Gender differences in reading ability and attitudes

Journal of Research in Reading, ISSN 0141-0423 *DOI: 10.1111/j.1467-9817.2008.01389.x*
Volume 32, Issue 2, 2009, pp 199–214

Gender differences in reading ability and attitudes: examining where these differences lie

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The aim of this study was to investigate gender differences in the relationship between reading ability, frequency of reading and attitudes and beliefs relating to reading and school. Two hundred and thirty-two 10-year-old children (117 male) completed a reading comprehension test and a questionnaire exploring the following areas: frequency of reading, attitude to reading, attitude to school, competency beliefs and perceived academic support (from peers and teacher). Overall, girls had better reading comprehension, read more frequently and had a more positive attitude to reading and school. However, smaller gender differences were found in reading ability than in attitudes and frequency of reading. Indeed, effect sizes for gender differences in reading were found to be small in this and other studies. Reading ability correlated with both boys' and girls' reading frequency and competency beliefs; however, only boys' reading ability was associated with their attitude to reading and school. Notably, gender differences were found predominantly in the relationship between factors, rather than solely in the factors themselves. Previous research has neglected to study these relationships, and has focused instead on the gender differences found in individual factors. Conclusions are made regarding the applicability of these findings to the school situation.

Attitude to reading is an important factor that is likely to influence children's regularity of independent reading, their level of involvement in class reading activities, the variety and range of reading topics chosen, their enjoyment of reading and possibly their reading achievement. Attitude to reading has been defined as 'a state of mind, accompanied by feelings and emotions, that make reading more or less probable' (Smith, 1990, p. 215), or alternatively as 'a system of feelings related to reading which causes the learner to approach or avoid a reading situation' (Alexander & Filler, 1976, p. 1). Both these reading-specific definitions of attitude assume that the more positive the attitude, the more likely one will engage in reading activities. Indeed, positive attitudes to reading have consistently been found to be associated with higher reading achievement (McKenna, Kear & Ellsworth, 1995) and more frequent reading (Sainsbury & Schagen, 2004). In addition, the development of a positive attitude to reading has been associated with sustained reading throughout the lifespan (Cullinan, 1987). This last point highlights the importance of fostering positive attitudes to reading while children are still in school.

Numerous studies have been conducted to measure children's attitudes to reading (Askov & Fischbach, 1973; Coles & Hall, 2002; Hall & Coles, 1999; Kush & Watkins, 1996; McKenna et al., 1995; Parker & Paradis, 1986; Quinn & Jadav, 1987; Sainsbury & Schagen, 2004; Smith, 1990; Twist, Gnaldi, Schagen & Morrison, 2004). In addition to educational and cognitive factors, there have been found to be numerous social, behavioural and environmental factors that influence a child's level of reading activity and achievement, and their overall enjoyment and success in school. These factors include motivation (Baker & Wigfield, 1999; Gottfried, 1990; Morgan & Fuchs, 2007; Wigfield & Guthrie, 1997), competency beliefs (Chapman & Tunmer, 1995, 1997; Wigfield et al., 1997), self-esteem (Davies & Brember, 1999), peer influences and relationships (Alloway & Gilbert, 1997; Henry & Rickman, 2007; Stowe, Arnold & Ortiz, 2000), competing alternatives to reading (Mckenna et al., 1995), interest and attitude towards school and reading (McKenna et al., 1995; Millard, 1997a, 1997b; Sainsbury & Schagen, 2004), family history (Conlon, Zimmer-Gembeck, Creed & Tucker, 2006), home literacy environment (Van Steensel, 2006), perceptions of reading (Archer & Macrae, 1991; Millard, 1997a, 1997b), school and reading curriculum (Coles & Hall, 2002), style of teaching (Alloway & Gilbert, 1997), personality (Alloway & Gilbert, 1997) and school resources (Coles & Hall, 2002).

Gender differences in reading ability and attitudes to reading

A consistent finding across the literature is that girls have a more positive attitude to recreational reading than boys (Askov & Fischbach, 1973; Coles & Hall, 2002; Hall & Coles, 1999; Kush & Watkins, 1996; McKenna et al., 1995; Sainsbury & Schagen, 2004; Smith, 1990). This gender difference has been found to span a wide range of school age groups (Kush & Watkins, 1996; McKenna et al., 1995; Sainsbury & Schagen, 2004; Smith, 1990), and also widen with increasing age (McKenna et al., 1995). In addition, there is evidence that for both boys and girls, attitudes to reading become more negative as children get older (Kush & Watkins, 1996; McKenna et al., 1995; Sainsbury & Schagen, 2004), although girls' attitudes have been found to be more stable across time (Kush & Watkins, 1996). Girls and boys also tend to differ in their reading preferences, habits and reading interests (Hall & Coles, 1999). Girls also read more than boys (Coles & Hall, 2002; Hall & Coles, 1999; Millard, 1997a, 1997b) and have better reading ability (Department for Children, Schools and Families [DCSF], 2007a, 2007b, 2007c; Mullis, Martin, Gonzalez & Kennedy, 2003; Mullis, Martin, Kennedy & Foy, 2007). Perhaps this higher frequency of reading and better reading ability could be an explanation for girls' more positive attitudes to reading. Indeed, a relationship between ability and attitude to recreational reading has been found, and has been shown to grow stronger over time (McKenna et al., 1995).

The relationship between reading ability and attitude to reading

In fact, many studies have shown that there is an association between reading ability and attitude towards reading. In an international study, Mullis et al. (2003, 2007) illustrated that, on average, students with high positive attitudes to reading have substantially higher average reading achievement than those with lower attitudes to reading. McKenna et al.

(1995), through a cross-sectional study of children in Grades 1–6, found that the strength of the association between ability and attitude to recreational reading grows stronger over time. In addition, Askov and Fischbach (1973) measured attitudes towards recreational reading with the word reading and paragraph meaning subtests of the Stanford Achievement tests, and found a relationship between attitude and paragraph meaning but not with word reading. Consistent with McKenna et al. (1995), the relationship between attitude and ability was found to grow stronger over time. One possible explanation for this strengthening association between attitude to reading and ability could be that if children receive constant and consistent feedback from their reading experiences, this feedback will intensify over time, resulting in more strongly reinforced positive or negative perceptions of reading. For example, if a child is poor at reading, and their experiences of reading are continually frustrating and negative, this will eventually lead to the belief that the inevitable result of reading is frustration. It follows then that children who are better readers will read more frequently (as it is an activity they are more likely to enjoy). However, there is little research studying the relationship between reading ability, frequency of reading and attitude, as studies either focus on reading ability and attitudes to reading (Askov & Fischbach, 1973; McKenna et al., 1995) or frequency of reading and attitudes to reading (Sainsbury & Schagen, 2004).

The role of other factors

As outlined, there are a multitude of factors that are already known to be related to a child's achievement in school. In addition to attitudes to reading, this study focuses on three other factors: attitude to school, competency beliefs and perceived academic support. These areas have been somewhat neglected in past research (with the exception of competency beliefs), yet may provide valuable insights into the source of gender differences in ability and attitudes. In addition, these areas are likely to affect classroom performance, which may impact on overall achievement in school.

Attitude to school

While there are few studies directly examining attitudes to school and its relation to reading ability, it is likely that the two are causally related. The ability to read opens a gateway to success in many other areas of school, as most school subjects rely to varying degrees on reading ability. Indeed, once children have mastered this fundamental skill, they will accomplish many tasks more easily, which may in turn lead to more enjoyment from school. It is often speculated that girls have a more positive attitude to school due to the nature of the school environment, and that the rules and restrictions imposed in schools are unfavourable to boys (Alloway & Gilbert, 1997; Daniels, Creese, Hey, Leonard & Smith, 2001). Research with primary-aged children has found that boys have more difficulty being 'good' pupils; those who listen, watch, sit quietly, read and write well are good group members and are unlikely to challenge teachers' ideas (Bank, Biddle & Good, 1980). As a consequence, boys are more likely to be treated in a negative light by the teacher and are more likely to develop negative attitudes towards school (Berk, Rose & Stewart, 1970). Indeed, studies have found that during primary school, boys are more disruptive and aggressive (Crick & Grotpeter, 1995) and are less attentive in class (Samuels & Turnure, 1974). In addition, boys are four times more likely than girls not to

do homework, and 71% of all school suspensions and 90% of all disciplinary actions are in response to infractions by boys (Wiens, 2006). These characteristics conflict with what teachers deem to be 'good' qualities necessary for being successful in school.

Competency beliefs

Competency beliefs refer to estimates of how good one is at a given activity. Chapman and Tunmer (1997) found that the correlation between children's self-concept of their reading ability and their actual reading ability grows stronger over time, indicating that they have better awareness of their reading ability as they grow older. Beliefs in one's ability may affect self-esteem, which in turn has been found to correlate with the successful functioning of an individual (Burnett, 1996). Davies and Brember (1999) have found that overall boys have significantly higher global self-esteem, while Burnett (1996) found that boys are more confident about their physical and mathematics abilities, while girls are more confident about their reading abilities. This is consistent with Hall and Coles (1999), who found that girls perceive themselves to be better readers than boys. Finally, Mullis et al. (2003, 2007) showed that children's reading self-concept was broadly associated with their reading ability. It may be that competency beliefs are causally related to reading ability; as children experience success or failure in reading, this is likely to elicit positive or negative beliefs in their ability.

Academic support networks

It is argued that girls are more likely to cooperate with each other and the teacher but that boys prefer independence, to work alone, and are often more competitive than girls (Daniels et al., 2001). While little research has been carried out looking at academic support networks within the classroom, it is likely that having a reliable source (i.e. teacher or peers) to help with academic difficulties may be beneficial for growth and achievement in school. Indeed, Henry and Rickman (2007) found that for children just starting school, the ability level of a child's peers in the classroom has direct effects on their cognitive, prereading and expressive language skills. In addition, Share, Jorm, Maclean and Matthews (1984) found that the ability level of a child's peers accounts for considerable variance in the child's later reading achievement, over and above their own ability.

The issue of boys' underachievement

Mullis et al. (2003, 2007) highlight very clearly that boys' underachievement crosses both cultural and language barriers. Regardless of writing system, or even educational system, boys consistently perform more poorly, on average, on measures of reading comprehension. In national literacy tests in British schools (conducted at approximately age 7 [Key Stage 1], age 11 [Key Stage 2] and age 14 [Key Stage 3]), girls consistently outperform boys, with a higher number reaching the standard expected for their age group in reading (DCSF, 2007a, 2007b, 2007c). This is also the case for other aspects of literacy, including writing (assessed in Key Stages 1, 2 and 3) and speaking and listening (assessed in Key Stage 1). Possible reasons for boys' underachievement have been addressed, and it has been suggested that the English primary school curriculum may be biased towards girls' reading interests (Coles & Hall, 2002). Others have suggested that

the whole teaching profession is feminised, with more female teachers in primary schools teaching reading, which unintentionally gives the appearance that reading is more commonly associated with females (Millard, 1997b). In order to investigate boys' underachievement in reading, it is important to understand the magnitude of the problem and the factors that may be associated with poor reading achievement.

The aim of this study is to investigate gender differences in factors which may influence ability and achievement in school, and examine these as possible contributors to differences in reading ability. It is predicted that in between-group comparisons, girls will have better reading ability and a more positive attitude to reading and school. It is also predicted that girls will have more positive beliefs in their ability, and a higher level of perceived academic support. In addition, reading ability is predicted to correlate with both attitude to reading and frequency of reading, for both boys and girls. A particular focus of attention will be an examination of the magnitude of any differences between boys and girls to assess whether these are large enough to be of practical importance in the classroom.

Method

Participants

Two hundred and thirty-two children (117 boys, 115 girls) from eight different primary schools took part in this study. These schools were located in a range of low to high socioeconomic status areas. Percentage of free school meals was taken as an index of SES; this ranged from 8.4% to 54% (average 23.1%). All schools were located in relatively highly populated areas and were within close proximity to a city centre (<5 miles). The average age of these children was 10 years 7 months (.35 *SD*). Their ages ranged from 10 years to 11 years 9 months, and children were tested at the end of their sixth year, or at the start of their seventh (final) year in primary school. All children had previously completed a test of reading ability (comprehension) on the same day as the questionnaire. All children had English as their first language. After the schools' participation in the study was granted by both the head teacher and class teacher of the schools, 2 weeks before the study the children were asked to take home a letter with a tear-off slip asking for parental consent. If parental consent was not given, the child was taken out of the class with a classroom assistant for the duration of the study. Approximately 90% of children's parents gave their consent and therefore their child participated in the study.

Test materials and procedure

Reading ability. *Group Reading Test II*: This test was chosen as it is a comprehensive test measuring word reading, comprehension and vocabulary, all of which are important elements for achievement in school. The Group Reading Test II 6-14 (Macmillan Test Unit, 2000) is a group administered test consisting of 45 items. Sentence Completion Forms C and D were used to assess reading via sentence completion, and to prevent copying, tests C and D were alternately given based on where the children were seated. The examiner read through the practice items with the children beforehand to ensure they understood the test. Testing was carried out in the children's classrooms and no time limit was imposed for completion of the test.

Questionnaire. The questionnaire was designed to obtain self-report measures of frequency of reading (one question), frequency of borrowing from library (one question), attitude to reading (five questions), attitude to school (five questions), competency beliefs (two questions) and perceived academic support (from peers and teacher) (two questions). An overview of these questions can be found in Appendix A, which shows the constructs derived from factor analysis. The full list of questionnaire items are in Appendix B. The questionnaire was devised so that it was easy to read and the vocabulary could be understood by children of this age group. Nevertheless, all the items on the questionnaire were read out so that reading ability did not affect completion. Each item was read one by one, allowing sufficient time for children to respond before the next item was read. After the introductory section, children were shown, by means of a practice question, how to use the 5-point Likert scale used in the questionnaire. Children were encouraged to use the full range of the Likert scale and to be as honest as possible when answering. All testing was carried out within the children's classroom.

Results

The results have been split into four sections: gender differences, correlations between all questionnaire areas, correlations with reading ability and correlations with frequency of reading.

Analysis of variance of gender differences

Reading comprehension. Girls were significantly better at reading, $F(1, 233) = 4.57$, $p < .05$. The effect size (partial η^2) was .01. See Table 1 for means and standard deviations.

Responses to introductory questions

Frequency of reading at home. Girls reported reading significantly more often than boys, $F(1, 231) = 22.60$, $p < .001$. The effect size was .09. See Table 1 for means and standard deviations.

Library use. Girls also reported borrowing books from the library more often than boys, $F(1, 231) = 22.51$, $p < .001$. The effect size was .09. See Table 1 for means and standard deviations.

Table 1. Gender differences in reading ability and responses to the introductory questions.

	Boys		Girls		Mean difference (gender)
	Mean	*SD*	Mean	*SD*	
Age (in decimal point)	10.62	0.37	10.60	0.34	
Reading comprehension (standardised score)	97.50	13.20	100.96	11.58	3.46
Reading frequency (1 = *low*, 5 = *high*)	3.21	1.39	4.00	1.12	0.79
Library use (1 = *low*, 5 = *high*)	2.48	0.12	3.31	0.13	0.83

Questionnaire responses

Factor analysis of questionnaire. As many of the variables were found to be correlated, a principal component analysis with Varimax (orthogonal) rotation was used to see what groupings the items in the questionnaire formed. This analysis gave rise to four different factors from the 14 items in the questionnaire (Table 2).

The questions loaded onto four factors, which are described as follows: attitude to school (ATS); attitude to reading (ATR); competency beliefs (CB) and support (peer and teacher) (SUP). Attitude to school refers to a child's enjoyment of school and how much they value its importance. Attitude to reading refers to a child's enjoyment of reading both within and outside of school. Competency beliefs refer to a child's perception of their reading ability and overall ability in school. Finally, support (peer and teacher) refers to the child's perception of the academic support they have in class from both their teacher and peers. These groupings were found to hold for both boys and girls separately. Therefore these factors were used in the subsequent analyses.

Reading ability was controlled for in the following analyses as girls had been found to score higher on the test of reading comprehension. It was considered that if they were found to have, for example, a more positive attitude to reading, this might merely reflect their higher performance in reading.

After controlling for reading ability, girls had a significantly more positive attitude to reading, $F(1, 227) = 10.13$, $p = .002$, and school, $F(1, 227) = 14.44$, $p < .001$. However, these differences were relatively small; the effect size was .04 for attitudes to reading and .06 for attitudes to school (Table 3).

Correlations between all factors identified in questionnaire

Also of interest was the strength of the relationships between all the factors measured in the questionnaire. Correlations (Pearson's *r*) were carried out before and after controlling

Table 2. Factor loadings for all questions.

Question	ATS	ATR	CB	SUP
Q1		**.73**		
Q3		**.71**		
Q8		**.71**		
Q11	.47	**.50**		
Q14		**.55**		
Q4	**.67**			
Q7	**.48**			
Q9	**.73**			
Q10	**.73**			
Q13	**.69**			
Q2				**.85**
Q5				**.51**
Q6			**.72**	
Q12			**.73**	

Notes: ATS = attitude to school; ATR = attitude to reading; CB = competency beliefs; SUP = perceived academic support (peer and teacher). Factor loadings $< .35$ are not presented. *Extraction method*: Principal component analysis. *Rotation method*: Varimax with Kaiser normalisation. Highest loading for each item is given in bold.

Table 3. Gender differences after controlling for reading ability (mean and standard deviation).

	Boys		Girls		Mean difference (gender)
	Mean	*SD*	Mean	*SD*	
Attitude to reading	3.02	.87	3.38	.86	.36
Attitude to school	3.09	.87	3.52	.86	.43
Competency beliefs	3.79	.97	3.58	.97	.21
Support (peer and teacher)	3.66	.97	3.81	.97	.15

Table 4. Correlations between questionnaire areas for boys and girls.

	Boys				Girls			
	ATR	ATS	CB	SUP	ATR	ATS	CB	SUP
ATR	–	.33**	.37**	.07	–	.43**	.28**	− .01
ATS	.37**	–	.47**	.27**	.43**	–	.25*	− .07
CB	.42**	.50**	–	.15	.27**	.24*	–	.04
SUP	.07	.27**	.14	–	− .00	− .07	.06	–

Notes: ATR = attitude to reading; ATS = attitude to school; CB = competency beliefs; SUP = support (peer and teacher). $N = 232$ for bivariate and partial correlation. Lower left quadrants show correlations before controlling for reading ability (bivariate Pearson's correlation). The upper right quadrants show correlations after controlling for reading ability (partial correlation).
*$p < .05$; **$p < .005$ (Bonferroni's correction).

for reading ability. Boys' and girls' scores were analysed separately to see if there were differences in the strength of the relationship between attitudes and beliefs regarding reading and school (Table 4).

Both boys and girls showed high correlations between all areas relating to internal thoughts and feelings (attitudes to reading, school and competency beliefs), but only boys' attitudes to school were significantly related to their perceived academic support (external source of influence).

The correlations were converted in a corresponding Fisher's z coefficient in order to see if there were significant differences between the boys' and girls' correlations. Before and after controlling for reading ability, boys were found to have significantly stronger correlations between attitude to school and competency beliefs, and attitude to school and perceived academic support than girls, $p < .01$. Before controlling for reading ability, the relationship between attitude to reading and competency beliefs was also stronger for boys than girls, $p < .01$.

Correlations between questionnaire factors and reading ability

Table 5 illustrates that, overall, reading ability correlated with frequency of reading, competency beliefs, attitude to reading and attitude to school; only support (peer and teacher) did not correlate with reading ability. However, when split by gender, only boys' reading ability correlated with attitude to reading and school. The correlations were converted in a corresponding Fisher's z coefficient in order to see if there were significant differences between the boys' and girls' correlations. There was a significant gender difference in the size of the correlation between attitude to reading and reading ability,

Table 5. Correlations between reading ability and questionnaire factors.

Reading ability	ATR	ATS	CB	SUP	Freq.
All	.22**	.17**	.32**	– .03	.32**
Boys	.29**	.22*	.29**	– .02	.24**
Girls	.07	.05	.37**	– .07	.39**

Note: ATR = attitude to reading; ATS = attitude to school; CB = competency beliefs; SUP = support (peer and teacher); Freq. = frequency of reading. $N = 232$, N boys = 117, N girls = 115.
*$p < .05$; **$p < .01$.

Table 6. Correlations between frequency of reading and questionnaire factors.

Reading activity	ATR	ATS	CB	SUP
All	.50**	.34**	.24**	.08
Boys	.44**	.30**	.32**	.10
Girls	.49**	.26**	.21*	.02

Note: ATR = attitude to reading; ATS = attitude to school; CB = competency beliefs; SUP = support (peer and teacher). $N = 232$, N boys = 117, N girls = 115.
*$p < .05$; **$p < .01$.

favouring boys. That is, the better the boys' reading comprehension, the more positive their attitude to reading, or vice versa; the more positive their attitude to reading, the better their reading comprehension. Girls showed no such correlation.

Correlations between questionnaire factors and frequency of reading

Table 6 illustrates that, overall, frequency of reading correlated most strongly with attitude to reading, followed by attitude to school and competency beliefs. There was no significant correlation between frequency of reading and perceived academic support. Boys and girls showed very similar associations, so the subsequent analyses are not split by sex. The correlations were converted in a corresponding Fisher's z coefficient in order to see if there were significant differences in the strength of these correlations, and it was found that the correlation between frequency of reading and attitude to reading was significantly stronger than the one between frequency of reading and attitude to school, $p < .01$.

Comparing Tables 5 and 6, both attitude to reading and attitude to school correlated significantly more strongly with frequency of reading than with reading ability, $p < .01$ (Fisher's z coefficient comparisons). While competency beliefs correlated more strongly with reading ability than reading frequency, this comparison was not significant.

Discussion

It was found that girls had better reading ability, read more frequently and had a more positive attitude to reading and school compared with boys. However, these differences, although significant, were relatively small. In addition, no significant gender differences were found in competency beliefs or perceived academic support from peers and teachers. Reading ability correlated with boys' attitudes to reading and school, but not those of girls, whereas reading ability correlated with both boys' and girls' frequency of

reading and competency beliefs. Boys' attitude to school was significantly more closely related with their competency beliefs and perceived academic support than for girls. In addition, before controlling for reading ability, boys' attitude to reading showed a significantly stronger association with their competency beliefs than it did for girls. While previous studies have focused on gender differences for specific factors (i.e. attitudes to reading), they have neglected to consider gender differences that may exist in the associations between such factors. Indeed, this study found that gender differences were more prominent in the association between factors, rather than solely in the factors themselves.

The results of this study are consistent with many other studies; gender differences favouring girls were found in reading ability (see also DCSF, 2007a, 2007b, 2007c; Mullis et al., 2003, 2007) and attitudes to reading (see also Coles & Hall, 2002; Hall & Coles, 1999; Kush & Watkins, 1996; McKenna et al., 1995; Sainsbury & Schagen, 2004). However, after examining the effect sizes for the reading ability and attitudes comparisons, it was clear that the magnitude of the gender difference in attitudes was greater than that in reading ability. Indeed, the significant advantage shown for girls in reading was relatively small. Therefore, it is important to consider whether findings such as these have any practical value in determining school practice or government policy.

In order to make comparisons between this study and other larger-scale studies on gender differences in reading ability, the partial η^2 effect sizes were converted into Cohen's d (Cohen, 1992), which can also be calculated from published means and standard deviations. Although government statistics for schools in England reveal gender differences in literacy (DCSF, 2007a, 2007b, 2007c), as children are categorised into bands of performance (i.e. Levels 1–4), no comparison relying on a normal distribution curve for the sample can be carried out. However, this analysis could be carried out on the international studies carried out by Mullis et al. (2003, 2007), which found that girls had better reading comprehension than boys in all participating countries. For these studies, the following effect sizes were calculated for English-speaking countries: .26, .25 (England), .21, .29 (Scotland), .22, .17 (USA) and .28, .27 (New Zealand), where the former value refers to data from the 2003 publication and the latter to 2007. In the present study, an effect size of .28 was found. These effect sizes would all be classified as relatively small according to Cohen's d (.20 = small, .50 = medium, .80 = large, where if $d = .20$, in normally distributed populations of equal size and variability, only 14.7% of their combined area is not overlapped [Cohen, 1977]).

In comparison with gender differences in reading ability, studies that have examined gender differences in attitudes towards reading have generally found greater differences. Both Kush and Watkins (1996) and McKenna et al. (1995) reported significant gender differences using the Elementary Reading Attitude Survey; this is a 10-item questionnaire with a 4-point Likert scale, which produces a mean score between 10 and 40 for recreational reading and academic reading. Kush and Watkins (1996) carried out a study of the same pupils over two time periods ($n = 189$) and reported significant gender differences in recreational reading compared with academic reading. When effect sizes were calculated using the means and standard deviations, in Grade 1, effect sizes of .43 (recreational) and .28 (academic) were found, compared with Grade 4, where effect sizes of .53 (recreational) and .07 (academic) were found. In addition, McKenna et al. (1995) tested a large number of pupils ($n = 18{,}185$), from different grades and of different ethnicity, and reported gender differences for both recreational and academic reading scores. Again, effect sizes were calculated using the means and standard deviations

presented in the paper. It was found that in each year group (Grades 1–6), the gender differences in attitudes were greater for recreational reading than academic reading, and the magnitude of the gender difference for both recreational and academic reading increased steadily with age. Effect sizes ranging from .40 to .74 (average .58) were found for recreational reading, and effect sizes ranging from .17 to .36 (average .28) were found for academic reading. Both these studies indicate that gender differences in attitudes to reading depend greatly on the nature of what is being read, or the purpose for which it is being read, recreational reading producing greater differences. In the current study, gender differences in attitude towards reading were found, before ($d = .48$) and after ($d = .42$) controlling for reading ability (however, the questionnaire contained a combination of academic and recreational reading questions). According to Cohen's d, if $d = .50$ there is 33.0% of non-overlap, an effect size argued to be large enough to be visible to the naked eye (Cohen, 1977). The effect sizes therefore do appear to be consistently greater for attitudes to recreational reading than for reading ability itself.

It is important to note that, as with reading ability, the method by which attitudes to reading are measured will determine whether or not effect sizes can be calculated. Sainsbury and Schagen (2004) asked children to either agree or disagree with a series of statements such as 'do you enjoy reading?' This forced-choice method found that a higher percentage of girls agreed with the positive reading statements compared with boys; however, the magnitude of these differences cannot be determined statistically. In addition, the forced-choice method reduces the quality of a response that can be given by a child compared to the Likert method used in the present study.

Consistent with previous research (Coles & Hall, 2002; Hall & Coles, 1999), boys perceived themselves to be reading less frequently than girls. However, it is important to acknowledge that reading comes in different forms (Hall & Coles, 1999). Boys tend to read more newspapers (Hall & Coles, 1999) and stories/articles on the Internet (Mullis et al., 2007) than girls, both of which will be developing their reading skill and should therefore be incorporated within self-report measures of reading frequency. However, it is possible that both boys and girls do not include this as a source of reading, and therefore this may have widened the gap in self-reported measures of reading frequency.

The associations between the factors were examined in the present study to discover whether they were a potential source of the differences in responses made by boys and girls. Consistent with previous research, the current study found a relationship between reading ability and attitude to reading. Interestingly, however, when the results were split by gender, it was only boys' reading ability that correlated with their attitude to reading. Previous studies that have reported an association between reading ability and attitude to reading have assumed that this relationship holds for both genders; however, the current study implies that this may not be the case. It should also be noted, however, that the McKenna et al. (1995) study is perhaps not a reliable measure of this association, as reading ability was not assessed using standardised reading tests as in the current study, but rather teacher ratings of ability were used (split into low, average and high reading ability). Also, Mullis et al. (2003, 2007) reported the relationship between attitude and achievement through categorising children into three bands (low, medium and high attitudes), therefore not allowing a measure of strength of association.

In addition, the current study found associations between reading ability and attitude to school, frequency of reading and competency beliefs. Indeed, the strongest relationship was found between reading ability and competency beliefs, highlighting the possible influence that success or failure has on children's beliefs in their ability. As before, when

the results were split by gender, it was only boys' reading ability that correlated with their attitude to school. It seems that an important source of gender differences may be detectable in how attitudes, ability and beliefs relate to each other, rather than in differences in mean performance levels (which have been found to be small and so may have little applicability in the real world).

The significant correlations for boys between reading ability and attitudes to reading and school provide an interesting insight into their attitudes. Although we cannot determine causation, it is possible that achievement in a particular area for boys is important in order to foster positive attitudes in that area. In terms of applicability, this implies that interventions for boys with reading problems are particularly effective when partly achievement focused, so that when progress is made, feelings of success and more positive attitudes to reading are fostered. As positive attitudes towards reading have been found to be associated with continued reading in adulthood (Cullinan, 1987), strategies for improving attitudes to reading in school will be likely to have a positive impact on reading frequency and ability after school. In addition, in the present study there were significantly closer relationships between boys' beliefs in their ability, and their attitudes to reading and school, than for girls, suggesting that boys in particular benefit from praise and encouragement to increase confidence in their abilities, which in turn promote more positive attitudes to reading and school.

Overall, there was a stronger relationship between all factors in the boys' questionnaire responses than the girls (with the exception of the correlation between attitude to reading and school). Boys' attitudes in one area are more closely tied to their attitudes or feelings in other areas, suggesting that boys in particular will benefit from the combination of teaching aimed at improving reading, with the promotion of positive attitudes and greater confidence in abilities. Interestingly, boys' attitudes to school were significantly more closely related to their perceived academic support (from teachers and peers), highlighting this as an avenue that could be used to promote more positive attitudes in school.

Overall, the results of this study show close relationships between all factors relating to internal thoughts and feelings (attitudes and competency beliefs) compared with external factors (support). While factor analysis identified groups of items as measuring different constructs, these close relationships between internal and external factors should be taken into consideration when developing programmes designed to tackle reading problems. In order to have a comprehensive programme of reading tuition that will produce long-lasting effects, the teaching of reading should continue to be combined with the promotion of positive attitudes and increasing confidence. It is possible that this will be more likely to lead to active and positive participation in literacy activities, and sustained reading throughout school and into adulthood, than if extra reading instruction is given alone.

The results of this study have potential consequences for models of attitudes to reading, which assume that the relationships between factors hold for both boys and girls. These models (e.g. Mathewson, 1994; McKenna et al., 1995) consider a range of factors that will influence an individual's intention to read, with complex relationships between beliefs, feelings, attitudes and intentions. However, the strength of these relationships has not been examined differentially for boys and girls, and it may be that some relationships hold for boys but not for girls (or vice versa), or that there are differences in the strength of the associations between these factors according to gender. This is an issue that will need to be examined further in future.

While many studies have considered either the relationship between attitudes to reading and reading ability (McKenna et al., 1995), or attitudes to reading and reading activity

(Sainsbury & Schagen, 2004), the present study has measured the strength of the associations between these three factors. How frequently a child reads is very important, as those who read more frequently are more likely to develop better sight word recognition, have a wider vocabulary, better reading comprehension, verbal fluency and general knowledge. Indeed, in this study there was a close relationship between reading ability and frequency of reading, particularly for girls. Interestingly, a significantly stronger relationship was found between frequency of reading and attitudes to reading than between reading ability and attitudes to reading. It may be that attitudes to reading have more impact on reading frequency, rather than being directly the product of reading ability.

Conclusion

The gender differences that have been found to exist in reading ability in the current study, and in previous literature, are of quite small magnitude, while larger differences are consistently found in attitudes. However, another more substantial and powerful source of gender differences may be found in the associations between these areas, as boys and girls were found to differ very markedly in the strength of the correlations found between attitudes, beliefs and reading ability.

Acknowledgements

The authors would like to thank all the children and teachers who took part in this study.

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Appendix A

The following table illustrates the items that were included in the questionnaire and how the questions relate to specific constructs derived from a factor analysis. An introductory section was included in the questionnaire in order to collect information about the child, their frequency of reading and library use.

Item number	Item content	Description
Intro 1	Gender	Boy or girl
Intro 2	Date of birth	Birth date (year and months)
Intro 3	First language	The child's first language
Intro 4	Frequency of reading	How frequently the child reads outside of school
Intro 5	Library use	How frequently child borrows book from library
1, 3, 8, 11, 14	Attitude to reading	Child's attitude towards reading
4, 7, 9, 10, 13	Attitude to school	Child's attitude towards school
6, 12	Competency beliefs	Child's beliefs regarding his/her ability at reading and school
2, 5	Peer/teacher support	Perceived academic support from peers and teacher within school

Note: While this questionnaire used a small number of items to measure each construct, this is comparable to Mullis et al. (2003, 2007) where a 5-item questionnaire was used to measure attitudes towards reading, and Coles and Hall (2002), which used only one item. In addition, the measure of competency beliefs (2 items) is comparable to that reported by Mullis and colleagues, which used 3 (2003) or 4 (2007) items.

Appendix B

Questionnaire.
Self-reported reading frequency
Intro 4. How often do you read at home?
This referred to reading for pleasure, and children were made aware of this at the time of testing. Five options were given and only one response could be made: every night, a few times a week, less than once a week, not very often, never.

The following questions were all answered using a 5-point Likert scale (1 = *negative response*, 5 = *positive response*).
Library Usage
Intro 5. Do you borrow books from the library to read for fun?

Q1. Do you enjoy reading? (ATR)
Q2. Do you and your friends help each other if you are stuck? (SUP)
Q3. Do you and your friends talk about books you have read? (ATR)
Q4. Do you like school? (ATS)
Q5. Do you find it easy to ask your teacher for help? (SUP)
Q6. Do you think you are good at school work? (CB)
Q7. Do you want to be good at school work? (ATS)
Q8. Would you like to have more or less time in class to spend reading? (ATR)
Q9. Do you ever get bored in school? (ATS)
Q10. Do you think you have to spend too much time in school? (ATS)
Q11. Do you like the books you read in school? (ATR)
Q12. Do you think you are good at reading? (CB)
Q13. Do you think it is important to go to school? (ATS)
Q14. Do you enjoy learning new things from books? (ATR)

These 14 questions were entered into the principal component analysis.
ATS = attitude to school, ATR = attitude to reading, CB = competency beliefs, SUP = perceived academic support (peer and teacher).

Received 25 February 2008; revised version received 21 May 2008.

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