, un carácter continuo (Barnes & Harlacher, 2008). No obstante, como contrapunto a esta limitación, cabe señalar que la presente tesis demuestra que el enfoque de instrucción estratégica y autorregulada es susceptible de ser implementado por el docente de forma fiable. Esto se refleja en los dos estudios instruccionales sobre el modelo RTI incluidos en esta tesis (ver capítulos 5 y 6), en

los que la instrucción estratégica en planificación a nivel de aula fue aplicada por el profesorado. El análisis posterior de las grabaciones de las sesiones demostró que la intervención se había implementado con fidelidad, ajustándose al contenido de los manuales entregados al profesorado.

En segundo lugar, nuestra investigación proporciona evidencia de la efectividad de la instrucción estratégica en planificación como un paquete conjunto con todos sus componentes instruccionales. Sin embargo, la naturaleza multicomponencial de este enfoque instruccional dificulta su aplicación en contextos de grupo-clase y los docentes tienden a incluir solamente algunos de los componentes instruccionales en su práctica de aula (De la Paz, 2007). Así, la investigación futura debe abordar la eficacia individual de cada componente instruccional (instrucción directa, modelado y práctica), de cara a simplificar el proceso de enseñanza determinando qué componentes proporcionan mayores beneficios. Esto ha sido previamente estudiado con alumnos en los últimos cursos de Educación Primaria (Fidalgo, Torrance, Rijlaarsdam, Van den Bergh, & Álvarez, 2015; Fidalgo et al., 2011; López, Torrance, Rijlaarsdam, & Fidalgo, 2017) pero, desde nuestro conocimiento, no existe investigación llevada a cabo al comienzo de la educación obligatoria. El análisis componencial de la instrucción estratégica beneficia al profesorado, ofreciéndole un procedimiento más sencillo de implementar. Sin embargo, se prevén posibles dificultades de generalización en estas edades, de modo que la instrucción en un solo componente no favorezca el rendimiento escritor en la misma medida en que lo haría la secuencia instruccional completa. Ello debe abordarse a través de estudios comparativos que determinen la mayor o menor eficacia del trabajo en profundidad de una sola dimensión frente al trabajo conjunto, aunque más superficial, de todas ellas.

Intervención preventiva de DA en escritura mediante el modelo RTI

Un segundo bloque explora la factibilidad y eficacia de aplicar el modelo de Respuesta a la Intervención a la enseñanza de la escritura en edades tempranas de cara a la prevención de las dificultades de aprendizaje en este campo. Esta línea de investigación parte de la consideración del modelo RTI como el más efectivo y preciso en la prevención e identificación de las dificultades de aprendizaje frente a otros enfoques tradicionales. A partir de ello, este segundo bloque se estructura en torno a dos consideraciones clave. A nivel de evaluación, se aborda el diseño y aplicación de medidas de monitorización del progreso que permitan detectar al alumnado en riesgo en base a su ritmo de aprendizaje. A nivel instruccional, se aborda el ajuste de la instrucción a las necesidades del alumnado, estableciéndose distintos niveles de intensidad y distintos componentes en los que se focaliza la instrucción. Ello garantiza un apoyo adicional individualizado a los estudiantes cuyo ritmo de aprendizaje se sitúa significativamente por debajo de la media. Por último, se reflexiona sobre el valor de la familia como recurso educativo de apoyo. De este modo, la investigación recogida en esta tesis doctoral expande la investigación en torno al uso del modelo RTI en lectura y matemáticas (Simmons et al., 2008; Vanderheyden, Witt, & Gilbertson, 2007) al campo de la escritura, complementando los escasos estudios descriptivos previamente desarrollados en este campo (Gil & Jiménez, 2019; Saddler & Asaro-Saddler, 2013).

Dentro de esta línea preventiva, es posible extraer las siguientes **conclusiones** derivadas la investigación recogida en esta tesis.

4ª. – Las medidas de monitorización del progreso permiten identificar al alumnado cuyo rendimiento se sitúa significativamente por debajo de la media y, por ende, son susceptibles de emplearse como mecanismo de detección de riesgo de futuras dificultades de aprendizaje en escritura. Las medidas de monitorización presentadas en esta investigación permiten evaluar al

alumnado en base a su ritmo de aprendizaje y no a su rendimiento en un momento concreto. Ello evita la recogida de datos incompletos o parciales sobre las habilidades de los estudiantes jóvenes, como ocurre cuando se evalúa el rendimiento escritor en un único momento temporal (van den Bergh, Maeyer, van Weijen, & Tillema, 2012). Además, las medidas propuestas se han diseñado de forma que resulten accesibles y sencillas de aplicar por parte del profesorado: son aplicables en un breve lapso de tiempo; se insertan dentro del propio proceso de enseñanza-aprendizaje como tareas cotidianas de escritura, evitando que el alumno las perciba como un mecanismo de evaluación; y no requieren material adicional al presente habitualmente en las aulas ni conocimientos más allá de lo que cabría esperar en el alumnado de estas edades.

5ª. – La aplicación combinada de los dos primeros niveles del enfoque de Respuesta a la Intervención permite que un porcentaje significativo de alumnos con un rendimiento inicial inferior a la media se incorporen a la marcha normal del aula. Ello va en línea con los resultados de meta-análisis previos en torno a la aplicación del modelo RTI en lectura, que destacan el potencial de este modelo para reducir el porcentaje de alumnos inicialmente identificados como alumnado en riesgo (Burns, Appleton, & Stehouwer, 2005). En este sentido, en nuestra investigación se encontraron mejoras significativas tanto a nivel individual, en alumnado con déficits caligráficos, como a nivel grupal, en alumnado con amplia variedad de problemas de escritura. Dichas mejoras se produjeron principalmente a nivel de caligrafía y calidad textual. Los efectos sobre la ortografía, sin embargo, fueron menos claros, apreciándose una mejora significativa únicamente cuando esta se evaluó en tareas de composición escrita, y no a través de tests específicos de ortografía. Una posible explicación podría estar en la naturaleza de la intervención en ortografía implementada, basada en la enseñanza directa de reglas ortográficas. Si bien la secuencia instruccional se apoya en estudios previos (Graham, Harris, & Chorzempa, 2002), una parte de la literatura aboga por el aprendizaje natural de la ortografía o la instrucción en ortografía integrada en el contexto (Graham, 2000;

O'Flahavan & Blassberg, 1992), frente al procedimiento utilizado en nuestra investigación. Cabría esperar que la instrucción directa en reglas ortográficas desembocase en una mejora del rendimiento en tests específicos. La ausencia de esta mejora sugiere que tal vez un aprendizaje natural de la ortografía sea un enfoque más efectivo en el contexto de nuestra investigación.

6ª. – En alumnado que presenta déficits caligráficos, una intervención adicional individualizada (nivel 2) que abarque procesos de orden superior e inferior no proporciona beneficios adicionales sobre una intervención centrada exclusivamente en procesos de bajo nivel. De forma general, esto parece contradecir hallazgos previos en torno a la mayor eficacia de una instrucción combinada frente a una instrucción basada en habilidades transcriptoras (Berninger et al., 2002; Limpo & Alves, 2017). Sin embargo, existen tres razones ligadas a la naturaleza de la instrucción que pueden justificar esta diferencia de resultados. En primer lugar, la muestra utilizada en estudios previos estuvo formada por alumnos con un desarrollo normalizado (Limpo & Alves, 2017) o con dificultades en fluidez escritora (Berninger et al., 2002). Por el contrario, las dificultades presentes en los alumnos de nuestra muestra afectaban a los aspectos más básicos de la escritura, en concreto a la caligrafía en cuanto a la legibilidad de la escritura. La profundidad de estas dificultades podría justificar que no se hayan obtenido beneficios adicionales de una intervención de nivel 2 que aborde procesos de orden superior. En este sentido, se sugiere que la respuesta a la intervención puede ser diferente según el tipo y la magnitud de los déficits presentados por el alumnado. Cuando estos déficits afectan a la base de la escritura, la instrucción más eficaz parece ser aquella centrada exclusivamente en ellos. En segundo lugar, la muestra utilizada en nuestro estudio recibió una instrucción general a nivel de aula que abarcaba tanto habilidades transcriptoras como planificación textual (nivel 1). Esta instrucción base, proporcionada tanto previamente como de forma paralela a la instrucción de nivel 2, no estaba presente en estudios previos. Por tanto, todos los alumnos de nuestra

muestra contaban con nociones de planificación derivadas de una instrucción grupal. Esto podría justificar que, teniendo en cuenta los déficits caligráficos de la muestra de estudio, una intervención adicional en planificación y transcripción no produjera beneficios adicionales sobre una instrucción focalizada en transcripción. Por tanto, los resultados obtenidos en nuestra investigación deben entenderse en el contexto de una intervención multinivel que no estaba presente en estudios previos. En tercer lugar, la muestra utilizada en estudios previos estuvo formada por alumnado en niveles educativos superiores y, por tanto, en un estadio diferente del aprendizaje de la escritura. Por tanto, cabría esperar que este alumnado hubiera recibido previamente instrucción formal en escritura. Nuestra muestra, en cambio, recibió la instrucción al inicio de la primera etapa de educación obligatoria, coincidiendo con el inicio de la instrucción formal en escritura.

A partir de las conclusiones anteriores en torno a la eficacia del modelo de Respuesta a la Intervención, es posible señalar dos **contribuciones** de esta tesis.

A nivel científico, la investigación presentada confirma la posibilidad de aplicar el modelo RTI de forma eficaz al ámbito de la escritura, como ya se había sugerido en estudios previos (Gil & Jiménez, 2019; Saddler & Asaro-Saddler, 2013). Los hallazgos de nuestra investigación, aunque preliminares, parecen favorecer la competencia escrita del alumnado y la prevención de posibles dificultades de aprendizaje, en consonancia con la literatura previa en torno al modelo RTI en lectura (O'Connor, Fulmer, Harty, & Bell, 2005; Simmons et al., 2008). En esta línea, nuestra investigación no solo expande la investigación en torno a la prevención temprana de las dificultades de aprendizaje en escritura, sino que ofrece pautas de intervención específicas para poner en práctica esta prevención.

A nivel educativo, la eficacia preliminar del enfoque RTI presentado en esta tesis sienta las bases para una posible inserción del modelo, a largo plazo, en el currículo educativo. En esta línea, se hipotetiza que podrían reducirse los costes y

recursos asignados a los servicios de atención a las necesidades educativas especiales, como ya ha enfatizado la literatura previa en el contexto internacional (Fuchs & Fuchs, 2006). Esta es, consideramos, una importante contribución de nuestra investigación, especialmente si se tiene en cuenta el papel clave de la escritura dentro del currículum ordinario de la escuela primaria (Decreto 26/2016 por el que se establece el currículo y se regula la implantación, evaluación y desarrollo de la Educación Primaria en la Comunidad de Castilla y León).

Sin embargo, las conclusiones y contribuciones anteriores han de ser interpretadas con cautela debido a una **limitación** significativa de nuestra investigación en cuanto a la efectividad del modelo. Los estudios recogidos en esta tesis abordan la aplicación de enfoques RTI en ausencia de un grupo control apropiado, formado por estudiantes en riesgo a los que no se proporcione instrucción adicional de nivel 2. Ello eliminaría la posibilidad de que los efectos obtenidos sean exclusivamente madurativos y, por ende, proporcionaría una evidencia mayor sobre la eficacia de las intervenciones multinivel. Así, como **futura línea de investigación**, nuestros estudios sientan la base para llevar a cabo ensayos aleatorios a gran escala con grupo control, como ya se ha hecho en lectura (Fuchs, Compton, Fuchs, Bryant, & Davis, 2008; O'Connor et al., 2005) y en matemáticas (Vanderheyden et al., 2007). Estos estudios deberían alargarse en el tiempo a fin de ser capaces de lidiar con el dilema ético que supone detectar carencias en los estudiantes y no asignarles a ninguna condición de intervención.

7ª. – El modelo RTI en el campo de la escritura es factible de ser aplicado en grupos-clase de en torno a 25 alumnos con un solo docente, de acuerdo con el marco establecido por el sistema educativo español. Esta conclusión viene apoyada por la visión global positiva manifestada por los docentes participantes en la investigación. No obstante, a pesar de su opinión favorable del programa, los docentes plantearon cuestiones en torno a la falta de tiempo,

experiencia y recursos, tal y como ha ocurrido en estudios previos sobre la factibilidad de aplicar el modelo RTI en el contexto de la lectura (Castro-Villarreal, Rodriguez, & Moore, 2014; Greenfield, Rinaldi, Proctor, & Cardarelli, 2010; Martinez & Young, 2011; Rinaldi, Averill, & Stuart, 2011; Stuart, Rinaldi, & Higgins-Averill, 2011). Por tanto, se enfatiza la necesidad de integrar los enfoques de Respuesta a la Intervención en el currículo escolar ordinario. Una vez integrado en los planes de estudio, resultará más sencillo destinar fondos y recursos a su puesta en práctica en los centros escolares.

8ª. – La labor de las familias como recurso educativo de apoyo al profesorado en la enseñanza de la escritura facilita la implementación del modelo RTI dentro de las características del sistema educativo español. La implementación efectiva del modelo RTI requiere de recursos financieros y humanos que permitan al centro ofrecer a los estudiantes una atención focalizada en sus necesidades en cada uno de los niveles de intervención (Arriaza & Rodas de Ruiz, 2014). La estructura del sistema educativo español podría dificultar la implementación del modelo ya que establece la presencia de un único docente frente a una ratio de 25 alumnos en las aulas de Educación Primaria (Real Decreto 132/2010 por el que se establecen los requisitos mínimos de los centros que impartan las enseñanzas del segundo ciclo de la educación infantil, la educación primaria y la educación secundaria). En este sentido, la investigación recogida en esta tesis doctoral apunta al valor educativo de las familias como recurso de apoyo al profesorado, lo que podría cubrir posibles límites en cuanto a la aplicación del modelo RTI derivados de las características del sistema educativo. Ello concuerda con los planteamientos generales del modelo, que señalan la implicación de los padres como un componente clave en el éxito de su aplicación (Stuart et al., 2011). No obstante, los beneficios de la labor de los padres en esta investigación ha de interpretarse dentro de las características de la instrucción propuesta. En este sentido, en el diseño de la intervención, se consideró importante que la instrucción estuviese basada en la evidencia empírica y fuese

autosuficiente, de modo que los padres sirviesen como apoyo educativo y motivacional a la labor del profesorado, sin asumir directamente el rol de instructores.

A partir de estas conclusiones en torno a la factibilidad de aplicar el modelo dentro del sistema educativo español y al rol que profesores y padres juegan en su aplicación, es posible señalar dos **contribuciones** de la investigación presentada. Desde una perspectiva científica, nuestros estudios contribuyen a expandir el uso del modelo RTI más allá de Norteamérica, donde la mayoría de Estados ya lo ponen en práctica (Berkeley, Bender, Peaster, & Saunders, 2009). Por otro lado, desde una perspectiva educativa, nuestra investigación proporciona a los docentes y otros agentes educativos formación en la implementación del modelo RTI y, de modo más general, pautas metodológicas para abordar la diversidad en el aula. A partir de estas contribuciones, se enfatiza la necesidad de que el modelo RTI se desarrolle de forma efectiva en nuestro país, de acuerdo con la legislación vigente, que asume la prevención e identificación temprana como principio de la atención a las dificultades de aprendizaje. En esta línea, es destacable la investigación en torno a la implementación del modelo principalmente en lectura y matemáticas en diferentes comunidades autónomas como las Islas Canarias (Jiménez et al., 2010; Jiménez, 2017; Jiménez, 2019).

Sin embargo, estas conclusiones y contribuciones han de ser interpretadas dentro de las **limitaciones** derivadas de esta investigación en torno a la labor de profesores y padres en la implementación del modelo. Dichas limitaciones se discuten a continuación, junto con **futuras líneas de estudio.**

En primer lugar, los programas de intervención presentados en nuestra investigación fueron diseñados como actividades complementarias al currículo ordinario del aula. Ello supone un tiempo y esfuerzo adicional por parte del profesorado, quienes no podían reemplazar sus métodos de instrucción tradicional por las nuevas propuestas. Por tanto, es necesaria investigación que explore si la

intervención multinivel en transcripción y planificación propuesta en esta tesis es más efectiva que el actual currículo de escritura, que carece de estas características. Si, como se espera, las prácticas instruccionales empíricamente validadas proporcionan al alunado mayores beneficios, tanto los investigadores como los agentes educativos deben hacer un esfuerzo para asumirlas en su práctica diaria. Esta propuesta apoya la línea de investigación focalizada en la necesidad de aunar el conocimiento científico y la práctica educativa (Biesta, 2007; Hordern, 2019).

En segundo lugar, el papel de los padres en la supervisión de la intervención de nivel 2 presentada podría afectar a la fidelidad de la intervención. Es cierto que el hecho de que la intervención estuviese basada en papel y fuese autosuficiente, puesto que no se esperaba que los padres actuasen como instructores, constituye, en sí misma, una medida de fidelidad. Sin embargo, dicha intervención tuvo lugar en el hogar de los participantes, siendo por tanto imposible controlar de forma directa el grado de implicación de los padres, el tipo de apoyo proporcionado y la distribución temporal de la intervención. En este sentido, se sugieren dos líneas de investigación para superar esta limitación. Por un lado, desde una perspectiva teórica, sería importante llevar a cabo una revisión empírica sobre los posibles agentes educativos que pueden aplicar los niveles de intervención 2 y 3 de forma eficaz. Por otro lado, desde una perspectiva aplicada, es necesaria investigación orientada a diseñar e implementar cursos de formación para padres en torno a la aplicación del modelo RTI. Esta iniciativa ya ha sido puesta en marcha en Estados Unidos por la Oficina de Programas de Educación Especial (OSEP), aunque los actuales centros de formación para padres centran sus esfuerzos en informarles acerca de las características del modelo RTI pero no necesariamente en entrenarles en su uso (Bradley, Danielson, & Doolittle, 2007).

A lo largo de este capítulo se han presentado conclusiones, contribuciones, limitaciones y líneas de investigación futuras derivadas de nuestra investigación en torno a dos grandes aspectos: la instrucción general en composición escrita basada en la evidencia empírica al comienzo de la escolarización obligatoria; y la prevención de dificultades de aprendizaje en escritura a través del uso de enfoques basados en la respuesta a la intervención. Aunando ambas líneas, es posible concluir que la investigación presentada en esta tesis doctoral contribuye a fomentar la competencia comunicativa global de los estudiantes y, por tanto, a prepararlos para la vida adulta y la obtención de empleo. En este sentido, Beddington et al., (2008) señalan que las habilidades comunicativas, entendidas como recursos cognitivos, constituyen una parte esencial del capital humano de una sociedad que, a su vez, determina el progreso de las sociedades actuales. Como reflexión final, y como cierre de este capítulo y de la disertación doctoral en su conjunto, se considera necesario enfatizar el tamaño y el valor de las habilidades de los estudiantes en edades tempranas y la necesidad de fomentarlas tan temprano como sea posible. Arthur Schopenhauer afirmó que "cada niño que nace es, en cierta medida, un genio, del mismo modo que un genio sigue siendo, en cierta medida, un niño". Es nuestro deber, como investigadores y educadores, explotar las capacidades de los niños y asegurarnos de que continúen siendo genios.

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