Effects of teaching planning strategies to first-grade writers

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Effects of teaching planning strategies to first-grade writers

Background. Traditionally writing instruction at the start of school has focused on developing students' ability to spell and handwrite. Teaching children explicit self-regulatory strategies for developing content and structure for their text has proved effective for students in later grades of primary (elementary) education.

Aims. The present study aims to determine whether first-grade students benefit from learning higher-level self-regulating strategies for explicit planning of content and structure.

Sample. Five mixed-ability Spanish first-grade classes were randomly assigned to either an experimental condition that received strategy-focused instruction (3 classes, N=62), or to a practice-matched control condition (2 classes, N=39).

Method. Over 10, 50 minutes sessions, the intervention taught strategies for writing stories. Writing performance was assessed prior to intervention, immediately after intervention and 7 weeks post-intervention, in terms of both text features associated with written narratives and by holistic quality ratings.

Results. Students who received the intervention subsequently produced texts with better structure, coherence and quality, and a larger number of features associated with narrative texts. These effects remained at follow-up and were not present in the control condition.

Conclusion. Our findings indicate that teaching explicit strategies for planning text content and structure benefits young writers even when spelling and handwriting skills are not yet well established.

Keywords: self-regulation; planning strategy; writing instruction; primary education; text quality.

1

Introduction

Learning to compose text requires development of low-level skills for translating ideas into sentences (handwriting, spelling, grammar) and knowledge of higher-level rhetorical structures that give global coherence to the text. However, this alone is insufficient: Students must also employ self-regulatory strategies that ensure that they retrieve and apply relevant knowledge in an organized and systematic way when they are faced with a writing task and specific communicative goals (Zimmerman & Bandura, 1994). Strategy-focused writing instruction aims to teach developing writers these strategies.

Strategy-focused instruction teaches explicit planning and/or revising procedures with the aim that students will then independently use these strategies in their own writing. Strategy-focused writing instruction, as operationalised, for example, in Self-Regulated Strategy Development (SRSD: Graham & Harris, 2018; Harris, Graham, & Mason, 2006; Harris, Santangelo, & Graham, 2008) typically proceeds through three stages: a) direct teaching, providing students with explicit knowledge of writing strategies, b) modelling, in which students observe the instructor modelling the target strategies, and c) emulation, when children write their own texts following the model. This approach, with some variation in detail, has been found successful in several studies. These include evaluation in struggling and typically-developing students, in primary and secondary schools, in small group and whole-class context, and in different languages and educational contexts (e.g., Brunstein & Glaser, 2011; Danoff, Harris, & Graham, 1993; De La Paz & Graham, 2002; Glaser & Brunstein, 2007; Graham, Harris, & Mason, 2005; Harris et al., 2006; Limpo & Alves, 2013; Sawyer, Graham, & Harris, 1992; Torrance, Fidalgo, & García, 2007). Meta-analyses indicate that strategy-focused instruction tends to outperform other approaches to teaching writing (Graham, McKeown, Kiuhara, & Harris, 2012; Graham & Perin, 2007; Koster, Tribushinina, de Jong, & van den

Bergh, 2015; Rogers & Graham, 2008). It is less clear exactly what mechanisms mediate the effect of this intervention (Torrance, Fidalgo, & Robledo, 2015), although it is typically assumed that students need explicit, strategic knowledge of how to write – particularly, of procedures to plan good texts– to regulate the process by which they produce their text.

Existing evaluations of strategy focussed instruction have almost exclusively sampled students in 3rd grade and above. Early writing instruction tends to focus almost exclusively on spelling and handwriting (Cutler & Graham, 2008; Dockrell, Marshall, & Wyse, 2015). The assumption has been that, until students achieve a reasonable level of mastery in these low-level skills, teaching strategies for planning and revising serves no function or will unnecessarily burden students. There are a handful of published studies evaluating strategy-focussed instruction for 2nd grade writers who fail to learn at the same rate as their peers under the normal writing curriculum. These involved individualised instruction delivered one-to-one (Lane et al., 2008, 2011; Lienemann, Graham, Leader-Janssen, & Reid, 2006) or in small groups (Harris, Graham, & Adkins, 2015; Harris et al., 2006). Three studies involved group comparison, contrasting intervention with a normal curriculum control (Harris et al., 2015, 2006; Lane et al., 2011). The remainder were case studies. Findings suggest that, for these children, teaching planning strategies gives significant gains in text structure and overall quality in children's narrative and persuasive writing.

To our knowledge, only one previous study has evaluated strategy-focused instruction in first-grade students. Zumbrunn & Bruning (2013) describe six single-case studies, sampling students who already demonstrated reasonable competence[1] in written composition. Instruction

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[1] Specifically, students were selected on the basis of their ability to "write independently about self-selected topics or in response to a writing prompt, express a main idea with some details, use a variety of descriptive words and phrases, identify and write complete sentences, use correct punctuation at the end of sentences, and proofread and correct for spelling errors." (Zumbrunn & Bruning, 2013, p94). Mean age of students was 7.3 years, compared to 6.6 in the present study.

3

was student-paced and implemented with pairs of students. Text quality, measured holistically on a 7 point scale and assessed at pre-test, post-test and follow-up, improved for all students.

The research that we report in this paper aimed to determine the effectiveness of strategy-focused instruction delivered in a fixed number of sessions by a single instructor in whole, mixed-ability first-grade classes (i.e. implemented in a form that would be possible in all typical first-grade teaching contexts). This question differs from that addressed by the studies that we have just reviewed. Previous research has established that strategy-focused instruction is effective with older students who might have a reasonable level of accuracy and automaticity in syntax, spelling and handwriting, and when delivered as an individualised, student-paced intervention to younger, struggling students. This finding does not, however, necessarily generalise to instruction for whole classes of younger students.

It is possible that teaching planning strategies prematurely will not benefit and may even hinder writing development. Written production is cognitively demanding, with various processes competing for limited cognitive capacity (McCutchen, 1996; Torrance & Galbraith, 2006). Fayol (1999) argued that in young children cognitive resources are mostly devoted to orthographic and grapho-motor processing, leaving little spare capacity for higher-level processing. Having to learn and remember an explicit planning strategy is, in itself, resource-demanding and potentially diverts resources from transcription. Rijlaarsdam and co-workers (Rijlaarsdam et al., 2011; Rijlaarsdam & Couzijn, 2000) describe the "double challenge" faced by students when they are required to learn a new writing strategy concurrently with performing demanding writing tasks. More directly, it may simply be that students who struggle to compose sentences are motivationally not ready to learn about how to apply higher-level structure to their text.

It is, however, also possible to make a resource-demand argument *in favour* of early planning-strategy instruction: It may be that teaching planning strategies, if done appropriately, reduces the cognitive load. By introducing discrete pre-planning or "stop and think" activities into the writing process, students can separate out the processing of higher-level text features from word and sentence production, thus reducing potential competition (Kellogg, 1988, 1990). Also, teaching students how to plan and structure text before they have mastered transcription is not necessarily demotivating. The genre-related characteristics of narrative text can, in principle, be learned independently of the ability to instantiate narratives with these characteristics on the page. Nemirovsky (2009) argued that teaching content and rhetoric – the social function of written language – promotes meaningful learning. Teaching children to play the role of authentic communicators is, in itself, motivating (Teberosky & Sepúlveda, 2009). The attention and effort devoted to a writing task is highly motivation-dependent (Bruning & Horn, 2000; Pajares, 2003). Interventions that increase students' enthusiasm for writing will increase opportunity for learning both high- and low-level skills.

In summary, existing research has established the benefit of teaching explicit strategies for generating and structuring content to children across a full-range of abilities at and above third grade. Younger children, who are unlikely to have achieved automaticity in transcription, may or may not benefit in the same way. The study we report in this paper therefore addresses the following research question: Does first-grade students' narrative-composition performance improve as a result of teaching explicit procedures for planning content and structure?

We implemented and evaluated a strategy-focused instructional program with mixed-ability classes of Spanish children in the second trimester of their 1st grade. The intervention was based in Cognitive Self-Regulation Instruction – a strategy-focused approach to writing instruction similar to SRSD - that has been demonstrated to have positive and sustained effects

in 6th grade children (Fidalgo, Torrance, & García, 2008; Fidalgo, Torrance, Rijlaarsdam, van den Bergh, & Álvarez, 2015; López, Torrance, Rijlaarsdam, & Fidalgo, 2017; Torrance et al., 2007). Writing performance was evaluated in controlled tasks prior to intervention, immediately following intervention, and at seven weeks. Texts from these tasks were evaluated in terms of holistic (reader-based) quality measures and by counts of linguistic features associated with good narrative texts. If first-grade students benefit from strategy-focused instruction, we predict greater and sustained increase in scores on both of these measures, relative to practice-matched controls.

Method

Design

Five existing first-grade classes were randomly allocated to either intervention or control conditions. Students in the intervention condition were taught planning strategies through a strategy-focused instructional program. Students in the control condition engaged in activities targeting their understanding of story structure and to increase motivation for story writing. Instruction for both conditions was delivered by a researcher who is also a trained teacher (the first author). Both groups completed the same number of writing tasks. Students performed controlled writing tasks before intervention and immediately after intervention, and then were followed up in a delayed post-test. Time between the end of the intervention and follow-up varied between 52 and 56 days, with a mean of 55 days for the intervention condition and 54 days for controls. Both evaluation tasks and instruction focused on story writing.

Participants

Five first-grade classes (101 children, 54 female) across 2 *concertados* schools in León (Spain), participated in the study. From a total of 110 students, 7 were removed from the sample

(5 intervention, 2 controls) because they did not complete all the writing assessments; and 2 (1 intervention, 1 control) because teachers identified them as having broad ranging and substantial developmental delay that prevented them from engaging in the intervention activities. Table 1 provides sample details. The intervention was conducted during the second trimester of the academic year (from January to March).

[insert Table 1 near here]

Educational and Language context

In the Spanish school system, education is not compulsory until first grade (6 years old). However, children who attend kindergarten, which was true for all participants in this study, receive some formal writing instruction. This focuses on letter name, shape and sound, and the writing of some simple words, mostly through copy tasks. At the end of kindergarten, most children are able to sound and write all the letters and short words with simple syllable structure (consonant + vowel). These skills are revisited during the first trimester of first grade. Students are also introduced to dictation tasks, capital letters and some spelling rules (c / z and c / q distinctions).

Instruction in phoneme-grapheme correspondence is a particular focus of early writing instruction in Spain. Nearly all words have regular spelling (straightforward phoneme-grapheme correspondence) which makes it quicker to move from letter sounds to the writing of words that would be the case in deep orthographies.

Instructional programs

Differences between intervention and control conditions are summarized in Table 2. Both programs were applied over 10 twice-weekly sessions lasting between 45 to 55 minutes, delivered to whole-class groups. Control and intervention conditions were matched in terms of

the amount of writing practice − time in completing a narrative writing task − that children received.

[insert Table 2 near here]

Planning-strategy instruction

The intervention design drew heavily on previous strategy-focused interventions, particularly Cognitive Self-Regulation Instruction (Fidalgo & Torrance, 2018; Fidalgo, Torrance, Robledo, & García, 2009), but with adaptations to make the instruction appropriate for younger writers. First-grade students typically struggle to produce written outlines for their text (Limpo, Alves, & Fidalgo, 2014). We therefore taught strategies that required "thinking before writing" but that encouraged incremental planning- transcription cycles rather than focusing all attention on a distinct planning phase prior to transcription. Instructional strategies were adapted to younger learners: where previous interventions have taught mnemonics based around acronyms to help students retain declarative knowledge of specific writing strategies, the present intervention used a puppet and a picture of a mountain as the central mnemonic device. This retained younger students' attention and motivation, and removed the additional load imposed by the need to memorise an acronym, thus reducing the "double challenge".

The intervention program focused on the structural parts of a narrative: introduction, development and conclusion. This structure is typically taught in Spanish elementary school textbooks, but its detail closely parallels the "situation, complication, resolution and coda" structure (Labov, 1972). The program was delivered in 3 phases: direct strategy teaching, modelling and individual practice. Direct strategy teaching comprised 5 sessions focused on providing students with explicit knowledge about planning processes and the structural elements of a narrative. In Session 1 students were reminded of the importance and purpose of writing. They were then taught a specific planning strategy, using a puppet called Pensarín

(Pensar = 'to think'). Students were instructed to recall Pensarín's name each time they write a story, since it reminds them to think carefully about what they are going to write. The next three sessions were devoted to direct teaching of the main parts of a narrative: introduction, development and conclusion. At the beginning of each session, students were reminded about the planning process through Pensarín's name. Then, the instructor introduced "La Montaña de los Cuentos" ("Story Mountain", appendix A), the mnemonic used to help students learn and retain explicit knowledge of story structure. Different sessions focused on introduction, development and conclusion, each represented by different villages on the road up the mountain. Students were taught the elements of that part of the text, represented as stickers shaped like houses. Introduction was represented by 3 houses: when the story happens, where it happens and who the main characters are. Development comprised what happens to the characters and how they react to these events. Finally, conclusion explained how the story ends. At the end of each session, stickers representing structural elements were removed and students placed them again correctly to aid retention of the strategy. Session 5 was devoted to reading and discussing two texts: one was a complete narrative, including all the taught elements, and the other omitted a number of features. Initially, students recalled the planning strategy and the narrative structure. They were then given a complete text, which the instructor read aloud, and were asked to judge whether it included all the structural elements. The procedure was then repeated with a story that had missing features.

The second phase, modelling, comprised 4 sessions focused on providing students with a mastery model of a writer applying the planning strategy taught. This involved the instructor "thinking aloud" in front of the class while writing a story. Think-aloud was semi-scripted. Given the students' age, and therefore likely inability to sustain attention, modelling was combined with some guided writing practice. In Session 6, children initially recall the planning

9

strategy and the elements of a proper introduction. The instructor then modelled how to plan and write a good introduction. During this process, the instructor emphasized the steps to follow in the writing process (e.g., "What was the first part of the mountain? Oh, it was "introduction", so the first part of my tale should be the introduction") and expectations of success (e.g., "using everything I've learnt, I'll write an amazing story"). Next session was devoted to students writing their own introduction, following the procedure previously observed. Sessions 8 and 9 followed the same pattern but focused on the development and the conclusion of a story.

The final session focused on individual practice in which students wrote their own stories. Students wrote a narrative without seeing the mountain, using everything they had learnt. The instructor patrolled the class providing encouragement and occasional feedback on surface features of the text, but did not comment on content or structure.

Control Condition

Students in the control condition received a program of largely play-based activities based around narratives. Their writing practice was matched to the intervention in terms of number of writing tasks and time spent writing. Sessions were guided by the same puppet used with the intervention condition, though no importance was attached to the puppet's name. Children did not receive explicit instruction on how to plan text or on the structural elements of a narrative. In session 1 the importance and purpose of writing were discussed in the same way as in the intervention condition. Students then told their favourite stories. Sessions 2 and 6 were devoted to reading comprehension, with the instructor reading a story and asking children questions about its content (i.e "what happened at the beginning?" "how could you change the end?"). Sessions 3, 5 and 10 were devoted to play-based activities aimed at increasing students' writing motivation. Sessions 4 and 9 focused on individual story writing to practice-matched

the experimental program. Session 8 was devoted to practice transcription skills through copy tasks. In session 7, children visited the school library with the aim of understanding the social function of writing.

Measures

All students completed narrative writing tasks at pre-test, post-test and follow-up. Students were free to choose the topic. The instructor told the students: "From now until I tell you to stop, you are going to write a story about whatever you want. You can make it up or recall one that already exists[2]. Think carefully about what you are writing. I'll read your narratives and show them to professors at university, so please, write as clearly as you can, making wonderful letters so that the people from university and I can understand your handwriting". Students were given a maximum of 40 minutes to complete the task. Texts were assessed with both text-based (text-linguistic) and reader-based measures.

Reader-based (holistic) text ratings

Reader-based holistic ratings were given for structure, coherence and overall quality (see appendix B for example compositions), based on a rating scheme adapted from that described by Spencer and Fitzgerald (1993).

Structure was assessed on a 4-point scale, with 1 indicating lack of discernible structure and 4 being well structured. The score was based on the extent to which pupils created a global framework to place the story, used connectors, mentioned the initial event, included characters' response to events and results obtained from characters' actions and established a temporal or causal relationship between events.

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[2] In response to reviewers' comments we explored whether conditions varied in the extent to which students made up their own narratives. Texts were coded as either "mainly invented / story unfamiliar to the raters" or "story contains main elements that are familiar to the raters". At pre-test, 37 intervention students (59.7%) and 25 control (64.1%) wrote a mainly invented story / unfamiliar story. At post-test, 56 intervention stories (90.3%) and 36 control (92.3%) were mainly invented. At follow-up, 55 intervention students (88.7%) and 33 control (84.6) made up their stories.

Coherence was assessed on a 4-point scale, with 1 given to incoherent texts and 4 for texts that were mainly or entirely coherent. This score was based on whether it was possible to identify the main topic, there was a clear development without entanglements, the text provided a clearly-defined general context, details were organized, the use of cohesion markers, fluent speech and for the existence of a conclusion.

Overall Quality was assessed on a 6-point scale, with 1 meaning incomprehensible and 6 very good. The score was based on the presence of a clear sequence of ideas with little or no irrelevant details, good global organization, suitable vocabulary, a variety of interesting details, correct sentence structure and correct punctuation and spelling.

Text-linguistic evaluation

Text-based measures involved identifying, within the text, organizational structures that are typically associated with written narratives, following Cuetos, Sánchez and Ramos (1996). We rated both framework and episode.

Framework included references to time, space and characters. One point was given for each temporal or spatial reference. For example, if a child wrote "Yesterday, at 9.00 pm, I was at home when…", then, they were given 2 points for temporal references and 1 point for a space reference. Characters were scored with 1 point if they were just named or listed ("One day, a princess was…") or 2 points if the children mentioned some of their physical or psychological features ("One day, a beautiful and friendly princess was…"). These scores were then summed.

Episode included the initial event, characters' emotional reactions to any happenings in the story, actions performed by the characters and consequences. Children were given 1 point if they wrote about an initial event ("Little Red Riding Hood's mother told her to go to her grandma's"). Then, we gave 1 point for each action and emotional reaction mentioned by the

children. For example, in the sentence "The wolf looked for the little girl but he did not find her, so he felt disappointed and sad" the child would be given 1 point for the action and 2 points for the reactions. Finally, consequences were scored with 1 point if they were mentioned ("The spell was finally broken, and the princess could marry the prince"). Scores were then summed.

All texts were scored by two independent raters, both blind to condition and to assessment (pre-test, post-test, follow-up). Interrater agreement, across all product measures and assessments, gave a mean of .94 (framework = .91; episode = .98; structure = .94; coherence = .93; quality = .95) indicating reliability of the measures.

Text length

We also measured *text length* (number of words written by the children, excluding those that were crossed out).

Results

We conducted separate analyses comparing scores at pre-test vs. post-test and at pre-test vs. follow-up. Data were analysed using linear mixed effects models (e.g. Quené & van den Bergh, 2004) with random by-student and by-class intercepts and test (pre-test vs. post-test, or pre-test vs. follow-up), condition (control, intervention), and the condition-by-test interaction as fixed factors. Models were implemented in LME4 (Bates, Mächler, Bolker, & Walker, 2015) with maximum likelihood estimation. Intra-class correlations are reported in Appendix C. We evaluated statistical significance by F-test using the Satterthwaite approximation for denominator degrees of freedom. We report standardized effect sizes calculated as the difference between estimated means, at post-test, and at follow-up, for the control and intervention conditions divided by total error variance (d_T, Hedges, 2007).

If strategy-focused instruction benefitted students then we would expect to see an increase in scores between pre-test and post-test in the intervention group, and that this increase would

be greater than in the control group. If effects of intervention were enduring, then we would expect to see an increase in the intervention condition between pre-test and follow-up, and again that this increase would be greater than in the control condition. The effectiveness of the intervention is therefore established by finding a significant interaction between test and condition. In all cases where we claim a significant effect values for p were less than the value of alpha after Bonferroni correction for familywise error rate (.05/6).

Scores on all five writing performance measures were approximately normally distributed. Text length was positively skewed, but approximately log-normal, and so was transformed prior to analysis. Bivariate correlations among measures are reported in Table 3. The three holistic measures were highly correlated, indicating weak discriminant validity. Correlation between the two text-based measures and between these measures and the holistic quality ratings were, however, less, suggesting better discrimination.

Mean scores by condition and test occasion can be found in Figure 1.

[insert Table 3 and Figure 1 near here]

Effects on reader-based (holistic) ratings

As can be seen from Figure 1 there was a substantial increase in the intervention group between pre-test and post-test in all three holistic measures of text quality. We did not observe similar changes in the control group. The interactions between condition (control, intervention) and test (pre, post) were statistically significant for all three measures (Structure, $F(1,99) = 43.2$, $p < .001$; Coherence, $F(1,99) = 20.6$, $p < .001$; $F(1,99) = 24.2$, $p < .001$; effect sizes, Structure, 1.4; Coherence, 1.0; Quality, 1.5). Effects persisted at the seven-week follow-up. The test by condition interaction remained significant for all three measures (Structure, $F(1,99)$

14

= 9.4, p = .003; Coherence, $F(1,99) = 18.7$, $p < .001$; Quality, $F(1,99) = 15.8$, $p < .001$; effect sizes, Structure, .9; Coherence, 1.0; Quality, 1.3).

Effects on text-linguistic evaluation

Text-based assessment showed similar effects to the holistic text ratings, although these were weaker, particularly in terms of the extent to which students included reference to time, space, and character in their narratives (the Framework measure). Students in the intervention condition improved in both Framework and Episode scores between pre-test and post-test and there was statistically significant improvement in both scores, relative to control (Framework, $F(1,99) = 3.91$, $p = 0.05$; Episode, $F(1,99) = 16.7$, $p < .001$ for the test by condition interaction; effect sizes, Framework, .93; Episode, 3.0). The effect on Episode scores remained at follow-up significant ($F(1,99) = 7.08$, p = .009, $d_T = 2.2$). However, the effect on Framework was not sustained at follow-up ($F(1,99) = 2.15$, $p = 0.15$). It should also be noted that Framework scores were significantly different at pre-test, as can be seen from Figure 1, with students in the intervention group scoring higher than students in the control condition. This lack of sustained effect and of equivalence between groups at baseline suggest that apparent effects of intervention on Framework should be treated with caution.

Effects on text length

Both the intervention and control groups wrote longer texts at post-test and at follow-up, relative to pre-test. However, we found no evidence that increases were greater in the intervention condition ($F < 1$ at post-test and $F(1,99) = 1.31$ at follow-up for the test by condition interaction).

Discussion

The present study aimed to determine whether very early writers, who are unlikely to have developed any level of automaticity in spelling and handwriting, benefit from strategies for

planning the content and structure of their text. Our findings provide evidence that this is the case. After instruction, intervention students' stories were more coherent, had better structure, included more sophisticated narrative content (the *Episode* measure), and were rated as having higher overall quality than those produced by students in the control group. These benefits were present immediately after intervention and sustained at least in the medium term.

Previous research has demonstrated the efficacy of planning strategy instruction for elementary students who have achieved reasonable competence in handwriting and spelling (Harris et al., 2012a, 2012b; Limpo & Alves, 2014; Tracy, Reid, & Graham, 2009; Zumbrunn & Bruning, 2013) and with small groups of second-grade struggling writers (Harris et al., 2006, 2015; Lane et al., 2008, 2011; Lienemann et al., 2006). Our findings suggest that this extends to whole, mixed-ability classes of students at the very beginning of primary education, when transcription skills are poorly developed. This is counter to the argument that focussing instruction on higher-level text features before skills necessary to generate sentences have been mastered will overload students to the detriment of their learning and writing.

Our findings suggest, therefore, strong and sustained benefits for students at a very early stage of writing development learning explicit content and structure planning strategies. This conclusion should be qualified in several ways.

First, delayed post-test was only seven weeks post-intervention. In previous research, effects of a similar intervention have been found in 6th grade children at 12 weeks and even two years after they had returned to typical, product-focused, writing instruction (Fidalgo et al., 2008; Torrance et al., 2007). Had our follow-up been more delayed, effects might have been lost. Arguably, however, in the present context this would not be evidence against the efficacy of learning planning strategies. Given the developmental stage of the students, we would not expect effects to be maintained without classroom reinforcement. Our study shows

16

that planning-focused instruction can be effective beyond effects that were present immediately after intervention. This alone is, we believe, sufficient evidence to support incorporating planning-focused instruction into classroom practice, sustained throughout the school year.

Second, our study, in common with most previous evaluations of strategy-focused writing instruction, does not provide strong evidence of mechanism. We do not know, for example, whether the effects of intervention are due to children adopting planning strategies or to them developing knowledge about the structure of good narratives, or both. Evidence suggests that when older children are taught explicit planning strategies they independently apply these when composing their texts (Armengol, 2007; Fidalgo et al., 2009, 2015). The process measures necessary to explore children's use of the procedures that they were taught are not easily obtained from the very early writers sampled in this study. From a classroom practice point of view, mechanism is probably unimportant. However, there is some evidence that teaching outlining strategies to older children may extend writing time without associated gains in text quality (Torrance et al., 2015).

Another possible explanation for our findings is that effects were achieved just by increasing students' motivation for writing. This would in itself have educational value, and it is probably the case that writing performance in very early writers is particularly motivation-dependent. However, there are three reasons to believe that effects of intervention went beyond increasing motivation. First, there is no particular reason why the intervention condition was more motivating than the control. Unlike "business as usual" control conditions often used in previous research, the control condition in this study deliberately involved activities designed to demonstrate that writing is valuable and enjoyable. Second, effects were sustained at seven weeks, after all students had returned to the same, transcription-focused writing instruction. Third, we would expect increased motivation to result in increased productivity. If intervention

students were simply more motivated, we would expect them to write longer texts than their peers. Previous evaluations of strategy-focused instruction, across a range of ages, have varied in whether or not they have found effects on text length (No effect: Fidalgo et al.,2009; Harris et al., 2012a, 2012b; Torrance et al., 2007; Torrance et al., 2015. Effect: Graham et al., 2005; Limpo & Alves, 2014; Tracy et al., 2009). The present study found no effect. It seems probable, therefore, that the positive effects of intervention in the present study resulted from students learning how to plan narrative texts and then regulating their own writing behaviour, applying what they had learned to how they wrote. Writing performance increased not as a result of longer texts, but because what they wrote was thematically and rhetorically more sophisticated.

A third qualification is that we do not have strong evidence for the efficacy of each of the individual instructional components that comprised the intervention. It may be for example, that modelling or declarative instruction alone is sufficient to achieve similarly large effects. There is evidence from interventions with older children to support both of these positions (Fidalgo et al., 2015; López et al., 2017; Sawyer et al., 1992). Application of the full program implemented in the present study is relatively time-consuming and effortful, and omitting redundant components is desirable. Research is needed, therefore, that isolates and evaluates, within very early writers, the various instructional components.

Finally, although our study provides robust evidence of an increase in average performance across mixed-ability classes, our results do not answer question about whether the intervention worked for children with particularly low (or high) ability. Research cited above has shown benefits of similar interventions with struggling second graders but literacy develops rapidly during the first two years of school, and it is possible that similar effects would not be found in first grade (but see Arrimada, Torrance, & Fidalgo, 2018).

The educational and language context for this study should be borne in mind when generalising from our findings. Students in this study were writing in a shallow orthography and had all received some handwriting and spelling instruction in kindergarten. Therefore although they will not have achieved a high level of transcription automaticity, it was reasonable to expect them to be able to write sufficient words to at least attempt to write a story, and also to guess spellings for words that they had not previously written. It may be the case in languages where spelling is less regular and / or with children for whom first grade is their very first contact with handwriting and spelling, that strategy-focussed instruction is less effective. There is, however, no in-principle reason why the higher-level skills taught in the present intervention should not be taught, in modified form, to children who have no transcription ability, with children practicing orally or by dictation.

In conclusion, our study suggests that, when appropriately adapted, instruction that focusses on developing explicit strategies for planning the content and structure of narrative texts has benefits even for writers who are far from gaining automaticity in handwriting and spelling. This suggests that it is possible for young writers to divide their attention between high and low-level writing processes without competition or, at minimum, that the negative effects of any competition that occurs are outweighed by the benefits of giving explicit attention to planning content and structure. More generally, our findings suggest that even very young writers are typically able not only to comprehend and retain meta-linguistic representations about text structure, but also to strategically apply this knowledge to their own writing. There appears, therefore, to be value in teaching students strategies for planning the content and structure of their text from the start of their writing career.

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Tables and Figure

Table 1. Sample Characteristics

Condition	Class	N (N male)	Age at pre-test in years, M (SD)
Intervention (N = 62)	Class A (School 1)	16 (10)	6.5 (.35)
	Class B (School 2)	22 (9)	6.6 (.28)
	Class C (School 2)	24 (11)	6.7 (.26)
Control (N = 39)	Class D (School 1)	16 (9)	6.5 (.28)
	Class E (School 2)	23(8)	6.6 (.24)

Table 2. Features of the Intervention and Control conditions

	Intervention	Control
Instructional content		
Strategies for planning narrative content and structure	+	
Transcription skills		+
Instructional approach		
Writing practice	+	+
Motivational training	+	+
Strategy instruction supported by mnemonics	+	
Teaching and modelling planning	+	
Text assessment	+	
Reading comprehension		+
Writing in a social context		+

Table 3. Correlations among outcome measures

|	Structure	Coherence	Quality	Framework	Episodes
Coherence	.78				
Quality	.80	.88			
Narrative framework	.38	.31	.35		
Episodic structure	.72	.54	.67	.24	
Text length	.31	.22	.38	.27	.56

Note. Parameters from linear mixed effects models of scores from all test occasions with random intercepts for students and random slopes and intercepts for test occasion.

Figure 1 Caption [figure submitted as separate pdf]: Mean observed scores on outcome variables, by condition and test occasion. Error bars represent 95% confidence intervals.

Figure 1 footnote: Note: Means and standard deviations by condition and time-of-task are also tabulated in Appendix C.

Appendix A: The Story Mountain mnemonic

Simplified version of the "Story Mountain" that formed the basis of the intervention reported in this paper. The road connecting the houses is omitted, and some other non-essential details are omitted for clarity.
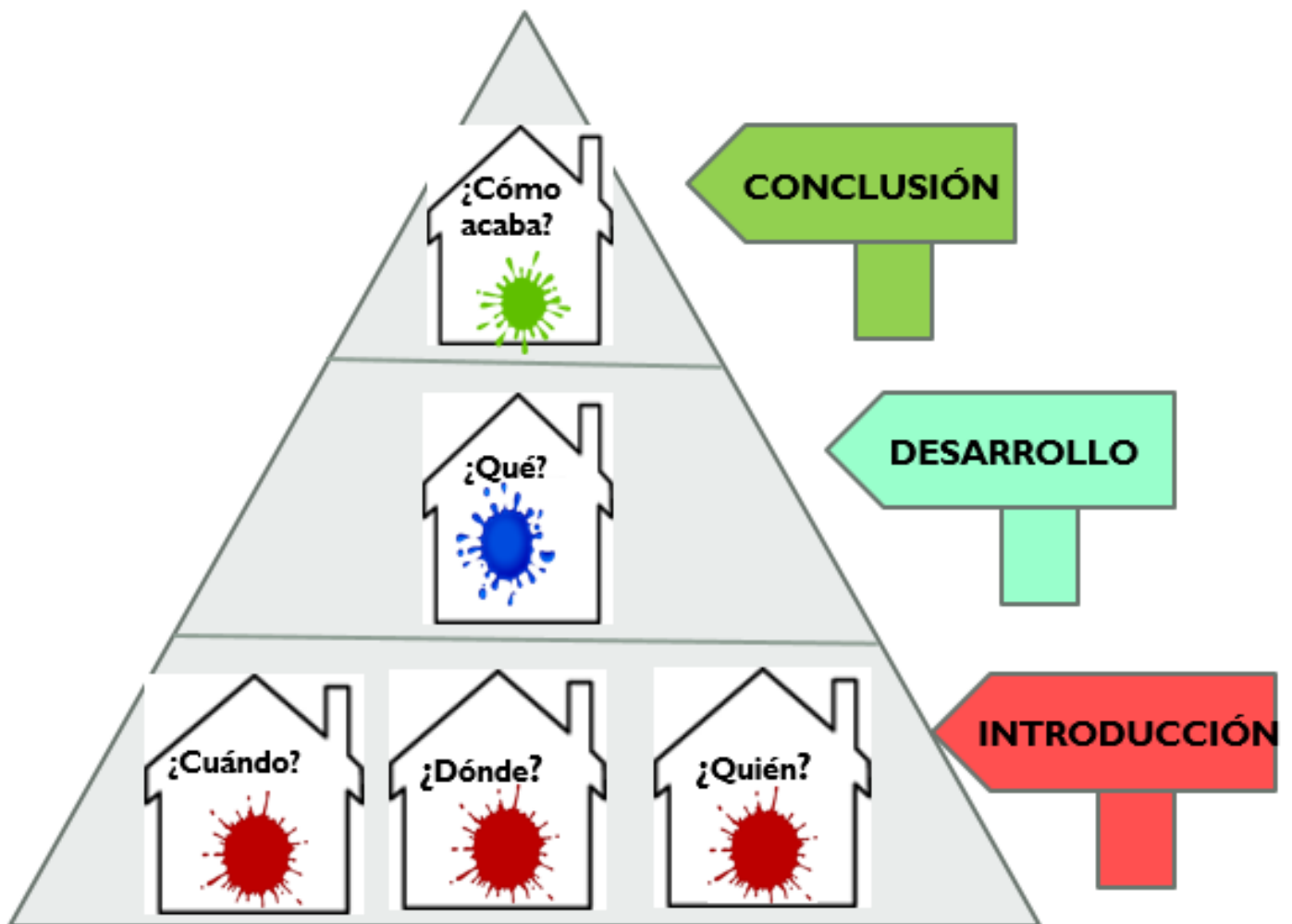
The following three samples are intended as prototypes of students' compositions rated low, in the middle, and high on the three holistic quality dimensions. These were transcribed so as to preserve spelling and all other errors. For readability we have in some cases inserted spaces between words where these were omitted or were unclear in the handwritten originals. Underlining indicates words with omitted capitalisation and/or diacritics. Italics indicate spelling mistakes, including uninterpretable words.

We also provide an English translation. This reproduces capitalisation and punctuation errors from the original, and represents misspelt words with plausible English spelling errors.

Text 1

48 words. Structure = 1, Coherence = 1, Quality = 1

<u>erase</u> una vez un *gerero* el sable del tigre lo <u>tenia</u> el rey el rey una vez se <u>habia</u> muerto y el *gerero* <u>tenia</u> el sable lo <u>tenia</u> el *gerero* el otro <u>tenia</u> las pistolas y la *gerera* era veloz. <u>el</u> niño y la niña <u>tenian</u> un zorro.

<u>once upon a time</u> a *warior* the saber of the tiger the king <u>had</u> it the king one time <u>was</u> dead and the *warior* <u>had</u> the saber the *warior* had it another one <u>had</u> the pistols and the *female warior* was quick. <u>the</u> boy and the girl <u>had</u> a fox.

Text 2

55 words. Structure = 3, Coherence = 2, Quality = 2

Ace mucho en los 80 _havia_ un roquero <u>mas</u> loco que una persona con una motosierra un <u>dia</u> estaba un fan de <u>el</u> le dijo si le firmaba un <u>autografo</u> <u>i</u> le dijo noooo <u>i</u> el fan se puso triste y el roquero le dijo <u>que</u> *lla* <u>estas</u> *quoteto* noo y el roquero se mata Fin

Log ago in the 80`s _ther was_ a rock player <u>crazier</u> than a person with a chainsaw one <u>day</u> there was a fan of <u>him</u> and told him if he signed an <u>authograph</u> for him *an* he said noooo *an* the fan felt sad and the rock player told him <u>if</u> he <u>was</u> *alredy hapy* noo and the rock player killed himself The End

Text 3

57 Words. Structure = 4, Coherence = 4, Quality = 5

El osito polar

Un día en el Polo Norte _abia_ un osito polar. Y <u>paso</u> el tiempo con su <u>mama</u>. Pero cuando tuvo que ir al colegio y *s* <u>quedo</u> triste y solo. *Asta* que en el recreo hizo un muñeco de nieve. Entonces sus compañeros <u>decidierón</u> ayudarle a mejorarlo. ¡Y hizo muchos amigos! Entonces fue feliz.

The polar bear

One day in the North Pole _ther was_ a polar bear. And he <u>spent</u> time with his <u>mommy</u>. But when he had to go to school he <u>felt</u> sad and lonely. *Util* in the playground he made a snowman. Then his classmates <u>decided</u> to help him to improve it. And he made lots of friends! Then he was happy.

33

Appendix C: Supplementary Statistics

Observed means by condition and test occasion. Standard deviations in parenthesis.

	Pre-test		Post-test		Follow-up	
	Control	Intervention	Control	Intervention	Control	Intervention
Structure	1.72 (0.79)	1.84 (0.75)	1.92 (0.77)	3.34 (0.72)	1.97 (0.67)	2.66 (0.9)
Coherence	1.85 (0.67)	1.95 (0.82)	2.15 (0.71)	3.08 (0.86)	1.9 (0.72)	2.77 (0.84)
Quality	2.03 (0.93)	2.1 (0.97)	2.15 (0.74)	3.34 (1.01)	2.05 (0.72)	2.94 (0.99)
Narrative framework	1.64 (0.58)	2.02 (1)	1.95 (1.45)	2.89 (0.83)	2.13 (1.15)	2.92 (1.11)
Episodic structure	3.62 (3.13)	3.02 (2.37)	2.85 (2.05)	4.56 (1.8)	3 (1.59)	3.76 (1.84)
Text length	47.5 (31.5)	48.8 (35.0)	56.4 (32.4)	55.9 (21.6)	53.9 (29.2)	61.9 (33.4)

Intra-class Correlation Estimates

	Pre and post test		Pre and follow-up test	
	subject	class	subject	class
Structure	0.31	0.00	0.35	0.14
Coherence	0.42	0.00	0.41	0.05
Quality	0.37	0.05	0.36	0.18
Narrative framework	0.00	0.00	0.04	0.19
Episodic structure	0.38	0.00	0.36	0.16
Text length	0.29	0.18	0.34	0.15

Note: Values calculated from random effect and residual variance estimates taken from the linear mixed effects models described in the text. See Stram, D. O., & Lee, J. W. (1994). Variance Components Testing in the Longitudinal Mixed Effects Model. *Biometrics*, 50(4), 1171–1177 for an explanation of the zero estimates.

Supplementary figure