Reciprocal Teaching: An Academic Critique

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Introduction

Reading Comprehension

According to the Simple View of Reading (SVR), reading is a complex process comprised of decoding and comprehension skills (Gough & Tunmer, 1986), with reading fluency and comprehension fostering the development of each other (Stecker, Roser, & Martinez, 1998). When decoding is adequate, reading comprehension is the product of three factors: well written texts, the reader's prior knowledge of the content and active strategies used to enhance understanding and retention (Palincsar & Brown, 1984). For expert decoders, reading and comprehension are relatively automatic processes, until the reader experiences a comprehension failure (Palincsar & Brown, 1984). This causes the reader to slow down and allocate time and effort to the comprehension failure, where they can apply active processing strategies. Research shows that proficient readers apply active comprehension processing strategies, whilst poor readers apply fewer strategies in less flexible ways (Lenski & Nierstheimer, 2002).

Reciprocal Teaching

Reciprocal Teaching (RT) is an instructional procedure designed to improve reading comprehension and was originally developed by Palincsar and Brown (1984). RT was developed on the basis that reading is an interactive process of constructing meaning from text (Palincsar, 2017). Additionally, "good readers do not use comprehension strategies one at a time as they read. Rather they orchestrate and coordinate a 'set' or 'family' of strategies to comprehend text" (Reutzel, Smith, & Fawson, 2005, p. 279)". Consequently, RT incorporates multiple strategy instruction where readers are taught how to apply and coordinate multiple strategies whilst reading.

Palincsar and Brown (1984) focussed on improving comprehension fostering strategies within RT as they viewed these as knowledge extending activities that extended past reading comprehension as basic skills of argument. RT embeds four cognitive strategies: summarising,

questioning, clarifying and predicting, that embody the most common underlying activities involved in reading comprehension (Brown, Palincsar, & Armbruster, 1984). These four strategies are used by proficient learners (Hattie, 2008), promote reading comprehension and provide opportunities for students to monitor their own comprehension (Palincsar, 2017). The four strategies are therefore comprehension fostering and comprehension monitoring activities (Palincsar & Brown, 1984).

Students acquire these strategies during teacher guided practice in small groups where students and the teacher take turns in leading discussions on a text whilst applying the strategies (De Corte, Verschaffel, & Van De Ven, 2001). Initially, the teacher leads discussions whilst modelling the strategies but as the students' mastery of the strategies improve, students take increasing responsibility for applying them while the teacher provides feedback, scaffolding and coaching (De Corte et al., 2001). Palincsar (2017) describes that, typically, the discussion leader generates questions which are answered by the group and additional questions are raised by others. The leader then summarises the text and others can elaborate. Then, clarifications of the text are discussed and lastly, the group generate predictions about upcoming text. RT therefore incorporates three key elements found in effective comprehension strategy instruction including: (1) explicit instruction of strategies, (2) gradual increase in student responsibility, and (3) coordinated use of multiple strategies (Pilonieta & Medina, 2009). The goal of RT is for students to use cognitive strategies flexibly when reading to actively construct meaning and to help them monitor their thinking and learning. RT was originally developed for "adequate decoders but poor comprehenders" (Brown & Palincsar, 1982), in line with the SVR.

Psychological Underpinnings

Social Constructivism

According to Vygotsky's developmental theory (1978), reading development is facilitated by social interactions in cultural contexts, and this socio-cognitive view implies that reading skills are developed through participation within social groups, through purposeful interactions with text (Lenski & Nierstheimer, 2002). Within RT, students learn to apply cognitive strategies in the presence of 'more knowledgeable others' who shape their current schemas to construct new ideas and understandings through scaffolded support within a student's 'Zone of Proximal Development' (ZPD; McAllum, 2014). RT also encompasses collaborative learning (McAllum, 2014) whereby the social context of a heterogenous group encourages students to learn from more knowledgeable peers. RT also enables teachers to continuously assess students' understanding which provides valuable information that enables teachers to provide individualised instructions, support and feedback (Palincsar, 2017). RT uses guided practice which explains how expert scaffolding, modelling and support from the group gradually decreases as students develop competence.

Proleptic Teaching

Palincsar and Brown (1984) also make explicit reference to how proleptic teaching is based

upon Vygotsky's (1978) developmental theory. Proleptic teaching can be defined as teaching in anticipation of competence (Brown, Campione, Ferrara, Reeve, & Palincsar, 1991) and involves a novice being encouraged to participate in a group activity before they are competent to perform independently. At this point the novices carry out simple aspects of the task whilst the teacher models cognitive strategies. Over time the teacher gradually increases the students' responsibilities of implementing strategies and managing the RT routine in the group, and slowly removes expert support as students learn the strategies and support each other (Piloneita & Medina, 2009).

Self-Regulated Learning and Metacognition

Metacognitive strategy instruction for Self-Regulated Learning (SRL) is another underlying psychological component of RT (Palincsar, 2017). Through scaffolded support within the student's ZPD, students make a gradual shift from external regulation to self-regulation of strategy by improving their metacognitive skills. Westera (2002) identified RT as an example of metacognitive strategy instruction through its development of thinking about thinking and skills for SRL. The explicit teaching of cognitive strategies provides opportunities for students to monitor their own comprehension (Palincsar, 2017) and RT aims to improve comprehension through explicit teaching of cognitive strategies needed for metacognition (McAllum, 2014). Successful comprehension of text relies on metacognitive processing which consists of knowledge about and regulation of cognitive processing through applying cognitive strategies (Cubukcu, 2008).

Evaluating the Evidence Base

Meta-Analyses

A vast amount of research has been conducted investigating the effectiveness of RT on reading comprehension and meta-analyses are useful in providing an overall review of multiple studies. Hattie (2009) conducted a synthesis of two meta-analyses which yielded an overall moderate effect size (d = .74). Rosenshine and Meister (1994) reviewed 16 studies and reported no differences in grade level, number of sessions delivered, number of cognitive strategies taught, size of group, or whether the teacher or researcher delivered the RT. Nevertheless, this meta-analysis reported that effects were greater when studies used experimenter developed (d = .88), rather than standardised tests (d = .32). Researchers suggested that experimenter developed tests may be more similar to questions practiced in RT. Consequently, studies using experimenter tests should be interpreted with caution due to its potential impact on construct validity. Effects were also higher in studies which provided explicit teaching of cognitive strategies prior to the intervention. Although this meta-analysis shows positive effects of RT, it was primarily based on unpublished work which raises questions around the study's quality. Galloway (2003) reviewed 22 studies and similarly found a moderate effect size for the impact of RT on reading comprehension and a larger effect size for studies using experimenter designed tests compared to standardised tests. Again, no difference was found between interventions implemented by teachers or researchers.

Reciprocal Teaching for Primary Aged Students

Whilst an extensive research base generally supports the effectiveness of RT for improving reading comprehension in primary aged children, some supporting research has methodological limitations which should be addressed and interpreted with caution. For example, Greenway (2002) found significant improvements in reading comprehension on standardised tests for year six students following a RT intervention. Nevertheless, this study was based on a very small sample (n = 6), impacting its generalisability. Additionally, no control group was included, making it difficult to establish a causal relationship, therefore the internal validity of the study is jeopardised. Extraneous variables, like developmental maturation, may have impacted results, so conclusive claims cannot be made. Nevertheless, Takala (2006) found the most effective improvements in reading comprehension were found in fourth and sixth grade Finnish students following a 15-session universal RT intervention in science, but not history for sixth graders. This study included a larger sample of students (*n* = 154), but despite including a control group, no statistical analyses compared scores between groups post intervention, only within group comparisons were made between pre-post measures. Interestingly, the 10 session RT intervention was not as effective as 15 sessions. Importantly, this study also used follow up measures five weeks after the RT intervention, which found significant improvements from pre-test to a five week follow up for fourth grade, but not sixth grade students.

Many studies within the literature also fail to measure intervention quality and fidelity. Although no universally agreed procedure or manual for administering RT exists, King and Parent Johnson (1999) showed that when teachers clearly and consistently modelled all four RT strategies, showed meaningful dialogues, offered guided practice and provided praise/feedback, student dialogues mirrored their teachers which led to improved comprehension monitoring and insight. Consequently, higher quality teacher input may impact students' comprehension. Despite this, many studies (e.g. Greenway, 2002; Takala, 2006) do not measure teacher quality or intervention fidelity. Linked to Rosenshine and Meister's (1994) and Galloway's (2003) findings that no differences were found between teacher or researcher implementation of RT, the findings by King and Parent Johnson (1999) suggest it may not be who delivers the intervention, but the quality of their input that is of greater importance.

Despite various methodological limitations within the literature, O'Hare et al. (2009) conducted a high quality randomised controlled trial across 98 schools in England with over 4000 students in association with the Education Endowment Foundation. Researchers compared the effectiveness of a targeted RT intervention with groups of year five and six students and a universal RT intervention with year four classes. Students in the targeted intervention made the equivalent of two additional months progress in reading comprehension (*g* = .18), which was not found in the universal intervention. Although a small effect size, this well powered, large scale study included control groups, controlled for intervention fidelity and quality and randomly allocated students to conditions, improving the internal validity. Additionally, the study used standardised tests of reading comprehension

which have been shown to yield more conservative effect sizes in previous studies (e.g. Rosenshine & Meister, 1994; Galloway, 2003).

Interestingly, the universal, class-based intervention in the O'Hare et al., (2009) study did not significantly improve reading comprehension which could suggest that RT is not effective in large, untargeted groups. In line with the SVR, RT was originally developed for adequate decoders but poor comprehenders, so it appears that careful selection of students may be important. This may also explain why Takala's (2006) findings with a universal RT intervention did not yield completely conclusive results at post intervention and follow up for both subjects. Nevertheless, Pilten (2016) investigated the effectiveness of an 11-week universal RT intervention in 54 fourth grade students in Turkey. Students' reading comprehension scores were significantly higher at post-intervention than the control group showing positive results for a universal RT intervention. Despite contradictory findings, in universal, class-based RT studies, students are often split into smaller groups within the class (e.g. in Pilten, 2016; Schunemann, Sporer & Brunstein, 2013) therefore, the question may be less about the optimal size of the group, but more about the composition of students within smaller groups and intragroup processes that make RT effective.

Many studies include heterogenous groups of mixed ability participants. For example, Kelly, Moore and Tuck (1994) found that a targeted RT intervention in New Zealand significantly increased reading comprehension in heterogenous groups of eight to 11-year-old students. All students had reading comprehension scores below age norms and mixed decoding skills, some up to three years below age norms! Over the 20-day intervention, teachers' use of the cognitive strategies decreased, whilst the students' use of the strategies increased, which is the aim of guided practice. It may be likely that the heterogenous groups provided more opportunities for students to rely on peer models and more knowledgeable others. Nevertheless, this study had a small sample (n = 18), so the generalisability of findings is limited, and reading comprehension was measured through experimenter designed tests. Whilst a heterogenous group may be useful for providing opportunities for peer scaffolding, selecting students up to three years below age norms in decoding is concerning. It is unlikely that these students would have been able to access the text, however, listening to text being read could be sufficient for a student to apply some RT strategies.

Similarly, Law (2014) explored the effectiveness of RT on reading comprehension with heterogenous groups of 235 grade six students in Hong Kong. Differing effects were found for high and low achievers (based on pre-test reading scores) depending on the structure of the intervention group. High achievers from low structured groups significantly outperformed high achievers from high structured groups and low achievers from high structured groups significantly outperformed low achievers in low structured groups. As the high structured group organised when members were required to lead the discussions, low achievers would have been encouraged to participate and to benefit from scaffolding and collaborative learning from more knowledgeable peers. These findings therefore advocate for the inclusion of heterogenous and high structured groups within RT, especially for low reading achievers.

As well as reviewing the evidence base for RT, it is also important to consider the mechanisms

through which RT improves comprehension. Meta-cognition is an important aspect of SRL, and studies have assessed the impact of combining explicit instruction of SRL strategies within RT. Schunemann, Sporer, and Brunstein (2013) found that a universal RT intervention significantly improved reading comprehension in fifth grade students in a German primary school (*n* = 323), but integrating explicitly taught SRL methods within the RT intervention enabled students to maintain gains in comprehension at an eight week follow up. Similar findings were reported by Sporer and Schunemann (2014). Researchers were able to identify that students with low reading fluency benefitted the most from the RT and SRL combined intervention, in line with Law's (2014) finding that low achieving students benefitted the most from high structured heterogenous groups. Furthermore, Schunemann, Sporer, and Vollinger (2017) found that RT combined with SRL enabled students to provide more informative feedback, and peer feedback quality was found to mediate improvements in reading comprehension at follow up. Consequently, SRL may augment the effectiveness of RT in universal interventions, particularly for low ability readers in groups with high quality peer feedback. As RT has also been found to increase reading motivation (Ismail, Ahmadi, & Gilakjani, 2012) and confidence in answering comprehension questions (Greenway, 2002), it is possible that motivation and confidence are also potential mediators which help explain how RT improves comprehension.

Conclusions and Implications for Practice

When working in schools, Educational Psychologists are in a position to advise on interventions using knowledge of the evidence base and assessing the appropriateness of interventions for the needs of individual students and the suitability within school systems. Through consideration of the evidence base, RT appears to be an effective intervention for improving reading comprehension in primary aged students, with promising effects also found at follow up. Furthermore, RT is a low-cost intervention (O'Hare et al., 2019), requires few materials and students have reported it as fun, positive and easier than other comprehension approaches due to peer support, constant guidance and extra time for comprehending (Pilten, 2016).

Consideration of the practicalities of implementing RT in schools is advised. Meta-analyses suggest no differences between teacher led and researcher led interventions (Rosenshine & Meister, 1994; Galloway, 2003), however, the quality of input from the teacher is important (King & Parent Johnson, 1999). According to Brown and Campione (1996) 'lethal mutations' can occur as teachers focus too much on how to carry out the RT procedures rather than understanding underlying learning principles. Consequently, staff may firstly require training on underlying learning principles before implementing RT. In line with Rosenshine and Meister (1994)'s findings, prior teaching to students of cognitive strategies may increase the effectiveness of RT too. Research has also shown that 10 sessions of RT are not enough for children to develop new comprehension skills, whereas 15 sessions were (Takala, 2006), so planning a RT intervention that is delivered frequently and over at least 15 sessions would appear most beneficial, in line with spaced practice. Consideration about how to measure progress is also required as higher effect sizes have been found for studies that used experimenter developed, rather than standardised testing (Rosenshine & Meister, 1994;

Galloway, 2003). Experimenter developed tests may be more similar to tasks carried out in RT and may reflect mastery with accuracy and fluency, however, standardised tests will more likely measure whether the RT strategies have reached the adaptation and generalisation stages of the learning hierarchy (Haring, Lovitt, Eaton, & Hansen, 1978).

Consideration around the design of the RT intervention is also needed in terms of appropriate selection of students. Although RT was developed for adequate decoders and poor comprehenders, there is mixed evidence regarding the effectiveness of universal and targeted RT. Whilst universal interventions are often delivered to a whole class, many studies split the class into smaller groups, therefore the question may be less about the optimal size of group, and more about the composition of students within groups and intragroup processes that make RT effective. Positive findings have been found for studies including heterogenous groups in terms of decoding and comprehension skills (e.g. Kelly, Moore & Tuck, 1994). Also, low achievers have been found to benefit more from high structured RT (Law, 2014). Both findings suggest that heterogenous ability and high structured groups encourage effective peer modelling, expert scaffolding and cooperative learning. Nevertheless, careful consideration about including students with significant decoding difficulties is needed as if text is too difficult to decode, this could affect students' confidence and motivation.

Furthermore, RT with explicit SRL strategies has been found to be more effective than RT alone (Sporer & Schunemann, 2014), especially for students with low reading fluency (Schunemann, Sporer, & Brunstein, 2013). Subsequently, consideration of how SRL strategies could be combined within RT would be needed and visual reminders and the use of a log book to help students apply cognitive strategies independently may be helpful tools to develop metacognition.

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Appendix

Systematic Search Strategy

Using the 'PICOS' framework (Higgins & Green, 2011), the key search terms were identified (see Table 1 below) to answer the research question 'how effective is reciprocal teaching in improving reading comprehension for primary aged children (5-11)?'. 'PsycINFO' and 'ERIC' databases were chosen databases for this search due to the focus on education and psychology, as well as a wider scoping search on 'Google Scholar'.

Table 1: *Search terms identified using the PICOS framework*

	Search Terms
Population (P)	child* OR student OR pupil
Intervention (I)	"reciprocal teaching"
Comparison (C)	N/A
Outcome (O)	"reading comprehension" OR "comprehension"
Setting (S)	N/A

**Search strategy: "reciprocal teaching" AND ("reading comprehension" OR "comprehension") AND (child* OR student OR pupil)*

Studies that were conducted on primary aged children, focussed on traditional reciprocal teaching techniques and measured reading comprehension were included. Studies that included students outside of the age range, that were not published, were grey literature, did not measure reading comprehension, used online or digital texts, had a paywall barrier, did not focus on the impact of traditional reciprocal teaching on reading comprehension, combined reciprocal teaching with other interventions, included students with hearing impairment, ASD, learning difficulties, had EAL, were not available to read in English and were not empirical were excluded (see figure 1). These studies were either excluded at the title/abstract screening phase or the full text screening stage. This systematic search was conducted during October 2019.

PRISMA Recording Flow Chart (Moher, Tetzlaff & Altman, 2009)

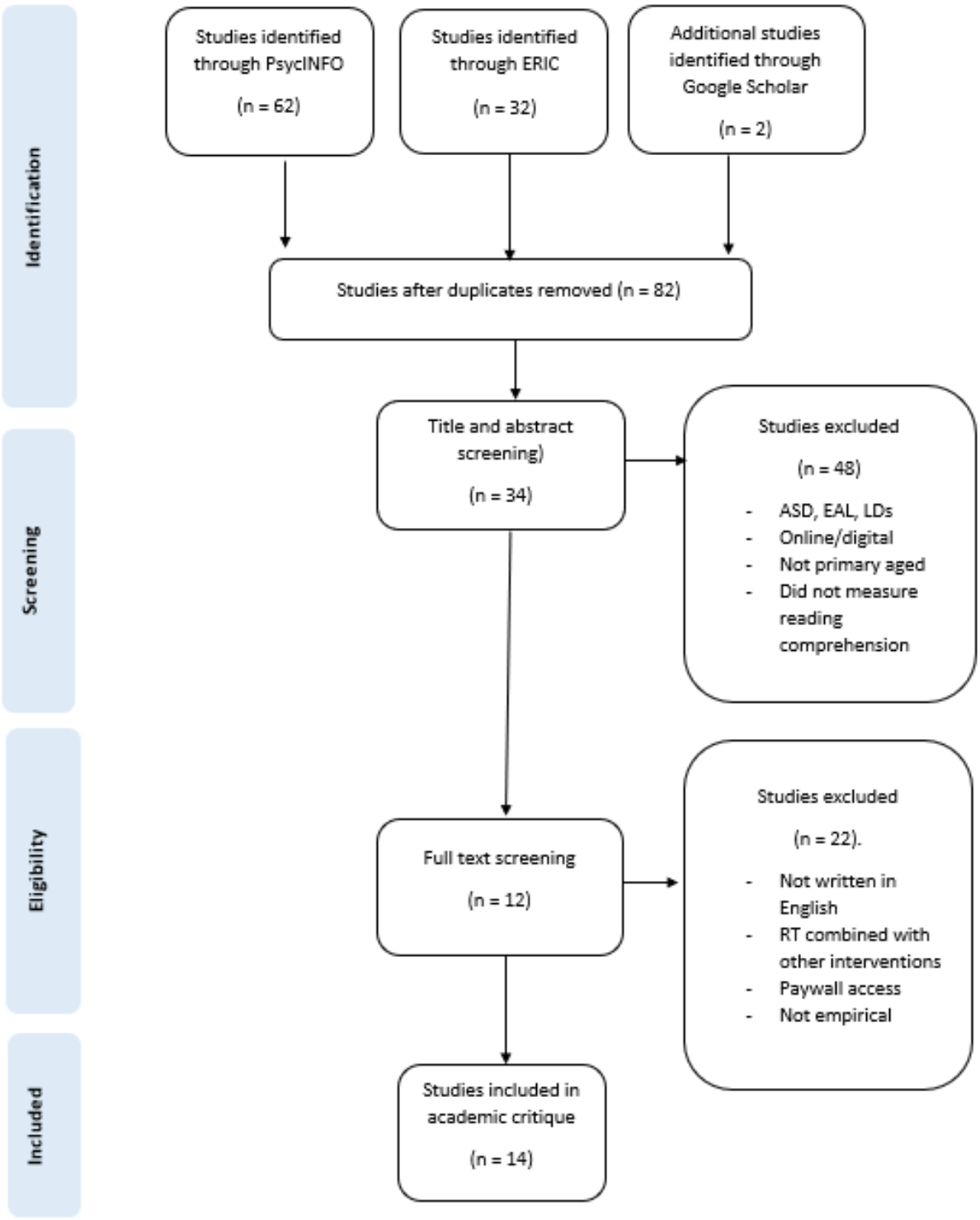

Figure 1. PRISMA Recording Flow Chart.