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Using cooperative learning to enhance reading in Colombia

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Abstract

Paired reading is a form of cooperative learning where two school students take the role of tutor (the better reader) and tutee (the reader with the lower level of development). They read together and errors are corrected, praise is given, and questions are asked about the text being read. There is therefore, a strong need for social interaction between the peers. It has strong evidence as a low-cost technique to improve reading in western European contexts. Evidence for efficacy beyond western Europe is limited. This paper will describe the theory and existing evidence for the effects of paired reading. It will then report results from a development randomized controlled trial of paired reading in four elementary schools in Colombia. The paired reading group showed positive effects (effect size +0.16) on a standardized reading test in Spanish. The trial was a collaboration of research teams from the United Kingdom, Colombia, Chile, and China.

Introduction

Colombia was ranked 59th out of 71 countries in the last PISA 2018 assessments of international reading (OECD, 2018). School students in Colombia, therefore, lag two years behind world average reading attainment. Paired reading is an evidence-based, cost-effective way to improve reading in schools and close the reading gap among students with low literacy levels. The use of paired reading has been successful in the United Kingdom (Thurston and Topping, 2007; Tymms et al., 2011; Cockerill and Thurston, 2015), and a Latin American Spanish version was developed to be used in an exploratory trial to determine if the effects of the pedagogy can be transferred to Spanish language primary/elementary school contexts.

The paper will give a brief overview of research on cooperative learning. It will then describe a form of cooperative learning, 'peer tutoring', in which a peer with better reading competences (called the tutor), works with a peer with lower competence in reading (called the tutee) to help reading development (this technique is often called paired reading in the literature). The more competent student monitors the reading, correcting errors, praising the student who is working at a lower level, and is also tasked with

asking questions to promote talk and understanding of the text (this is described in more detail later in this work). The processes of organizing learning of this nature in the classroom will be described. The research findings will be reported from an exploratory study that took place in four schools in Bogota, Colombia, over a period of 10–12 weeks, from March to July, 2021.

Theoretical framework

Peer tutoring is a structured form of cooperative learning characterized by specific role-taking as either tutor or tutee. Tutoring involves cognitive challenge from peers and post-interaction reflection and restructuring, wherein tutor and tutee fulfil their roles to effectively create social interdependence. Their individual success is linked through common goals and mutual dependence and is the process by which gains in the tutoring process accrue.

For co-operative learning to be present during peer tutoring then, social interdependence must be present in the form of:

- *Goal structure*: The pair work together with the aim of reading and understanding a piece of text;
- *Positive interdependence*: In the tutoring process, clear patterns for interaction are defined during training in the roles of tutor and tutee (these patterns have been developed through research and evaluation to optimize them);
- *Individual accountability*: Both the tutor and tutee have responsibilities. In the form of tutoring used, each must reflect on both their own and their peer partner's performance;
- *Interaction patterns*: The tutoring process is structured to stimulate promotive interaction and group processing, and to enhance social skills.

Thurston and Topping (2007) developed a theoretical model of cognitive development that occurs during peer tutoring. In summary: students read a text together. The tutor listens to the tutee read. The tutor supports the tutee by reading hard sections together and when reading errors occur, the tutor will also ask the tutee questions. Reading together/alone, forward scanning the text whilst thinking of questions, and the processing of prior knowledge using metacognitive strategies to link previous learning to the current problem, all require social interdependence (Johnson, Johnson & Roseth, 2010). These processes both facilitate self-regulation and result in enhanced metacognition, facilitating the assimilation of learning, the accommodation of new ideas, and enhanced lexicon (Topping & Ehly, 1998). Paired reading pairs an older tutor with a younger tutee because optimal performance of paired reading requires there to be an attainment differential between tutors and tutees. Without the gap, both tutor and tutee can be under-stimulated (Greenwood, Terry, Arreaga-Mayer & Finney, 1992).

Paired reading and literacy development

Using paired reading should develop a number of key literacy concepts as part of the language curriculum. These include:

1.1 Competence in reading

- Mastering new words and vocabulary;
- Being clear, coherent, and accurate in spoken and written communication;
- Reading and understanding a range of texts and responding appropriately;
- Developing a heightened sense of reading self-concept.
- *Creativity and context*
- Making fresh connections between ideas, personal experiences, texts, and words, drawing on a rich experience of language and literature.

1.2 Cultural understanding of literature

- Gaining a sense of the literary heritage and engaging with important texts in it;
- Exploring how ideas, experiences, and values are portrayed differently in texts from a range of cultures and traditions.

## 1.3 Critical understanding of literature

- Engaging with ideas and texts, understanding, and responding to the main issues;
- Assessing the validity and significance of information and ideas from different sources (this is most likely to happen when reading non-fiction literature such as newspapers or magazines);
- Exploring others' ideas and developing the ability to express their own.
- Analyzing and evaluating spoken and written language to appreciate how meaning is shaped;
- Developing the ability to extract and interpret information from texts; inferring and deducing the intensions of the writer; justifying their own ideas on what they have read; understanding the nature and purpose of text; understanding how meaning is created through the use of text.

1.4 Reading for enjoyment

- Developing their enjoyment of reading and the enjoyment of sharing written texts with a partner.

1.5 Speaking and listening about texts

- Enhancing speaking and listening skills as pairs talk about and explore the meaning of the text they are reading.
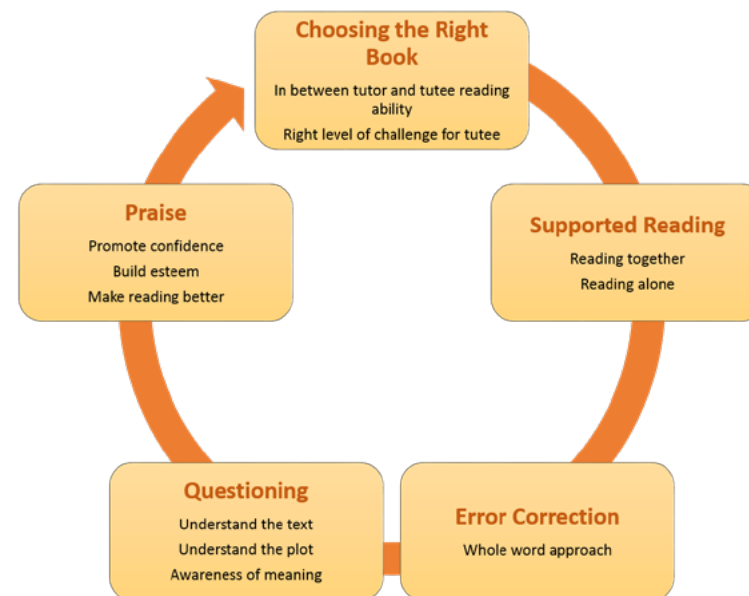
- **Figure 1:** Aspects of paired reading

What is paired reading?

Training

It is important to train both tutors and tutees in the processes of paired reading. Most teachers have found training them together works well, but it is important to clearly identify to tutor and tutee respectively, what their roles and responsibilities are. We have normally suggested two staff members model the technique for students. There are also a number of videos we make available to schools (in the project that follows we made new materials in Spanish for students to see how it worked).

Paired reading

Paired reading is a form of reading together and structuring academic talk surrounding text (Thurston & Cockerill, 2017). It has five main aspects:

- Choosing the right book;

- Supported reading;
- Error correction;
- Questioning;
- Praise.

These five aspects are all inter-related and are represented in Figure 1.

Choosing the right book

A long-established feature of the paired reading process is that tutees select their own book. The tutee is instructed to select a book with content that would interest them. This may be from magazines, library books, newspapers, storybooks, or even football programs. Any sort of reading material is suitable. However, the teacher may have to exercise some degree of editorial control over content. This will help pairs to experience different genres of text and ensures that the book chosen is at the right level of reading difficulty.

The tutee should select a book of the correct readability using a 'five finger technique'. For this, the tutee should open the book on a random page and place five fingers onto the page. The tutee should attempt to read the words under the fingers. The tutee should repeat this for another four pages. If they can read all the words on the five pages, the book selected is too easy. There is no decoding involved in the process (as this is not a feature of the technique). The tutee attempts to read the whole world and success, or failure is gauged by their success at doing so. Tutees should be advised to choose a book where they make between about 2–3 errors (out of the 25 words read). This may seem a strange way in which to assess the suitability of the reading level of a book. However, it is quick and has been used in previous projects and seems to work well. (Alternatives such as testing the reading ability of students, converting their scores to reading ages and then calculating the reading age of the text selected to ensure it was suitable were tried in the pilot of a previous study. This method was found to be no more effective than using the five-finger test.) The book chosen by the tutee has to be above the independent readability level of the tutee, but below that of the tutor. This will facilitate the tutor being able to help the tutee by correcting their errors. A rough guide as to what has been found to be the correct 'error rate', would be expecting to hear one error about every minute.

Supported reading

The cycle of paired reading alternates between the tutor and tutee reading together and the tutee reading alone. The tutor helps the tutee gain confidence by modulating the speed of their reading to be just behind the reading of the tutee. This is important because we want the tutee to be reading a book that is slightly harder than their independent reading ability. In addition, the tutor provides a good model of reading for the tutee. They may be able to read with more expression or intonation and this may help the tutee to be more expressive when reading out loud. The tutor and tutee start by reading together. They agree on a signal that the tutee will give when they want to read alone. The tutee signals to read alone when they feel confident enough to tackle the text reading independently. On giving the signal, the tutor stops reading out loud but continues to follow and monitor their tutee. The tutor should aim to read with the tutee when they start reading and when a mistake is made by the tutee.

Error correction

When an error occurs, the tutor waits 4–5 seconds, and if the tutee does not self-correct, the tutor corrects the tutee. Tutors should not jump in and correct the word as soon as a mistake is made. The rule is that tutors pause and give the tutee 4–5 seconds to see if they will put it right by themselves. This allows tutees space to self-correct. It needs practice, however. After an uncorrected error, the tutee repeats the error word correctly, the tutor gives praise and the pair read together again until the tutee signals to read alone again. Then the tutee reads alone until the next error that is not self-corrected. This process of error correction is central to the successful

implementation of the technique in classrooms and is a non-fussy way of correcting errors. By not stopping to decode words using phonics, the flow of the reading is maintained and the focus remains on the overall text/story rather than the mechanics of reading individual words. It has a number of important features that include waiting to correct errors, using the correct process to correct errors (an important part of this is praising once the tutee self-corrects), moving smoothly between the tutor/tutee reading together and the tutee reading alone, and, most importantly, supporting the tutee with praise (for reading the word correctly) and by reading together after an error.

The paired reading cycle

The actual process and cycle of paired reading is shown in the flow diagram in Figure 2. In the early stages of establishing paired reading, copies of the flow diagram should be given to each pair to remind them of what they should be doing.

Questioning

One of the keys to getting the most benefit from paired reading and promoting academic talk is to get effective questioning going during the tutoring session. Put simply, this should involve tutors and tutees asking each other questions about the book:

1 Before reading

- About the book/text and similar texts they have read before;
- About the author and the author's style (if they have read something by the same author);
- The reasons for choosing the text, personal links to the story and/or the author.

2 During reading

- Asking questions to make sure the tutee understands what has been read;

- Asking questions to help the tutee understand what has been read, and what is happening in the text;
- Ask questions that require the tutee to predict what may happen next (in fiction literature);
- Asking questions to show interest in the text;
- Asking questions to show it matters and links to wider aspects of life (this is important as it then provides an authentic context for reading and additional insight into the meaning of what is being read).

3 After reading

- About what was read. (This is an important place where the tutee can ask questions. We have often found that making a 'quiz' for your tutor can be fun for the tutee.)
- About what was and was not enjoyable;
- About how reading could be improved (for instance to read with more expression or read with more fluency), or indeed about how the text itself could have been improved.

Such questioning could take place at a number of different levels. It may be important to give guidance to the tutors and tutees about the sort of questioning that would be appropriate. As part of this project we developed Question Mats[1] at four different levels to help this process, ranging from simple process and opinion questions such as 'What do you think will happen next?', 'Why did you select this to read?' or 'Do you like this book?' to much more conceptually-based discussions. For example, The Trumpet of the Swan by EB White could be interpreted as a love story between two swans. Alternatively, it could be interpreted as a voyage of difference, identity, finding one's own identity and an analogy for aspects of the American civil rights' movement in 1960s America. Mats will need to be at differentiated levels for students. Students should keep them on the desk as they read to act as an aide memoire to help prompt and frame effective

[1]   These are cards with prompt questions printed or written on.

questioning. Some teachers prefer to let students design their own question mats. In some classes, laminating the mats has given them longevity (and allowed pairs to write and make notes on the mats using 'dry-wipe' marker pens), but plastic wallets can be just as effective for protecting the mats.

Some teachers have found it useful to have Quiz Time as part of the tutoring session. This could take place at the beginning, mid-point, or end of the session. Teachers have tended to stop the whole class from reading to ask the tutors and tutees to think up questions for each other. If this is in the middle of the paired reading session, it is best to give the class warning that they need to find a suitable place to take a break from their reading. Then they ask their questions. In more competitive classrooms, some pairs have kept a 'score' of who answered more correctly, turning this into an unofficial competition.

Praise

It is very important that the tutor enthusiastically and sincerely praises the tutee as they read. It is important to work with the tutors to find different ways to praise the tutee. There are set points during the paired reading cycle where the tutor should praise the tutee, including when transferring to reading alone and after the tutee corrects an error. However, praise should not be limited to these points; spontaneous praise from the tutor should also be encouraged (e.g., for reading with good expression or fluency). Praise is very important. It promotes positive attitudes to reading, builds self-concept in reading, and reinforces correct patterns in reading behavior. It is something that often is difficult to generate in classrooms and requires discussion and practice to get right (and ensure praise does not become superficial).

Self-assessment

Tutees also need to learn to 'self-assess' by reflecting on their reading and how it is improving. The tutor can help this process, as can the teacher. The teacher can model effective praise during
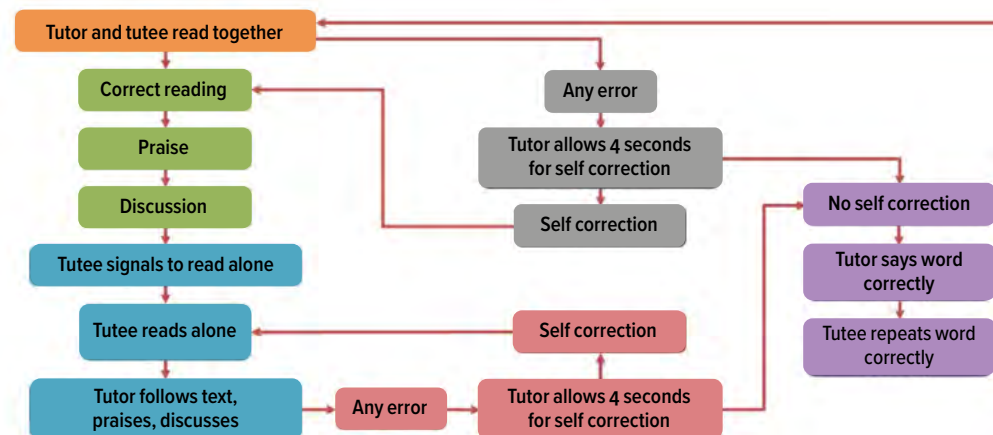
● **Figure 2:** The process of paired reading

the session, by saying, for example, 'John is reading with great expression' or 'Siobhan is tackling difficult words well today.' Tutees should try to identify how their reading is improving by recording this in a diary or log book.

Peer formative assessment

One of the main features of the paired reading process is peer formative assessment. There have been a number of successful policy initiatives on formative assessment such as Assessment is for Learning (Scottish Qualifications Authority, 2003) and Assessing Pupils' Progress (Department for Children, Schools & Families, 2008) in England and Wales. The common goal of these formative assessment strategies is to review assessment in short cycles (often per lesson) and to use this information to address gaps in students' learning, thus providing an element of personalized learning. Paired reading gives a pedagogic medium within which peer formative assessment can be effectively developed.

Organizing paired reading

Selection and matching of student pairs

All students can undertake paired reading. Ideally, students should work in a pair that remains constant. However, student absence through illness or other reasons may mean that some pairs have to change temporarily. This is not a significant issue. Triads can also be formed if there are uneven numbers of older and younger students, or within the class if same age pairs are being used. Triads can work well during paired reading. However, the role of the 'third student' should be defined as either that of tutee or tutor. There are a number of possibilities to help with this:

If the third student is from an older class, they should become a tutor. If from a younger class, they should become a tutee.

If the triad forms with two tutees, they should be of similar ability. The tutees should share the time of the tutor by reading the same book, or by choosing different books and having the tutor switch attention as they read.

If the triad forms with two tutors, then the roles of tutors can be more flexible. One triad member could be used to cover absenteeism. The tutors should share their roles.

Matching of pairs

Reading ability should be the initial pairing criteria. For cross-age paired reading there should be a two-year difference between the older and younger class (e.g., grade 5 and grade 3). The following steps should be followed when selecting the pairings:

1. Students are paired according to reading ability from highest to lowest in the older and younger classes. Teacher judgement or test results may be used to determine the pairings.
2. The two highest ability students from each class are paired together, followed by the next two highest ability students, and so on until all students are matched with another student.

For same age paired reading:

1. Students are paired according to reading ability from highest to lowest in the class. Find the mid-point on the list.
2. The best reader from the class (tutor) is paired with the best reader from the mid-point of the list of students (tutee), the second-best reader from the top half (tutor) is paired with the second-best reader from the bottom half (tutee), and so on until everyone has a partner.

Other factors may have to be taken into consideration, such as, for example, gender, maturity, and personality. If ability-based pairing has problems because of one of these factors, the tutor can be chosen from the next one in line. In rare instances in post primary/secondary/high school, it has been reported that gender can interact to negatively affect a pairing. This might occur when a younger tutee is male and an older tutor is female or when some pairs are too diverse in terms of physical size and maturity. In practice, the fears of the younger male tutee can dissipate during the act of tutoring. Once matched and when any teething problems have been resolved, the pairs should remain stable. Only a serious incident should result in the reconstitution of pairs at this point.

Organization of contact

Tutoring should take place in normal school hours during timetabled contact time. Schools should identify an appropriate time and the classes/subject areas. Once paired, half of the students should work in one classroom, and the other half in another.

Tutoring sessions should last for about 30 minutes. This includes time to move students between classes. In reality, the students should expect to engage in paired reading for about 20 minutes, once per week, for a duration of between 12 and 16 weeks. Previous studies found that there was no additional benefit to undertaking paired reading more than once per week (Tymms et al., 2011). The students should sit comfortably close to each other at a desk or in a quiet corner of a library, for example. The point is that the pairs

should be able to listen to and hear each other without straining or having to raise their voices.

Introducing paired reading

There are many stages in the paired reading procedure and it is beneficial to introduce it over three sessions. The first session focuses on explaining what paired reading is and why it is being undertaken. In terms of the paired reading process, the first session focuses on choosing a book at the right level (five finger tests) and then switching between reading alone and reading together, including error correction. The second session focuses on modelling praising and consolidating error correction. The third session practices the previous techniques and introduces questioning. This last session also uses three 'question time' breaks: one before reading, one about halfway through the session, and one after reading. The question mat helps with this technique.

Trouble shooting

Throughout the session, the teacher monitors the pairs, intervening only when a pair is unable to move forward with the process. Some common problems include:

Personality clashes: This can include over-dominant partners, cultural differences, and gender issues. Teachers are encouraged to help the pair identify and resolve the problems. Only as a last resort should the pairings be changed.

Poor communication: This can include pairs who find the process too complex. The teacher can suggest staying focused on the 'error correction' and 'praise' parts of the technique. Writing down additional questions that could be asked at the end of a reading session can also help. The teacher can take the role of tutor to both students in order to model how to structure the process effectively.

Pace and challenge: Some pairs may race through books and finish quickly, making few, if any, errors. A good technique for a pair such as this is to ask them to select a more challenging book or to focus on asking regular questions. Pairs who struggle and make too many errors should be encouraged to choose easier books. Previous experience has indicated that this may be a particular issue for male tutees who have low reading ability. They may try to hide their true reading ability by choosing an overly complex book. However, making too many errors will be counter-productive and previous research has shown that it will inhibit the potential benefits of peer tutoring.

Praise: Previous work suggests that students find it difficult to praise each other. Teachers can run specific sessions on how to praise and encourage students. They have also developed 'praise' help cards. There is strong research evidence to suggest that when students feel that they are good at a subject, they start to perform better in subsequent tests. Students have reported that when they get praise from their tutors it helps them persevere for longer with tricky reading problems. This is tied into the substantive literature on self-concept as a predictor of future academic attainment in reading (Marsh & O'Neill, 1984; Marsh, Plucker & Stocking 1997).

How did it work in Colombia?

Sample

Four state-funded elementary schools in the Bogota area took part, with a minimum level of disadvantage of at least 85% as defined by the Colombian classification of socioeconomic status. Two of the schools implemented paired reading with children of higher reading attainment tutoring children of lower reading attainment in either grade 3 or grade 5 classes. Two schools served as control. This gave a control group of four classes. The final sample was composed of four schools, eight classes and 298 students. The four schools were paired with their closest school in terms of socio-economic indicators and prior Spanish reading attainment. They were allocated to their condition randomly using a random number generator program for iPhone: Version 5.5, 123 The Random Number Generator by Nicolas Dean. This is set to generate an equal number of 0=control (N=2) and 1=paired reading (N=2) schools.

Two hundred and ninety-eight students took part, comprising 183 grade 5 students, and 136 grade 3 students. One-hundred and forty-two students were randomized to the control condition and 176 were randomized to the paired reading condition. Sixty-six grade 3 students and 76 grade 5 students were allocated to the control group. Sixty-nine grade 3 and 107 grade 5 students were randomized to the paired reading group. The mean age of the sample was 11.41 years (SD 1.95). All 298 students were entitled to free-school meals. The control group was a wait-treatment control and they undertook normal classroom activities in reading during this period.

Reading material

One of the important aspects of this project was to provide the schools with a supply of appropriate reading materials. To do this each school was allocated £500 (Sterling) worth of books. The titles of books were selected by our Colombian colleagues and before the list for purchased was finalized it was checked with the schools and teachers to ensure it was optimal. The final list included a variety of fiction and non-fiction, with various genres of literature. Book purchases were made in Colombia (rather than in the U.K. and shipped out) to ensure value for money.

Form of paired reading

Although it was planned to use cross-age paired reading (grade 5 students tutoring grade 3 tutees), this was not possible. The Covid-19 outbreak meant that when the schools returned, each grade acted as a 'bubble'. A form of paired reading was used in which students with higher reading attainment became tutors to students of lower reading attainment within the same grade level. This form of paired reading was reported to be effective with previous studies reporting an effect size of +0.2 (Topping et al., 2012).

Primary outcome measures

Attainment in reading was determined using Dialect Assessment, a Spanish language reading test developed by Universidad de los Andes, Chile (UANDES). This is an adaptive computerized test that draws text from 40 passages of varying difficulty. It reported alpha of 0.97 when tested with a sample of 1186 Grade 3, 893 Grade 5, and 1531 Grade 8 students (MetaMetrics, 2015).

Ethics

The trial was approved by the School of Social Sciences, Education and Social Work Ethics Committee from Queen's University, Belfast, U.K., and from the Pontificia Universidad Javeriana Ethical Review Board, Colombia.

Effect of paired reading on reading attainment

Results of the dialect reading pre- and post-test are reported in Table 1. Missing data was less than 10%. Considering that the trial took place in the middle of the Covid pandemic, this was considered acceptable.

Condition	N Pre-reading score (SD)	N Post-reading score (SD)	Change
Control	N=127 534.57 (260.19)	N=120 539.37 (279.76)	+4.8
Intervention/ paired reading	N=171 618.12 (229.57)	N=155 659.95 (242.17)	+41.83
Total	N=298 582.51 (246.17)	N=275 607.34 (265.60)	

Table 1: Pre- and post-test attainment score in Spanish reading for control and paired reading groups

Gains for the intervention group over the control were +37.03 marks on the test. The *Effect Size* (as Cohen's *d*) was +0.16 (95% confidence intervals 0.004 to 0.322). Within condition t-tests

showed no significant gains in the control group (t(112)=-0.56, p=0.58). However, there was a significant gain within condition in the reciprocal reading arm of the trial (t(153)=-2.03, p<0.05). At this stage with the small sample researched it was not appropriate to compare gains between the paired reading group and the control group. Although the control group had lower pre-test scores than the intervention, we were not using post-test as the outcome (risking type I error). The design was not scaled to determine definitive causative effects, merely that the technique could be implemented in Colombian schools). The differences in pre-test scores demonstrate the great variability of student attainment in Colombian schools (even when drawn from similar socio-economic strata).

Discussion

Previous studies have reported that use of paired reading gave effect size gains for treatment over control groups of +0.24 for both tutors and tutees (Tymms *et al.,* 2011), and similarly +0.24 for students acting as tutors (Thurston, Cockerill & Chiang, 2021) to +0.45 for the bottom decile literacy students acting as tutors (Thurston *et al.,* 2019) in western European, English-speaking samples. It has also shown modest effect sizes at retention test of +0.18 (both tutors and tutees) in western Flemish-speaking samples (van Keer, 2004). This scientific study has established that these benefits may accrue in a similar way for a sample of elementary Latin American students with a high poverty background when reading in Spanish. While overall effect sizes on reading test scores were modest (overall ES +0.16), the intervention ran only for between 6–11 weeks across the four classes who implemented paired reading, which may not have been long enough for gains to maximize. This variability was due to the Covid-19 pandemic affecting school attendance and school opening/closures during the trial. In contrast, the Fife Peer Learning study in Scotland ran for a period of 104 weeks to produce effect sizes of +0.2 to +0.24 (Tymms *et al.*, 2011).

The benefits of the paired reading pedagogy may lie in the ability of peers to scaffold for peers. Peer learning, whilst helping the tutee to work within their Zone of Proximal Development (ZPD) is also likely to scaffold for their tutee, keeping them focused on the required behaviors and to 'concentrate on the difficult skills she is in the process of requiring' (Bruner, 1978, p. 19). This is an obvious advantage of many forms of cooperative learning and lies at the heart of social interdependence theory. The closely structured behaviors during paired reading encourage work in the ZPD, scaffolding, and promoting positive interaction.

Developing linguistic abilities also regulates cognitive development (Vygotsky, 1985; Wells, 1985). Bernstein's (1982) analysis provides convincing insight into the linkage between cognitive development and linguistic abilities. Examining the range and type of language structures employed by families and within schools, Bernstein classified codes as elaborated when language and discourse were rich. This language-rich approach to reading books facilitates children's development of an elaborated code that helps them undertake logical reasoning and decode the theoretical, and often abstract, concepts embedded within texts to which they are exposed in school. Students growing up in literacy poverty, where their language may not be stimulated to the same extent as children from more literate backgrounds and homes, may be afforded fewer opportunities to expand their ability to express abstract terms in verbal discourse, developing the required lexicon and comprehension to fully articulate with school-based texts (Bernstein, 1999). Using paired reading helps linguistic development within a sociocultural context. The importance of the tutor and tutee creating shared understanding through promotive positive interaction links back through theories of social interdependence (Johnson, Johnson & Roseth, 2010) to the original theories of Vygotsky (1985). Paired reading may provide the scaffolding required to facilitate these processes.

Conclusion

The paired reading technique shows promise as a cost-effective way to raise reading attainment in high poverty areas using Spanish language in Latin America. A book, chosen by students and not the teacher, provides a motivating and facilitating medium through which to base learning. Teachers found the technique easy to replicate and noted that students engaged enthusiastically with paired reading. Further work is now required to explore the use of the pedagogy in more detail, and to determine whether the techniques can be generalized to a larger population of students where valid comparisons can be made between the paired reading group and a suitably-sized control group.

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