Low ability secondary-school students show emotional, motivational and performance benefits when reading to a dog versus a teacher

Olivia Barber¹ & Leanne Proops¹

¹Centre for Comparative and Evolutionary Psychology, Department of Psychology, University of Portsmouth, Portsmouth PO1 2DY, United Kingdom.

Corresponding Authors: leanne.proops@port.ac.uk; olivia.barber@port.ac.uk

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Abstract

Research has shown that reading to a dog can positively impact both reading attainment and attitude to reading in school children, however, most research to date has focussed on primary school-aged children (4-11 years). In this study we use a series of comparisons to assess the immediate effects of reading to a dog versus a teacher on reading performance, reading motivation and mood, in low attainment secondary school-aged students. Twenty participants, aged 11-12 years, were given four reading sessions in which they were asked to read to a dog for 5 minutes and to a teacher for 5 minutes, in a counterbalanced order. The final session was recorded and measures of reading performance were coded. Students were significantly more fluent, improved the pacing and showed better reading behaviour (such as confidence and posture) when reading to the dog compared to when reading to the teacher. Participants also reported experiencing more positive emotions and fewer negative emotions when reading to a dog compared to teacher. However, an Attitudes to Reading questionnaire revealed no significant differences in scores immediately following reading to the dog versus the teacher. Children were also asked to explain how they felt about reading to the dog (the positive and negative aspects). Thematic analysis revealed insights into the experience of participants, including emotional benefits, the impact of the therapy dog herself, and changes in attitude towards reading. This study suggests that when reading to a dog compared to a teacher, benefits can be direct and immediate, and can include better reading performance, increased motivation and more positive mood. Importantly, this study also indicates that reading to dogs can have a beneficial effect for this demographic in secondary schools.

Keywords: animal assisted therapy, human-animal interactions, reading dog, therapy dog, educational psychology

Introduction

Evidence suggests that reading aloud is an activity disliked by many secondary school-aged children (11-16 years old) (Bintz, 1997; Sarroub & Pernicek, 2016; Worthy, 1996). Hesitancy or mispronunciation can cause anger and shame (Warner, Crolla, Goodwyn, Hyder & Richards, 2016), frustration or anxiety (Davison, 2015). Unfortunately, this leaves some students at a considerable disadvantage. There are many benefits of reading aloud, including improved listening vocabulary and comprehension, opportunity for teachers to identify strengths and problems, promotion of new word learning, development of reading fluency, pronunciation and prosody, and an introduction to the enjoyment of books and reading (Beers, 2003; Gibson, 2008; Goodwin & Redfern, 2000). Despite these benefits, motivating students to read aloud, especially secondary school aged children, can be difficult (Ecroyd, 1991; McKenna, Kear & Ellsworth, 1995). Compounding this, the act of reading aloud may not increase competency if reading aloud is considered daunting and the student is not motivated to read (Guthrie et al., 2007; Kellett & Dar, 2007).

One novel strategy to motivate reluctant students to read out loud, is reading to dogs. Modern empirical demonstrations of the ability of animal assisted therapy to exert a positive influence over individuals' emotional and physical well-being are now widespread (Hall, Gee & Mills, 2016). Building on the success of animal assisted therapy in other contexts, visitation programs are being developed that bring dogs into the classroom, with this method increasingly being used with low ability readers (Booten, 2011; Fisher & Cozens, 2014; Paradise, 2007). Corresponding evidence that reading to a dog can significantly improve reading ability has been reported, but results are mixed. One study reported an improvement of 20% in the oral fluency scores of students (Smith, 2009). However, whilst these gains were statistically significant, the increase in reading speed of 8 words per minute was not a considerable increase as an outcome measure. Black (2009) also reported improvements in reading scores and an increase in reading rates. Both of the aforementioned studies used the Sit, Stay Read intervention on participants who had just started receiving the intervention, and so the full benefit of the program may not have been achieved and long-term results may differ (Smith, 2009). In a randomised control trial, children that underwent a 10 week Pets as Therapy reading programme

showed increased performance compared to a control group and groups that read to an adult and a teddy bear (Le Roux, Swartz & Swart, 2014). However, comparison of baseline abilities was not reported and may have been higher for the dog group (Hall et al. 2016).

In a review of research in this field, Hall et al. (2016) identified 48 studies of reading dog programs and classified their methodologies based on the Oxford Centre for Evidence-Based Medicine's (OCEBM) Levels of Evidence. The OCEBM provide a list of criteria researchers can use to assess the quality of evidence for therapeutic effects. They found that the majority of studies were classified at the lowest level (Level 5) due to failures in blind scoring and controlling for baseline scores, failing to use standardised measurements, and relying on reports from teachers or dog handlers, therefore introducing an increased likelihood of subjectivity in measurements. Many studies use age-equivalent reading scores as outcome measures, however, they provide only a very general estimation of a child's ability and can be very different to the child's chronological age without falling outside the normal range of performance (Connelly, 2013). Thus, despite a range of studies demonstrating positive effects of reading dogs, there remains a need for more scientifically robust assessments of this intervention.

In addition, research is required to explore the mechanisms by which any positive outcomes may occur. It has been suggested that the success of Animal Assisted Activities in schools is due to the fact that children tend to become less inhibited around animals and are positively affected by the stress-moderating effects of the animal's presence (Jalongo, Astorino & Bomboy, 2004). Feelings of increased psychological wellbeing, decreased stress and anxiety, reduced aggressive and hyperactive behaviours and increased motivation have been reported in reading dog studies (Jalongo, 2005; Kirnan, Siminerio & Wong, 2016; Kotrschal & Ortbauer, 2003). A diagrammatic framework outlining potential mechanisms of action provided by Hall et al (2016), proposes that positive outcomes are dependent initially on the student having a positive attitude to dogs, and include mood elevation, increased confidence and motivation and a decrease in stress and anxiety. Thus, exploring the students' experience and attitudes while reading to an adult versus a dog, rather than focusing on attainment alone, can provide crucial insights in to the mechanisms

by which observed benefits may occur and allow for more nuanced interventions to be developed.

As well as the methodological weakness of many studies in this area, research to date has largely focussed on the impact of reading dogs on reading attainment in primary-school aged children. Only one study to date has explored the effects of classroom visits by a therapy dog on reading performance of secondary school aged children, and this study found no effect of the intervention (Petersen 2008). However, the children interacted with the dog in an unstructured way rather than specifically reading to the dog, suggesting that any potential improvements may require structured reading time. Since reading enjoyment tends to decline with age, and secondary school students tend to be more self-conscious and negative about their reading than primary school children (Clark & Foster, 2005), secondary-aged students may benefit significantly from reading to a therapy dog because of the potential increased enjoyment and reduced stress derived from the dog's presence. Thus, the aim of this study was to compare the immediate effects of reading to a dog versus a teacher in an understudied population - secondary school students. Students were given four individual sessions where they read to a dog and to a teacher, each for five minutes, in a counterbalanced order. We adopted a mixed method approach, incorporating measures of emotional and motivational responses alongside observational measures of reading performance, to explore the potential differences experienced by the students when reading to a teacher versus a dog, and to gain insights in to the potential mechanisms by which differences may occur.

Method

Participants

20 individuals participated in the study, 14 males and 6 females, aged 11-12 years (Mean (M) = 11.45, Standard Deviation (SD) = 0.51). These participants were recruited from a Year 7 nurture class (a class created to provide extra support for students with additional educational and emotional needs) in a local mainstream secondary school in West Sussex, UK. All members of the class and their parents were given an information sheet detailing the nature of the study. Researchers confirmed with parents and students that potential participants were not allergic to

dogs and were not fearful of them. If students met these inclusion criteria, consent to participate in the study was obtained from the children and their parent/guardian. All students chose to fully participate in the study, with the exception of two students who did not wish to be recorded reading but participated in all other aspects of the study.

Students were placed in the class because they had lower-than-average academic attainment. Additional learning difficulties and mental health issues were experienced by some students, with some students experiencing multiple conditions (Autistic Spectrum Condition $N = 1$, Dyslexia $N = 5$, High Anxiety $N = 2$, Cystic Fibrosis $N = 1$, Down Syndrome $N = 1$, Social, Emotional and Mental Health Needs $N = 6$). In the school, reading age is tested using Renaissance Learning's STAR Reader test (Renaissance Learning, 2017), a computer-adaptive assessment of reading comprehension providing a measure of reading age. The mean reading age of participants was 8.06 ($SD = 0.91$). This is below expected levels for students of this age because their reading age should match or exceed their chronological age (Ellis, McDougall & Monk, 1996). The test also provides an upper and lower bound for each individual to choose their books from (class average $M = 2.61 - 3.75$, $SD = 0.52 - 0.75$).

The Reading Dog

The therapy dog used in the present study was a small, one-year old, Jack Russell-Poodle cross breed, owned by OB. The therapy dog had passed the Pets as Therapy assessment that tested her temperament and behaviour when meeting new people, and her ability to follow commands, such as "sit", "settle", and "stay". She was familiar with children and young people, having visited a number of different establishments in her therapy dog role.

The Teacher

OB, was employed as a teaching assistant in the school and so was known to the students. The students read to OB in the familiar adult condition and she handled the therapy dog in the reading dog condition. As such, OB is referred to as the teacher (rather than the researcher) throughout the paper to reflect her existing role with the children in the study.

Ethics

This study was approved by the University of Portsmouth's Science Faculty Ethics Committee and the study adhered to BPS and ASAB guidelines. The study involves the participation and video-recording of students under 18-years old, thus consent was obtained from parents and the students. 'Accessible' consent forms were generated for participants and carefully explained by the researcher to ensure that participants could understand the language used and were able to give informed consent. Consideration was also given to the welfare of the therapy dog. The therapy dog was involved in the study for a maximum of two hours per day. As her registered handler, OB was able to monitor her for any signs of discomfort or distress, and if they were to have occurred (no signs of stress were observed), the session would have ended.

Reading Materials

For the first three sessions, students could choose any book from their reading range, determined by the Renaissance Learning's STAR reading test. All students were at the same reading level, so for the final, recorded session that assessed reading performance, two books deemed highly comparable were used for all participants. The books selected for the final sessions were "The Slightly Annoying Elephant" (2013) and "The Queen's Orangutan" (2015), both written by David Walliams and Tony Ross. They had STAR reader levels of 3.1 and 3.9 respectively, were written and laid out in a similar style, and comparable with one another in difficulty. The books were randomly assigned to either the dog or adult condition on an equal weighting.

Procedure

Prior to the start of the reading sessions, the therapy dog was brought into the school to allow students to meet her and familiarise themselves with her. Initially, she visited for three, hour-long sessions and during this time she was used for a dog safety lesson, for whole class reading, and to be present in the class whilst the students worked on other tasks. The class teacher also delivered a preparatory lesson educating the participants about the meaning of different emotion words to ensure that the students would be able to understand them when they were presented with the emotion word selection task later in the study.

Due to conflicting activities in the school, a variety of different locations were used, however the experimental set up remained the same. The rooms used for reading were all quiet and provided a space for the student to read unobserved by others. During the dog condition, OB wore noise cancelling headphones (Bose Quietcomfort® 25 Wireless Headphones II) to ensure the students' reading was not audible. This was explained to the children. OB averted her gaze and did not react to the reading. When reading to the dog, the students were given the choice of sitting next to her on her cushion, on a chair, or having the dog on the chair next to them (Figure 1a). The participant sat next to the teacher (OB) for the reading to an adult condition (Figure 1b). The interval between reading to the two audiences was approximately five minutes. In all sessions, an Apple iPad (3rd Generation) on a tripod was positioned 1.5m from where the student sat but only the final sessions of reading to the human and to the dog were recorded to assess reading ability. This was to allow students to adjust to the experimental procedure in previous sessions and to allow any improvements observed when reading to the dog to become apparent as these may not be evident on the first session.

	Session 1		Session 2		Session 3		Session 4	
A	1 st dog	Then adult	1 st dog	Then adult	1 st adult	Then dog	1 st adult	Then dog
B	1 st adult	Then dog	1 st adult	Then dog	1 st dog	Then adult	1 st dog	Then adult
<i>Attitude to reading questionnaire</i>			<i>Emotion checklist 1</i>	<i>Emotion checklist 2</i>			<i>Attitude to Reading 2</i>	<i>Written Feedback</i>

Figure 1. Order of experimental procedure (including counterbalancing of groups).

At the start of the first reading session, an “Attitudes to Reading” questionnaire was administered to all participants. This questionnaire was developed by the National Foundation for Educational Research (Sainsbury & Schagen, 2004) to assess attitudes towards different aspects of reading, including reading silently or out loud, reading support and interest in different genres. Students were read the questionnaire before they completed it, so that difficulties reading the questionnaire would be less likely to limit their ability to answer accurately. Participants were then randomly assigned to Group A or B, which determined the order of reading audience

in the sessions. Students were taken out of the class individually and given four sessions over three weeks: two sessions in the first week, a gap of one week due to previously organised events within the school, and then two more sessions in the final week. During each session the students read to both the therapy dog and to the teacher (OB) for a period of five minutes. The order of reading audience was counterbalanced, so each student read to the dog first for two sessions and the teacher first for two sessions (Figure 2).

Please circle the words that describe how you feel when you read to an adult.				
Confident	Upset	Interested	Helpless	Accepted
Irritated	Aggressive	Embarrassed	Important	Clever
Cheerful	Cross	Calm	Worried	Bored
Determined	Disappointed	Unsure	Brave	Lucky
Annoyed	Enthusiastic	Tense	Encouraged	Comfortable

Figure 2. Emotion word checklist.

In the second experimental reading session, they completed the Emotional Word Checklist (adapted by the research team from PsychPage.com List of Feeling words). After reading to the first audience, participants were presented with the checklist, that consisted of 25 emotion words (13 positive and 12 negative, identified a potentially relevant to the experience by the research team), and were told they could select as many emotion words as they wanted to in order to describe how they felt after reading to the adult/dog. This was to ensure that they did not feel their choices were constrained to a specific number or that they had to select more words to meet the desired number. The participants then read to the next audience (dog or adult) and repeated the Emotion Word Checklist.

In the third session, they completed the Attitude to Reading questionnaire twice, once after each condition. In the final session, reading performance was recorded for subsequent coding and analysis. A series of open-ended questions were developed by the research team to gain qualitative feedback about the experience of reading to the dog. At the end of the final session, participants provided written

responses to the questions: "Can you tell us about reading to the dog? What were the good things and the bad things? How did it make you feel?".

Behavioural and Data Analysis

Reading aloud performance was assessed using a coding scheme based on previous research (Let's Read Aloud!, 2015). The section of screen where the dog or teacher was positioned was obscured during coding so that the reading performance was coded blind. Four superordinate measures: fluency, intonation, pacing and physical behaviour were identified and a series of subordinate measures within these categories were scored on a 4-point Likert scale (see Table 1). A score of 1 indicated poor performance at each component, giving a potential range of scores between 9 and 36. All videos were second coded and inter-rater reliability was high (Spearman's Rank correlation: $r_{s\ 34} = 0.94$, $p < 0.001$). The participants' scores were compared across conditions (dog vs. adult) using a paired samples t test. A chi squared test of association assessed whether there was a significant difference between the total number of positive and negative emotion words selected after reading to the two audiences. Binomial tests were then performed to compare the number of positive or negative emotion words generated for each condition.

The scores for the reading attitude questionnaire were summed for each condition (pre-study, after dog, and after adult), including reverse scoring negatively-worded questions. Responses that indicated a positive attitude to reading were scored 2, "not sure" was scored 1 and negative answers were scored 0. Total scores could range between 0 to 36. Lastly, the participants' qualitative reports of the experience of reading to the dog were assessed using a thematic analysis (Braun & Clarke, 2006) and were grouped together based on emerging similarities through the process of clustering (Miles & Huberman, 1994). Where appropriate, effect sizes were calculated using Cohen's d and are defined as small (0.2-0.5), medium (0.5-0.8) and large (0.8+) as classified by Cohen (1992). Relative Risk (RR) was calculated as a measure of effect size for Chi Square and binomial calculations of emotion word choice. When comparing the number of positive and negative words selected using the Chi Square test, this analysis provides a measure of how many times more likely it is that a positive word will be selected for the dog condition compared to the adult condition. For the two binomial probability calculations, the

figure reflects the relative chance of a negative and a positive word referring to reading to the dog (rather than reading to the teacher)

Results

Quantitative Results

Participants' reading aloud scores were significantly higher when they read to the dog ($M = 24.78$, $SD = 6.10$) than when they read to the adult ($M = 21.28$, $SD = 5.63$), $t_{17} = 12.3$, $p < 0.01$, $d = 0.5$ (See Figure 3a). A number of differences emerged between the two conditions when the subordinate measures (Fluency, Pacing, Intonation, Physical Behaviour) of the reading aloud assessment were analysed individually (See Figure 3b). The students read significantly more fluently to the dog ($M = 11.50$, $SD = 2.62$) than to the adult ($M = 10.22$, $SD = 2.73$), $t_{17} = -2.39$, $p = 0.03$, $d = 0.48$. They were significantly better at pacing their reading speed when reading to the dog ($M = 5.00$, $SD = 1.68$) compared to the adult ($M = 4.39$, $SD = 1.38$), $t_{17} = -2.37$, $p = 0.03$, $d = 0.39$. Students also had significantly better physical behaviour, measured by "confidence and posture" and "reading enjoyment", when reading to the dog ($M = 6.06$, $SD = 1.51$) compared to the adult ($M = 4.78$, $SD = 1.35$), $t_{17} = 2.80$, $p = 0.01$, $d = 0.89$. The difference between the two groups on the measure of intonation approached significance (Dog: $M = 2.22$, $SD = 1.31$; Adult: $M = 1.89$, $SD = 1.13$) $t_{17} = -2.06$, $p = 0.055$, $d = 0.91$.

Figure 3. Mean scores (± 1 SE) for participants on the reading aloud assessment when reading to a dog and to an adult. **a.** Overall scores. **b.** Scores for the superordinate themes in the reading aloud assessment. * $p < 0.05$, ** $p < 0.01$.

There was a significant difference in the number of positive versus negative words selected after reading to the dog compared to the adult, $\chi^2_1 = 56.79$, $p < 0.0001$, $RR = 2.1$ (see Figure 4). Participants were 2.1 times more likely to choose a positive word in response to the dog condition than the adult condition with 42% of words chosen to describe the experience of reading to the adult being positive and 88.71% of responses to the dog condition being positive. Thus, significantly greater number of negative emotion words were chosen after reading to the adult (64) compared to the dog (14), $N = 78$, $K = 14$, $p < 0.001$, $RR = 0.09$, and a greater number of positive emotion words were chosen after reading to the dog (110) compared to the adult (47), $N = 158$, $K = 110$, $p < 0.001$, $RR = 1.40$. There was no significant difference between attitude to reading scores at baseline, after reading to the dog and after reading to an adult, $F_{2,38} = 0.33$, $p = 0.72$, (Baseline $M = 20.95$, $SD = 5.92$; Adult $M = 21.20$, $SD = 8.22$; Dog $M = 21.85$, $SD = 6.71$). There was also no difference in participants' preference for reading silently or aloud at baseline, after reading to a dog or after reading to an adult, $\chi^2_4 = 7.18$, $p = 0.13$ (Figure 5).

Figure 4. Frequency of **a.** positive and **b.** negative emotion words selection after reading to an adult and dog.

Figure 5. The frequency of participants' preference for reading silently or aloud at baseline and after reading to the adult and dog.

Qualitative Results and Discussion

The themes, subordinate categories and direct quotes from the written feedback can be found in Table 2. The narratives provided have been corrected for spelling but otherwise have been reported verbatim.

Table 1. Behavioural coding table for reading aloud performance

Superordinate measure	Subordinate measure	Score			
		4	3	2	1
Fluency & Accuracy	Pronunciation	Words are properly pronounced.	Nearly all words are properly pronounced.	Pronounces most words properly.	Makes significant errors in pronunciation.
	Stumbling	No hesitation, repetition or stumbling.	Little hesitation or stumbling.	Some hesitation or stumbling.	Frequent hesitation or stumbling.
	Phrasing	Phrases are spoken as a group of words that go together.	Phrases are spoken in a meaningful way.	May break some phrases improperly.	Calls out words individually.
	Punctuation	Pays attention to punctuation, rhythm and rhyme.	Pays attention to punctuation, but not as much to rhythm and rhyme.	May make some errors in punctuation that affect reading.	Pays little attention to punctuation or phrasing.
	General Pace	Reads at talking pace.	Mostly reads at talking pace.	Frequently reads too fast or too slowly.	Reads too fast or too slowly.
Pacing	Variety of Pace	Varies pace to enhance mood or meaning.	Some attempt to vary pacing to enhance mood.	Little attempt to vary pacing.	No attempt to vary pacing.
Intonation & Expression		Changes level and pitch of voice to enhance mood or meaning.	Some good attempts to vary both pitch <u>and</u> voice level.	Some attempt to vary pitch <u>or</u> voice level.	No attempt to vary level or pitch.
Physical Behaviour	Confidence and Posture	Looks very relaxed and confident. Sits up straight on chair.	Looks relaxed and confident. Sometimes sits up straight on chair.	Rarely looks relaxed and confident. Mainly slouched but occasionally sits up straight.	Looks very unconfident and unrelaxed. Mainly slouched in chair.
	Enjoyment	Appears to be greatly enjoying reading. Smiles often.	Appears to be moderately enjoying reading.	Appears to be ambivalent about reading/neutral.	Appears to be intensely disliking reading.

Emotional Benefits

- Calm

A common thread through the participants' narrative was both the implicit and explicit references to the emotional benefits from reading to the dog. For example, "*Tallulah makes me feel calm and relaxed*" (Participant 17) and "*I liked reading to Tallulah because it made me feel calm unlike when I read to an adult*" (Participant 1). The words "calm" or "relaxed" were mentioned by 11 (55%) of the participants, demonstrating that this was a particularly salient effect of reading to the dog. This calming effect has also been noted in previous literature for a range of demographics (Hall et al., 2016) and "calm" was the most frequent selection in the emotion word selection task after reading to the dog in this study. Students in the present sample are of low ability and find the prospect of reading aloud stressful, yet they reported experiencing the opposite effect when reading to a therapy dog. This may be attributed to the "non-threatening and socially supportive atmosphere" (Wohlfath et al, 2014, p. 61) of reading to the dog. The reported relaxation effects were further supported by the more relaxed body language and posture, and signs of enjoyment, observed in the reading assessment when reading to the dog.

- Happy

Feelings of happiness experienced when reading to the dog was also reported by six (30%) participants. As one participant expressed: '*When Tallulah is in the room I feel really happy and 10 times better*' (Participant 5). Like the calming effects previously discussed, the happiness that participants reported seemed to mediate the stressful event of reading aloud.

- Fun/Enjoyment

Six participants (30%) report feelings of fun and enjoyment from reading to the dog. Participants expressed that reading to the dog was '*fun and exciting*' (Participant 13) and '*very fun and enjoyable*' (Participant 16). Reading to a dog is an unusual activity in school, and an alternative to normal methods of learning, and this may have contributed to the feeling of fun reported by the students. It may also produce an increase in the participants' intrinsic motivation to read, a key component in improved academic ability (Logan, Medford & Hughes, 2011).

The therapy dog herself

- The dog listening

The participants appreciated that the reading dog was specially trained and qualified for this purpose. Dogs are particularly well adapted to this type of therapy, as they are trainable, relaxed and respond to the attention they are given (Cole & Howard, 2013). Four students (20%) referred to her ability to listen as an important attribute (*"I felt she listens to me"* – Participant 1; *"She listens very well"* – Participant 10).

Participants reported that the therapy dog was actually listening to them read which is interesting because it may have been assumed that secondary school-aged children would be sceptical that she could actually listen. It may be that participants actually believed she was listening or that she looked as if she could be listening, or even that they were biased in their responses to agree with the instructions that told them that she would be listening. Regardless of the underlying reason for reporting this, this feedback demonstrates that secondary school-aged students are able to engage with reading to a calm, well-behaved dog.

- Physical appearance and behaviour

Eight students (40%) also mentioned physical characteristics about the therapy dog, such as she has a *"cute face"* (Participant 2) and that her *"ears are cute, eyes are pretty"* (Participant 13). The participants seemed to be greatly influenced by the physical attributes of the dog that makes her "cute". They also mentioned behaviours that the dog has been taught, including her tricks that they were shown during the introductory sessions. These sessions were designed so that the participants could become familiar with her, but they seem to have also created a strong affection for her.

- Lack of Criticism

The students seemed to particularly enjoy the fact that the therapy dog was unable to criticise or judge their reading ability. For example, one student wrote *"she doesn't tell me off if I read a bit wrong"* (Participant 2), and another expressed this using the slang *"she doesn't burn you if you get the word wrong"* (Participant 10). When checked with the participant afterwards, he clarified that the word "burn" meant "tell off". This comment was made by five participants (25%) suggesting they were particularly concerned with being negatively judged or criticised when reading. This

finding is supported by the selection of negative emotion words by participants in the reading to a teacher condition. When reading to adults, children are likely to feel anxious and frustrated, and this negatively impacts their reading ability (Davidson, 2015), creating a cycle that reinforces the young persons' beliefs that reading is traumatic and they are not very good at it. If the person in question does not feel like they are being judged when they are reading, however, this cycle may be broken, leading to improvements in attitudes, emotion and motivation.

Attitude to Reading

Reading to the therapy dog seemed to change the participants' attitude to reading. It impacted their self-perception of their reading ability (mentioned by four students, 20%), such as Participant 17 who felt that since reading to the dog "*I can read better*". The non-critical listening by the dog may be a factor that encourages the student to relax and begin to enjoy reading (Friesen, 2010), rather than reading being yet another activity that they face criticism and assessment in. If the student believed that they were reading better, they may be more motivated to read more often in future and to challenge themselves with their reading material. Since many students experienced reading to the therapy dog as fun and relaxing, a positive feedback process seemed to occur whereby each positive experience they had reading to the dog made them more willing to read to her in future. Indeed, Participant 17 reported that "*I would love to read to her once or twice a week*". An increased level of motivation to read was reported by participants, supporting Jalongo's (2005) ideas that reading to dogs builds motivation and focus. This increased confidence and self-efficacy could have a positive effect on the students, as it may encourage development by motivating them to tackle more challenges (Bandura, 1982).

What was not so good

To encourage participants to be honest in their feedback, they were also asked what the bad things were about reading to the dog. Even with this attempt to allow participants to voice any negative opinions, most participants (17 participants, 85%) did not have any disadvantages to report or explicitly reported that there were "*no bad things about it*" (Participant 11). Other respondents indicated that there was "*not enough time*" (Participant 18). However, some participants expressed some negative

experiences, mainly referring to the fact that they still felt self-conscious. One participant said that “*when I first read to [the dog] I was nervous because I thought that [the adult] was listening*” (Participant 5) and another said that “*it sometimes makes me nervous of the way I speak*” (Participant 18). So, while it seems that most students reported that reading to the dog removed their worries of being judged, this fear remained for some students.

General Discussion

The aim of the present study was to extend previous research by assessing the differences in reading aloud performance and participant experience of secondary school-aged students when reading aloud to a therapy dog versus to a teacher. It was found that students’ reading performance was significantly better when reading to the dog compared with reading to a teacher. Reading to the dog also produced more positive emotional reports and the written feedback regarding the experience was overwhelmingly positive. However, there was no significant difference in the attitude to reading questionnaire when comparing students’ scores after reading to the dog to those pre-study and after reading to an adult.

The improvement to reading aloud performance when the students read to the dog supports previous studies showing attainment improvements (Fisher & Cozens, 2014; Kirnan et al., 2016; Paradise, 2007). When the results between the subordinate measures on the reading aloud assessment were analysed individually, participants’ fluency and accuracy, pacing, and physical behaviour were all better when reading to the dog, supporting previous studies showing improvements in different aspects of reading performance (Black, 2009; Intermountain Therapy Animals, 2009; Smith, 2009). However, there was no significant difference between scores for intonation, possibly because the low reading ability of the students meant they were not able change their intonation yet due to poor decoding skills (Benjamin & Schwanenflugel, 2010). These results are particularly notable due to the short-term nature of the study; reading performance was compared after only three 5-minute sessions of reading to the dog, spread over three weeks, suggesting that improvements in reading performance when reading to a dog occur very quickly and may be immediate. The presence of the camera and OB as the dog handler, while

necessary, could have ameliorated the effects of reading to the dog and made students feel more self-conscious. For the majority of students, it did not seem to affect their performance or emotional reports but the presence of OB was mentioned by two participants in the qualitative feedback. Despite these potential limitations, significant benefits of reading to a dog compared to reading to an adult were seen and provide insights in to the underlying mechanisms that might give rise to these benefits.

Participants also reported experiencing significantly more positive emotions and significantly less negative emotions when reading to the dog versus the teacher, extending similar findings from primary school children (Davison, 2015; Jalongo, Astorino & Bomboy, 2004). By directly comparing the two conditions in a repeated measures design, with only 5 minutes between each condition, the difference in emotional experience for an individual when reading to the dog versus the teacher could be clearly established. These results are supported by the qualitative data analysis, in which a number of themes highlighting the positive emotional benefits experienced when reading to the dog, including feeling calm, happy and more motivated to read. Our protocol also addresses previous criticisms of research in this field by providing a clear control condition (reading to a teacher), utilising a repeated methods design to remove issues of baseline variation in performance, reporting demographic information about the students, using statistical tests with effect sizes, and ensuring observational data is blind-coded and assessed for inter-observer reliability.

Results show that secondary school students can derive immediate emotional, motivational and performance benefits from reading to a therapy dog and the study provides some insights in to psychological mechanisms underpinning these observed benefits. Possible explanations for these benefits could include the novelty and excitement of having the reading dog as a change from standard lessons, students feeling special that they have this opportunity, forming an emotional relationship with the dog, or the relaxation effects of physically touching a dog (Davison, 2015). Further research could profitably attempt to distinguish between and assess how different factors contribute to the beneficial effect of reading to a therapy dog in a larger sample size of secondary-aged students of different ages and

abilities (Hall et al., 2016). Combining assessment of the immediate effects of reading to a dog with a longer-term intervention study would allow researchers to determine if immediate effects such as enjoyment and increased motivation and performance are maintained.

Despite 25% of students reporting an increased motivation to read in the qualitative feedback, no significant improvement in the participants' Attitude to Reading scores was observed after reading to the dog. There are several possible reasons for this discrepancy, the questionnaire may have lacked discriminative power by only having the responses of 'yes' or 'no' and it may be that a more nuanced Likert scale would have provided answers that more closely matched their written feedback. Similarly, asking the students whether they preferred reading aloud or to themselves was a forced choice that may not have been sensitive to improvements in attitudes to reading aloud. Instead, future studies should ask students to rate how much they enjoy reading aloud and to themselves on two separate scales. It may also be the case that the short series of four 5-minute sessions did not significantly change their attitudes, or that repeating the questionnaire three times meant participants became bored and answered inaccurately. The sample size was small due to the availability of the students involved in the study and it would have been beneficial to assess the effects of therapy dogs with a more homogenous sample (the present study included students with a range of different learning difficulties and emotional needs).

In conclusion, this study has identified a range of beneficial outcomes of reading to a dog for the secondary school students investigated. That positive results were evidenced in this short-term study supports the argument that the benefits to reading performance and emotional-wellbeing are direct and immediate. Previous national surveys have found correlations between children's reading enjoyment and their reading attainment (Clark, 2014) and the results of this study show both a range of positive emotions associated with reading to dogs as well as improved reading performance. Results of this preliminary study therefore suggest that the benefits of reading to a dog that have been reported for younger children can also be experienced by low attainment secondary school aged children.

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