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Predicting children's reading comprehension: An analysis of cognitive  
skills and motivational factors

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## Abstract

Extensive research has been carried out to examine the cognitive skills and motivational variables that influence reading comprehension. However, there are substantially fewer studies which have examined the influence of cognitive skills and motivation on reading comprehension together within a single study. The extant literature also provides little indication of the predictive ability of cognitive skills and motivation on children's comprehension of different text types. The studies in the present thesis therefore examined both cognitive skills and motivational variables in order to provide a more comprehensive account of the factors that predict children's reading comprehension. Additionally, the studies distinguished between cognitive and motivational factors that influence children's comprehension of different text genres and texts aimed at different audiences. Relations between cognitive skills, motivation and reading comprehension were explored in children ages 9 to 11, from three primary schools in the UK. Taken together, the results suggest that fundamental cognitive skills for reading comprehension overwhelmingly account for variance in children's comprehension across text types. There is some evidence that motivational variables may explain a small amount of additional variance in children's reading comprehension after accounting for cognitive skills, however motivation did not consistently predict any further variance. The findings also indicate that boys and girls may have different preferences for different types of text, though there is no evidence to suggest that this affects comprehension for different text types. For educators in particular, the results strongly advocate the development of children's vocabulary knowledge and phonological skill for enhancing their reading comprehension skill.

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## TABLE OF CONTENTS

<b>ABSTRACT</b>	i
<b>ACKNOWLEDGEMENTS</b>	ii
<b>LIST OF TABLES.....</b>	vi
<b>LIST OF FIGURES.....</b>	viii
1. Introduction.....	1-72
Children’s reading development.....	1
Reading comprehension.....	3
Reading motivation.....	5
Theories of motivation.....	6
Reading motivation and reading comprehension.....	17
Mediating effect of reading amount.....	28
Interest and reading comprehension.....	28
Sex differences in motivation for reading and reading comprehension performance.....	32
Cognitive skills for reading.....	33
Models of reading.....	35
Word reading.....	38

Phonological skill.....	39
Working memory.....	41
Language skills and reading comprehension.....	43
Syntactic ability.....	45
Inference making.....	46
Research examining multiple cognitive skills for comprehension.....	48
Reading comprehension in different orthographies.....	51
Cognitive skills and reading comprehension: Concluding comments.....	52
Reading motivation and cognitive skills for reading comprehension.....	53
Text features, text interest and children’s text preferences.....	61
Children’s text genre preferences and comprehension performance for different text genres.....	64
Aims and hypotheses.....	68
2. Method.....	73-82
Participants.....	73
Materials.....	75
Procedure.....	80
3. Results.....	82-127

Study One.....	82
Study Two.....	106
4. Discussion.....	128-158
Study One.....	128
Study Two.....	139
General Discussion.....	147
5. References.....	159
6. Appendices.....	183-222
Appendix A: Graded Non-Word Reading Test .....	183
Appendix B: British Picture Vocabulary Scale.....	184
Appendix C: Motivation for Reading Questionnaire.....	186
Appendix D: Motivation to Read Profile.....	189
Appendix E: Male and Female-oriented texts.....	194
Appendix F: Male-oriented text comprehension assessment.....	203
Appendix G: Female-oriented text comprehension assessment.....	208
Appendix H: Fiction and non-fiction text comprehension assessments...	215
Appendix I: Ethical Approval.....	221

## LIST OF TABLES

Table	Page
1. Means, standard deviations, skewness and kurtosis for cognitive skills, motivation variables and male and female-oriented comprehension assessments	83
2. Correlations between cognitive skills, motivation variables and comprehension for the male-oriented and female-oriented texts	88
3. Correlations between cognitive skills, motivation variables and reading comprehension split by sex	90
4. Mean and standard deviation for all measured variables split by sex	91
5. Hierarchical regression analyses with cognitive skills and motivation variables regressed on comprehension performance for the male-oriented text (whole sample)	95
6. Hierarchical regression analyses with cognitive skills and motivation variables regressed on comprehension performance for the female-oriented text (whole sample)	97
7. Hierarchical regression analyses with cognitive skills and motivation variables regressed on boys' comprehension performance for the male-oriented text	100
8. Hierarchical regression analyses with cognitive skills and motivation variables regressed on boys' comprehension performance for the female-oriented text	102
9. Hierarchical regression analyses with cognitive skills and motivation variables regressed on girls' comprehension performance for the female-oriented text	104
10. Hierarchical regression analyses with cognitive skills and motivation variables regressed on girls' comprehension performance for the male-oriented text	106
11. Means, standard deviations, skewness and kurtosis for cognitive skills, motivation variables and fiction and non-fiction comprehension assessments	108

12.	Correlations between cognitive skills, motivation variables and comprehension for the fiction and non-fiction texts	110
13.	Correlations between cognitive skills, motivation variables and reading comprehension split by sex	112
14.	Mean and standard deviation for all measured variables split by sex	113
15.	Hierarchical regression analyses with cognitive skills and motivation variables regressed on comprehension performance for the fiction text (whole sample)	116
16.	Hierarchical regression analyses with cognitive skills and motivation variables regressed on comprehension performance for the non-fiction text (whole sample)	118
17.	Hierarchical regression analyses with cognitive skills and motivation variables regressed on boys' comprehension performance for the fiction text	121
18.	Hierarchical regression analyses with cognitive skills and motivation variables regressed on boys' comprehension performance for the non-fiction text	123
19.	Hierarchical regression analyses with cognitive skills and motivation variables regressed on girls' comprehension performance for the fiction text	125
20.	Hierarchical regression analyses with cognitive skills and motivation variables regressed on girls' comprehension performance for the non-fiction text	127



## LIST OF FIGURES

Figure	Page
1. Mean interest and enjoyment ratings for male and female-oriented texts for the whole sample and split by sex	84
2. Mean interest and enjoyment ratings for fiction and non-fiction texts for the whole sample and split by sex	109

## Predicting children's reading comprehension: An analysis of cognitive skills and motivational factors

### *1. Introduction*

The ability to read is an essential skill, vital not only in education but also in life in general beyond the school years (Eason, Goldberg, Young, Geist & Cutting, 2012); with this skill being imperative in enabling individuals to be a success in later life (Netten, Droop & Verhoeven, 2011). With regards to education, as children progress through primary school i.e., from Foundation Stage (first year of formal schooling), towards Key Stage 2 (Years 3-6), they will increasingly be required to not only read (i.e., recognise words), but to extract meaning from the texts they read, to foster greater learning within the classroom across all subject areas. In fact, research indicates that children who show superior comprehension ability will later have greater educational success (e.g., Cain & Oakhill, 2006), thus highlighting the importance of acquiring good comprehension skills. The ability to accurately comprehend a text demonstrates that an individual possesses a high level of reading skill, because the individual not only has to accurately decode written words, but must also construct meaning. However, because reading, particularly for children, can be an arduous task requiring effort, perseverance and a personal decision as to whether to read or not read; motivation is therefore highly important for children's engagement in reading activities and their reading skill (Baker & Wigfield, 1999; Wigfield, Guthrie, Tonks & Perencevich, 2004).

### *Children's reading development*

The English language uses an alphabetic writing system, whereby there is a relationship between the letters and sounds in printed and spoken words respectively

(Treiman, Sotak & Bowman, 2001). When typically developing children first begin to learn to read, it may be through a visual approach (i.e., they may be taught to look at words and make associations between the word and the pronunciation of the word). However, this association is arbitrary, meaning that the child is likely to have simply attached a label to a particular string of letters to represent the word (Hulme & Snowling, 2009); as opposed to having a clear understanding of the way in which these letters are linked to specific sounds. Words may have particularly salient features which a child remembers (Treiman et al., 2001), thus enabling them to recall the label that they have attached to this word. Children cannot, however, rely only on these arbitrary associations to read and would be unable to remember labels that they have attached to every single word with which they have been exposed to. Furthermore, this approach to reading becomes problematic when children are exposed to novel and perhaps low frequency words (Share, 1995). In this case it becomes important for a child to learn letter-sound correspondences in order to decode words; which therefore enables them to vastly increase the number of words they are able to read, including new, novel words. Through this understanding that letters correspond to certain sounds, this means that the child does not have to store in memory labels for each letter string they have observed. The mapping of graphemes (i.e., letters) to phonemes (i.e., sounds) is said to facilitate word recognition and the development of vocabulary (Share, 1995), further enhancing children's reading skill. However, the English language has quite a complex orthography, containing a number of words which do not follow regular letter-sound correspondence rules, for example the word 'yacht'. Although these words can sometimes be taught through a phonics approach, very often children are taught to commit such words into their sight vocabulary, so that when this word is presented they recognise the full word and pronounce the word accurately.

Coltheart, Curtis, Atkins and Haller (1993) discuss dual-route theories of word reading, which contend that individuals store words that they have learned, in memory, so they can then retrieve these words and their pronunciation and read them out loud. However, non-words or new, unfamiliar words are not represented within the memory in this way and therefore the individual must possess a non-lexical route which allows them to read the word (Coltheart et al., 1993). It is through the non-lexical route that grapheme-phoneme (i.e., letter-sound) correspondences play a role in reading. Dual-route theories therefore propose that reading is dependent upon both visual word recognition and knowledge of rules controlling letter-sound mappings.

### *Reading Comprehension*

Gaining an understanding of what has been conveyed within a text and extracting meaning from a text are the desired outcomes of reading and, as such, assessing reading comprehension is crucial (Sideridis, Mouzaki, Simos & Protopapas, 2006). As previously mentioned, the initial process of learning to read is a complex task which draws on a number of cognitive skills. However, the ability to comprehend a text is a considerably more complex task. Comprehension of text is a “highly interactive mechanism” (Graesser, McNamara & Kulikowich, 2011, p. 225), meaning that there are many combined elements required to enable successful reading comprehension. Fundamental cognitive skills, such as decoding skill, are essential, though are not sufficient for successful reading comprehension (Katzir, Lesaux & Kim, 2009). The fundamental cognitive skills for reading interact with additional cognitive processes and skills, including memory capacity, background knowledge, component skills of comprehension and understanding of the structure of different text genres (Basaraba, Yovanoff, Alonzo & Tindal, 2013). Moreover, successful reading

comprehension requires not only the ability to accurately decode words via linkage of graphemes and phonemes, but is also dependent on an individual's ability to recognise words quickly and with precision; which inevitably facilitates more effective comprehension (Ouellette, 2006). In addition, reading comprehension skill is also reliant on a meaningful interaction between the text and its reader (National Reading Panel, 2000).

A report by the Rand Reading Study Group (Snow, 2002) further highlights the multifaceted and interactional nature of reading comprehension, proposing that comprehension comprises three different factors: the reader, the text and the purpose of the reading activity. The report details how the reader brings many influences to comprehension performance such as cognitive skills, motivation and knowledge (e.g., vocabulary and topic knowledge). In addition, there are text influences on comprehension (such as text difficulty, text genre and text content), though text genre and text content, in particular, can also interact with the reader's prior knowledge related to these (Snow, 2002). Lastly, the reading activity can influence comprehension. For instance, the purpose for reading can affect comprehension, with these purposes for reading being either intrinsically controlled (e.g., an individual reading something for enjoyment, or reading an instruction manual to understand how to do something) or externally controlled (e.g., when an individual is told to read something). Moreover, the purpose for reading can interact with the individual's motivation, particularly their interest in the text (Snow, 2002). As is evident, due to its' complex nature, research investigating reading comprehension and the factors that underpin this skill, should take into account multiple factors so that a comprehensive account of comprehension performance is established.

### *Reading Motivation*

As stated previously, reading is an effortful activity and one that is difficult to master, particularly in the initial phases of learning to read. Therefore, having the desire to read and the persistence to continue reading even when facing difficulties, is an important factor that is likely to develop a child's reading skill. Motivation can be defined as the psychological processes that determine the effort and persistence of an individual's behaviour and the course of action that one takes (Ford, 1992; Ryan & Deci, 2000b). There are individual differences in motivation, with individuals possessing various types of motivation to differing degrees (Ryan & Deci, 2000a). A theoretical concept of reading that encompasses motivation is the engagement model of reading development, proposed by Guthrie and Wigfield (2000). From this perspective, engaged reading includes not only motivation, but also the use of reading strategies (Guthrie & Cox, 2001; Guthrie & Wigfield, 2000) and therefore suggests that the integration of motivation and cognitive processes results in engaged reading (Guthrie & Wigfield, 2000; Guthrie et al., 2004). An engaged reader is one who reads for the enjoyment of reading and to gain new knowledge and, thus, is intrinsically motivated to read (Guthrie & Cox, 2001; Guthrie et al., 1996; Guthrie et al., 2004). In addition, the engaged reader uses strategies for reading comprehension, whereas readers who are less engaged use reading strategies less frequently (Wigfield et al., 2008). Guthrie and Wigfield (2000) suggest that engaged reading is linked to greater reading achievement, therefore it is important to consider how the engagement perspective links to reading comprehension performance.

### *Theories of Motivation*

Reading motivation is a multi-dimensional construct (Baker & Wigfield, 1999; Guthrie et al., 2007; Park, 2011) which has been found to contribute to children's reading comprehension performance (Anmarkrud & Bråten, 2009; Logan, Medford & Hughes, 2011; Taboada, Tonks, Wigfield & Guthrie, 2009). Motivation comprises a number of different constructs, and despite differing conceptualisations of motivation, there are overlaps. For example, the expectancy-value theory of motivation links to other motivational constructs, such as intrinsic motivation, self-efficacy and interest (Murphy & Alexander, 2000). This indicates that these constructs may share variance with regard to predicting reading comprehension performance. Also of importance is the specificity of motivation, in terms of the fact that an individual may be motivated to engage in one task, though may be entirely disinterested in another task, subsequently lacking motivation to engage in that task. In the present thesis, motivation will be discussed generally, but will also be specifically linked to reading.

One of the most commonly cited conceptualisations of motivation differentiates between intrinsic and extrinsic motivation. This focuses on the reasons why individuals partake in particular activities (Eccles & Wigfield, 2002) and has frequently been used to assess pupils' reading motivation (e.g., Becker, McElvany & Kortenbruck, 2010; Park, 2011; Wang & Guthrie, 2004; Wigfield & Guthrie, 1997). There is a strong general consensus as to the definition of intrinsic motivation, largely conceptualised as engaging in a task or activity because it is inherently enjoyable (Henderlong & Lepper, 2002; Y. G. Lin, McKeachie & Kim, 2003; Milyavskaya, McClure, Ma, Koestner & Lydon, 2012; Miserandino, 1996; Ryan & Deci, 2000a) and undertaking an activity in the absence of external rewards or reinforcements (Deci & Ryan, 1985; Milyavskaya et

al., 2012). With specific reference to education, intrinsic motivation is characterised by a desire to perform challenging tasks, in order to satisfy curiosity and to enable task mastery and competence (Meece, Blumenfeld & Hoyle, 1988).

Intrinsic motivation has sometimes been described as positively relating to school achievement (Gottfried, Fleming & Gottfried, 1994) and this has been found to be the case across different subject domains (Gottfried, 1985; Gottfried, 1990) and across different classroom tasks (Pintrich & De Groot, 1990). School achievement is a very broadly defined category and, in practice, specific areas of school achievement are analysed, such as achievement in maths or reading. Moreover, research has shown that school pupils may be intrinsically motivated in one subject area, yet this does not mean that the pupil is also intrinsically motivated across other subject areas (Harter & Jackson, 1992). However, some pupils have been found to be intrinsically motivated or extrinsically motivated across subject-domains (Harter & Jackson, 1992).

Consequently, when investigating children's motivation it is important that motivation is measured specifically for the domain of interest. With regard to reading and intrinsic motivation, children who are intrinsically motivated to read would be considered to be fully engaged during reading activities, and would find opportunities to read both in leisure time and in school (Sweet, Guthrie & Ng, 1998). These children would also be expected to choose to engage in reading activities without external coercion.

Unlike intrinsically motivated behaviour, behaviour that is extrinsically motivated is not performed due to an inherent interest in an activity and this motivation does not emanate from within the learner (Guthrie et al., 1996). Instead, extrinsically motivated behaviours are performed to obtain some external reward (Broussard & Garrison, 2004; Deci, 1972; Y. G. Lin et al., 2003; Wang & Guthrie, 2004), or to



comply with social demands (Wang & Guthrie, 2004). Research also suggests that generally, extrinsic motivation and extrinsic rewards can undermine an individual's intrinsic motivation (for a review see Deci, Koestner & Ryan, 1999). External reasons for motivating behaviours in the classroom may include the desire to gain acceptance and approval from staff (e.g., teachers) or the desire to achieve good grades (Harter, 1981; Harter & Jackson, 1992). With respect to reading and extrinsic motivation, children may read because it is a way of showing that they have mastered a task that is deemed socially desirable and not because they find reading inherently enjoyable (Wang & Guthrie, 2004). Moreover, children who are extrinsically motivated to read may have a desire for superior reading performance compared to peers or to obtain rewards for others to see (Guthrie, Wigfield, Metsala & Cox, 1999).

The theory of the intrinsic-extrinsic dimensions of motivation has been debated. Initial research, specific to motivation within the classroom, implied that intrinsic and extrinsic motivations represent polar opposites on a single scale and are therefore dichotomous (Harter, 1981). In this respect, a child can therefore only be solely intrinsically or extrinsically motivated and cannot be simultaneously intrinsically and extrinsically motivated. To the contrary, more recently it has been suggested that children should not be classified as high or low in motivation, but instead, children may possess varying degrees of different types of motivation both for school in general (Lepper, Corpus & Iyengar, 2005) and for reading (Baker & Wigfield, 1999). Indeed, research has shown that intrinsic and extrinsic motivation are independent of one another (Lepper, Sethi, Dialdin & Drake, 1997), again indicating that an individual does not have to be categorised as either an intrinsically motivated or extrinsically motivated reader. Baker and Wigfield (1999) propose that the combination of motivational characteristics that children might possess, may include characteristics which result in a

child being an engaged reader, but also characteristics which may result in a child not being engaged in reading.

The dimensions of intrinsic and extrinsic motivation are encompassed within self-determination theory (Deci & Ryan, 1985). Self-determination theory aims to describe what causes different motivational processes and how they influence individuals' behaviours. The theory differentiates between 'self-determined' behaviour (behaviour that is volitional), whereby the individual makes a conscious choice to engage in an activity and initiates behaviour consistent with that choice, and 'controlled' behaviour which is regulated by external factors; though both self-determined and controlled behaviours are motivated and performed with intent (Deci, Vallerand, Pelletier & Ryan, 1991). Self-determination is important because when individuals feel that they are in control of their behaviour they are likely to feel more motivated (Patall, 2013), which is thought to have a positive impact on behaviour and performance. Intrinsic motivation represents self-determined behaviour (De Naeghel, Van Keer, Vansteenkiste & Rosseel, 2012), whereas controlled behaviour is more representative of externally motivated behaviour. However, in contrast to the simple intrinsic-extrinsic distinction, self-determination theory comprises four forms of extrinsic motivation: integrated, identified, introjected and external regulation (Deci & Ryan, 1985; Deci et al., 1991). All four lie on a continuum, whereby the degree to which they are controlled or self-determined varies (Ryan & Connell, 1989). De Naeghel et al. (2012) provide a clear example regarding reading; they propose a situation whereby a child is extrinsically, and not intrinsically motivated to read, yet this child may see reading as personally valuable and therefore the motivation to read has become internalised, which is defined as identified regulation. Therefore it is evident that this form of motivation is not wholly externally motivated. Students who are

intrinsically motivated to read are thought to become self-determined readers (Wang & Guthrie, 2004), in that they will engage in reading activities through their own volition. Therefore, the extent to which children are motivated to read for intrinsic purposes is particularly important because these children are likely to read out of choice, rather than to achieve a separable outcome, and as a consequence are likely to perform more successfully on reading tasks. In support of this, research has shown that children's intrinsic reading motivation is significantly associated with their school reading achievement, in terms of standardised reading test scores and teacher ratings (Gottfried, 1990), and that intrinsic motivation directly predicts children's reading comprehension (Wang & Guthrie, 2004).

An individual's self-system comprises concepts such as self-efficacy, self-concept and expectations (Borkowski, Carr, Rellinger & Pressley, 1990, as cited in Chapman & Tunmer, 1997); all of which are based on an individual's perceptions of themselves and their capabilities. Self-efficacy theory (Bandura, 1977), a social-cognitive theory of motivation, proposes that behaviour is influenced by an individual's personal beliefs about their ability, or their coping skills in a particular situation. An individual is likely to persevere and exert much effort in a situation in which they feel that they can meet the demands of that situation. In contrast, an individual is unlikely to persevere when difficulties arise, or to engage in an activity whereby they feel that they cannot be successful (Bandura, Barbaranelli, Caprara & Pastorelli, 2001). According to Bandura (1977), efficacy expectations, combined with incentives and an individual's actual ability to meet the demands of the particular situation, strongly determine the activities that an individual engages in and the effort that is exerted. Efficacy expectations specifically relate to whether an individual believes they can execute certain behaviours to achieve a particular outcome (Eccles & Wigfield, 2002). Self-efficacy is domain-

specific or task-specific, because it is related to an individual's beliefs regarding their ability to perform a specific task and is not related to the general physical or psychological characteristics pertaining to an individual (Zimmerman, 2000).

Children's efficacy beliefs are also highly specific to their level of ability on a particular criterion, rather than compared to peers. For example, a child's beliefs about how well they can perform on an upcoming mathematics test are not related to whether they think that they can perform more successfully on the test than another individual (Zimmerman, 2000). This differs conceptually to expectancy within the expectancy-value theory of motivation which, when assessed by the Motivation for Reading Profile (MRP; Gambrell, Palmer, Codling & Mazzoni, 1996), questions children's beliefs in their ability in a particular domain (in this case reading) compared to their peers. With regard to reading comprehension, if a child is given a particular text to read, yet feels that they have little understanding of the content and that they are unable to successfully read the text, then they are likely to withdraw from the task, exerting little or no effort.

Another motivational construct is self-concept, which is theoretically similar to self-efficacy, though there are differences between the two (for a full discussion see Bong & Skaalvik, 2003). As previously outlined, unlike self-concept, self-efficacy is less focussed on the actual abilities that an individual possesses and is more concerned with what an individual thinks they are capable of doing with the skills that they have (Bong & Skaalvik, 2003). Self-concept is typically focussed on general perceptions of ability in a given domain, whereas self-efficacy relates to an individual's perception of their ability in a very specific situation, i.e., for a certain task (Bong & Skaalvik, 2003; Morgan & Fuchs, 2007). Self-concept has been found to predict academic achievement, for example in the mathematics domain (Marsh, Trautwein, Lüdtke, Köller & Baumert, 2005; Marsh & Yeung, 1997). However, the relationship between self-concept and

achievement could be reciprocal (Marsh & Yeung, 1997). With regard to reading, components of self-concept, as described by leading researchers in this area (Chapman and Tunmer), include attitudes, perceptions of competence and perceptions of difficulty (Chapman & Tunmer, 1995). The attitude component refers to a child's feelings about reading (Chapman & Tunmer, 1995), be that positive or negative affect towards reading. Perceptions of competence refers to how competent a child thinks they are at reading, whereas perceptions of difficulty refers to whether a child thinks that reading is a difficult task (Chapman & Tunmer, 1995). Bouffard, Marcoux, Vezeau and Bordeleau (2003) found that children's reading self-concept (perceptions of competence) in grades two and three, contributed to their achievement in reading at grades two and three respectively. Moreover, Chapman, Tunmer and Prochnow (2000) found that children identified as having a negative academic self-concept performed significantly poorer on assessments of reading comprehension than children who were identified as having a positive academic self-concept; which suggests that perceptions of ability are important for children's reading performance.

Another well-established, widely accepted theory of motivation is the expectancy-value theory, which originates from the achievement motivation perspective (Plante, O'Keefe & Théorêt, 2013). This theory suggests that an individual's level of persistence, their choice and their performance in an activity are related to their expectancy beliefs and their value of the task (Eccles & Wigfield, 2002). Indeed, research has shown that pupils' expectancies and values are related to their academic achievement (Plante et al., 2013). According to Eccles and colleagues (Eccles et al., 1983) expectancy refers to an individual's beliefs about how competent they will be in a particular task (as cited in Eccles & Wigfield, 2002). Therefore, in the context of reading this refers to whether an individual believes they can or cannot be successful at

reading. Research has shown that children's self-perception of their ability contributes to their academic achievement across different subject domains, including maths and English (Spinath, Spinath, Harlaar & Plomin, 2006). Task value, on the other hand, is comprised of four components: intrinsic value, cost, utility value and attainment value (Eccles & Wigfield, 2002). Intrinsic value refers to an individual's enjoyment of a task and their interest in the domain/activity in question (Plante et al., 2013; Wigfield & Eccles, 2000) and utility value refers to the degree to which an activity is related to an individual's plans and goals, both in the present and the future (Eccles & Wigfield, 2002; Plante et al., 2013; Wigfield & Eccles, 2000). Cost, as the name suggests, refers to the negative consequences associated with performing a particular task, for example a negative effect of engaging in a task could include the individual experiencing anxiety and also experiencing worry related to possible task failure (Eccles & Wigfield, 2002; Plante et al., 2013). Cost also refers to whether engaging in the activity will require a lot of effort and whether, as a result of this, opportunities to do other things will not be possible (Eccles & Wigfield, 2002; Wigfield & Eccles, 2000). Eccles et al. (1983) proposed that attainment value refers to an individual's beliefs regarding how important they feel it is to perform well on an activity (as cited in Eccles & Wigfield, 2002). As previously stated, similarities exist between a number of motivational constructs (Murphy & Alexander, 2000), and it is possible to see the similarities between intrinsic motivation and the intrinsic value component within the expectancy-value model. Also, in the motivation literature, the terms expectancy and self-efficacy are sometimes used interchangeably, despite referring to marginally different concepts, again highlighting how there are overlaps between some motivational constructs.

Prior to the work of Wigfield and Guthrie (1997) the nature of reading motivation was relatively underexplored. Wigfield and Guthrie studied the motivation

literature to identify dominating constructs of motivation that are related to an individual engaging in reading, and subsequently developed a questionnaire to assess these motivational processes for reading (The Motivation for Reading Questionnaire; MRQ). After examining the literature, motivation for reading was conceptualised in terms of self-efficacy beliefs, intrinsic-extrinsic motivation, goals for achievement and social aspects of motivation. The intrinsic-extrinsic motivation distinction in this questionnaire does not assess aspects of extrinsic motivation included within self-determination theory (e.g., introjected extrinsic motivation), but instead questions are focussed on the simple distinction between intrinsic and extrinsic motivation (De Naeghel et al., 2012).

Interest is also linked to motivation, in that interest is related to engaging in a task or frequent re-engagement in a task (Hidi & Renninger, 2006). For example, if an individual's interest is triggered they will be motivated to continue this task and could also be motivated to re-engage in the task in future. In particular, interest is linked to intrinsic motivation, with researchers sometimes using these two terms to represent the same thing (Hidi & Harackiewicz, 2000). Wigfield and Guthrie (1997) included interest within their conceptualisation of reading motivation, acknowledging that interest is an important factor that influences reading performance. In addition, according to Dewey (1913), interest is related to the pleasure one experiences when partaking in an activity (as cited in Schiefele, 1992) and interest is also often accompanied by positive feelings that influence engagement (Hidi & Renninger, 2006), which further emphasises the intrinsic nature of interest, as opposed to interest being related to external factors.

Interest can manifest itself in two main ways; it can be thought of in terms of individual/personal interest or situational interest (for a review see Schraw & Lehman, 2001). Individual interest is stable, is maintained over time (to some extent) and is also specific to a particular activity or topic (Ainley, Hillman & Hidi, 2002; Eccles & Wigfield, 2002; Wade, Buxton & Kelly, 1999). Situational interest on the other hand tends to be intermittent in nature (Wade et al., 1999) and relates to interest that is elicited in a specific context, by characteristics of a task or the environment (Ainley et al., 2002; Kang, Scharmann, Kang & Noh, 2010; Schraw & Lehman, 2001; Wade et al., 1999). This means that interest is elicited sporadically for a particular activity being undertaken or a particular topic being studied, as a result of features of the activity/topic generating interest. However, these two sources of interest are likely to interact in many situations and therefore should not be dichotomised (Hidi, 1990; Hidi, 2001). Although interest is often conceptualised in terms of these two types, Hidi and Renninger (2006) proposed a four-phase model of interest development. This model postulates that interest develops from an initial triggered situational interest, as outlined above, to a maintained situational interest, which differs in that an individual's interest in the particular activity/for the particular topic occurs again. The early phases of interest (e.g., both forms of situational interest) are characterised by positive affect and increased attention towards an activity, which is one of the cognitive components of increased interest. The next phase within the model is emerging situational interest, which is when an individual begins to develop a stable interest in the activity and wishes to re-engage in the activity. Lastly, an individual may form a well-developed personal interest in the activity/domain, as outlined previously.

Interest is thought to influence children's reading comprehension, as it influences text processing and learning (for reviews see Alexander & Jetton, 1996; Hidi,



1990). It is therefore important to be aware of children's interests in reading, for certain text genres and also for reading in general. Interest is a motivational factor and a child's reading motivation can be measured in terms of their interest in a specific book read at a certain time, which would be indicative of their situational motivation (Guthrie et al., 2007). Conversely, children can also be assessed on their motivation to read more generally (Guthrie et al., 2007), which would be assessing their individual interest for reading, because a child that is motivated to read in general would display an interest in reading that is relatively stable across different text genres. It should be noted that there is a specific sub-type of situational interest related to texts, which is termed text-based interest (Hidi & Baird, 1988). This relates to how interesting a text is rather than focussing on the personal interests pertaining to an individual; therefore, in this case, how the features of the text and the individual interact (Hidi, 1990). However, when reading a text it is likely that both individual and situational interests will evoke interest. Therefore, an individual may be interested in a given text due to characteristics of the text that elicit interest (situational interest), but may also find the text interesting because the text content is related to a subject that they are particularly interested in (individual interest). For example, if a child is reading a discourse about an elephant and they already have a strong pre-existing interest in elephants (individual interest); their interest in the text could be enhanced if characteristics of the text (situational interest) also elicit interest.

When reading and processing a text, interest can play an important role through its influence on attention. Interest is said to encourage attention when reading a text, as an interesting text will be more likely to motivate an individual to focus their attention on the text (Anderson, 1982, as cited in McDaniel, Waddill, Finstad & Bourg, 2000). Conversely, another theoretical position on interest and its association with attentional

resources, suggests that there is an automatic allocation of attention, in that selective attention to interesting aspects of text occurs spontaneously and a conscious allocation of attention to interesting aspects does not occur (Hidi, 1990). As a consequence, comprehension of interesting texts will demand fewer cognitive resources compared to the comprehension of texts that are less interesting (McDaniel et al., 2000). Indeed, research has been shown to support this assertion, through quicker response times to a secondary task when reading a high interest text (McDaniel et al., 2000) and through children demonstrating faster reading speed for a text that they rated as more interesting (Bernstein, 1955). These findings suggest that interest facilitates faster response times and faster reading speed, due to the fact that selective attention was spontaneously allocated, rather than consciously allocated to reading of the text. This then enables cognitive resources to be used elsewhere. Interest therefore seems to influence cognition and task engagement, although interest also comprises affective components, such as enjoyment (Patall, 2013). Schiefele (1992) discusses feeling-related valences associated with interest, which refers to an individual's feelings of enjoyment, pleasure and involvement related to a particular topic. As such, interest has both a positive impact on cognition and also generates positive affect, both of which are thought to serve to improve task performance.

### *Reading motivation and reading comprehension*

Reading comprehension requires an individual to have an understanding of a text at various levels, including the lexical (word) level, syntactic (sentence) level and the semantic level (Aarnoutse, Leeuwe, Voeten & Oud, 2001). This differs conceptually to word reading which requires a child to map graphemes and phonemes, which they can master with little knowledge of meaning. The current thesis will

predominantly focus on factors that affect children's reading skill, in terms of their reading comprehension. This refers to a child's ability to understand the meanings of words and sentences, and to develop a coherent understanding of a text.

Within the literature there are a vast number of studies that have examined the association between reading motivation and reading comprehension (Baker & Wigfield, 1999; Becker et al., 2010; Guthrie et al., 1999; Guthrie et al., 2007; D. Lin, Wong & McBride-Chang, 2012; Logan et al., 2011; Park, 2011; Wang & Guthrie, 2004). Studies have reported the presence of a relationship between motivation and reading comprehension, with regard to motivational constructs, such as self-efficacy (D. Lin et al., 2012), value of reading (Anmarkrud & Bråten, 2009), intrinsic motivation (Lau & Chan, 2003; Logan et al., 2011; McGeown, Norgate & Warhurst, 2012; Park, 2011) and reading self-concept (De Naeghel et al., 2012; Katzir et al., 2009). However, the majority of studies have focussed on the intrinsic-extrinsic dimensions of motivation (Becker et al., 2010; McGeown et al., 2012; Park, 2011; Wang & Guthrie, 2004). A fairly recent meta-analysis of motivation and reading comprehension research (Morgan & Fuchs, 2007) indicates that there is a bi-directional relationship between children's motivation, in terms of competency beliefs and goal orientations, and their reading skill. Therefore, when considering the associations between motivational constructs and reading comprehension, it is important to keep this in mind, as much of the research is correlational in nature and thus directionality of the relationship is not possible to determine.

An early study by Gottfried (1985) was one of the first to differentiate between children's intrinsic motivation across domains. Children's intrinsic motivation was assessed across a range of subject areas including reading, maths and science, and was

correlated with children's academic achievement in these subjects. Intrinsic reading motivation and reading achievement were found to be significantly positively related, though children's general intrinsic motivation was also significantly positively associated with their reading achievement, suggesting that domain-specific and general measures of intrinsic motivation are comparable. Wang and Guthrie (2004) investigated the influence of intrinsic motivation and extrinsic motivation on students' text comprehension performance. The study included students from the US and China, in order to also examine whether there are existing cultural differences in the relationships between students' motivation, reading achievement, reading amount and text comprehension. Correlations showed that dimensions of intrinsic motivation (involvement, curiosity and challenge) were positively related to comprehension for the Chinese students. A similar pattern of results was obtained for the US students, though curiosity was not significantly associated with reading comprehension performance. Structural equation modelling showed that for both US and Chinese students, intrinsic motivation was a direct positive predictor of text comprehension and was positively associated with text comprehension, even when additional variables such as extrinsic motivation, past reading achievement and reading amount (at school and for enjoyment) were controlled for. From this research, the authors also proposed new dimensions within intrinsic and extrinsic motivation, thus advocating adaptations to the Motivation for Reading Questionnaire (MRQ; Wigfield & Guthrie, 1997) and leading to the production of its most recently revised version. This most recently revised version of the MRQ has intrinsic motivational constructs, which include involvement, curiosity and a preference for challenge, and extrinsic motivational constructs which include competition, grades, recognition, social and compliance.

Park (2011) explored the relationships between motivational constructs and also examined how they interact to predict reading comprehension. Intrinsic reading motivation and students' perceptions of their reading skill (compared to peers and in terms of their own criterion) were positively related to reading comprehension, whereas extrinsic motivation was not associated with reading comprehension. The results further revealed that extrinsic motivation facilitates greater reading comprehension to a certain point, before it then begins to undermine comprehension. The findings indicate that there is a complex relationship between intrinsic and extrinsic motivation and how they predict reading comprehension. For example, Park explained how extrinsic motivation was negatively related to comprehension for pupils with low intrinsic motivation. However, the role of extrinsic motivation changed for pupils with a higher level of intrinsic motivation, whereby in this case, a moderate level of extrinsic motivation was associated with higher reading comprehension. In general the study indicates how motivational facets interact to predict comprehension, yet there is still an emphasis on the importance of intrinsic motivation for reading comprehension.

D. Lin et al. (2012) examined the reading motivation and reading comprehension performance of Chinese students, for both Chinese and English texts. For these children, English was a foreign language, although it was studied from a very young age. Significant differences in children's motivation for reading in Chinese and in English were evident, with children scoring higher on motivation measures for Chinese reading, including self-efficacy, intrinsic motivation (curiosity and involvement), recreation (reading for leisure) and extrinsic motivation (grades). Subsequent analyses showed that self-efficacy was significantly positively related to both Chinese and English reading comprehension. For Chinese comprehension there were also significant, positive associations with curiosity and recreation, whereas for

English comprehension there was a significant positive relationship with instrumentalism, which refers to how useful one perceives reading to be and its benefits, perhaps for the future. The only significant predictor of children's Chinese reading comprehension was recreation, which is the extent to which the children read Chinese for pleasure and as a leisure activity. In contrast, the only significant predictor of children's English reading comprehension was instrumentalism. This study highlights the specificity of reading motivation because, in the same individuals, different motivational factors can influence reading comprehension performance, depending on the text that is presented.

Though the influence of motivation on children's reading comprehension has been explored, it is interesting to consider the relationship between these variables from a longitudinal perspective. Becker et al. (2010) sought to examine the relationships between intrinsic motivation, extrinsic motivation and the development of children's reading literacy skill. Reading literacy was a composite measure consisting of performance on assessments of reading comprehension, vocabulary and decoding skill. Data was collected at three intervals, when children were in grades three, four and six. Structural equation modelling was conducted to establish whether, and to what degree, intrinsic reading motivation in grade four could predict children's reading literacy in grade six. The results illustrated that children's grade four intrinsic reading motivation was a positive predictor of their grade six reading literacy performance; hence, children scoring highly for intrinsic motivation to read in grade four, later demonstrated higher reading literacy performance. However, when children's amount of reading (reading frequency and how long children read for) in grade four was controlled for, there was no longer a significant relationship between grade four intrinsic reading motivation and reading literacy performance in grade six. This highlights the mediating role of reading

amount in the relationship between intrinsic motivation and reading literacy, which supported one of the authors' initial hypotheses. Moreover, there was a highly significant and strong correlation between children's intrinsic motivation and their reading amount in grade four, and children's reading amount in grade four was also a significant predictor of reading literacy in grade six. As such, it can be inferred that children who were highly motivated to read in grade four therefore read books more frequently and, as a consequence, these children then performed better on measures of reading literacy in grade six. Further analyses did show that, although small, reading amount acted as a significant mediator in the relationship between intrinsic reading motivation and reading literacy. When children's previous reading literacy performance (grade three reading literacy) was added to the model, this altered some of the previous relationships. Most notably, the association between intrinsic reading motivation and reading literacy in grade six was attenuated by prior reading literacy performance, and was no longer significant, perhaps because reading literacy performance is consistent and stable over time (Becker et al., 2010). Regarding extrinsic motivation, analyses showed that children's extrinsic reading motivation in grade four was a negative predictor of their reading literacy performance in grade six. When reading amount in grade four was then added to the model, extrinsic motivation still significantly negatively predicted reading literacy at grade six, thus implying that reading amount may not mediate this relationship. Further results in fact established reading amount as a significant, but very weak, mediating variable on this relationship.

McGeown et al. (2012) examined relationships between reading comprehension performance and intrinsic and extrinsic motivation, for children identified as either very good readers or very poor readers. Categorising children in terms of their reading abilities was useful because few studies had made this distinction, with most using data

from pupils with wide-ranging reading skills (McGeown et al., 2012). The results showed no significant association between either intrinsic motivation or extrinsic motivation and reading skill, for the sample of poor readers in the study (though notably this may have reflected score distributions for reading skill). As for the good readers in this study, again there was no significant association between intrinsic motivation and reading skill, however there was a positive association between their extrinsic motivation and reading skill. Meanwhile, for the whole sample, intrinsic reading motivation was significantly associated with reading skill while extrinsic reading motivation was not. The findings, overall, demonstrate this positive association between children's intrinsic motivation and their reading skill. However, the results also highlight that for children with different levels of reading skill, the relationship between their reading motivation and reading skill may differ. The authors noted how these results aligned with Park (2011) who argued that extrinsic reading motivation may not necessarily be detrimental to children's reading skill, if they also have high levels of intrinsic reading motivation. Indeed, in this study, good readers had high levels of intrinsic reading motivation and the authors suggest that extrinsic reading motivation may have therefore given some good readers a competitive edge.

Many studies have assessed children's reading motivation using self-report data; however, researchers have also found a positive association between teachers' perceptions of pupils' intrinsic motivation and pupil achievement in reading (Sweet et al., 1998). A limitation with using teacher reports of pupils' intrinsic motivation is that it is difficult for teachers to know the internal feelings of their pupils (i.e., their levels of motivation) and therefore they may base their ratings of motivation on the children's abilities. For example, a teacher may perceive a child as having high intrinsic reading motivation because that child has good reading skills. In contrast, a limitation of pupil



self-evaluations of reading motivation is the possibility of social desirability bias, with pupils providing answers that they believe are socially desirable.

Wigfield & Guthrie (1997) examined the relationship between self-efficacy, intrinsic-extrinsic motivation and children's reading amount and reading breadth. Results collated at different time points (in the Spring and Autumn of two consecutive school years) showed that the intrinsic motivation composites - involvement and curiosity - were significantly positively correlated with reading amount and breadth at many of the time points. Furthermore, reading efficacy was significantly positively associated with reading breadth and with reading amount, at all but two time points. However, recognition and grades, both composites of extrinsic motivation, were also frequently significantly positively correlated with reading breadth and with reading amount. Subsequent analyses of variance showed that children who scored more highly for intrinsic motivation had a greater breadth of reading and read more than those children scoring lower for intrinsic motivation. This research highlights the association of reading motivation with children's reading amount and breadth of reading, though does not illustrate how reading motivation and reading amount may interact to affect reading comprehension performance. This is important because research has shown that there is a positive association between children's reading amount and their reading achievement (Becker et al., 2010; Guthrie et al., 1999).

Drawing on the work of Wigfield and Guthrie, Baker and Wigfield (1999) expanded the research to include reading achievement. The relationships between reading activity (e.g., how often a child reads books), reading motivation and reading achievement, of fifth and sixth grade students, were analysed. Reading achievement was measured using two standardised assessments of reading comprehension and also a

reading performance assessment, developed for the purposes of the study, based on the reading curriculum. The results that followed were surprising as none of the intrinsic motivation components were statistically significantly correlated with performance on any of the measures of reading comprehension. Work avoidance was significantly negatively correlated with reading comprehension on all measures. In addition, there were positive, albeit moderate, associations between comprehension performance on the performance assessment and the extrinsic components - grades, recognition and compliance. These findings are in stark contrast with other studies, which have found either no significant association or a negative association between extrinsic reading motivation and reading performance (Becker et al., 2010; Logan & Medford, 2011; Wang & Guthrie, 2004). In terms of reading activity, the intrinsic components, involvement and challenge, were the motivation factors with the strongest association with reading activity. However, although reading motivation, reading activity and reading comprehension were collectively investigated, there was no specific assessment of reading activity as a mediator of the relationship between motivation and comprehension.

Children's self-concept can also influence their reading performance and research has shown that reading self-concept is directly related to children's reading comprehension (Katzir et al., 2009). Furthermore, Chapman and Tunmer (1995) found that children's reading self-concept was positively related to word identification, spelling and reading comprehension. Specifically, both in years four (ages eight and nine) and five (ages nine and 10), children's reading comprehension was most strongly related to their perceptions of the difficulty of reading tasks. The results also indicated that children did not think reading was an easy task, despite displaying positive affect for reading and believing that they are good at reading (Chapman & Tunmer, 1995).

Katzir et al. (2009) found that reading self-concept was positively related to reading comprehension, and that even when children's verbal IQ and word reading skills were controlled for, each component of reading self-concept (e.g., attitudes, perceived competence, perceived ease with reading) was individually significantly predictive of comprehension performance, when entered after cognitive skills. However, when all three components of reading self-concept were entered into the model together, only perception of ease with reading was a significant unique contributor to comprehension. Likewise, De Naeghel et al. (2012) found that pupils' reading self-concept was related to their reading comprehension, both in an academic context and a recreational context, though the association was stronger in the academic context. De Naeghel et al. (2012) also used the self-determination theory of motivation to explain children's reading comprehension, and found that pupils' recreational autonomous motivation (motivation for recreational reading) was positively associated with their reading comprehension; indicating that feeling in control of one's own reading behaviour relates to superior reading comprehension.

When investigating the relationship between reading motivation and reading comprehension performance, an important factor to consider is the genre of text that comprehension performance is being measured upon. Wigfield, Cambria and Ho (2012) examined the relationships between intrinsic and extrinsic motivation and students' comprehension performance on school information books. In contrast to much of the extant literature, intrinsic motivation was negatively correlated with students' reading comprehension performance, and children's school intrinsic motivation (intrinsic motivation for reading school books) was a negative predictor of their reading comprehension. However, the authors postulate that such findings could be due to the fact that intrinsic motivation was measured specifically regarding

students' intrinsic motivation for reading school information books. To further support this idea, when assessing a smaller sample of these children, the results demonstrated a positive correlation between the students' intrinsic motivation for reading in general and their reading comprehension performance. Therefore students who scored highly for reading comprehension were, to a lesser extent, intrinsically motivated to read the information books that they are required to read within school (Wigfield et al., 2012), but were perhaps more intrinsically motivated to read other types of text. It appears that the role of motivation for students' reading comprehension may vary depending on how motivation is assessed, for example whether motivation for reading is assessed generally, or with regard to a specific text type. In addition, the role of motivation for reading comprehension may also differ depending on the texts used to assess comprehension.

Guthrie et al. (2007) explored the multi-dimensional nature of reading motivation and the relation of motivation to comprehension growth. Children's motivation was assessed in several ways, such as in terms of their intrinsic reading motivation, reading efficacy, general motivation for reading and their specific motivation for reading narrative and informational texts. Reading comprehension was assessed using a standardised reading test and informational reading passages (multiple text comprehension). Children were assessed at two time points and correlation analyses showed that, at time one, children's intrinsic reading motivation, general motivation for reading and their motivation for reading narrative texts were related to reading comprehension on the standardised test, whilst children's information reading motivation was not. Though, note that these findings were not consistent with those at time two. Also at time one, children's multiple text comprehension was only significantly associated with their intrinsic reading motivation. Multiple regression

analyses were conducted to determine whether motivation can predict growth in reading comprehension and the results showed that both interest and involvement significantly predicted reading comprehension growth. These findings highlight two things: that reading motivation is multifaceted and that reading motivation is highly specific with regard to its association with comprehension of different texts.

#### *Mediating effect of reading amount*

Some studies have found evidence that children's reading amount/frequency acts as a mediator between their reading motivation and reading performance (Becker et al., 2010; Guthrie et al., 1999). However, other research has conversely found that neither reading frequency (e.g., De Naeghel et al., 2012) nor reading amount (e.g., Wang & Guthrie, 2004) mediates the relationship between reading motivation and comprehension performance. Wang and Guthrie (2004) found that children's reading amount, in school and for their own enjoyment, was not significantly associated with their text comprehension performance, when intrinsic and extrinsic motivation were controlled for. Becker et al. (2010), as previously discussed, did find evidence to suggest that reading amount mediated the relationship between intrinsic reading motivation and reading literacy performance. However, when children's previous reading achievement was taken into account, the relationship between previous reading achievement and current reading achievement was so strong that it severely attenuated the association between reading amount and later reading literacy, with the relationship no longer found to be significant.

#### *Interest and reading comprehension*

Within the literature there seems to be only a small body of research examining the influence of other affective variables, such as interest, on children's reading

comprehension (though see discussion earlier). Individual interests can have a powerful effect on an individual's cognitive processing and their performance, in that they will persevere with a task for longer and pay greater attention to a task if they are interested in it (Hidi, 1990). Early research showed that pupils had superior reading comprehension performance for texts deemed interesting, compared to texts deemed less interesting (Belloni & Jongmsma, 1978; Bernstein, 1955). Bray and Barron (2004) noted that little research had been conducted to examine how students' interest in the content of reading tests may impact on test performance. It is important to examine text interest and its effect on reading performance, because it is imperative that reading assessments measure reading skill and are not confounded by text interest and any possible effects this could have on performance. Perhaps a child that finds a text very interesting may perform substantially better for comprehension of this text than a child who finds the same text rather uninteresting, despite comparative cognitive and reading skill. Bray and Barron sought to determine whether text interest is associated with reading comprehension performance, but also included gender and verbal ability within their investigations to establish whether the relationship between text interest and reading comprehension is comparable across levels of verbal ability and gender. The authors probed participants' text interest after reading the test passages, postulating that ratings of interest post-reading provide the best measure of interest elicited by the test passage. The study also used a diverse selection of text genres with which the effect of text interest on comprehension performance could be examined on. These texts included, but were not limited to, types of narrative and expository texts. Correlation analyses yielded a significant, albeit small, positive correlation between interest and reading comprehension scores, and when a partial correlation was conducted to control for verbal ability this correlation increased slightly. Pupils showed greater

comprehension for passages rated as more interesting and this association was stronger for girls than it was for boys; thus interest appeared to be more important for girls' comprehension performance than for boys'. The importance of interest as a predictor of reading comprehension varied depending on how interesting the text was. Interest was a stronger predictor of reading comprehension for texts that were more interesting, than texts that were deemed to be less interesting. Another focus of the research was to examine whether texts which are male or female focussed influence pupils' interest for these texts and whether this subsequently impacts on reading comprehension of these texts. The authors used passages that they coded as female focussed, if the text included mainly female characters, or male focussed if the text included mainly male characters. Results showed that for boys there was no significant effect on their reading comprehension performance as to whether the text was female or male focussed, and they did not show an increased interest for the male focussed passages. In contrast, girls' reading comprehension performance was affected by the gender focus of the text, with girls finding female focussed passages more interesting and demonstrating greater comprehension performance for these texts. There is an indication here again that interest is a more important predictor for girls' reading comprehension performance than it is for boys'.

Other researchers have also noted sex differences regarding interest and reading, though have found different results. Ainley et al. (2002) found that, for grade ten students, girls rated all texts as more interesting than did boys in the study. Interestingly however, girls showed greater persistence with texts, particularly the low interesting texts, when compared to boys. The results also suggested, however, that, for both boys and girls, when interest is generated this elicits positive affect and persistence (in terms of whether or not students chose to persevere with reading a text). Perseverance was

also related to students' recall for the text, which highlights that increased interest can influence reading performance. Though the first study discussed indicated that interest is more important for girls' comprehension, others have found evidence to suggest that boys' comprehension is most influenced by interest (e.g., Asher & Markell, 1974; Baldwin, Peleg-Bruckner & McClintock, 1985; Oakhill & Petrides, 2007), or that there are no sex differences in the role of interest on comprehension (e.g., Belloni & Jongasma, 1978). Oakhill and Petrides (2007) asked children about their preference for two different SATs texts, that they would subsequently read, before comprehension of both texts was assessed. In contrast to the findings of Bray and Barron (2004), it was boys' comprehension performance that was affected by their interest, in that they showed significantly better comprehension for the text that they had initially indicated they had more interest in. Though the majority of girls had a preference for one of the particular texts, this did not affect their comprehension performance, with no significant difference evidenced between comprehension performances for both texts. Asher and Markell (1974) found that there was no difference between boys and girls in their reading performance for texts that were of high interest to them. Yet, boys performed poorer than girls for texts of low interest. Baldwin et al. (1985) postulated that pupil interest for a text and comprehension of this text may be influenced by a pupil's degree of background knowledge relating to the text. They found that pupils' comprehension was significantly higher for texts of high interest to them and for texts which they possessed high background knowledge. Both boys' and girls' reading comprehension scores were higher on texts for which they possessed greater background knowledge, but only boys scored significantly higher for comprehension of high interest texts. Examining the existing literature therefore highlights discrepancies in the findings relating to sex differences in the role of interest on comprehension performance.



However, interest can act as a facilitator for reading comprehension and so it is important to account for degree of text interest when examining children's reading comprehension.

*Sex differences in motivation for reading and reading comprehension performance*

Girls tend to show more positive affect for reading than do boys (Lynch, 2002), which could explain sex differences in reading behaviours and reading achievement. Sex differences in reading comprehension performance, favouring girls, have been consistently found, demonstrating that girls outperform boys across cultures (e.g., Chiu & McBride-Chang, 2006; Mullis, Martin, Kennedy & Foy, 2007), at primary school age (e.g., Lynn & Mikk, 2009; Mullis et al., 2007; Stevenson & Newman, 1986) and at secondary school (e.g., Lynn & Mikk, 2009); thus highlighting how long-lasting this sex difference may be. Though, notably, there is considerable overlap in the distribution of boys' and girls' scores throughout and some research has even shown boys to outperform girls (e.g., Baldwin et al., 1985). Lynn and Mikk (2009) found that when analysing data for the reading comprehension performance of boys and girls, aged 10 and 15, girls' superior reading comprehension performance was even greater with age. Bray and Barron (2004) found that across grade levels four to eight, girls significantly outperformed boys on comprehension of a range of text genres. In addition, a significant, though small, positive correlation emerged between gender and reading comprehension, which increased when verbal ability was controlled for. A sex difference favouring females is apparent across a range of ages, which could have a detrimental effect on the educational attainment of males because the ability to extract information and understanding from texts is crucial for learning and educational success.

To further explore sex differences in reading comprehension, Logan and Medford (2011) examined the relationships between competency beliefs, reading motivation and reading comprehension performance, for boys and girls separately. For boys there was a stronger association between their intrinsic motivation and their reading comprehension performance than that for girls. The authors proposed a reciprocal relationship to explain these findings, suggesting that boys' intrinsic reading motivation may be dependent on their reading comprehension performance, or that their comprehension performance may be dependent upon their degree of intrinsic reading motivation. Additionally, there was a closer association between boys' competency beliefs and their reading comprehension performance, therefore indicating that for boys, their perceived ability in reading is an important contributory factor influencing their reading skill. The results illustrate how the motivational processes that influence boys' and girls' reading may differ, although it is not always clear in what way.

#### *Cognitive skills for reading*

It seems logical that children who have poorer general cognitive ability will have poorer text comprehension. Cain and Oakhill (2006) suggest that if reading comprehension is influenced by general cognitive ability, then individuals who are less skilled comprehenders should present with deficits in both their verbal and non-verbal ability. However, Cain and Oakhill (2006) obtained results showing that the majority of poor comprehenders in their sample scored above the sample mean on measures of verbal ability (vocabulary assessments) and a measure of non-verbal ability. Therefore, this indicates that reading comprehension performance may be influenced by specific cognitive and language skills and not by a general deficit in cognition. As such, it is important to examine which specific cognitive skills underpin reading comprehension.

Reading comprehension cannot be explained by a unitary cognitive skill; comprehending a text involves the utilization and integration of various cognitive skills. There are fundamental lexical level skills, including knowledge of vocabulary and word reading skill; sentence level skills, such as understanding of the structure of grammar; and higher-order skills, such as comprehension component skills (e.g., comprehension monitoring, inference making) and working memory (Cain & Oakhill, 2006). The lower level skills are imperative as they allow cognitive resources to be focussed on the higher level cognitive skills that facilitate a meaningful representation of a text (Cain & Oakhill, 2006). Indeed, research has shown that after accounting for fundamental cognitive skills (i.e., word reading ability and vocabulary), working memory and comprehension component skills (i.e., comprehension monitoring and inference making) explain significant additional variance in children's reading comprehension (Cain, Oakhill & Bryant, 2004); which indicates that higher order cognitive skills are also important for reading comprehension. Despite a number of cognitive skill deficits having been associated with reading comprehension difficulties, research in some cases has failed to find any consistent weaknesses in fundamental cognitive skills in children deemed to be poor comprehenders (Cain & Oakhill, 2006). Such discrepancies highlight the need for further research examining the cognitive skills that underpin reading comprehension.

It is important to note that as children's reading skill develops, different cognitive skills will become important contributors to individual differences in comprehension performance (Christopher et al., 2012). For example, when a child is initially learning to read they will rely heavily on phonological decoding skill and word reading skill. However when reading skill has developed, children may no longer need to invest as much cognitive effort on these fundamental cognitive skills, thus allowing

cognitive resources to be utilised for higher level component skills of comprehension (e.g., comprehension monitoring, inference making). Nevertheless, if these fundamental cognitive skills fail to develop sufficiently this is likely to cause problems for later reading. In light of this, any research examining the cognitive skills that give rise to successful comprehension must account for the age of the children being assessed, and the cognitive skills that students are likely to have acquired at this age according to developmental norms. For example, research with children of a very young age (e.g., five years old) should not assess children's comprehension component skills, as children are likely not to have developed these skills, as at this age their reading will be mostly determined by their word reading and phonological skills.

### *Models of reading*

Oakhill, Cain and colleagues have investigated reading comprehension and the cognitive skills that engender comprehension. Such research is particularly useful as it seems that there are some discrepancies in the literature, possibly because much of the research is correlational in nature. As previously outlined, research has shown that comprehension component skills can explain variance in children's reading comprehension after accounting for fundamental cognitive skills (Cain et al., 2004). In contrast, others focus specifically on the fundamental cognitive skills that are the basis of reading comprehension and argue that without these skills, successful reading comprehension would not occur. For example, with regard to theoretical models of reading, Gough and Tunmer (1986) proposed a 'Simple View of Reading'. This perspective suggests that reading relies not only on an individual's ability to decode, but also on their ability to understand sentences, based upon the words presented (linguistic comprehension). Both of these skills are necessary components for reading success, but

are not sufficient. Therefore, both decoding and linguistic comprehension skill are needed for reading comprehension success. Furthermore, Gough and Tunmer state that decoding ability, in this context, does not refer to merely ‘sounding-out’ words, but instead comprises word recognition alongside knowledge and understanding of letter-sound rules. Their reasoning for this is that recognising a word is also dependent on the individual’s understanding of the rules regarding letter-sound combinations. In many reading comprehension models, word recognition is recognised as a vital component (Eason et al., 2012). Research has shown that components of the simple view of reading can explain significant variance in children’s reading comprehension (Tilstra, McMaster, Van den Broek, Kendeou & Rapp, 2009), although the explanatory power of this model across age ranges has been shown to differ (Tilstra et al., 2009). For example, for children aged nine and ten, phonological decoding was more influential for their reading comprehension than for children aged between 12 and 15 (Tilstra et al., 2009).

Another theoretical model of reading is the convergent skills model (Vellutino, Tunmer, Jaccard & Chen, 2007), which postulates that a range of cognitive skills are important for reading comprehension. The convergent skills model is similar to the simple view of reading, though takes into account differences in the predictive ability of several cognitive and language skills, based on developmental variations in reading ability. One proposed element of the model is that for younger readers, who possess less sophisticated reading skill, phonological skill will explain more variance in reading comprehension; whereas for older readers, with more well-developed word recognition skills, language comprehension can explain more variance in comprehension. Although the simple view of reading, in particular, proposes that decoding ability and linguistic comprehension are the fundamental skills for reading (Gough & Tunmer, 1986),

research has highlighted other variables which may hold explanatory power for reading comprehension performance (e.g. Cain et al., 2004). In addition, an alternative argument is that phonological awareness, one element of decoding as described by Gough and Tunmer, is not a precursory skill required for reading comprehension but that it is a skill which develops as an individual learns to read (Blomert & Willems, 2010). As such, learning to read and acquiring a greater breadth of vocabulary would therefore facilitate understanding of letter-sound correspondences. It has also been suggested that a reciprocal relationship exists between reading and phoneme awareness (Shankweiler & Fowler, 2004); positing that phonological skill may provide a basis for reading development, although exposure to discourse may subsequently generate improvements in phonological awareness.

The term cognitive skill encompasses a number of different cognitive mechanisms and research has found significant associations between reading comprehension performance and phonological skill (Goff, Pratt & Ong, 2005; Ouellette, 2006), verbal IQ (Badian, 2001; Cain et al., 2004; Katzir et al., 2009), verbal memory (Badian, 2001; Goff et al., 2005), inference making (Cain et al., 2004), vocabulary knowledge (Cain et al., 2004; Ecalle, Bouchafa, Potocki & Magnan, 2013; Goff et al., 2005; Oakhill, Cain & Bryant, 2003; Ouellette, 2006; Seigneuric, Ehrlich, Oakhill & Yuill, 2000) and syntactic ability (Oakhill et al., 2003; Proctor, Silverman, Haring & Montecillo, 2012). Whilst not exhaustive, these are some of the cognitive and component skills of reading comprehension that have been established as being important for children's reading comprehension and the present thesis will discuss research that has investigated cognitive skills for comprehension.

### *Word Reading*

Word reading ability has been identified as a stable skill and one that is associated with children's reading comprehension performance (Betjemann et al., 2008). Longitudinal research by Betjemann et al. (2008) found that there was a stronger relationship between children's word reading and their reading comprehension when they were first assessed, compared to when they were re-assessed five years later. This could indicate that, although word reading and comprehension are related, word reading ability may be more crucial for reading comprehension at a younger age, whereas at an older age, other cognitive skills may take precedence. Likewise, Cain et al. (2004) found that word reading accuracy was most strongly positively correlated with reading comprehension performance at ages eight to nine, while the correlation was no longer significant by ages 10 to 11. Such a finding, the authors explain, may be due to the fact that when children were assessed at an older age, their word reading was more fluent and, therefore, word reading ability had less of an impact on their ability to comprehend a given text. However, when controlling for age, research has shown that word recognition is still moderately to strongly ( $r = .60$ ) related to comprehension (Ouellette, 2006). Conversely, this implies that word recognition is important for text comprehension throughout reading development and regardless of age and exposure to reading materials.

Nation and Snowling (1998) highlight that there is a difference between word recognition skill and decoding skill in that words which have "regular spelling-sound correspondences" are read with the assistance of decoding skill, whilst words that have irregular spellings may require additional skills, such as whole word recognition, in order for these words to be read. Nation and Snowling found that the poor

comprehenders within their study had weaker word recognition skills when compared to children who were normal comprehenders. Notably, this weaker word recognition was found for words which have an irregular sound-spelling correspondence, which indicates that the poorer comprehenders had semantic processing weaknesses (Nation & Snowling, 1998). This is the case because if children have a semantic processing deficit they will have difficulty in using the context in which an irregular word is presented in order to assist them when reading the word (Goff et al., 2005). In contrast, children who do not have semantic processing deficits will be able to use the context in which a word is presented to establish what the presented word is likely to be (i.e., they make use of the surrounding words within the sentence to assist them). With regard to the research of Nation and Snowling, had the words had regular letter-sound correspondences, then phonological processing skills may have been more influential in the decoding of these words. Goff et al. (2005) also found that irregular word reading skill contributed unique variance to children's comprehension performance and was the strongest single predictor of reading comprehension, which supports the findings of Nation and Snowling.

### *Phonological skill*

Another cognitive skill closely associated with reading comprehension is phonological skill. This comprises a number of different components, one of which is phonological awareness. This refers to the ability to recognise the individual sound units within a word, but also to the ability to manipulate and blend these units of sound to form the full spoken word (Dufva, Niemi & Voeten, 2001; Young & Bowers, 1995). Phonological sensitivity is a more basic form of phonological awareness, as it relates to an individual being able to identify phonological aspects of language, such as rhyme



and alliteration, rather than possessing a clear understanding of the distinct phonemes within a word (Wagner, Torgesen & Rashotte, 1994). With regard to measuring phonological decoding skill, assessing one's ability at pronouncing non-words provides a pure measure of this skill (Gough & Tunmer, 1986; Hulme & Snowling, 2009; Nation & Snowling, 1998), as these words cannot be recognised by 'sight'; instead they require the application of grapheme-phoneme rules to be read accurately. Research has shown that phonological skill, assessed in this way, is positively related to reading comprehension (Goff et al., 2005; Ouellette, 2006; Poulsen & Elbro, 2013). The simple view of reading (Gough & Tunmer, 1986) proposes that phonological skill is one element of decoding necessary for reading comprehension. However, Tong, Deacon, Kirby, Cain and Parrila (2011) found evidence to the contrary. Children were grouped into unexpected poor comprehenders, expected average comprehenders and unexpected good comprehenders, based on their word reading skills and their reading comprehension performance. Results showed that there were no significant differences between children in the three groups in their phonological awareness, suggesting that cognitive skills beyond, or in addition to phonological skill, facilitate text comprehension.

However, a possible explanation for these findings could be related to the stage of reading development at which children were assessed. Research has shown that phonological skills are more instrumental in the reading comprehension of younger children (Vellutino et al., 2007), who will usually inevitably be less skilled readers. In comparison, listening comprehension ability has been identified as a more important predictor of variance in older children's reading comprehension, who are more advanced in terms of word recognition skill (Vellutino et al., 2007). However, this is not to say that phonological skills are no longer important for the reading

comprehension of older children and adults, it is just assumed that the majority of these individuals will possess adequate phonological skills, and so this skill is less likely to explain individual differences in comprehension performance. However, if these individuals did not have sufficient phonological skill then this could affect reading comprehension, and in this case phonological skill would likely be identified as an important skill affecting comprehension.

### *Working memory*

Research highlights that additional cognitive skills facilitate successful text comprehension, particularly higher order cognitive skills. Working memory is integral to reading comprehension, because the effectiveness of the working memory determines the efficiency of particular sub-processes which are important for reading comprehension (Ehrlich, Kurtz-Costes & Loidant, 1993). Being able to comprehend a text relies on an individual's ability to integrate a number of processes that involve the individual remembering what they have just read, having an understanding of word meanings, and then mentally manipulating what they have read, duly enabling them to understand and comprehend the text (Christopher et al., 2012). Working memory capacity has been found to directly predict comprehension performance, predicting additional variance in comprehension after accounting for decoding and vocabulary skill (Seigneuric et al., 2000). However, from the existing literature it is unclear whether or not the importance of working memory for reading comprehension is highly specified. For example, it is not clear whether it is specifically verbal working memory which predicts comprehension, or whether working memory in general can account for variance in comprehension performance, after accounting for the influences of accuracy in word reading and language skills (Goff et al., 2005). A meta-analysis by Carretti,

Borella, Cornoldi and De Beni (2009) indicates that the predictive influence of working memory for reading comprehension is not clear cut. The greatest differences between good and poor comprehenders appears to be in their performance on verbal working memory tasks, as opposed to visuo-spatial tasks, which does indicate that highly specified (verbal) working memory is most predictive of reading comprehension. However, the degree to which tasks exerted high attentional demands was also predictive of comprehension.

Cain et al. (2004) also found evidence to highlight the important role of working memory in children's reading comprehension. Their study found that working memory, as measured by a sentence-span task, was significantly positively correlated with reading comprehension at all ages examined. Moreover, when controlling for word reading accuracy, verbal IQ and vocabulary knowledge, working memory contributed significant further variance to reading comprehension performance at all ages. However, Goff et al. (2005) found that after controlling for age and general IQ and after entering word reading variables (e.g., irregular word reading skill, degree of exposure to print) and language variables (e.g., receptive vocabulary, receptive grammatical skills), the memory variables (e.g., verbal short-term memory, verbal working memory, visuospatial short-term memory) only accounted for an additional 2% of the variance in reading comprehension performance of children in the later years of primary school. This suggests that cognitive skills, such as word reading and language variables, are more instrumental for children's comprehension performance. Overall, research indicates that facets of cognition over and above fundamental cognitive skills, for example working memory efficiency, are important for children's reading comprehension; though the extent to which individual differences in working memory efficiency can explain variations in reading comprehension performance is still unclear.

*Language skills and reading comprehension*

Some researchers argue that children have specific language impairments or deficits in language skills that undermine their reading comprehension skill. Semantic skill is one language skill that has been found to influence children's reading comprehension. Research has demonstrated a significant association between semantic skill and reading comprehension performance (Proctor et al., 2012) and children with poorer comprehension skills have been found to have poorer semantic fluency and semantic processing ability, when compared to children with normal comprehension skills (Nation & Snowling, 1998). Semantic skill is important as it enables a child to confer the meanings of words that they do not know, as they can use contextual cues to determine what the likely meaning of an unknown word is (Proctor et al., 2012).

One specific semantic skill involved in reading comprehension is vocabulary skill, such as receptive vocabulary skill (Hagtvet, 2003). Vocabulary skill is related to semantics because semantic ability basically involves having an understanding of the meaning of words and also being aware that a single word can have a number of meanings, defined as polysemy (Proctor et al., 2012). Vocabulary knowledge can be sub-divided into breadth and depth of vocabulary knowledge; the former relating to the number of words an individual knows and the latter referring to the degree to which an individual has semantic representations of these words (Ouellette, 2006). Measures of vocabulary breadth assess an individual's mental recognition of a word (Proctor et al., 2012), whereas assessments of vocabulary depth assess an individual's understanding of the word's meaning. This distinction is important because a child can recognise a word but may not know what it means.

Vocabulary knowledge has been identified as a significant predictor of reading comprehension (Seignuric et al., 2000) indicating how this skill can explain variance in children's reading comprehension. Vellutino et al. (2007) found that in contrast to phonological skills, semantic ability (e.g., measures of vocabulary and verbal similarities) was uniquely predictive of both younger (grades two and three) and older (grades six and seven) children's reading comprehension. Likewise, Cain et al. (2004) found a significant positive association between receptive vocabulary and reading comprehension, at three different time points that children were assessed. In addition, Nation and Snowling (2004) found that even after entering age, non-word reading skill, phonological skill and non-verbal ability, vocabulary explained significant unique variance in comprehension. Results from these studies signify the importance of vocabulary knowledge for children's reading comprehension across stages of reading development and not merely for young children at the earliest stages of reading.

In a longitudinal study, Kirby, Ball, Geier, Parrila & Wade-Wooley (2011) found that receptive vocabulary ability at grade one was the strongest unique predictor of passage comprehension at grade three, when entered alongside non-verbal ability and socio-economic status. Furthermore, Nation and Snowling (1998) found that children classified as having poor comprehension ability scored significantly lower on measures of expressive and receptive vocabulary compared to children classified as having 'normal' comprehension ability. Collectively these studies indicate that lexical ability is an important cognitive skill for reading comprehension. When assessing the relationship between vocabulary knowledge and comprehension, specifically in relation to depth and breadth of vocabulary, research has shown that measures of vocabulary breadth (e.g., expressive vocabulary, receptive vocabulary) are significantly correlated with reading comprehension (Ouellette, 2006; Proctor et al., 2012). Ouellette (2006)

also found that after taking into account the influence of age, general intelligence (non-verbal IQ), decoding skill and word recognition, expressive and receptive vocabulary shared variance in comprehension performance, and vocabulary depth further accounted for significant unique variance in reading comprehension skill.

When investigating the influence of various cognitive skills on reading comprehension, it is important to consider which cognitive skills are associated with reading comprehension for different text genres. Yildirim, Yildiz and Ateş (2011) examined the relationship between vocabulary knowledge and reading comprehension performance, whilst also assessing the relative importance of vocabulary knowledge for pupils' comprehension of narrative and expository text. There were significant relationships between vocabulary knowledge and comprehension of narrative and expository text, though there was a stronger relationship between vocabulary knowledge and expository text comprehension. That the association between vocabulary and reading comprehension was stronger for expository texts is not a surprising finding as expository texts will likely use more unfamiliar and technical vocabulary and so vocabulary knowledge would be more important for comprehension of this text genre.

### *Syntactic ability*

Some children display language processing difficulties, for example syntactic difficulties. Syntactic awareness refers to having an awareness of sentence structure, but also being able to manipulate sentence structure (Mokhtari & Thompson, 2006) and construct sentences that make sense grammatically (Proctor et al., 2012). It therefore also pertains to having an understanding of grammatical rules (Layton, Robinson & Lawson, 1998) and tasks intended to measure syntactic awareness may involve individuals having to detect sentences that are grammatically incorrect (Hagtvet, 2003).

Syntactic ability has often been associated with reading comprehension performance (Mokhtari & Thompson, 2006; Oakhill et al., 2003; Proctor et al., 2012). However, some have found evidence to suggest that syntactic ability is not fundamental for reading comprehension (Cain & Oakhill, 2006; Layton et al., 1998). For instance, Layton et al. (1998) found that although syntactic training could serve to improve syntactic awareness, there was no evidence to show that improvements in syntactic awareness resulted in improvements in reading comprehension. Therefore, as with much of the research examining the influence of various other cognitive skills for reading comprehension, it seems that there are discrepancies regarding the nature of the relationship between syntactic ability and comprehension, and whether this comprehension component skill can explain differences in comprehension performance.

### *Inference making*

Cain and colleagues have found evidence to suggest that reading comprehension is also influenced by the ability to make inferences from a text (e.g., Cain & Oakhill, 1999; Cain et al., 2004). Inference making, as the term suggests, refers to an individual being able to make inferences from the text that they are reading. An individual may make an inference using information that is explicitly stated within the text. For example, in a study by Oakhill (1982), children had to infer from the following sentences that the mouse ate bread: “The mouse ate some food. The food was bread. The mouse looked for some cheese.” (as cited in Cain & Oakhill, 1999). A child’s ability to make inferences could also be influenced by their general knowledge, or background knowledge that is relevant to the text in question (Cain, Oakhill, Barnes & Bryant, 2001). So, if an individual possesses a large knowledge base pertaining to a text, they are likely to be able to make inferences from this text more successfully than

an individual with little knowledge surrounding the topic of the text, when information to aid inference making is not explicitly stated within the text.

Cain et al. (2001) compared the inferential abilities of skilled and less skilled comprehenders and found that children who were more skilled comprehenders made more inferences than children who were less skilled comprehenders. This was the case even though background knowledge was made available to the same degree for all children. Cain et al. (2001) postulated that this difference could be due to the good comprehenders also having greater comprehension monitoring ability, meaning that these individuals were monitoring their understanding of the text more frequently than the poorer comprehenders. As a result, they were more aware when inferences were needed to be made from the text, to allow them to fill in any details that were absent in the text, thus enabling them to make textual inferences more successfully (Cain et al., 2001). Again, this research demonstrates the importance of higher level cognitive skills for reading comprehension. However, Cain, Oakhill and Bryant (2000) discuss how the methodology of much of the research regarding higher order cognitive skills, such as inference making, has usually been correlational. Therefore, it is not possible to determine the directionality of the relationships, or indeed any causality. For example, it could be that possessing good inferential skills leads to greater comprehension (Oakhill & Cain, 2000), or alternatively, individuals classed as good comprehenders may have more experience with texts, wider vocabularies and consequently have greater inferential skills (Cain et al., 2000; Oakhill & Cain, 2000). Oakhill and Cain (2000) propose that a methodology which has involved a “comprehension-age match design”, despite being unable to infer causality, can indicate whether a particular skill is likely to have given rise to comprehension skill, or is more likely to be a result of comprehension ability. Research using this type of design (Cain & Oakhill, 1999) found that the



comprehension-age matched children in the sample (typically developing children, younger than the less skilled comprehenders but matched on comprehension ability) were significantly better at making text connecting inferences than the less skilled comprehenders. This implies that inference making is not a product of reading comprehension, but is instead a skill that leads to greater reading comprehension ability, as younger children would be expected to have had less experience with texts than older children, yet the younger children still demonstrated superior performance.

*Research examining multiple cognitive skills for comprehension*

A study conducted by Oakhill et al. (2003) aimed to examine the ability of various cognitive and comprehension component skills in predicting variance in children's reading comprehension. Children were assessed at two time points and the results showed that when first assessed, children's reading comprehension was significantly positively correlated with receptive vocabulary, verbal IQ, syntactic ability, verbal working memory, phonological awareness, comprehension monitoring and text integration skills. Integration refers to the extent to which an individual can process a text as a whole and form a meaningful representation of a text; for a child the processing of a text at the local level may not be difficult, however they may have problems with processing a text as a whole (Cain et al., 2001). Of these skills, reading comprehension was most strongly positively correlated with comprehension monitoring (a comprehension sub-component) and phonological awareness (assessed using a task whereby the child was presented with four words and had to decide which out of the four words did not start or end with the same sounds as the other words). When assessed at a second time point, the variables most strongly positively correlated with comprehension were receptive vocabulary, sight vocabulary, syntactic ability and

inference skills. Also, those skills showing small to moderate positive correlations with reading comprehension were phonological awareness, comprehension monitoring, verbal working memory, digit working memory and students' understanding of literal information within text. Multiple regression analyses illustrated that for both time one and time two, receptive vocabulary and verbal IQ contributed significant unique variance to reading comprehension. However, when additional variables were added to the model, including verbal working memory, knowledge of story titles, comprehension monitoring, integration/inference making skills and phonological awareness, each contributed significant further variance to reading comprehension. A conclusion that can be drawn from this study is that reading comprehension is underpinned by several cognitive skills including verbal IQ and measures of vocabulary, but also more complex language skills such as comprehension monitoring and inference making. The results further indicate that not just one single cognitive skill overwhelmingly explains children's reading comprehension.

Though different statistical analyses were employed, Cain and Oakhill (2006) obtained similar findings to those of Oakhill et al. (2003). Cain and Oakhill conducted a longitudinal study, with children aged seven and eight, and found that compared to poor comprehenders, good comprehenders scored significantly higher on measures of receptive vocabulary, comprehension monitoring, verbal working memory and inference making, yet there was no significant difference in performance on the measure of syntactic ability. Cain and Oakhill point out that, although there was a difference between the receptive vocabulary abilities of the good and poor comprehenders, the poor comprehenders still achieved scores that were age-appropriate. Therefore, despite observed differences between the two groups in their receptive vocabulary ability, the poor comprehenders did not have a receptive vocabulary deficit as such. With regard to

the measure of verbal intelligence, a large proportion of the children with low levels of comprehension skill displayed verbal IQ scores that were lower than their age-appropriate scores, which could indicate that poor comprehenders have a fundamental verbal skill deficit. However, when examining poor comprehenders' performance IQ scores, these were comparable with their verbal IQ scores, suggesting that these children do not have a specific verbal deficit (Cain & Oakhill, 2006). This indicates that there are individual differences in the skill deficits that perhaps underpin poorer reading comprehension skill. Examining children's SATs performances three years later showed that children who were good comprehenders scored significantly higher on SATs assessments in Maths, Science and English compared to children who were poor comprehenders. It seems then that comprehension skill may influence later educational attainment, which should prompt educators to consider the importance of early remediation for children displaying comprehension difficulties.

Cain et al. (2004), as previously discussed, examined the simultaneous ability of several variables to predict children's reading comprehension, including verbal ability and working memory. Several skills at the higher level of language processing were also examined, such as understanding of story structure, inference making and comprehension monitoring. Comprehension monitoring refers to a child's ability to assess their understanding of a story whilst reading it (Paris & Myers, 1981) and their ability to predict which parts of a story they are likely to have difficulty understanding, therefore allowing them to dedicate more time to the comprehension of this part of the text (Weaver & Bryant, 1995). Individuals who are poorer at comprehension monitoring are less likely to recognise any mistakes and inconsistencies within a text (Oahkill & Cain, 2000). Cain et al. (2004) found that when first assessed (ages seven to eight), children's age-equivalent scores on measures of word reading skill and reading

comprehension were in accordance with the children's mean chronological age.

Though when assessed again, one and two years later, the results showed that children's age-equivalent scores for their word reading skill were higher than their chronological age, yet their age-equivalent scores for their reading comprehension were lower than their chronological age. The authors noted that despite children possessing word level reading skills that should enable them to be competent readers, this did not necessarily mean that children developed the skills to comprehend a given text. Seemingly, possessing good word reading skill is not sufficient to enable a child to comprehend a text. It is possible that children may score highly on measures of word reading skill as they are very familiar with the words that they are exposed to. However, this does not mean that a child has an understanding of the meaning of particular words, which is necessary for comprehension.

#### *Reading comprehension in different orthographies*

A final point to note regarding cognitive skills and reading is that the cognitive skills influencing reading comprehension may vary across nations, dependent upon its orthography. This notion is termed the 'script dependent hypothesis' (Geva & Siegel, 2000). Consequently, reading comprehension research and its findings are highly specific to particular orthographies and researchers and practitioners must ensure that they interpret the findings accordingly. The orthography in some nations is far more transparent and regular than the deep, irregular English orthography; letter-sound correspondences are far more complex in deep orthographies (Geva & Siegel, 2000). Due to this, phonological processing skill may, for instance, be more important for a child's reading comprehension depending on the orthography in which a child is learning to read. Indeed, research conducted in different orthographies from English,

such as in Norway, has shown that phonological skill directly influences reading comprehension (e.g., Engen & Høien, 2002). However, research has also shown support for both the ‘script dependent hypothesis’ and the ‘central processing hypothesis’ (eg., Geva & Siegel, 2000), the latter of which essentially suggests that the same cognitive skills are necessary for reading in different orthographies (Geva & Siegel, 2000). For example, research found that for students classified as trilingual, phonological skill was significantly associated with their word reading skill across three different orthographies, including English and two relatively shallow orthographies (Abu-Rabia & Siegel, 2003).

*Cognitive skills and reading comprehension: Concluding comments*

In conclusion, although research highlights the importance of higher level cognitive skills and broader language skills for reading comprehension, without mastery of the lower level cognitive skills, such as word recognition and vocabulary knowledge, the higher order skills could not be utilised to facilitate text comprehension.

Establishing what the fundamental cognitive skills for reading comprehension are means that such skills can be fostered in the classroom at an early age to ensure these skills are at a sufficient level to support a child’s reading comprehension. Cain and Oakhill (2006) discussed how, in terms of remediation of reading comprehension, it would be very disheartening if less skilled reading comprehension was a result of possessing deficiencies in all of the skills that are necessary for reading comprehension.

It is likely that there are individual differences in the cognitive skill deficiencies that undermine a child’s reading comprehension. As outlined previously (e.g., the convergent skills model of reading; Vellutino et al., 2007), there are also age and developmental differences regarding the cognitive and language skills that are most

important for reading comprehension. Notwithstanding, it is still of essence to establish which skills are most commonly deficient in children who demonstrate less skilled comprehension to then enable effective remediation for these children. Furthermore, researchers should not perceive comprehension as being shaped by an individual's degree of ability in terms of lower level and higher level reading-related skills, but should consider children's language and cognitive skills and the integration of these skills for reading comprehension (Cain & Oakhill, 2006).

#### *Reading motivation and cognitive skills for reading comprehension*

As discussed throughout, reading research has examined the relationships between motivational factors and reading comprehension and has investigated the influence of a range of cognitive skills and their relationship with reading comprehension. However, a large proportion of the research into reading comprehension has focussed on these motivational and cognitive variables independently, examining their individual predictive ability for reading comprehension performance, with remarkably few researchers examining these factors together in a single study. Investigating the influence of both cognitive and motivational factors on reading comprehension in a single study, provides a far more comprehensive account of the relative contribution of each of these factors and how each underpins reading comprehension. Early longitudinal research by Stevenson and Newman (1986) considered the relationships between children's cognitive skills and their reading and mathematics achievement, whilst also considering affective factors. A range of cognitive skills assessed before children entered kindergarten (ages four and five) were positively associated with reading comprehension at grades five (ages ten and 11) and ten (ages 15 and 16), including vocabulary skill and word recognition. Affective factors

assessed were self-concept, expectancy, value and perceived difficulty (e.g., of reading or mathematics). Similar patterns of relationships emerged for boys and girls across year groups, in relation to their reading achievement and their attitudes and positive affect for reading, though all associations were considerably larger for girls. For both boys and girls, there were significant positive associations between their reading achievement at grades two, three and five and their reading self-concept, expectancy and value of reading at grade ten. The results also showed that boys' and girls' reading achievement in grades three and five, predicted their reading self-concept and their expectancy at grade ten, though reading achievement was more consistently predictive of girls' expectancy and self-concept. There were also observed sex differences in achievement, with girls displaying superior reading achievement in decoding, at grades two and five, and comprehension at grades two and three. These findings indicate that children's previous reading achievement influences their later perceptions of their reading ability. If a pupil performs well on reading activities and consequently thinks they are a competent reader, they may then be keener to engage in reading activities. However, these findings are not informative of how motivation relates to current or future reading achievement.

Taboada et al. (2009) also investigated the influence of both cognitive and motivational variables on reading comprehension performance. Cognitive skills examined were students' background knowledge pertaining to the text they were reading and students' use of cognitive strategies, such as the type of questions students generate about the text they are reading. Regarding motivation, the authors proposed a construct termed *internal motivation for reading*, which they argued comprises five dimensions including interest, perceived control, social collaboration, involvement and self-efficacy. Multiple regressions demonstrated that, when controlling for each

variable, the cognitive variables (student questioning and background knowledge) and motivational variables each independently contributed significant further variance to children's reading comprehension performance. The authors highlighted that the research was the first to control the effects of cognitive variables, when examining the influence of internal motivation on children's reading comprehension performance. Motivation seemingly predicts additional variance in reading comprehension after accounting for cognitive skills.

Examining the influence of cognitive and motivational factors on a single cohort of children with wide ranging abilities is only informative of the underlying factors that predict comprehension performance for these children as a whole. Ehrlich et al. (1993) divided children into good and poor comprehenders, enabling them to identify those factors which best explain variance in the comprehension of good comprehenders, and those which best explain variance in the comprehension of poorer comprehenders, meaning that any differences could be pinpointed. For the whole sample and for good comprehenders, word recognition and academic self-concept (for subjects which involve verbal skill, e.g., spelling and foreign languages) were positively related to comprehension performance. Yet for poor comprehenders, academic self-concept was not related to their comprehension, though word recognition was. With regard to the factors underlying comprehension, for the whole sample, metacognitive knowledge (e.g., the use of comprehension monitoring and understanding of text features related to comprehension) and word recognition explained variance in comprehension. However, only self-concept for the good comprehenders, and word recognition for the poor comprehenders, explained variance in reading comprehension. Perhaps word recognition accounted for variance in the reading comprehension of children with poorer comprehension skill because these children were more dependent on this lower



level cognitive skill. In comparison, children who are better comprehenders are likely to possess sufficient word recognition skills and so it is possible that other cognitive factors, not assessed in this study, such as higher order cognitive skills, may be better predictors of differences in comprehension amongst these children.

Similarly, Logan et al. (2011) conducted a study whereby children were categorised as low or high ability readers. The study aimed to establish the differential importance of intrinsic motivation on reading comprehension performance for children classified as either high or low ability readers. Cognitive skills were assessed (verbal IQ, phonological decoding skill) to determine whether intrinsic motivation explained further variance in reading comprehension, after accounting for fundamental cognitive skills for reading comprehension. Correlation analyses exhibited significant positive relationships between verbal IQ, phonological decoding skill, intrinsic motivation and reading comprehension performance for all children. However, regression analyses showed that for the whole sample, only verbal IQ and phonological decoding skill accounted for significant variance in reading comprehension. Notably, regression analyses further showed that for high ability readers, only verbal IQ explained significant variance, whereas for low ability readers, phonological decoding and intrinsic reading motivation accounted for significant variance in reading comprehension performance. Thus, the results demonstrate how intrinsic motivation appears to be more important for readers of low ability. The authors proposed that children who are poorer at reading may need to be more intrinsically motivated to read in order to persevere reading a text, as they will find this text more difficult than their high ability peers.

Sideridis et al. (2006) conducted research in Greece with children in grades two to four. Both cognitive and motivational variables were assessed for children classed as typical readers or as having reading comprehension difficulties. Students with reading comprehension difficulties scored significantly lower on measures of vocabulary (receptive and expressive) and motivation (curiosity, challenge and competition). As children with reading comprehension difficulties performed significantly poorer on measures of vocabulary, this is an indication of the importance of vocabulary knowledge for reading comprehension and is consistent with other research highlighting this. Further analyses also showed that, across the sample, expressive and receptive vocabulary were the strongest cognitive predictors of reading comprehension difficulties and that, overall, difficulties in comprehension were mostly explained by cognitive skills rather than motivational variables.

Research by Lau and Chan (2003) demonstrated that the relationship between cognitive and motivational factors and reading comprehension is similar across cultures. In this study, Chinese students, aged 11 to 16, were assessed and a significant positive association was found between students' intrinsic motivation and reading comprehension. A significant positive relationship also emerged between students' extrinsic motivation and reading comprehension, though this relationship was weaker. Moreover, students were divided into good and poor comprehenders and, of all motivation measures assessed, the two groups only significantly differed in their intrinsic motivation, with poor comprehenders showing lower intrinsic motivation. Regarding cognitive strategies, it was found that good comprehenders were more accurate at detecting errors in text, reading unfamiliar words and were better at inferring meaning from texts and summarising ideas within texts. These findings illustrate the

importance of considering both cognitive skill and motivation for pupils' reading performance.

In order to develop a clearer understanding of the influence of cognitive variables, motivation and reading frequency on reading comprehension, Guthrie et al. (1999) examined how each predicted reading comprehension performance. In their first study, with students in grades three and five, cognitive variables analysed were pupils' past achievement on a reading assessment and their background knowledge for topics included in the passages used in the study. Motivational factors examined were reading motivation (intrinsic and extrinsic motivation combined) and students' reading self-efficacy. Pupils' comprehension performance was assessed in two ways: passage comprehension and conceptual learning from multiple texts. Passage comprehension measured students' narrative and informational text comprehension, whereas conceptual learning from multiple texts referred to pupils' abilities to search texts and to identify information related to the topics being examined in the assessments. Correlation analyses showed that both cognitive variables (past achievement and background knowledge) were significantly positively associated with passage comprehension and with text comprehension in terms of conceptual learning. However, neither reading motivation nor reading self-efficacy were significantly positively associated with either of the text comprehension measures. Regression analyses further showed that each of the cognitive variables and reading amount predicted significant unique variance in passage comprehension, although when reading motivation and self-efficacy were added neither contributed significant unique variance. This indicates that cognitive skills explain a significant proportion of the variance in students' text comprehension and that students' reading motivation, when assessed in this way, may have little impact on comprehension. However, a subsequent regression model showed that reading

motivation predicted significant unique variance in students' reading amount, and because reading amount contributed significant variance to children's comprehension, this implies that reading motivation may indirectly influence comprehension performance through moderation of children's reading amount. Also, correlational analyses yielded significant positive associations between reading motivation and reading amount, between reading self-efficacy and reading amount and also between reading amount and both measures of text comprehension. A second study, with students in grades eight and ten, showed that reading motivation significantly predicted text comprehension, when other variables were controlled (i.e., socio-economic status, past achievement, reading amount and reading efficacy), which shows that, across development, motivation may function differently with regard to its impact on reading comprehension.

For the most part, researchers have used the intrinsic-extrinsic construct of motivation when investigating the relationships between motivation and reading comprehension performance. However, Anmarkrud and Bråten (2009) considered how motivation, in terms of expectancy-value theory, could predict students' reading comprehension performances on a social studies text. Students in the ninth grade were assessed on their value of reading and their perceived efficacy in reading, with additional variables being controlled for (gender, students' previous grades, background knowledge, and reading strategy use). The subsequent findings showed that when controlling for these variables, value of reading explained significant further variance in students' reading comprehension performance. Therefore, the findings illustrate how motivation can explain variance in pupils' comprehension, after accounting for cognitive variables (e.g., background knowledge, reading strategy use). The authors suggested that perceived efficacy in reading may not have accounted for significant

further variance in reading comprehension, due to possible shared variance with other variables.

More recently, Netten et al. (2011) conducted research in the Netherlands, attempting to develop a multi-factor model that could explain reading literacy both for children who converse in their first language, but also for children who are second language learners. The reading literacy performance of children who were first language learners (children who are not learners of a second language) was best explained by their literacy ability two years previously. However, linguistic skill (semantic and syntactical skill) and decoding were also moderate predictors of reading literacy. Reading motivation and academic self-confidence (how well children believed they performed at school) were also weak, but still significant predictors of reading literacy. Similar findings were demonstrated for second language learners, though academic self-confidence was instead a strong predictor of reading literacy. These results are in line with the simple view of reading (Gough & Tunmer, 1986), illustrating that decoding ability and linguistic skill are important for reading comprehension. Though, the findings also demonstrate that beyond cognitive skills, reading motivation may further contribute to comprehension skill. In addition, children's beliefs and confidence in their academic ability also appear to further explain comprehension skill, though one perhaps has to question the direction of this relationship. For example, it could be that children who are very confident in their ability and believe that they perform well in school are the children that actually do perform well in school, thus explaining their superior reading comprehension, as opposed to their superior comprehension performance being influenced by their level of confidence.

*Text features, text interest and children's text preferences*

Text features can influence children's comprehension performance. Studies have found that specific characteristics of text can elicit situational interest and that this can subsequently influence reading comprehension performance (Hidi & Harackiewicz, 2000). Also, sex differences have been found in relation to the influence of interest on comprehension, with boys in particular showing better comprehension for high interest texts (Baldwin et al., 1985; Oakhill & Petrides, 2007). As text interest may differentially affect the performance of boys and girls on measures of reading comprehension, it is therefore important to identify those specific factors that elicit interest for boys and those which evoke girls' interest. There may be certain text features which boys and girls find differentially interesting, which could result in boys and girls exhibiting different levels of comprehension skill for texts that incorporate these different text features. It is essential to investigate this possibility because high stakes tests in the UK, such as SATs, GCSEs and A-Levels, use the same reading materials for males and females; thus it is crucial that a text is not biased towards one sex, especially if this could subsequently affect performance. Additionally, gaining a greater insight into reader preferences can aid in the construction of test materials that are of high interest (Beyard-Tyler & Sullivan, 1980).

Research has shown that both boys and girls find stories less interesting when the protagonist is of the opposite sex, though boys' interest was more strongly influenced by sex of the protagonist (Bleakley, Westerberg & Hopkins, 1988). Furthermore, Connor and Serbin (1978) found that whilst boys showed a significant overall preference for stories with a male protagonist, girls did not show an overall significant preference for stories with a female protagonist. However, a preference for

same-sex protagonists has been documented in both pre-school children (Kropp & Halverson, 1983) and adolescents (Beyard-Tyler & Sullivan, 1980). Greater preference and interest for stories with a same-sex protagonist can also translate to improved performance. For instance, Daly, Salters and Burns (1998) found that, for children aged 8 and 11, boys' recall for a text with a male protagonist was better than girls' performance for this text. Moreover, there were particularly large differences between girls' and boys' recall for a text with a female protagonist, with girls showing superior immediate and delayed recall for this text. On the other hand, research has also shown that, in spite of children finding stories with a same-sex protagonist more interesting, this did not result in greater comprehension performance (Bleakley et al., 1988).

Murphy and Ross (1990) found, when presenting maths story problems to students, that those who were given a story problem with a protagonist of a preferred sex (students chose whether they would like to work on the story problem with a male, female or mixed protagonists) performed significantly better than those students who worked on a maths story problem with mixed gender protagonists. However, it should be noted that this finding was not consistent across both schools within the sample. Students were also found to prefer the maths story problems with same-sex protagonists, therefore girls tended to prefer the story with a female protagonist, whereas males tended to prefer the story with a male protagonist. However, there was no significant difference in the performance of students who worked on maths story problems with a same-sex protagonist and those who worked on story problems in which the protagonist was of the opposite sex.

In more recent research, Graham, Tisher, Ainley and Kennedy (2008) examined students' engagement in reading and how this is influenced by gender and students'

levels of self-efficacy, self-handicapping and also their achievement goals. The authors selected two narrative fiction texts, one that was deemed to be more interesting for males and one that they expected would be more interesting for female readers. The basis for the selection of the stereotypically male-oriented text was that it had a male protagonist and the story involved physical action. In contrast, the stereotypically female-oriented text had a female protagonist, with an emotion and relationships based storyline. Students gave interest ratings for both of the texts based on the story titles and a small description of the theme of the story. The results showed that, as expected, the female pupils rated the female-oriented text significantly higher in interest than did the male students, and males gave significantly higher interest ratings for the male-oriented text than did the female students. Moreover, 70.6% of the female students chose to read the female-oriented text first and 76.9% of the male students chose to read the male-oriented text first. In terms of interest and reading performance, female students performed significantly better than male students on questions pertaining to their recall and understanding of their preferred text, highlighting that in this case text interest was a more important contributor to the reading performance of female students than male students.

The type of interest that is measured must also be considered. Graham et al. (2008) measured interest both before students read the texts (interest rated based on story titles) and also on-task (interest in the texts was assessed whilst in the process of reading). These two different measures of interest generated different results, with girls' on-task ratings of interest for the male-oriented text being higher than their initial ratings of interest for this text. In contrast, boys' ratings of interest for the male-oriented text decreased from their initial rating to their on-task interest rating. Notably, interest assessed whilst reading was not a significant predictor of reading performance



on students' first choice text, though it did contribute significant variance towards students' reading performance for their second-choice text (the text that was usually rated as less interesting). Therefore, it is essential to construct a clear, operational definition of interest, as results can differ dramatically depending on when, how and what type of interest is being assessed.

Text theme is another textual feature that may influence children's interest for a text. Research has tended to highlight a female preference for texts that incorporate themes of emotion, romance and relationships (Coles & Hall, 2002; Graham et al., 2008). A National Literacy Trust report, investigating the reading preferences of children in primary and secondary schools, found that books about romance and relationships were read by a significantly larger percentage of girls than boys (Clark & Foster, 2005). Likewise, Coles and Hall (2002) found that there was a large difference in the percentage of boys and girls that read books relating to relationships and romance, with a substantially larger percentage of girls reading this type of book, whereas boys read more science fiction and sports related books. Although there are differences between boys and girls in their reading preferences, what is not so clear is whether these differences in text preference result in differences in comprehension performance.

#### *Children's text genre preferences and comprehension performance for different text genres*

Reviewing the literature, there also seems to be a paucity of research comparing children's reading comprehension performance for different text genres, namely fiction and non-fiction texts. Furthermore, as previously highlighted, research has examined children's preferences for reading, but has very infrequently expanded this to determine

whether text genre preferences influence comprehension performance. Examining preferences for different text genres is likely to give an indication of the texts that children find most interesting and enjoyable, because when choosing a preferred text a child is likely to pick the text genre that they find most interesting over one that they find uninteresting. In school, pupils are required to read a range of different texts. For instance, a text may be narrative, whereby the text has a story structure and is written to be engaging and entertaining (Basaraba et al., 2013). In contrast, texts may be expository/informational, in which the main function of these texts is to inform the reader about a particular topic (Basaraba et al., 2013; Eason et al., 2012). At school, children are more familiar with narrative texts to begin, though as children move through school they are more frequently exposed to expository texts (Graesser et al., 2011). It is also often presumed that children prefer narrative texts (Guthrie et al., 2007). In addition to texts having different purposes for reading, there are other aspects that may differ between texts. For instance, texts can be fictional, non-fictional, or functional, such as a text that is a set of instructions on how to do something (Eason et al., 2012).

On account of the variety of text genres that children are expected to read, it is crucial that when assessing reading comprehension, consideration is given to the genre of text that comprehension will be assessed upon, and that comprehension performance for one genre of text is not generalised to other text genres. It could be that a pupil performs more successfully on a reading comprehension assessment examining their ability to comprehend a narrative fiction text, as opposed to an expository text. Indeed, research has demonstrated that children show a general superior comprehension performance for narrative over expository texts (Best, Floyd & McNamara, 2008; Diakidoy, Stylianou, Karefillidou & Papageorgiou, 2005). Perhaps pupils have greater

familiarity with the structure of fiction texts, consequently resulting in superior comprehension performance for this text genre. Or perhaps expository texts require greater cognitive skill, due to more complex and unfamiliar vocabulary, or require more extensive background knowledge. In fact, research has shown that children's background knowledge accounts for a large amount of variance in their comprehension of expository texts (Best et al., 2008).

In terms of fiction and non-fiction reading, a report by the National Literacy Trust, as mentioned previously, found that 51.5% of children chose to read fiction books outside of school, compared to only 27.5% of children that chose to read factual books; illustrating, in general, a preference for fictional texts over non-fiction texts (Clark & Foster, 2005). Children in general may show preferences for one text genre over another, though there are likely to be individual differences in reading preferences. Research has however indicated that there are sex differences in reading preferences. The National Literacy Trust report found that a higher percentage of girls than boys read fiction books outside of school, and that a higher percentage of boys than girls read factual books (Clark & Foster, 2005). Similarly, Simpson (1996) explored the reading preferences of boys and girls aged ten to 12 years and found that girls in the study almost always read fiction texts, whereas boys were more varied in their reading choices. Merisuo-Storm (2006) examined the reading preferences of boys and girls aged ten and 11 and found that girls least liked reading non-fiction books, whereas boys stated that they would least like having to read poems, fairy tales and stories. Furthermore, a survey of children's reading choices (ages ten to 14) showed that, overall, a higher percentage of children read fiction compared non-fiction texts, although, of those children that did read predominantly non-fiction texts, 78% were boys (Coles & Hall, 2002). Mohr (2006) found that, overall, both boys and girls (*M* age

= 7.7 years) preferred to read informational and non-fiction texts, though girls were more varied in their choices than boys.

Although research has highlighted an apparent sex difference in reading preferences, it is important to determine whether children's comprehension performance differs across different text genres. Topping, Samuels and Paul (2008) found that, of children's total book reading, non-fiction books made up a higher proportion of boys' book reading than it did girls'. In contrast, fiction book reading made up a higher proportion of girls' book reading than it did boys'. The results also showed that non-fiction reading was negatively associated with reading comprehension performance and that children scored lower on comprehension for non-fiction texts compared to fiction texts (Topping et al., 2008), suggesting that texts of this genre may be more complex and harder for children to comprehend. However, it is not explicitly clear whether having a preference for a particular text genre translates to superior comprehension performance for this text genre over another. Moreover, perhaps a child's motivation for reading will be more important for their comprehension of a text that is of a genre that they dislike or have less positive affect towards. Cognitive skill requirements may also vary depending on text genre; for example, text genres have different purposes for reading and therefore may place different demands on various cognitive skills. This could mean that a child's comprehension performance for one text genre may not be a representative or comprehensive indication of their comprehension ability (Eason et al., 2012). Research investigating the influence of cognitive and motivational factors on reading comprehension has sometimes assessed comprehension using texts of different genres (e.g., Guthrie et al., 1999). However, this research has not explicitly investigated whether the influence of motivation and cognitive skill differs across text genres, such as for fiction and non-fiction texts.

Eason et al. (2012) questioned whether different types of text and questions vary in difficulty for children and whether they therefore require the use of different cognitive components. The text genres compared included narrative, expository and functional texts. Cognitive skills assessed were single word reading, receptive vocabulary, listening comprehension (assessed in terms of inferencing and ability to deduce from scenarios) and more complex cognitive skills (such as planning, organisational and inferential language skills). An analysis of variance showed that children's comprehension of functional texts was better than comprehension of narrative or expository texts. However, no significant difference emerged between comprehension performance for narrative and expository texts. Regression analyses indicated that word recognition and receptive vocabulary were significant unique predictors of reading comprehension performance, across each of the text types. Furthermore, for expository texts only, inferencing and planning and organising skill explained significant unique variance in comprehension. The authors explain that despite no significant difference between comprehension of narrative and expository texts being identified, comprehension of expository texts is more reliant on higher-order cognitive skills. It appears that for all text genres, the fundamental lower order cognitive skills are integral to comprehension; however, more complex cognitive skills may differ in their importance for text comprehension, depending on text genre.

#### *Aims and hypotheses*

Two studies are documented within this thesis. The studies are twofold in that they examine the importance of cognitive and motivational factors for children's comprehension of different text types and, in addition, the studies examine whether motivational constructs can explain significant variance in reading comprehension, over

and above cognitive skills. Furthermore, regarding the ability of motivation to predict additional variance in children's comprehension, the studies also seek to determine whether different motivational constructs differ in their predictive ability. These studies expand on the existing research, for which there does not appear to be an individual study that concurrently examines the importance of both cognitive skills and motivational factors for children's reading comprehension of different types of text. Previous research has exclusively examined how such factors may influence children's reading comprehension of a specific text/genre of text, or has not explicitly compared the influence of these variables on comprehension of different texts. Moreover, research examining the motivational factors that influence comprehension, has not been as extensive as research investigating the cognitive skills that underpin reading comprehension. The inclusion of a multitude of factors that may influence reading comprehension performance should provide a more comprehensive view of reading comprehension performance for different types of text. The two studies also consider whether there are differences in the cognitive skills and motivational factors that predict boys' and girls' reading comprehension for different text types.

### *Study One*

The first study presented investigates how important cognitive skills, in terms of vocabulary knowledge and phonological decoding skill, are for children's comprehension of narrative fiction texts that are female or male-oriented. The study also aims to examine the relative importance of motivational factors for children's comprehension of these different texts, specifically children's intrinsic reading motivation, expectancy and value of reading and text-specific motivation. The study also aims to establish whether motivational variables can explain any further variance in

children's comprehension of the male and female-oriented texts, after accounting for fundamental cognitive skills.

The male-oriented text in the present study is classified as such due to the male protagonist. Equally, the female-oriented text in the present study is classified as such due to the female protagonist and the themes of family and relationships that run through the story. Research has shown that young children and adolescents have a preference for same-sex protagonists (Beyard-Tyler & Sullivan, 1980; Kropp & Halverson, 1983). Therefore, it is hypothesised that significantly more girls than boys will show a preference for the female-oriented text, and that significantly more boys than girls will show a preference for the male-oriented text. Previous research has shown that motivational variables are associated with reading comprehension (Anmarkrud & Bråten, 2009; Lau & Chan, 2003; McGeown et al., 2012; Park, 2011; Wang & Guthrie, 2004). Therefore, an additional hypothesis is that motivation factors (intrinsic reading motivation, expectancy, value of reading, text-specific motivation) will be significantly associated with reading comprehension for both texts, and that this relationship will hold true for both boys and girls. Moreover, existing research has indicated that, in addition to cognitive skills, motivation is also important for pupils' reading comprehension. For instance, Lau and Chan (2003) found that poor comprehenders were not only poorer at using cognitive strategies, but that they also scored lower for intrinsic motivation. In addition, research has also shown that motivation accounts for significant further variance in comprehension after cognitive variables (e.g., Anmarkrud & Bråten, 2009; Taboada et al., 2009). It is therefore predicted that motivation factors will explain significant variance in children's reading comprehension of both texts, over and above that explained by cognitive skills. As outlined above, it is expected that boys will have a preference for the male-oriented text,

due to greater interest in this text, and that girls will have a preference for the female-oriented text, due to greater interest for this text. As such, it is also predicted that motivation factors will be more important for girls' comprehension of the male-oriented text and for boys' comprehension of the female-oriented text.

### *Study Two*

Similar to study one, study two also examines the importance of cognitive skills and motivational factors for children's reading comprehension. However, the influence of cognitive skills and motivational factors for children's comprehension are compared for different text genres. Previous research has assessed children's comprehension using different text genres, e.g., narrative and informational texts (Guthrie et al., 1999); however this research has not explicitly compared the influence of various factors on pupils' comprehension of these texts separately. Furthermore, there appears to be no study that incorporates both cognitive skills and motivational factors to investigate reading comprehension for different text genres. Moreover, researchers have generally made distinctions between narrative fiction texts and expository texts when examining reading comprehension, and have tended not to compare texts that are narrative fiction, with texts that are narrative non-fiction. Hence, in study two, the importance of cognitive skills and motivational factors for children's comprehension of fiction and non-fiction texts is investigated.

The existing literature indicates that girls, in particular, are less interested in non-fiction texts (Merisuo-Storm, 2006) and that they have more of a preference for fiction texts (Clark & Foster, 2005; Simpson, 1996). In comparison, research has shown that a higher percentage of boys than girls read factual books (Clark & Foster, 2005) and that of children who read non-fiction books, a large percentage of these



children were boys (Coles & Hall, 2002). These findings indicate that boys show greater positive affect for non-fiction texts than do girls. However, research has also indicated that both boys and girls tend to show a preference for fiction texts, over non-fiction texts (e.g., Clark & Foster, 2005; Coles & Hall, 2002). Nevertheless, it is hypothesised that significantly more girls than boys will show a preference for the fiction text and that significantly more boys than girls will show a preference for the non-fiction text. As in study one, it is also predicted that motivation factors (intrinsic motivation, expectancy and value of reading, text-specific motivation) will be significantly related to comprehension for both texts, and that this relationship will hold true for both boys and girls. It is also hypothesised, as in study one, that motivation will explain significant further variance in children's comprehension of the fiction and non-fiction texts, after accounting for cognitive skills. As previously stated, girls tend to show a greater preference for fiction texts, compared to non-fiction texts, whilst boys often show a greater preference for non-fiction texts than do girls. It is therefore predicted that motivation will be more important for girls' comprehension of the non-fiction text and for boys' comprehension of the fiction text. Furthermore, it is expected that the importance of motivation for comprehension, will be more pronounced for girls' comprehension of the non-fiction text, as some studies have indicated that both boys and girls prefer fiction texts over non-fiction texts (Clark & Foster, 2005; Coles & Hall, 2002). As outlined previously, a further aim of the current research is to examine whether different motivational constructs are differentially predictive of children's comprehension of different text types. No hypotheses are made regarding this aim, as I am aware of no other study which has explicitly compared the influence of different motivational constructs on children's comprehension of different text types.

## 2. Method

### Study One and Study Two

#### *Participants*

In total, 185 children participated in these studies: 84 boys (45.4%) and 101 girls (54.6%). Children were aged between nine and 11 years ( $M$  age = 10 years, 5 months,  $SD$  = 6.34 months) and were in school years five and six, from three different primary schools located in the county of Yorkshire, in the UK. A total of 79 children ( $M$  age = 9 years, 11 months,  $SD$  = 3.33) were in year five, comprising 35 boys and 44 girls. From year six there were a 106 children ( $M$  age = 10 years, 9 months,  $SD$  = 3.77), comprising 49 boys and 57 girls. Key Stage two English SATs results for 2012 (the year closest to the time of testing) are informative of the educational attainment of each of the schools. Children are expected to achieve level four or above in SATs at the end of Key Stage two (year six) and in 2012, the National average for achieving this standard was 85%. The percentages of children achieving this standard at each of the schools, in the year 2012, were 79%, 81% and 100% ("Primary school league tables," 2012). This indicates that two of the schools were slightly below the National average, with another school excelling. Permission to carry out the research in each of the schools was obtained from Head Teachers, followed by class teachers. Following University of Hull ethical protocol, letters were sent to parents/guardians, providing information about what the research would involve and explaining that their child could withdraw from the study at any time. If parents did not want their child to take part they were required to sign a form stating that they wish to withdraw their child from the research. Only children who had not been withdrawn from the study were permitted to participate.

*Rationale for participant selection*

There is a clear rationale behind the selection of primary school pupils in years five and six for the present studies. Firstly, children of this age are likely to be efficient decoders and, thus, able to independently read texts. For children in the early stages of reading development (e.g., four or five years of age in UK primary schools), their reading predominantly focuses on decoding words, rather than on deciphering meaning from the text. Indeed, if a reader is unable to recognise and read words then this restricts their comprehension (Rupley, Willson & Nichols, 1998). Furthermore, as previously outlined, text comprehension is highly skilful and so it is important that the participants in the present studies have at least an adequate level of reading skill.

With regard to the hypotheses in both studies, both studies make predictions surrounding pupils' text preferences. If a pupil's reading is dominated by trying to decode words within a text, they are perhaps less likely to experience any enjoyment in reading the text. Therefore, as both studies seek to determine text preferences (i.e., for a female-oriented or male-oriented text or for a fiction or non-fiction text) it is crucial that children's potential text preferences are not inhibited by substantial difficulties in decoding the words within the text. In addition, when children reach years five and six in primary school they are likely to have greater control over the books that they read. They may also have a greater developed interest in books and in reading books for leisure purposes compared to younger pupils. Furthermore, because children of these ages will be more independent readers and are likely to select which books they want to read, they may have more clearly defined text preferences. In contrast, much younger children may not have as well developed text preferences and are likely to have books selected for them to read or have certain books read to them. Consequently, the

subsequent findings regarding text preferences may not be as valuable with younger children.

A further reason for the focus on primary school aged children is that there are clearer educational implications of the research for children of this age. Among primary school teachers there is a strong interest in fostering children's reading engagement and enjoyment, and primary school teachers are in a position that enables them to achieve this. Moreover, study one focuses on pupils' reading comprehension for texts comprised in the National Curriculum Assessments (SATs). Although these assessments are statutory in both years two and six of primary school, the focus is on older primary school children as the tests taken when pupils are in year six hold greater importance for schools and educators. Moreover, it is difficult to reliably assess young children's reading motivation. Compared to young children, older children have a greater level of self-awareness and self-reflection and so can more reliably comment on their motivations for reading. Furthermore, given the research design with the large sample size and group-administered assessments of reading motivation, it is considered that data regarding reading motivation can be gathered more reliably with this age group. This also holds true for study two, whereby pupils' reading motivation is again measured using self-report methods.

### *Materials*

#### *Cognitive Skills*

*Phonological decoding skill:* Phonological decoding skill was assessed using the Graded Non-Word Reading Test (GNWRT; Snowling, Stothard & McLean, 1996). However, an additional ten items were included, as used by Logan et al. (2011), in order to reduce ceiling effects (see Appendix A). The GNWRT includes ten one syllable

items, ten two syllable items and the additional items added were three syllable items, with all words conforming to letter-sound correspondences. Children were also given five practice items to ensure they understood the task. Items were typed in a large font size so that they could be easily read. Children read non-words aloud.

*Receptive Vocabulary:* Pupils' receptive vocabulary was assessed with the British Picture Vocabulary Scale II (BPVS II; Dunn, Dunn, Whetton & Burley, 1997). This assessment is usually individually administered, but in the current studies it was adapted to enable group administration (see Appendix B for an illustration of two test items). A wide range of word sets were used (sets 3-8) so that a basal level could be established and again to minimise ceiling effects. In accordance with manual guidelines, pupils were required to select the picture that best represents the meaning of the word that they are orally presented with. However, with this modified version, instead of pointing to the picture that best represents the word in question, pupils circled the picture.

Children's vocabulary knowledge and phonological decoding skill were assessed in the present studies, as opposed to higher order cognitive skills. The reasoning behind this is that the simple view of reading (Gough & Tunmer, 1986) suggests that decoding skill and linguistic comprehension are the most important skills for reading success and that without these skills successful reading will not occur. Receptive vocabulary skill was assessed as it is deemed a suitable proxy for linguistic comprehension skill.

### *Reading Motivation*

In the present studies, three measures of reading motivation were taken so that different theories of motivation could be compared, with regard to their ability to predict reading comprehension skill after accounting for cognitive skills. Specifically, the studies aim

to compare two leading theories of motivation (intrinsic motivation and expectancy-value theory) with text-specific reading motivation.

*Intrinsic reading motivation:* Pupils' general motivation to read was assessed using the most recently revised version of the Motivation for Reading Questionnaire (MRQ; Wang & Guthrie, 2004). Only intrinsic reading motivation was assessed in the present studies as it is deemed most theoretically significant, with numerous studies finding a positive association between intrinsic motivation and comprehension (Lau & Chan, 2003; Logan et al., 2011; McGeown et al., 2012; Park, 2011). Conversely, extrinsic motivation has frequently been found to either be negatively associated with, or not significantly associated with reading performance (Becker et al., 2010; Logan & Medford, 2011; Wang & Guthrie, 2004). The assessment in the present studies therefore included only the intrinsic motivation composites of the MRQ revised version: curiosity, involvement and preference for challenge (see Appendix C). Curiosity measures an individual's desire to learn about specific topics they are interested in; preference for challenge refers to an individual's sense of satisfaction they feel when acquiring a clear understanding of the complex ideas within a text; and involvement refers to the feeling of gratification when reading a text that is written well or is about an interesting topic (Wang & Guthrie, 2004). Total scores on the MRQ intrinsic composites could range from 19 to 76. Internal reliability estimates were calculated using Cronbach's alpha. Cronbach's alpha for involvement items = .55, for challenge items = .49 and for curiosity items = .67.

*Expectancy-value theory:* Reading motivation was further assessed in relation to the expectancy-value distinction of motivation, using the Motivation to Read Profile (MRP; Gambrell, et al., 1996). The MRP comprises two parts, the Conversational Interview

and the Reading Survey. However, in both studies one and two, only the Reading Survey was administered (see Appendix D). The Reading Survey is a group-administered questionnaire which provides information regarding how much a student values reading and information relating to a student's self-concept as a reader. The self-concept items provide information about how competent a student perceives him/herself to be at reading, compared with their peers. The value items provide information regarding how much a student values reading activities and how frequently they engage in reading activities (Gambrell et al., 1996). Internal reliability estimates were calculated using Cronbach's alpha. Cronbach's alpha for expectancy items = .65 and for value of reading items = .83.

*Text-specific motivation (Text interest and text enjoyment):* Text-specific motivation in the present thesis is conceptualised as the interest and enjoyment one experiences for a specific text. Pupils' text-based interest for the passages used in both studies was assessed similarly to that of Bray & Barron (2004). Directly after reading each text participants were presented with the question: "How interesting did you find...?" (followed by the name of the text the participant had just read). Participants then circled one of four possible responses: not at all, a little, quite a lot, a lot. The second question presented asked "How much did you enjoy...?" (followed by the respective name of the text the participant had just read). As before, participants circled one of the four possible options: not at all, a little, quite a lot, or a lot. Children then completed the accompanying comprehension questions for the text.

## *Reading Comprehension*

### Study One

Pupils' reading comprehension was assessed using texts and complimentary questions extracted from the 2004 and 2005 National Curriculum Assessments (SATs) for reading. SATs are a national assessment in England, used to assess children's performance in maths, science, reading, writing and spelling, when they are in year six (ages ten and 11). It is therefore extremely useful for educators to be aware of the relationships between cognitive skills, motivation and reading comprehension performance for such texts. School leaders will also be very interested in such research, because the national league tables for the performance of primary schools is based on the results of these national assessment tests.

Comprehension was assessed for two narrative fiction texts, one called 'On the Plains' and another called 'You Can Do It' (see Appendix E). These texts were selected on the basis that one is more representative of male text interest and the other more representative of female text interests. 'On the Plains' is classified as a male-oriented text in this study as it has a male protagonist. 'You Can Do It' is classified as a female-oriented text as it has a female protagonist and because themes within the text are related to family and relationships.

*Male-oriented text:* The male-oriented text was extracted from the 2005 SATs reading test. The word count for the text is 740 words and there were 13 comprehension questions to accompany this text (See Appendix F). The questions assessing this text were a combination of multiple choice, short answer and extended answer. According to the marking scheme, these questions assess a pupil's ability to understand, describe or retrieve information and ideas from the text, interpret information/ideas from the text,



identify and discuss grammar at the text level, comment on the structure of the text, and discuss the language and grammar that the writer has used.

*Female-oriented text:* The female-oriented text was taken from the 2004 SATs reading test. The word count for this text was 1333 words and there were 16 comprehension questions to accompany this text (see Appendix G). Comprehension questions for this text were also a combination of multiple choice, short answer and extended answer and assessed the same skills as outlined above for the male-oriented text. However, there was an additional question which aimed to assess children's ability to discuss the viewpoints of the writer and the effects that the text has on the reader.

## Study Two

In study two, reading comprehension was assessed using two standardised comprehension assessments (see Appendix H) from the York Assessment of Reading for Comprehension (YARC; Snowling et al., 2009). Texts were selected based on their genre: one text was fiction (Camping Trip), the other non-fiction (Pirates). The fiction text was slightly shorter (189 words) than the non-fiction text (219 words), though this difference was considered minimal. Both texts were accompanied by eight questions which required children to make a knowledge-based inference, evaluative inference or to extract literal information from the text. Furthermore, some questions were vocabulary dependent (see YARC Passage Reading Test Manual; Snowling et al., 2009).

## *Procedure*

Before data collection could begin, informed consent was sought from each child's parent/guardian. Providing that children did not return a form stating that their parent/guardian wished to withdraw them from the study, all children could be assessed.

Data collection was carried out within school in normal school hours. For all motivation and reading comprehension measures and for the receptive vocabulary measure (BPVS), pupils were assessed in their classrooms, seated in their usual positions. The Graded Non-Word Reading Test was individually administered outside of the classroom. Items from both motivation assessments (MRP, MRQ) were read aloud, so as to not disadvantage students who possess poorer reading skills. Assessments were administered in four separate testing sessions. In the first session all assessments were administered within approximately 50 minutes in the following order: motivation assessments (MRQ, MRP), vocabulary assessment (BPVS). Children were given a break of 20 minutes after administration of the motivation assessments and before administration of the vocabulary assessment. In the second testing session, children were given a maximum of 45 minutes to complete the male and female-oriented comprehension assessments. In the third testing session, children were given a maximum of 45 minutes to complete the fiction and non-fiction comprehension assessments. In cases where children did not complete comprehension assessments within the 45 minutes, due to time constraints, they had to finish where they were within the assessment. In the fourth and final testing session, pupils were assessed individually on the measure of non-word reading.

To control for order effects, half of the children were presented with the male-oriented text first and its comprehension questions, followed by the female-oriented text and its comprehension questions. The other half of the children were presented with the texts in the reverse order. Likewise, half of the children were given the fiction text and its corresponding comprehension questions first, followed by the non-fiction text and its comprehension questions, with the other half of the children presented with these in the

reverse order. Not only did this control for order effects, but children were also given the texts in an opposing order to the child sat next to them, thus preventing copying.

### 3. Results

#### Study One

Table 1 shows descriptive statistics and z-scores for skewness and kurtosis for each of the cognitive assessments, intrinsic motivation constructs, expectancy/value composites and comprehension performance for the male-oriented and female-oriented texts. All variables were significantly skewed, apart from the expectancy composite of the MRP and scores on the female-oriented text comprehension assessment. However, kurtosis was only significant for global intrinsic motivation and for the measure of receptive vocabulary (BPVS). To ensure that this significance was not a product of the large sample size, normality was assessed visually. This showed that scores on the measure of receptive vocabulary skill were negatively skewed, with most pupils achieving scores at the top end of the scale. This could have been a result of the group-administration of the BPVS, which was developed to be administered individually. In light of this, caution must be taken when interpreting the findings regarding receptive vocabulary skill.

Possible ranges of scores on each of the measures were: male-oriented text (0 – 15), female-oriented text (0 – 27), Graded Non-Word Reading Test (0 – 30), BPVS (0 – 72), global intrinsic reading motivation (19 – 76), curiosity (7 – 28), involvement (7 – 28), challenge, (5 – 20), expectancy (10 – 40), value (10 – 40).

Table 1

*Means, standard deviations, skewness and kurtosis for cognitive skills, motivation variables and male and female-oriented comprehension assessments*

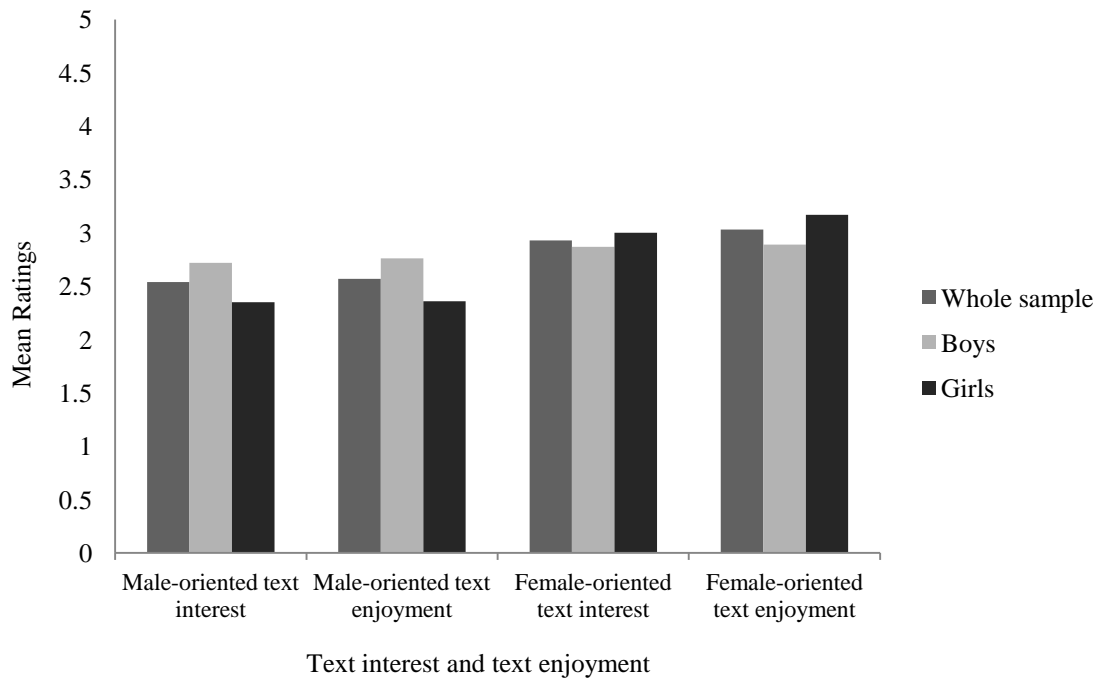
Variable	Mean	SD	Skewness	Kurtosis
Male-oriented text	5.92	3.57	2.10*	- 1.46
Female-oriented text	8.39	4.35	0.16	-1.86
GNWRT	20.01	6.92	- 4.81***	0.05
BPVS	64.25	6.39	- 9.38***	12.50***
Intrinsic motivation (global)	9.04	1.31	- 3.20**	3.62***
Curiosity	2.96	.57	- 3.81***	0.69
Involvement	2.99	.55	- 3.56***	0.50
Challenge	3.08	.57	- 2.69*	0.11
Expectancy	29.07	4.08	0.03	1.16
Value	29.91	5.48	- 2.55*	0.72

*Note.* GNWRT = Graded Non-Word Reading Test, BPVS = British Picture Vocabulary Scale.

Means and standard deviations are calculated for raw scores. Values for skewness and kurtosis are converted to z-scores.

\*  $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

Figure 1 shows the mean interest and enjoyment ratings for the male and female-oriented texts, for the whole sample and split by sex. For the whole sample, the mean interest rating was 2.54 (1 = not at all interesting, 5 = a lot) for the male-oriented text and 2.93 for the female-oriented text. The mean enjoyment rating was 2.57 (1 = not at all, 5 = a lot) for the male-oriented text and 3.03 for the female-oriented text. When descriptives were split by sex, mean interest ratings for the male-oriented text were: boys = 2.72, girls = 2.35; and mean enjoyment ratings were: boys = 2.76, girls = 2.36. For the female-oriented text, mean interest ratings were: boys = 2.87, girls = 3.00; and mean enjoyment ratings were: boys = 2.89, girls = 3.17.



*Figure 1.* Mean interest and enjoyment ratings for male and female-oriented texts for the whole sample and split by sex

Before data analysis could commence, raw scores on cognitive measures (BPVS, GNWRT) were converted into z-scores to account for children's years of schooling. Also, z-scores were calculated for the measure of receptive vocabulary (BPVS), instead of the standardised norms already provided, in order to account for any possible effects of group-administration; scores on the BPVS had reached ceiling level, possibly as a result of the group-administration of this assessment. Scores on the comprehension assessments for the male-oriented and female-oriented texts were calculated as percentages and not raw scores, because the total number of marks available for the comprehension questions for each text differed. Percentage scores were then converted to z-scores.

The following information applies to both study one and study two, as the samples comprised of the same children. Within the sample, 12 children (6.5% of the total sample) were classified as having English as an additional language (EAL). Research has shown that there are significant differences in the language abilities of children who are second language learners and those who speak in their first language, in terms of their syntactical and semantic linguistic skills (Netten et al., 2011). Furthermore, children with EAL have been found to perform significantly poorer on measures of expressive and receptive vocabulary compared to their monolingual (English speaking) peers (Burgoyne, Kelly, Whiteley & Spooner, 2009; Burgoyne, Whiteley & Hutchinson, 2011). Therefore, in the current study, Multivariate Analysis of Variance (MANOVA) was used to examine whether there were any significant differences in the cognitive skills (e.g., receptive vocabulary, phonological decoding) of children with EAL and English speaking children. Hotelling's Trace statistic is reported, as this is a more robust statistic when there are deviations from normality, as there were with the cognitive skills assessed. With Hotelling's Trace statistic there was a significant difference between EAL pupils and non-EAL pupils in their performance on the cognitive assessments,  $T = .18$ ,  $F(2, 157) = 13.73$ ,  $p < .05$ ,  $\eta_p^2 = .12$ . EAL pupils performed significantly poorer than non-EAL pupils on the measure of receptive vocabulary,  $F(1, 158) = 18.59$ ,  $p < .001$ ,  $\eta_p^2 = .11$ . However, there was no significant difference between EAL pupils and non-EAL pupils in their phonological skill,  $F(1, 158) = 1.83$ ,  $p = .18$ ,  $\eta_p^2 = .01$ . Consequently, as a difference between EAL and non-EAL children was found to exist only for receptive vocabulary, the decision was made to leave the data for EAL children within the analysis. In addition, it was expected that the associations between cognitive skills and motivation with reading comprehension for EAL children, would show the same patterns as for English speaking children, as

research has shown that the patterns of relationships between reading comprehension and reception of grammar, expressive vocabulary and receptive vocabulary are highly similar for children with EAL and monolingual children (Hutchinson, Whiteley, Smith & Connors, 2003). Moreover, the studies in the current thesis seek to provide a view of the cognitive skills and motivational factors that influence children's reading comprehension within typical classrooms, and it is increasingly likely that in many 'real-life' classrooms there will be children with English as an additional language.

Twenty seven children in the sample (14.6% of the total sample) were classified as having special educational needs (SEN). MANOVA was conducted to examine whether there were significant differences in the cognitive skills of children with SEN and typically developing children in the sample. MANOVA showed that children with SEN had overall statistically lower scores than typically developing children on measures of cognitive skill; Hotelling's Trace statistic,  $T = .24$ ,  $F(2, 157) = 19.05$ ,  $p < .001$ ,  $\eta_p^2 = .20$ . SEN children scored significantly lower for phonological skill,  $F(1, 158) = 55.41$ ,  $p < .001$ ,  $\eta_p^2 = .26$ ; and receptive vocabulary, compared to typically developing children,  $F(1, 158) = 29.66$ ,  $p < .001$ ,  $\eta_p^2 = .16$ . In spite of the significantly lower scores of SEN children for receptive vocabulary and phonological skill, data for these children remained within the analysis because, as suggested with regard to children with EAL, this is more likely to typically reflect primary school classrooms within the UK. One would also expect similar relationships between motivation and reading comprehension for SEN and non SEN children. Moreover, SEN and EAL children were included in all analyses to ensure sufficient numbers for statistical power. This was particularly important for the regression analyses, where separate analyses were carried out for boys and girls.

*Correlations between cognitive skills, motivation variables and reading comprehension for male and female-oriented texts*

Zero order correlations were conducted (see Table 2) to examine associations between variables, in particular to examine how strongly the motivation variables (intrinsic motivation constructs, expectancy, value, text-specific motivation) and cognitive skills (phonological skill, receptive vocabulary) are related to reading comprehension performance for the male and female-oriented texts. Both of the cognitive skills assessed were significantly positively correlated with reading comprehension performance for the male-oriented and female-oriented text. Phonological skill was significantly, albeit moderately, related to reading comprehension for the male-oriented text,  $r(147) = .28, p < .01$ , and the female-oriented text,  $r(147) = .33, p < .001$ . Receptive vocabulary was more strongly associated with comprehension of both the male-oriented text,  $r(148) = .53, p < .001$  and female-oriented text,  $r(148) = .45, p < .001$ .

Correlations between motivation variables and comprehension performance showed that pupils' global intrinsic motivation (a composite score of curiosity, involvement and challenge) was not significantly correlated with comprehension performance for either of the texts. However, the intrinsic motivation construct challenge was associated with comprehension of the female-oriented text,  $r(148) = .17, p < .05$ ; and involvement was significantly related to comprehension of the male-oriented text,  $r(147) = .24, p < .01$ . However, these correlations were not particularly large in magnitude. With regard to expectancy and value of reading, value was positively related to comprehension for the female-oriented text,  $r(149) = .19, p < .05$ , and expectancy was significantly related to comprehension of both the male-oriented



text,  $r(149) = .36, p < .001$  and female-oriented text,  $r(149) = .31, p < .001$ . In terms of text-specific motivation factors, comprehension performance for the male-oriented text was significantly related to pupils' interest for this text,  $r(148) = .23, p < .01$  and enjoyment for this text,  $r(148) = .18, p < .05$ . Likewise, comprehension of the female-oriented text was significantly related to pupils' interest for this text,  $r(150) = .16, p < .05$ , and enjoyment for this text,  $r(150) = .20, p < .05$ .

Table 2

*Correlations between cognitive skills, motivation variables and comprehension for the male-oriented and female-oriented texts*

Measure	Reading Comprehension	
	Male-oriented text	Female-oriented text
Cognitive skills		
Vocabulary	.53***	.45***
Phonological decoding	.28**	.33***
Motivational variables		
Intrinsic motivation (global)	.08	.11
Curiosity	-.12	-.05
Involvement	.24**	.14
Challenge	.08	.17*
Expectancy	.36***	.31***
Value	.07	.19*
Interest	.23**	.16*
Enjoyment	.18*	.20*

*Note.* Interest and enjoyment for each individual text is correlated with comprehension performance for that same text.

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

*Sex differences in the relationships between cognitive skills, motivation and reading comprehension for male and female-oriented texts*

Correlations identical to those outlined above were conducted separately for boys and girls, to examine whether there are any sex differences in the associations

between cognitive skills and motivation with reading comprehension (see Table 3). For boys, vocabulary was positively related to comprehension for the male-oriented text,  $r(71) = .44, p < .001$  and female-oriented text,  $r(71) = .48, p < .001$ . Phonological skill was also positively associated with comprehension for the male-oriented text,  $r(68) = .50, p < .001$  and female-oriented text,  $r(68) = .46, p < .001$ . With regard to motivation variables, expectancy was significantly associated with comprehension of the male-oriented text,  $r(72) = .30, p < .01$  and female-oriented text,  $r(72) = .27, p < .05$ . No other motivational variables were significantly associated with boys' comprehension of either text. For girls, vocabulary was again positively related to comprehension of the male-oriented text,  $r(75) = .61, p < .001$  and female-oriented text,  $r(75) = .44, p < .001$ . However, phonological skill was only significantly associated with comprehension of the female-oriented text,  $r(79) = .25, p < .05$ . With regard to motivation, involvement was positively related to comprehension of the male-oriented text,  $r(73) = .42, p < .001$ , whereas challenge was positively related to comprehension of the female-oriented text,  $r(74) = .30, p < .01$ . Text interest for the female-oriented text was also positively correlated with comprehension of the female-oriented text,  $r(75) = .25, p < .05$ . Expectancy was positively associated with girls' comprehension of both the male-oriented text,  $r(75) = .40, p < .001$  and female-oriented text,  $r(75) = .35, p < .01$ . To examine whether correlations significantly differed in strength for boys and girls, correlation coefficients were transformed into Fisher  $z$  coefficients. The relationship between phonological skill and comprehension of the male-oriented text was significantly stronger for boys ( $z = 2.75, p < .01$ ) and the association between involvement and comprehension of the male-oriented text was significantly stronger for girls ( $z = -2.20, p < .05$ ). No other correlation was significantly different for boys or

girls, though the association between challenge and comprehension for the female-oriented text was approaching significance ( $z = -1.92, p < .055$ ).

Table 3

*Correlations between cognitive skills, motivation variables and reading comprehension split by sex*

Measure	Male-oriented text		Female-oriented text	
	Boys	Girls	Boys	Girls
<b>Cognitive skills</b>				
Vocabulary	.44***	.61***	.48***	.44***
Phonological decoding	.50***	.09	.46***	.25*
<b>Motivational variables</b>				
Intrinsic motivation	.00	.17	-.02	.17
Curiosity	-.09	-.14	-.15	.01
Involvement	.08	.42***	.12	.13
Challenge	.02	.15	-.01	.30**
Expectancy	.30**	.40***	.27*	.35**
Value	-.02	.19	.05	.25*
Interest	.17	.28*	.06	.24*
Enjoyment	.14	.21	-.03	.18

*Note.* Interest and enjoyment for each individual text is correlated with comprehension performance for that same text.

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

#### *Sex differences in cognitive skills, motivation and comprehension performance*

MANOVA was conducted to examine whether there are significant sex differences in receptive vocabulary ability, phonological skill, intrinsic motivation (e.g., challenge, curiosity, involvement), expectancy and value of reading, text-specific motivation (e.g., interest and enjoyment for each text) and comprehension performance for the male and female-oriented texts. It is important to note that normality was assessed visually, due to the large sample size, and there appeared to be some deviations from normality. Both vocabulary and phonological skill were negatively skewed, with

more scores higher in the distribution. Therefore this should be kept in mind when interpreting the results. Table 4 shows the means and standard deviations for all variables, separately for boys and girls. Using Pillai's trace statistic, there was an overall significant effect of sex on the dependent variables combined,  $V = .23$ ,  $F(13, 121) = 2.75$ ,  $p < .01$ ,  $\eta_p^2 = .23$ . Benjamini and Hochberg's (1995) Linear Step Up procedure was used to control for multiple comparisons. Using this procedure there were no statistically significant differences between boys and girls on any of the measured variables, although the difference between boys' and girls' value of reading was close to significance (adjusted alpha value = .004), with girls scoring higher than boys,  $F(1, 133) = 8.69$ ,  $p = .004$ ,  $\eta_p^2 = .06$ .

Table 4

*Mean and standard deviation for all measured variables split by sex*

Variable	Boys		Girls	
	M	SD	M	SD
Phonological skill (z-scores)	.11	.91	-.06	1.01
Vocabulary (z-scores)	.03	.85	.11	.93
Challenge	3.08	.50	3.19	.56
Curiosity	2.90	.54	3.04	.58
Involvement	2.94	.50	3.10	.54
Expectancy	28.92	3.59	29.51	4.38
Value	28.45	5.20	31.23	5.71
Interest (female-oriented text)	2.92	.93	3.01	.99
Enjoyment (female-oriented text)	2.91	.94	3.16	.85
Interest (male-oriented text)	2.74	1.03	2.38	.96
Enjoyment (male-oriented text)	2.80	1.10	2.33	.97
Female-oriented text (z-scores)	-.11	.96	.23	.98
Male-oriented text (z-scores)	.14	.98	.02	1.01

*Note.* Raw scores are used unless specified.

*Assessing the predictive effect of cognitive skills and motivation on children's reading comprehension performance for male and female-oriented texts*

Hierarchical regression analyses were conducted to establish how much of the variance in reading comprehension performance, for the male-oriented and female-oriented texts separately, can be accounted for by cognitive skills and to examine whether motivation explains additional variance in comprehension. Moreover, regressions were carried out to investigate which of the theoretical conceptualisations of motivation (intrinsic, expectancy-value, text-specific) accounts for the most unique variance in comprehension performance, and whether different cognitive skills and motivational factors are differentially important for comprehension of texts that are aimed at different audiences (males or females). Due to the possibility of multicollinearity amongst the predictor variables, diagnostics were carried out for each of the separate regression analyses conducted. In addition, correlations between each of the variables were examined to identify any possible multicollinearity. There were strong correlations between text interest and text enjoyment (whole sample) for the male-oriented text ( $r = .78$ ); text interest and text enjoyment (whole sample) for the female-oriented text ( $r = .78$ ); text interest and text enjoyment (for boys) for the male-oriented text ( $r = .83$ ); text interest and enjoyment (for girls) for the male-oriented text ( $r = .71$ ); text interest and enjoyment (for boys) for the female-oriented text ( $r = .81$ ); and text interest and enjoyment (for girls) for the female-oriented text ( $r = .76$ ). This could suggest that multicollinearity may pose a problem, although Field (2009) suggests that multicollinearity tends to be an issue only for correlations that are greater than .9. Nevertheless, as these correlations were strong, variance inflation factors and tolerance were analysed. Variance inflation factors for all variables were below 10 and tolerance

for all variables was above 0.1. As a result, all variables were considered appropriate for use within the regressions following criteria established by Myers (1990) and Menard (1995) (as cited in Nunes, Bryant & Barros, 2012). In all regression models reported, cognitive skills (phonological skill and receptive vocabulary) were entered at the first step, as these are the fundamental skills for comprehension (Gough & Tunmer, 1986).

*Male-oriented text comprehension: Whole sample*

The criterion variable for the first set of regression analyses was comprehension performance for the male-oriented text, for the sample as a whole (see Table 5). In the first model, intrinsic motivation composites were added at the second step after cognitive skills, in the second model, expectancy and value components were added at step two, and in the third model, text-specific motivation factors were entered at step two. In model one, cognitive skills collectively explained 30.4% of the variance in comprehension of the male-oriented text, and the predictive effect of the IVs was significant,  $F(2, 141) = 30.78, p < .001$ . When intrinsic motivation constructs were added to the model,  $R^2$  increased by 2.4%, though this change was not significant ( $p = .18$ ). Only vocabulary and phonological skill explained unique variance in comprehension of the male-oriented text. No intrinsic motivation construct contributed significant unique variance, though involvement was approaching significance ( $p = .058$ ). In the second model, cognitive skills again explained 30.4% of the variance in children's comprehension of the male-oriented text, and the predictive effect of the IVs was significant,  $F(2, 143) = 31.25, p < .001$ . When expectancy and value components were entered,  $R^2$  increased by 2.8% and this change was approaching significance ( $p = .054$ ). As in the previous model, vocabulary and phonological skill accounted for

significant unique variance in comprehension; however expectancy also contributed significant unique variance to comprehension of the male-oriented text. In the third regression model, cognitive skills accounted for 30.9% of the variance in comprehension, and the predictive effect of the IVs was significant,  $F(2, 138) = 30.91, p < .001$ . Text-specific motivation (text interest and text enjoyment for the male-oriented text) significantly increased  $R^2$  by 3.6%. Vocabulary, phonological skill and text-based interest explained significant unique variance in comprehension performance of the male-oriented text.

Table 5

*Hierarchical regression analyses with cognitive skills and motivation variables regressed on comprehension performance for the male-oriented text (whole sample)*

Criterion Variable: Male-oriented text comprehension

Model 1

Predictors: Cognitive skills, intrinsic motivation constructs	R <sup>2</sup>	Change in R <sup>2</sup>	Final $\beta$
Enter			
1. Vocabulary			.42***
Phonological skill	.30	.30***	.19**
2. Challenge			.05
Curiosity			-.12
Involvement	.33	.02	.16
<i>n</i>	144		

Model 2

Predictors: Cognitive skills, expectancy and value of reading	R <sup>2</sup>	Change in R <sup>2</sup>	Final $\beta$
Enter			
1. Vocabulary			.43***
Phonological skill	.30	.30***	.16*
2. Expectancy			.18*
Value	.33	.03	-.00
<i>n</i>	146		

Model 3

Predictors: Cognitive skills, text-specific motivation	R <sup>2</sup>	Change in R <sup>2</sup>	Final $\beta$
Enter			
1. Vocabulary			.49***
Phonological skill	.31	.31***	.16*
2. Interest			.28*
Enjoyment	.35	.04*	-.13
<i>n</i>	141		

Note. \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .



*Female-oriented text comprehension: Whole sample*

In the second set of regression analyses (see Table 6) the criterion variable was comprehension performance for the female-oriented text, for the whole sample. As before, three separate hierarchical regression analyses were conducted, with the same predictors entered in the same order as in the previous analyses. Cognitive skills accounted for 26.1% of the variance in comprehension of the female-oriented text and the predictive effect of the IVs was significant,  $F(2, 141) = 24.86, p < .001$ . When intrinsic motivation constructs were added to the model they did not significantly increase  $R^2$  and only vocabulary and phonological skill contributed significant unique variance to comprehension of the female-oriented text. No intrinsic motivation construct accounted for significant individual variance, though challenge was approaching significance ( $p = .086$ ). In the second model, cognitive skills accounted for 26.4% of the variance in children's comprehension of the female-oriented text. When expectancy and value of reading were entered after cognitive skills, they significantly increased  $R^2$  by 4.9%. Vocabulary, phonological skill and children's value of reading contributed significant unique variance to comprehension of the female-oriented text. In model three, cognitive skills explained 24.4% of the variance in comprehension of the female-oriented text. When text-specific motivation was added to the model (text interest and enjoyment for the female-oriented text) this increased  $R^2$  by 2.9%, with this change approaching significance ( $p = .067$ ). Only vocabulary and phonological skill contributed significant unique variance to comprehension of the female-oriented text.

Table 6

*Hierarchical regression analyses with cognitive skills and motivation variables regressed on comprehension performance for the female-oriented text (whole sample)*

Criterion Variable: Female-oriented text comprehension

Model 1

Predictors: Cognitive skills, intrinsic motivation constructs    R<sup>2</sup>    Change in R<sup>2</sup>    Final  $\beta$

Enter

1. Vocabulary			.39***
Phonological skill	.26	.26***	.25**
2. Challenge			.14
Curiosity			-.03
Involvement	.28	.02	-.01
<i>n</i>	144		

Model 2

Predictors: Cognitive skills, expectancy and value of reading

R<sup>2</sup>    Change in R<sup>2</sup>    Final  $\beta$

Enter

1. Vocabulary			.35***
Phonological skill	.26	.26***	.26**
2. Expectancy			.12
Value	.31	.05**	.16*
<i>n</i>	146		

Model 3

Predictors: Cognitive skills, text-specific motivation

R<sup>2</sup>    Change in R<sup>2</sup>    Final  $\beta$

Enter

1. Vocabulary			.40***
Phonological skill	.24	.24***	.22**
2. Interest			.09
Enjoyment	.27	.03	.09
<i>n</i>	143		

Note. \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

### *Sex differences in text preferences*

A chi-square test for independence was conducted to ascertain whether there was a sex difference in preferences for the male and female-oriented texts. Sex had a significant effect on text preference,  $\chi^2 (1, N = 126) = 14.23, p < .001, \phi = -.34$ ; indicating that there was a significant difference between boys and girls for which text they preferred. For the male-oriented text, 60% of boys stated that they preferred this text, with 40% of boys stating that they preferred the female-oriented text. In comparison, 73% of girls stated that they preferred the female-oriented text with the remaining 27% stating that they preferred the male-oriented text.

### *Examining the influence of cognitive skills and motivation on boys' and girls' comprehension of male-oriented and female-oriented texts*

Following the significant chi-square, showing that boys significantly preferred the male-oriented text and girls preferred the female-oriented text, subsequent regression analyses were conducted to establish whether motivation plays a more important role in comprehension of a text which children have less positive affect towards and perhaps find less interesting. Therefore, in the case of many of the male pupils, the female-oriented text would be the less interesting text and for many female pupils, the male-oriented text would be the less interesting text. In addition, the regression analyses examined whether there are differences in the predictive value of well-established classical theories of motivation (intrinsic motivation, expectancy-value) and text-specific motivation (text-based interest, enjoyment) in explaining children's comprehension of male and female-oriented texts. Analyses were carried out separately for boys and girls.

*Predictors of boys' comprehension for male-oriented text*

Table 7 shows regression analyses conducted only for boys in the sample. In both models, cognitive skills were entered first and the criterion variable was comprehension for the male-oriented text. In model one, classic theoretical distinctions of motivation (intrinsic, expectancy, value) were entered at the second step, after cognitive skills. Boys' cognitive skills were significantly predictive of their comprehension for the male-oriented text, accounting for 34.4% of variance, and the predictive effect of the IVs was significant,  $F(2, 66) = 17.31, p < .001$ . Classic theoretical distinctions of motivation overall, did not predict any significant further variance in boys' comprehension of the male-oriented text, after cognitive skills. However, expectancy did contribute significant unique variance, alongside vocabulary and phonological skill. In the second model, text-specific motivation was entered at step two, after cognitive skills. Cognitive skills were again significantly predictive of boys' comprehension of the male-oriented text; accounting for 35.2% of variance. Text-specific motivation (interest and enjoyment for the male-oriented text) did not explain any significant further variance in boys' comprehension of the male-oriented text and only vocabulary and phonological skill contributed significant unique variance.

Table 7

*Hierarchical regression analyses with cognitive skills and motivation variables regressed on boys' comprehension performance for the male-oriented text*

Criterion variable: Male-oriented text comprehension			
Model 1			
	R <sup>2</sup>	Change in R <sup>2</sup>	Final $\beta$
Predictors: Cognitive skills, classic theoretical motivation variables			
Enter			
1. Vocabulary			.30**
Phonological skill	.34	.34***	.39***
2. Challenge			-.04
Curiosity			.01
Involvement			.05
Expectancy			.25*
Value	.39	.05	-.12
<i>n</i>	69		
Model 2			
	R <sup>2</sup>	Change in R <sup>2</sup>	Final $\beta$
Predictors: Cognitive skills, text-specific motivation			
Enter			
1. Vocabulary			.35**
Phonological skill	.35	.35***	.39**
2. Interest			.09
Enjoyment	.36	.01	-.02
<i>n</i>	69		

*Note.* \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

*Predictors of boys' comprehension for female-oriented text*

Another set of regression analyses were conducted for boys in the sample, with comprehension of the female-oriented text as the criterion variable (see Table 8).

Cognitive skills were entered first in both models. As in the previous analyses, in model one classic theoretical distinctions of motivation were entered at the second step and in model two, text-specific motivation was entered as the alternative second step.

In model one, cognitive skills alone accounted for 37.5% of the variance in boys' comprehension of the female-oriented text, and the predictive effect of the IVs was significant,  $F(2, 66) = 19.78, p < .001$ .  $R^2$  increased by 5.1% when classic theoretical motivation variables (challenge, curiosity, involvement, expectancy, value) were added to the model, though this change was not significant ( $p = .38$ ). As in prior models, vocabulary and phonological skill were significant contributors of unique variance, though expectancy also contributed significant unique variance to boys' comprehension of the female-oriented text. In model two, cognitive skills explained 35.4% of the variance in boys' comprehension of the female-oriented text and the predictive effect of the IVs was significant,  $F(2, 65) = 17.78, p < .001$ . Text-specific motivation factors, when added to the model, did not significantly increase  $R^2$ . Only vocabulary and phonological skill contributed significant unique variance to boys' comprehension of the female-oriented text.

Table 8

*Hierarchical regression analyses with cognitive skills and motivation variables regressed on boys' comprehension performance for the female-oriented text*

Criterion variable: Female-oriented text comprehension

Model 1

Predictors: Cognitive skills, classic theoretical motivation variables

Enter

	R <sup>2</sup>	Change in R <sup>2</sup>	Final $\beta$
1. Vocabulary			.37**
Phonological skill	.38	.38***	.37**
2. Challenge			-.06
Curiosity			-.05
Involvement			.01
Expectancy			.23*
Value	.43	.05	.02
<i>n</i>	69		

Model 2

Predictors: Cognitive skills, text-specific motivation

Enter

	R <sup>2</sup>	Change in R <sup>2</sup>	Final $\beta$
1. Vocabulary			.41***
Phonological skill	.35	.35***	.33**
2. Interest			-.10
Enjoyment	.37	.02	.21
<i>n</i>	68		

Note. \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

*Predictors of girls' comprehension for female-oriented text*

Identical regression analyses were also conducted for girls only. The criterion variable for the first set of analyses was girls' comprehension of the female-oriented text (Table 9). In model one, cognitive skills accounted for 21.7% of the variance in girls' comprehension of the female-oriented text, and when classic theoretical

motivation components were added to the model (challenge, curiosity, involvement, expectancy, value) they significantly increased  $R^2$  by 14%. Regarding cognitive skills, only vocabulary contributed significant unique variance to girls' comprehension of the female-oriented text. Value of reading also contributed significant unique variance and involvement was approaching significance ( $p = .078$ ). In the second model, cognitive skills accounted for 20.7% of the variance in girls' comprehension of the female-oriented text. Text-specific motivation (text-based interest and enjoyment for the female-oriented text) increased  $R^2$ , though not significantly, by 6.1%, however this was approaching significance ( $p = .062$ ). Vocabulary uniquely predicted variance in girls' comprehension of this text and text interest was approaching significance ( $p = .055$ ).



Table 9

*Hierarchical regression analyses with cognitive skills and motivation variables regressed on girls' comprehension performance for the female-oriented text*

Criterion variable: Female-oriented text comprehension

Model 1

	R <sup>2</sup>	Change in R <sup>2</sup>	Final $\beta$
Predictors: Cognitive skills, classic theoretical motivation variables			
Enter			
1. Vocabulary			.45***
Phonological skill	.22	.22***	.11
2. Challenge			.21
Curiosity			-.07
Involvement			-.23
Expectancy			.05
Value	.36	.14*	.32*
<i>n</i>	75		

Model 2

	R <sup>2</sup>	Change in R <sup>2</sup>	Final $\beta$
Predictors: Cognitive skills, text-specific motivation			
Enter			
1. Vocabulary			.42***
Phonological skill	.21	.21***	.12
2. Interest			.31
Enjoyment	.27	.06	-.09
<i>n</i>	75		

Note. \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

*Predictors of girls' comprehension for male-oriented text*

The second set of analyses was also conducted for the girls in the sample, with girls' comprehension of the male-oriented text as the criterion variable (see Table 10).

In model one, cognitive skills explained 36.5% of the variance in girls' comprehension

of the male-oriented text. When entered after cognitive skills, classic theoretical motivation variables (challenge, curiosity, involvement, expectancy, value) significantly increased  $R^2$  by 13.4%. Vocabulary, curiosity and involvement were significant unique contributors to girls' comprehension of the male-oriented text. In model two, cognitive skills accounted for 36.9% of the variance in girls' comprehension of the male-oriented text, and when text-specific motivation was added to the model, this significantly increased  $R^2$  by 6.7%. Vocabulary and text-interest were the only variables to explain significant unique variance in girls' comprehension of the male-oriented text.

Table 10

*Hierarchical regression analyses with cognitive skills and motivation variables regressed on girls' comprehension performance for the male-oriented text*

Criterion variable: Male-oriented text comprehension			
Model 1			
	R <sup>2</sup>	Change in R <sup>2</sup>	Final $\beta$
Predictors: Cognitive skills, classic theoretical motivation variables			
Enter			
1. Vocabulary			.44***
Phonological skill	.37	.37***	-.04
2. Challenge			.04
Curiosity			-.32**
Involvement			.30*
Expectancy			.10
Value	.50	.13**	.15
<i>n</i>	75		
Model 2			
	R <sup>2</sup>	Change in R <sup>2</sup>	Final $\beta$
Predictors: Cognitive skills, text-specific motivation			
Enter			
1. Vocabulary			.61***
Phonological skill	.37	.37***	-.02
2. Interest			.32*
Enjoyment	.44	.07*	-.11
<i>n</i>	72		

*Note.* \*  $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

## Study Two

Descriptive statistics and z-scores for skewness and kurtosis were calculated for each of the cognitive assessments, measures of motivation and comprehension performance for the fiction and non-fiction texts (Table 11). All variables were

significantly skewed except for the expectancy component of the MRP and scores on the non-fiction text comprehension assessment. As outlined in the results section for study one, the measures of receptive vocabulary skill (BPVS) and global intrinsic motivation, produced significant values for both skewness and kurtosis. When assessing normality visually, scores on the measure of receptive vocabulary were negatively skewed, with more scores higher in the distribution. When interpreting the results, particularly regarding receptive vocabulary, this should be taken into consideration.

The range of scores possible on each of the measures were: fiction text (0 – 8), non-fiction text (0 – 8), Graded Non-Word Reading Test (0 – 30), BPVS (0 – 72), global intrinsic reading motivation (19 – 76), curiosity (7 – 28), involvement (7 – 28), challenge, (5 – 20), expectancy (10 – 40), value (10 – 40). Before data analysis, scores on the measures of receptive vocabulary (BPVS), phonological skill (GNWRT) and reading comprehension, for the fiction and non-fiction text, were converted into z-scores to account for children's years of schooling.

Table 11

*Means, standard deviations, skewness and kurtosis for cognitive skills, motivation variables and fiction and non-fiction comprehension assessments*

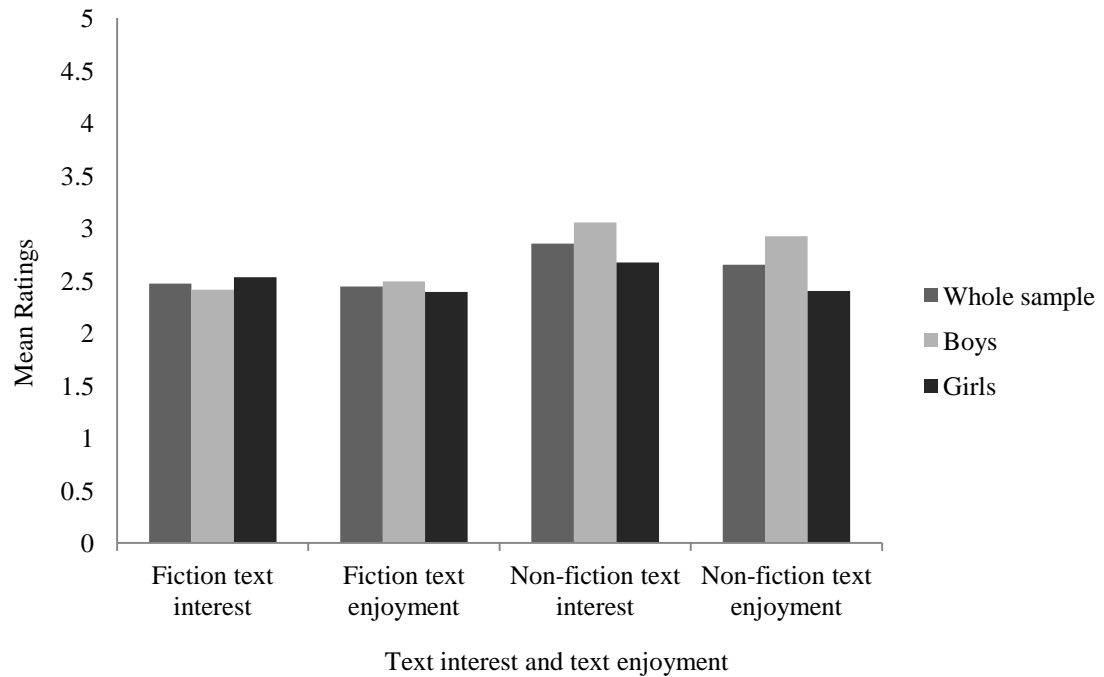
Variable	Mean	SD	Skewness	Kurtosis
Fiction	2.67	1.66	2.52*	-0.89
Non-fiction	3.61	2.13	- 0.32	-2.29*
GNWRT	20.01	6.92	- 4.81***	0.05
BPVS	64.25	6.39	- 9.38***	12.50***
Intrinsic motivation (global)	9.04	1.31	- 3.20**	3.62***
Curiosity	2.96	.57	- 3.81***	0.69
Involvement	2.99	.55	- 3.56***	0.50
Challenge	3.08	.57	- 2.69**	0.11
Expectancy	29.07	4.08	0.03	- 1.16
Value	29.91	5.48	- 2.55*	- 0.72

*Note.* GNWRT = Graded Non-Word Reading Test, BPVS = British Picture Vocabulary Scale

Means and standard deviations are based on raw scores. Values for skewness and kurtosis are converted to z-scores.

\*  $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .

Figure 2 shows the mean interest and enjoyment ratings for the fiction and non-fiction texts, for the whole sample and split by sex. Ratings of interest and enjoyment for the fiction and non-fiction texts were as follows: for the whole sample, the mean interest rating was 2.47 (1 = not at all interesting, 5 = a lot) for the fiction text and 2.85 for the non-fiction text. The mean enjoyment rating was 2.44 (1 = not at all, 5 = a lot) for the fiction text and 2.65 for the non-fiction text. When descriptives were split by sex, mean interest ratings for the fiction text were: boys = 2.41, girls = 2.53; and mean enjoyment ratings were: boys = 2.49, girls = 2.39. For the non-fiction text, mean interest ratings were: boys = 3.05, girls = 2.67; and mean enjoyment ratings were: boys = 2.92, girls = 2.40.



*Figure 2.* Mean interest and enjoyment ratings for fiction and non-fiction texts for the whole sample and split by sex

*Correlations between cognitive skills, motivation variables and reading comprehension for fiction and non-fiction texts*

Zero order correlations were conducted to examine relationships between reading comprehension, for the fiction and non-fiction texts, and cognitive skills and motivation variables (Table 12). Receptive vocabulary and phonological skill were both significantly positively related to comprehension performance for both texts, though vocabulary was more strongly associated with comprehension for the non-fiction text,  $r(162) = .54, p < .001$  than the fiction text,  $r(162) = .40, p < .001$ . Similarly, phonological skill was marginally more strongly associated with comprehension performance for the non-fiction text,  $r(156) = .43, p < .001$  than the fiction text,  $r(156) = .38, p < .001$ . There was a similar pattern of relationships between

the well-established theoretical motivation variables and comprehension for the fiction and non-fiction text. Fiction text comprehension was positively correlated with challenge,  $r(164) = .19, p < .05$  and expectancy,  $r(164) = .38, p < .001$ . Non-fiction text comprehension was also positively correlated with challenge,  $r(164) = .16, p < .05$  and expectancy,  $r(164) = .39, p < .001$ , but also with involvement,  $r(163) = .22, p < .01$ . In contrast, there was a different pattern of relationships between text-specific motivation variables and comprehension performance for each text. Non-fiction text comprehension was significantly positively correlated with self-reported ratings of interest,  $r(163) = .16, p < .05$  and enjoyment for this text,  $r(165) = .19, p < .05$ ; though these relationships are small to moderate in magnitude. Conversely, fiction text comprehension was not significantly associated with interest or enjoyment for this text.

Table 12

*Correlations between cognitive skills, motivation variables and comprehension for the fiction and non-fiction texts*

Measure	Reading Comprehension	
	Fiction	Non-fiction
Cognitive skills		
Vocabulary	.40***	.54***
Phonological decoding	.38***	.43***
Motivational variables		
Intrinsic motivation (global)	.08	.14
Curiosity	-.10	-.05
Involvement	.11	.22**
Challenge	.19*	.16*
Expectancy	.38***	.39***
Value	.07	.09
Interest	-.08	.16*
Enjoyment	-.09	.19*

*Note.* Interest and enjoyment for each individual text is correlated with comprehension performance for that same text.

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

*Sex differences in relationships between cognitive skills, motivation and reading comprehension of fiction and non-fiction texts*

Identical correlations were conducted, though separately for boys and girls, to examine whether there are sex differences in the relationships between cognitive skills and motivation with reading comprehension for the fiction and non-fiction text (Table 13). For boys, vocabulary was positively associated with comprehension of the fiction text,  $r(75) = .36, p < .01$  and the non-fiction text,  $r(75) = .50, p < .001$ . Phonological skill was also related to comprehension for both the fiction text,  $r(69) = .44, p < .001$  and non-fiction text,  $r(69) = .50, p < .001$ . With regard to motivation, expectancy was significantly associated with comprehension of both the fiction text,  $r(77) = .31, p < .01$  and non-fiction text,  $r(77) = .32, p < .01$ . No other motivation variables were significantly associated with boys' fiction or non-fiction text comprehension. For girls, vocabulary was positively correlated with comprehension of both the fiction text,  $r(85) = .42, p < .001$  and the non-fiction text,  $r(85) = .57, p < .001$ . Phonological skill was also positively related to comprehension of the fiction text,  $r(85) = .33, p < .01$  and the non-fiction text,  $r(85) = .38, p < .001$ . In terms of motivation, challenge was associated with comprehension of both the fiction text,  $r(85) = .23, p < .05$  and the non-fiction text,  $r(85) = .24, p < .05$ . Expectancy was also positively related to comprehension of the fiction text,  $r(85) = .44, p < .001$  and the non-fiction text,  $r(85) = .45, p < .001$ . Involvement was positively correlated with comprehension, though only for the non-fiction text,  $r(84) = .26, p < .05$ . Correlation coefficients were transformed into Fisher  $z$  coefficients to investigate whether there are significant sex differences in the strength of the relationships between cognitive and motivational variables with comprehension of



the fiction and non-fiction texts. No associations were significantly different for boys and girls ( $p > .05$ ).

Table 13

*Correlations between cognitive skills, motivation variables and reading comprehension split by sex*

Measure	Fiction		Non-fiction	
	Boys	Girls	Boys	Girls
<b>Cognitive skills</b>				
Vocabulary	.36**	.42***	.50***	.57***
Phonological decoding	.44***	.33**	.50***	.38***
<b>Motivational variables</b>				
Intrinsic motivation (global)	.04	.10	.13	.16
Curiosity	-.09	-.12	.02	-.10
Involvement	.05	.14	.21	.26*
Challenge	.12	.23*	.09	.24*
Expectancy	.31**	.44***	.32**	.45***
Value	-.02	.10	.07	.14
Interest	-.19	-.00	.14	.16
Enjoyment	-.23*	.02	.25*	.12

*Note.* Interest and enjoyment for each individual text is correlated with comprehension performance for that same text.

\*  $p < .05$ , \*\*  $p < .01$ , \*\*\*  $p < .001$ .

*Sex differences in cognitive skills, motivation and comprehension performance for fiction and non-fiction texts*

MANOVA was conducted to examine whether there are sex differences in receptive vocabulary, phonological skill, intrinsic motivation, expectancy and value of reading, text-specific motivation (interest and enjoyment for each text) and comprehension of the fiction and non-fiction texts. As outlined in study one, normality was visually examined due to the large sample size. Again, there were deviations from normality with vocabulary and phonological skill appearing negatively skewed, due to a

large proportion of scores higher in the distribution. Therefore, this should be considered when interpreting the results. Table 14 shows the means and standard deviations by sex, for each of the variables. Using Pillai's Trace there was an overall effect of sex on the dependent variables combined,  $V = .18$ ,  $F(13, 121) = 2.29$ ,  $p < .01$ ,  $\eta_p^2 = .18$ . Benjamini and Hochberg's (1995) Linear Step Up procedure was used to control for multiple comparisons. Boys' ratings of enjoyment were significantly higher than girls' ratings of enjoyment for the non-fiction text (adjusted alpha = .008),  $F(1, 149) = 8.15$ ,  $p < .008$ ,  $\eta_p^2 = .05$ . No other comparisons were statistically significant, although boys' ratings of interest were higher than girls' ratings of interest for the non-fiction text and this was close to significance (adjusted alpha = .012),  $F(1, 149) = 6.43$ ,  $p = .012$ ,  $\eta_p^2 = .04$ . Also, girls scored higher than boys for value of reading and this was close to significance (adjusted alpha = .004),  $F(1, 149) = 11.36$ ,  $p = .004$ ,  $\eta_p^2 = .07$ .

Table 14

*Mean and standard deviation for all measured variables split by sex*

	Boys		Girls	
	M	SD	M	SD
Phonological skill (z-scores)	.02	.98	-.05	1.03
Vocabulary (z-scores)	-.02	.89	.00	1.08
Challenge	3.05	.54	3.14	.56
Curiosity	2.89	.57	3.03	.56
Involvement	2.92	.55	3.09	.52
Expectancy	28.81	3.56	29.22	4.36
Value	28.49	5.16	31.37	5.31
Interest (Fiction)	2.43	.97	2.54	.96
Enjoyment (Fiction)	2.49	1.02	2.43	.89
Interest (Non-fiction)	3.07	.92	2.67	1.03
Enjoyment (Non-fiction)	2.91	.99	2.44	1.03
Fiction (z-scores)	-.08	.95	.05	1.00
Non-fiction (z-scores)	.04	.96	-.04	1.01

*Note.* Raw scores are used unless specified.

*Assessing the predictive effect of cognitive skills and motivation on children's reading comprehension performance for fiction and non-fiction texts*

Hierarchical regression analyses were conducted to examine to what extent cognitive skills and motivational variables predict children's comprehension performance for fiction and non-fiction texts, and specifically to investigate whether motivation constructs explain any additional variance in comprehension after cognitive skills. As there was the possibility of multicollinearity existing between some of the variables, correlations between variables were examined. None were found to be greater than .9; therefore, according to Field (2009), these predictors could remain within the analysis. Despite this, there were still strong correlations between text-interest and enjoyment (whole sample) for the fiction text ( $r = .71$ ); text interest and enjoyment (whole sample) for the non-fiction text ( $r = .76$ ); text interest and enjoyment (for boys) for the fiction text ( $r = .77$ ); text interest and enjoyment (for boys) for the non-fiction text ( $r = .73$ ); and text interest and enjoyment (for girls) for the non-fiction text ( $r = .76$ ). As a result, variance inflation factors were examined and none was found to be higher than 10, which, according to Myers (1990), is when there is concern about multicollinearity (as cited in Field, 2009). Furthermore, no tolerance was below 0.1, the value of which Field (2009) suggests is a problem for multicollinearity. Consequently, all predictors were suitable to remain within the analysis. Cognitive skills were added first to all regression models because, as outlined previously, these are the fundamental skills for reading comprehension (e.g., Gough & Tunmer, 1986). However, each model had different constructs of motivation entered at the second step (intrinsic motivation, expectancy-value, text-specific motivation), allowing the comparison of different theoretical models of motivation for predicting children's reading comprehension for fiction and non-fiction texts. Entering fundamental cognitive skills first means that any

additional variance in comprehension, explained by the motivational variables, can be established.

*Predictors of children's fiction text comprehension: Whole sample*

The criterion variable for this set of regression analyses was comprehension of the fiction text, for the whole sample (Table 15). In model one, intrinsic motivation constructs (involvement, challenge, curiosity) were entered at the second step, after cognitive skills. Cognitive skills explained 22.2% of the variance in children's fiction text comprehension, and the predictive effect of the IVs was significant,  $F(2, 153) = 21.88, p < .001$ . When intrinsic motivation constructs were added to the model they did not significantly increase  $R^2$  ( $p = .086$ ). Both vocabulary and phonological skill contributed significant unique variance to comprehension of the fiction text. Of the motivational variables, only challenge contributed significant unique variance, though curiosity was approaching significance ( $p = .078$ ). In model two, expectancy and value were entered after cognitive skills. Cognitive skills again accounted for 22.2% of the variance in children's fiction text comprehension and the predictive effect of the IVs was significant,  $F(2, 154) = 21.95, p < .001$ . Expectancy and value of reading significantly increased  $R^2$  by 3.9%. Again, both vocabulary and phonological skill contributed significant unique variance to comprehension of the fiction text; however expectancy also contributed significant unique variance. In the third model, components of text-specific motivation (text interest and enjoyment for the fiction text) were added at the second step, after cognitive skills. Cognitive skills accounted for 22.3% of the variance in children's fiction text comprehension, and the predictive effect of the IVs was significant,  $F(2, 154) = 22.05, p < .001$ . However, text interest and enjoyment, when added to the model, did not significantly change  $R^2$  ( $p = .68$ ). In terms

of unique variance contributed by each of the variables, only vocabulary and phonological skill were significant.

Table 15

*Hierarchical regression analyses with cognitive skills and motivation variables regressed on comprehension performance for the fiction text (whole sample)*

Criterion Variable: Fiction text comprehension

Model 1

Predictors: Cognitive skills, intrinsic motivation constructs

	R <sup>2</sup>	Change in R <sup>2</sup>	Final $\beta$
Enter			
1. Vocabulary			.28**
Phonological skill	.22	.22***	.26**
2. Challenge			.20*
Curiosity			-.15
Involvement	.26	.03	.03
<i>n</i>	156		

Model 2

Predictors: Cognitive skills, expectancy and value of reading

	R <sup>2</sup>	Change in R <sup>2</sup>	Final $\beta$
Enter			
1. Vocabulary			.23**
Phonological skill	.22	.22***	.26**
2. Expectancy			.23**
Value	.26	.04*	-.04
<i>n</i>	157		

Model 3

Predictors: Cognitive skills, text-specific motivation

	R <sup>2</sup>	Change in R <sup>2</sup>	Final $\beta$
Enter			
1. Vocabulary			.30***
Phonological skill	.22	.22***	.28***
2. Interest			.05
Enjoyment	.23	.004	-.09
<i>n</i>	157		

Note. \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

*Predictors of children's non-fiction text comprehension: Whole sample*

Hierarchical regression analyses identical to those conducted for children's fiction text comprehension were also conducted for children's non-fiction text comprehension (Table 16). In model one, cognitive skills accounted for 36.9% of the variance in children's comprehension of the non-fiction text, and the predictive effect of the IVs was significant,  $F(2, 153) = 44.79, p < .001$ . When added to the model after cognitive skills, intrinsic motivation did not significantly increase  $R^2$  ( $p = .35$ ). Only cognitive skills (vocabulary, phonological skill) contributed significant unique variance to children's comprehension of the non-fiction text. In model two, cognitive skills accounted for 35.2% of the variance in children's non-fiction text comprehension. When expectancy and value of reading were added to the model this increased  $R^2$  by 2.2%, with this change approaching significance ( $p = .07$ ). Vocabulary and phonological skill contributed significant unique variance to children's comprehension of the non-fiction text; however expectancy was also a significant unique contributor. In the third model, text-specific motivation factors (non-fiction text interest and enjoyment) were entered after cognitive skills. Cognitive skills explained 36% of the variance in children's non-fiction text comprehension, and the predictive effect of the IVs was significant,  $F(2, 152) = 42.71, p < .001$ . When text-specific motivation variables were entered, they increased  $R^2$  by 1.1%, though this change was not significant ( $p = .26$ ). Furthermore, only vocabulary and phonological skill contributed significant unique variance to children's comprehension of the non-fiction text.

Table 16

*Hierarchical regression analyses with cognitive skills and motivation variables regressed on comprehension performance for the non-fiction text (whole sample)*

Criterion Variable: Non-fiction text comprehension			
Model 1			
Predictors: Cognitive skills, intrinsic motivation constructs	R <sup>2</sup>	Change in R <sup>2</sup>	Final $\beta$
Enter			
1. Vocabulary			.39***
Phonological skill	.37	.37***	.31***
2. Challenge			.09
Curiosity			-.07
Involvement	.38	.01	.09
<i>n</i>	156		
Model 2			
Predictors: Cognitive skills, expectancy and value of reading	R <sup>2</sup>	Change in R <sup>2</sup>	Final $\beta$
Enter			
1. Vocabulary			.38***
Phonological skill	.35	.35***	.28***
2. Expectancy			.16*
Value	.37	.02	.01
<i>n</i>	157		
Model 3			
Predictors: Cognitive skills, text-specific motivation	R <sup>2</sup>	Change in R <sup>2</sup>	Final $\beta$
Enter			
1. Vocabulary			.43***
Phonological skill	.36	.36***	.29***
2. Interest			.07
Enjoyment	.37	.01	.05
<i>n</i>	155		

Note. \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

*Sex differences in text preferences*

A chi-square test of independence was conducted to establish whether there are significant sex differences in preferences for the fiction and non-fiction text. Sex had a significant effect on text preference,  $\chi^2 (1, N = 159) = 4.52, p < .05, \phi = .17$ . However, the non-fiction text was the preferred text for both boys and girls. For boys, 69% preferred the non-fiction text, with the remaining 31% stating a preference for the fiction text. For girls, 53% preferred the non-fiction text, with the remaining 47% preferring the fiction text. However, of all the pupils that preferred the fiction text, 65% of these were female and 35% were male. For the non-fiction text, of all the pupils that indicated a preference for this text, 52% were male and 48% were female. Therefore, of the children who preferred the fiction text, a much higher percentage of these children were female.

*Examining the predictive effect of cognitive skills and motivation for boys' and girls' comprehension of fiction and non-fiction texts*

Following the chi-square, showing a significant effect of sex on preferences for the fiction and non-fiction texts, hierarchical regression analyses were conducted separately for boys and girls. In all subsequent regression models, cognitive skills (vocabulary, phonological skill) were entered first, followed by either classic theoretical distinctions of motivation (intrinsic motivation, expectancy and value) or text-specific motivation components (text interest and enjoyment) at the second step. This enables the comparison of classic theoretical motivation constructs with text-specific motivation components, in terms of their ability to predict boys' and girls' comprehension of fiction and non-fiction texts.



*Predictors of boys' comprehension for fiction text*

Table 17 shows regressions with boys' comprehension of the fiction text as the criterion variable. In model one, cognitive skills accounted for 25% of the variance in boys' fiction text comprehension. When well-established theoretical motivation components were added to the model (intrinsic motivation constructs, expectancy and value) they increased  $R^2$  by 5.2%, although this change was not significant ( $p = .46$ ). Only phonological skill was a unique significant predictor of boys' fiction text comprehension, though vocabulary was approaching significance ( $p = .077$ ). In model two, cognitive skills explained 24.1% of the variance in boys' comprehension of the fiction text, and the predictive effect of the IVs was significant,  $F(2, 67) = 10.64$ ,  $p < .001$ . When text-specific motivation factors (fiction text interest and enjoyment) were added to the model this increased  $R^2$ , though not significantly, by 3.3% ( $p = .23$ ). Again, the only variable to contribute significant unique variance was phonological skill.

Table 17

*Hierarchical regression analyses with cognitive skills and motivation variables regressed on boys' comprehension performance for the fiction text*

Criterion variable: Fiction text comprehension

Model 1

Predictors: Cognitive skills, classic theoretical motivation variables

	R <sup>2</sup>	Change in R <sup>2</sup>	Final $\beta$
Enter			
1. Vocabulary			.21
Phonological skill	.25	.25***	.36**
2. Challenge			.12
Curiosity			-.13
Involvement			-.08
Expectancy			.17
Value	.30	.05	-.07
<i>n</i>	71		

Model 2

Predictors: Cognitive skills, text-specific motivation

	R <sup>2</sup>	Change in R <sup>2</sup>	Final $\beta$
Enter			
1. Vocabulary			.20
Phonological skill	.24	.24***	.38**
2. Interest			.08
Enjoyment	.27	.03	-.24
<i>n</i>	70		

Note. \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

*Predictors of boys' comprehension for non-fiction text*

Regression analyses identical to those outlined above were conducted, though the criterion variable was boys' non-fiction text comprehension (see Table 18). In the first model, cognitive skills alone accounted for 37.9% of the variance in boys' comprehension of the non-fiction text, and the predictive effect of the IVs was

significant,  $F(2, 68) = 20.79, p < .001$ . When classic theoretical motivation variables were added to the model (challenge, curiosity, involvement, expectancy, value) this increased  $R^2$  by 2.9%, though not significantly ( $p = .69$ ). Variables that contributed significant unique variance were vocabulary and phonological skill. In the second model, cognitive skills again explained 37.9% of the variance in boys' non-fiction text comprehension. When text-specific motivation factors (non-fiction text interest and enjoyment) were added to the model, after cognitive skills, this increased  $R^2$  by 4.4%, with this change approaching significance ( $p = .086$ ). Only vocabulary and phonological skill explained significant unique variance in boys' non-fiction text comprehension.

Table 18

*Hierarchical regression analyses with cognitive skills and motivation variables regressed on boys' comprehension performance for the non-fiction text*

Criterion variable: Non-fiction text comprehension			
Model 1			
	R <sup>2</sup>	Change in R <sup>2</sup>	Final $\beta$
Predictors: Cognitive skills, classic theoretical motivation variables			
Enter			
1. Vocabulary			.32**
Phonological skill	.38	.38***	.39***
2. Challenge			-.07
Curiosity			.05
Involvement			.13
Expectancy			.16
Value	.41	.03	-.08
<i>n</i>	71		
Model 2			
	R <sup>2</sup>	Change in R <sup>2</sup>	Final $\beta$
Predictors: Cognitive skills, text-specific motivation			
Enter			
1. Vocabulary			.38***
Phonological skill	.38	.38***	.37***
2. Interest			.07
Enjoyment	.42	.04	.16
<i>n</i>	71		

*Note.* \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

*Predictors of girls' fiction text comprehension*

Regression analyses were conducted for just the girls in the sample. The criterion variable for this set of regressions was girls' fiction text comprehension (Table 19). In model one, classic theoretical motivation constructs were entered after cognitive skills. Cognitive skills explained 20.8% of the variance in girls' fiction text

comprehension, and the predictive effect of the IVs was significant,  $F(2, 81) = 10.62, p < .001$ . Classic theoretical motivation factors, when added to the model, increased  $R^2$  by 9.6% and this change was approaching significance ( $p = .076$ ). Expectancy contributed significant unique variance and vocabulary was close to approaching significance ( $p = .051$ ). In model two, text-specific motivation factors (fiction text interest and enjoyment) were entered after cognitive skills. Cognitive skills explained 22% of the variance in girls' fiction text comprehension, and the predictive effect of the IVs was significant,  $F(2, 84) = 11.84, p < .001$ . Only vocabulary and phonological skill contributed significant unique variance to girls' comprehension of the fiction text.

Table 19

*Hierarchical regression analyses with cognitive skills and motivation variables regressed on girls' comprehension performance for the fiction text*

Criterion variable: Fiction text comprehension

Model 1

Predictors: Cognitive skills, classic theoretical motivation variables

Enter

	R <sup>2</sup>	Change in R <sup>2</sup>	Final $\beta$
1. Vocabulary			.24
Phonological skill	.21	.21***	.12
2. Challenge			.10
Curiosity			-.19
Involvement			-.07
Expectancy			.27*
Value	.30	.10	.09
<i>n</i>	84		

Model 2

Predictors: Cognitive skills, text-specific motivation

Enter

	R <sup>2</sup>	Change in R <sup>2</sup>	Final $\beta$
1. Vocabulary			.35**
Phonological skill	.22	.22***	.22*
2. Interest			.02
Enjoyment	.22	.00	.02
<i>n</i>	87		

Note. \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

*Predictors of girls' non-fiction text comprehension*

Further regression analyses were carried out, with girls' non-fiction text comprehension as the criterion variable (see Table 20). In the first model, cognitive skills accounted for 35.8 % of the variance in girls' comprehension of the non-fiction text, and the predictive effect of the IVs was significant,  $F(2, 81) = 22.55, p < .001$ .

When classic theoretical motivation variables were added to the model (challenge,

curiosity, involvement, expectancy and value) these increased  $R^2$ , though not significantly, by 5.2% ( $p = .26$ ). Vocabulary was the only variable to contribute significant unique variance, though phonological skill was approaching significance ( $p = .051$ ). In model two, text-specific motivation (non-fiction text interest and enjoyment) was entered after cognitive skills. Cognitive skills explained 35.9% of the variance in girls' non-fiction text comprehension, and the predictive effect of the IVs was significant,  $F(2, 81) = 22.65, p < .001$ . When text-specific motivation factors were entered they did not significantly change  $R^2$ . Vocabulary and phonological skill were the only factors to contribute significant unique variance to girls' comprehension of the non-fiction text.

Table 20

*Hierarchical regression analyses with cognitive skills and motivation variables regressed on girls' comprehension performance for the non-fiction text*

Criterion variable: Non-fiction text comprehension			
Model 1			
	R <sup>2</sup>	Change in R <sup>2</sup>	Final $\beta$
Predictors: Cognitive skills, classic theoretical motivation variables			
Enter			
1. Vocabulary			.39**
Phonological skill	.36	.36***	.19
2. Challenge			.13
Curiosity			-.18
Involvement			.07
Expectancy			.12
Value	.41	.05	.05
<i>n</i>	84		
Model 2			
	R <sup>2</sup>	Change in R <sup>2</sup>	Final $\beta$
Predictors: Cognitive skills, text-specific motivation			
Enter			
1. Vocabulary			.50***
Phonological skill	.36	.36***	.22*
2. Interest			.10
Enjoyment	.36	.00	-.08
<i>n</i>	84		

*Note.* \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .



## Discussion

### Study One

One main aim of the present study was to establish whether motivation can explain additional variance in children's reading comprehension, after accounting for fundamental cognitive skills for comprehension, namely those outlined in the simple view of reading (Gough & Tunmer, 1986). The findings suggest that motivation does, to a small extent, explain additional variance in children's reading comprehension, thus partially supporting one of the hypotheses. However, it is apparent that cognitive skills overwhelmingly predict a large proportion of the variance in children's reading comprehension performance, with only a minor contribution from (some) aspects of motivation. The results further suggest that motivational constructs are differentially predictive of children's comprehension for male and female-oriented texts. For instance, for the whole sample, expectancy and value of reading explained additional variance in comprehension of the female-oriented text. In contrast, text-specific motivation, when entered after cognitive skills, explained further variance in comprehension of the male-oriented text (for the whole sample).

Different constructs of motivation were predictive of boys' and girls' comprehension on the male and female-oriented texts. Supporting the prediction that motivation would be more important for girls' comprehension of the male-oriented text, than for their comprehension of the female-oriented text, both classic theoretical motivation constructs and text-specific motivation explained significant further variance in girls' comprehension of the male-oriented text. Specifically, curiosity, involvement and text interest were significant unique contributors. For girls' comprehension of the female-oriented text, classic theoretical constructs of motivation overall contributed

significant additional variance after cognitive skills, though only value of reading was a unique individual contributor to girls' comprehension of this text. Regarding the hypothesis that boys' motivation would be more important for their comprehension of the female-oriented text, there was no evidence to support this assumption. When motivational constructs were entered after cognitive skills, none explained significant additional variance in boys' comprehension of either text, and expectancy was the only motivation variable to contribute significant unique variance to boys' comprehension of either text. The findings suggest that motivation may be marginally more important for girls' reading comprehension, because motivational constructs, when entered after cognitive skills, predicted significant further variance in girls' comprehension of both texts, and more motivational constructs contributed significant unique variance to girls' comprehension.

An unexpected finding, partially contradicting one of the hypotheses, is that global intrinsic reading motivation was not significantly associated with comprehension of either text, for the sample as a whole. This is also inconsistent with previous literature which has found that intrinsic motivation is positively associated with reading comprehension (e.g., Logan et al., 2011; McGeown et al., 2012; Park, 2011). However, dimensions of intrinsic motivation (involvement and challenge) were positively related to comprehension of the male and female-oriented texts respectively. Despite this, for the sample as a whole, no intrinsic motivation construct was found to contribute significant unique variance to comprehension of either the male or female-oriented text. Supporting the hypothesis that motivation will be associated with reading comprehension, facets of text-specific motivation (i.e., children's interest and enjoyment for the specific passage read) were significantly associated with

comprehension of both texts, for the whole sample. That text-specific motivation components were associated with comprehension and global intrinsic motivation was not, highlights that different constructs of motivation may vary in their association with reading comprehension. For all children, level of interest for the male-oriented text also contributed unique individual variance to comprehension of this text. So, children who found the male-oriented text interesting subsequently comprehended this text more successfully than children who did not find this text interesting. There is an indication here that text-specific motivation, specifically children's text-based interest, is more integral to their reading comprehension performance for certain texts, than is their general inherent interest in reading (i.e., intrinsic motivation for reading). For instance, a child may have a general interest in reading and enjoy reading activities, but if they do not find the text that they are reading very interesting, they may comprehend this text less successfully than a text that they have greater interest for.

Other aspects of motivation were differentially associated with comprehension of the male and female-oriented texts and were also differentially predictive of children's comprehension for both texts. Research has shown that value of reading predicts additional variance in students' reading comprehension (Anmarkrud & Bråten, 2009). However, in the present study, value of reading (how much children value reading activities and how frequently they engage in reading tasks) for the sample as a whole, was only associated with comprehension of the female-oriented text. In addition, when regression analyses were split by sex, value of reading only contributed significant unique variance to girls' comprehension for the female-oriented text. Therefore, girls with a high task value for reading comprehended the female-oriented text more successfully than those who place less value on reading tasks. For boys, their

perception of their reading skill (expectancy) was the only motivational variable to contribute significant unique variance to their comprehension of both the male and female-oriented texts, whereas predictors of girls' comprehension were more varied. As outlined above, value of reading explained unique variance in girls' comprehension of the female-oriented text, while for the male-oriented text, girls' interest for this text was the strongest positive unique contributor to their comprehension. Put simply, girls who found the male-oriented text more interesting comprehended this text more successfully than girls who found this text less interesting. These patterns of results suggest that boys and girls may be motivated to read in different ways, with perceptions of reading competence being particularly important for boys' reading comprehension.

In support of literature which has shown that reading comprehension is related to children's perception of their reading skill (Katzir et al., 2009; D. Lin et al., 2012), expectancy emerged as the motivational variable most strongly positively associated with reading comprehension for both the male and female-oriented texts, and the only motivational variable to be significantly related to comprehension of both texts for boys and girls separately. This suggests that if children feel they are skilled readers they are likely to show superior reading comprehension. On the other hand, this relationship could be reciprocal in that children who think they are skilled readers demonstrate greater performance on reading comprehension tasks, or alternatively, children who show superior performance on reading comprehension tasks may subsequently believe that they are skilled readers. It is not possible to disentangle this potentially reciprocal relationship to indicate direction of causality. What is also not clear from the findings is how expectancy beliefs influence children's motivation, in terms of how perceived competence in reading generates effort and persistence for reading comprehension

activities. Shell, Colvin and Bruning (1995) argue this point, though for students' self-efficacy beliefs. They argue that although children's reading beliefs and achievement may be related, this does not mean that their beliefs are the cause of their superior performance. The authors further suggest that research needs to examine how these beliefs can then influence the cognitive mechanisms that are responsible for differences in performance.

As predicted, boys and girls had different preferences for the two texts. Boys preferred the male-oriented text and girls preferred the female-oriented text. It is possible that differences in the motivational constructs associated with each text may have emerged because of boys' and girls' differential interest for each of the texts. That boys preferred the male-oriented text and girls preferred the female-oriented text supports previous research, which has shown that individuals have a preference for same sex protagonists (Beyard-Tyler & Sullivan, 1980; Kropp & Halverson, 1983). However, it cannot be ruled out that boys preferred the male-oriented text simply because they preferred the story and its themes, as opposed to preferring this story due to its male protagonist. Similarly, the girls may have preferred the female-oriented text due to the themes within the story, particularly that of family relationships. Indeed, as previously discussed, research indicates that girls have a greater preference for stories surrounding relationship themes, than boys (Clark & Foster, 2005; Coles & Hall, 2002).

For the whole sample, interest for the male-oriented text predicted unique variance in children's comprehension of this text. However, when analyses were split by sex, interest for the male-oriented text was only uniquely predictive of girls' comprehension of this text, illustrating the importance of text interest particularly for girls' comprehension. This is in keeping with previous research which has indicated

that interest is more important for girls' reading performance (Bray & Barron, 2004; Graham et al., 2008). However, this is at odds with existing literature which has indicated that interest is more integral to boys' reading comprehension (e.g., Asher & Markell, 1974; Baldwin et al., 1985; Oakhill & Petrides, 2007). When analyses were split by sex, a significant difference emerged between boys and girls in the strength of the association between involvement and reading comprehension for the male-oriented text, with involvement more strongly related to girls' comprehension. In addition, involvement explained unique variance in girls' comprehension of the male-oriented text. Involvement refers to being motivated to read for the feeling of satisfaction felt when reading something that is interesting. As such, experiencing positive affect (e.g., feelings of satisfaction) when reading an interesting text facilitated girls' comprehension of this text. The male-oriented text, however, was the least preferred text for a large proportion of girls in the sample; therefore it could be assumed that this text was less interesting for many of the girls. Hence, for girls who perhaps had some interest for this text, scoring highly for involvement (i.e., being motivated to read for the feeling of satisfaction experienced when reading something interesting) may have facilitated their comprehension for this text, particularly compared to girls who either did not find this text at all interesting, or those who found the text interesting, but scored low for involvement.

Interestingly, there was no significant difference between boys and girls in their comprehension for both texts, despite boys and girls having different preferences for the two texts. This suggests that text preferences may not be crucial for reading comprehension. However, it may have been useful to run analyses comparing boys' comprehension for the male-oriented text, with their comprehension for the female-

oriented text, and vice versa for girls' comprehension, as opposed to merely comparing boys' and girls' comprehension for both of the texts. Bray and Barron (2004) found that girls tended to perform better for comprehension of female-oriented texts, but that for boys there was no difference in their comprehension across texts, indicating that girls' comprehension is more highly facilitated by the gender focus of the text; this was not corroborated by the present study. Another, perhaps more informative and valid way of examining how interest influences comprehension would have been to run analyses assessing the predictive influence of interest on children's comprehension of the text that they rated as more highly interesting, compared with their comprehension of the text they rated as less interesting. In the current study, the influence of interest on comprehension, was compared for female and male-oriented texts, however not all girls preferred the female-oriented text and not all boys preferred the male-oriented text. Therefore, it is not possible to conclude that the female-oriented text was the most interesting text for girls, or that the male-oriented text was the most interesting text for boys, because this was not always the case.

A seemingly counterintuitive finding is the inverse predictive relationship between girls' curiosity and their comprehension of the male-oriented text; highlighting that girls who scored lower for curiosity (i.e., are less interested in reading to find out new information and/or learn about new topics), showed superior comprehension on the male-oriented text. However, this finding could be due to girls, in general, being less interested in this text, which is supported by the fact that girls showed a significant preference for the female-oriented text. As a result, girls who are less curious and who are not motivated to read to learn about things that interest them, were perhaps less affected by the fact that they found this text less interesting, because they are to a lesser

extent motivated to read to find out about topics that interest them. In contrast, girls who are highly motivated to read to learn new information and to read about topics that interest them, were likely to have been more negatively affected by the lack of interest they had for the male-oriented text.

In terms of the cognitive skills assessed, both vocabulary and phonological skill were positively associated with comprehension of both texts, as expected. This is in accordance with the simple view of reading (Gough & Tunmer, 1986) and also supports previous research which has shown positive associations between vocabulary and comprehension (Cain et al., 2004; Ecalle et al., 2013; Ouellette, 2006) and between phonological skill and comprehension (Goff et al., 2005; Ouellette, 2006). However, when analyses were split by sex, the association between phonological skill and comprehension of the male-oriented text was significantly stronger for boys. Moreover, vocabulary was a significant unique contributor to comprehension of the male and female-oriented texts, for the sample as a whole and for both boys' and girls' comprehension of these texts separately; whereas, phonological skill was a significant contributor to comprehension of both texts for the whole sample and for boys, but not for girls. Why phonological skill uniquely contributed variance to boys' comprehension of both texts, but not to girls' comprehension is unclear. A possible explanation could pertain to children in the sample with special educational needs (SEN), as in the present study children with SEN were retained in the analyses. A number of children in the sample with SEN had reading disorders, such as dyslexia, which could have therefore confounded the results. This may have been a particular problem because 17 out of the 27 children with SEN were boys. This could perhaps explain why phonological skill was a more important predictor of boys' comprehension. It could be the case that girls



in the present study were overall more skilled readers, possessing sufficient phonological skill, and as a result, phonological skill would be less able to explain variation in girls' comprehension performance. On the other hand, overall, boys in the study may have possessed poorer phonological skill, due to more boys in the sample having reading disorders, therefore, this skill would be more likely to explain variation in boys' reading comprehension scores. However, MANOVA showed that scores for boys and girls did not differ significantly on the measure of phonological decoding skill. Boys and girls also differed very little in their scores on other measured variables. No statistically significant differences emerged, though the difference between boys' and girls' value of reading was very close to significance. The adjusted alpha value for this comparison and the obtained  $p$  value were both .004. Previous research has shown that girls score significantly higher for value of reading than boys (Eccles, Wigfield, Harold & Blumenfeld, 1993). Value of reading, in the present study, was significantly positively associated with girls' comprehension of the female-oriented text, but not with boys' comprehension of this text. Despite this, there was no significant difference between boys and girls in their comprehension performance for this text.

A limitation of the present study is the same as a limitation discussed by Bray and Barron (2004) with regard to their study. The authors explain how in their study, male and female-oriented texts were selected on the basis of having more male or female characters respectively. Similarly, in the present study, the female-oriented text was chosen on the basis of having a female protagonist and the male-oriented text selected on the basis of having a male protagonist. It was then predicted that girls would find the female-oriented text more interesting and that boys would find the male-oriented text more interesting. Though this was indeed the case, it would have perhaps

been more methodologically sound to select two texts with identical stories, though one with a male protagonist and the other with a female protagonist, as Bray and Barron suggest. In doing this, one can be more confident that any differences in perceived interest for a female-oriented and male-oriented text is due to sex of the protagonist and not due to pupils finding one text more interesting because of other textual features.

Another limitation of this study is that reading comprehension performance for male and female-oriented texts was assessed using only two texts (one male-oriented and one female-oriented). Examining the variables that predict children's comprehension performance for male-oriented and female-oriented texts using a substantially larger number of male and female-oriented texts, would have provided a more valid and comprehensive account of the predictive value of these variables for pupils' reading comprehension across text types. A final limiting factor of the current study is that it was presumed that because a larger percentage of girls preferred the female-oriented text that this therefore indicated that girls found this text more interesting than the male-oriented text. Likewise, it was assumed that because a greater percentage of boys preferred the male-oriented text compared to the female-oriented text, that this implied boys found this text more interesting. Regression analyses were then conducted on the basis that motivational variables would be more important for girls' comprehension of the male-oriented text and for boys' comprehension of the female-oriented text, as these are supposedly less interesting texts for girls and boys respectively. However, not all boys preferred the male-oriented text, thus some boys may have found the female-oriented text more interesting, and the same applies to girls with regard to the male-oriented text. Future research could still investigate children's

preferences for texts with a male or female protagonist, though could examine the influence of interest on the texts that children rate as more and less interesting.

An implication of the current study is that cognitive skills are critical to children's reading comprehension and, thus, teachers should encourage the development of children's cognitive skills. In particular, educators should seek to broaden children's vocabulary knowledge and ensure that children have sufficient phonological decoding skill. From the results of the present study, there is some ambiguity regarding the importance of fostering children's reading interests and motivation for reading. The extant literature suggests that motivation is important for children's reading comprehension, whereas the present study indicates that motivation is less important. Moreover, there was not one conceptualisation of motivation which stood out as being consistently important for comprehension across both texts for all children, which suggests that in circumstances where motivation does influence children's reading comprehension, there can be various motivational influences.

Findings from the present study may also offer suggestions for test developers. The comprehension assessments in the present study were extracted from SATs papers, which are national assessments given to children in year six in schools in England. The results indicate that boys and girls do show preferences for texts with a same-sex protagonist. Therefore, to avoid any possible bias, test developers could use passages that have both male and female characters, and which have themes that are likely to be of interest to both boys and girls. This would prevent any systematic bias from confounding scores on comprehension measures. On the other hand, Bray and Barron (2004) suggest that test developers use passages that are rather uninteresting, because, in their study, interest was a more potent predictor of comprehension of interesting texts.

In conclusion, the present study is seen as an initial step towards investigating how both cognitive skills and motivational variables are related to comprehension of texts aimed at different audiences (males/females). The study illustrates that cognitive skills are critical for children's reading comprehension for these texts and that, to a small degree, motivation can sometimes explain further variance in children's reading comprehension. Furthermore, the study shows that the relationships between different constructs of motivation and reading comprehension vary according to the specific text that a child's comprehension is being measured upon. Therefore, this illustrates how the findings of research examining the predictive influence of cognitive skills and motivational variables on reading comprehension are very specific to the particular texts children comprehend. Additional research is needed to further examine the influence of cognitive skills and motivation constructs on children's comprehension of these text types. In particular, future research should assess children's comprehension performance across a range of texts aimed at males and a range of texts aimed at females, to provide a more accurate and comprehensive account of how cognitive and motivational variables predict comprehension of these texts.

## **Discussion**

### **Study Two**

The main aim in study two, as in study one, was to determine whether motivation can account for further variance in children's reading comprehension, after accounting for fundamental cognitive skills. The results from study two provide even less support, than those from study one, for the ability of motivation to explain further

variance in children's reading comprehension. Cognitive skills were by far the strongest predictors of children's reading comprehension for both the fiction text and the non-fiction text. However, despite the dominance of cognitive skills in explaining children's comprehension of fiction and non-fiction texts, there were significant relationships between some motivation constructs and reading comprehension. Children's expectancy of reading (i.e., children's perceptions of their reading skill) was positively related to comprehension of both text genres, for the whole sample, which suggests that perceiving oneself as a competent reader is important for comprehending texts of different genres. In fact, in the present study, expectancy predicted significant unique variance in children's comprehension of the fiction text and the non-fiction text.

Partially supporting the hypothesis that motivational constructs would be associated with children's comprehension, challenge was significantly related to comprehension of both texts. This indicates that feeling a sense of satisfaction when gaining an understanding of complex ideas in texts (challenge) is related to superior comprehension. However, global intrinsic motivation was not associated with comprehension for either text genre, which also opposes the findings of existing research that has shown intrinsic motivation to be positively associated with reading achievement (e.g., Logan et al., 2011; McGeown et al., 2012; Park, 2011). Text-based interest and enjoyment were only associated with comprehension for the non-fiction text, which suggests that finding the non-fiction text interesting, related to better comprehension of this text. A possible explanation could be that children may have found the non-fiction text harder to comprehend and so interest and enjoyment for the non-fiction text could have been more important for pupils' comprehension of this text. Research has shown that children are generally better at comprehending narrative texts

compared to expository texts (e.g., Best et al., 2008; Diakidoy et al., 2005), which could perhaps be due to the more complex and unfamiliar vocabulary commonly used in such texts. Although the non-fiction text in the present study was narrative in structure and not expository, non-fiction texts are also likely to include more complex and unfamiliar vocabulary, which could have made this text harder to comprehend. Contradicting this, however, challenge emerged as a significant unique predictor of comprehension for the fiction text, for the whole sample. This could indicate that children found the fiction text harder to comprehend, because children who feel a sense of satisfaction when acquiring an understanding of complex ideas within a text (challenge), showed superior comprehension for this text.

When analyses were split by sex, there were some differences between boys and girls in terms of the motivational constructs that were associated with comprehension of both texts. For instance, expectancy was the only motivational variable associated with boys' reading comprehension of either text. Whereas, for girls, both challenge and expectancy were significantly associated with comprehension of both texts, and involvement was significantly related to girls' comprehension for the non-fiction text. However, statistically there were no significant differences between boys and girls in the strength of the associations between any of the motivational variables and comprehension for either of the texts.

In the present study there was also a lack of evidence to support the hypothesis that motivational constructs would explain variance in comprehension over and above cognitive skills. For boys' comprehension of both the fiction and non-fiction text, no motivational factors accounted for variance in comprehension performance; only cognitive skills contributed significant unique variance. Therefore, the results also do

not support an additional prediction that motivation would be more important for boys' comprehension of the fiction text. Similarly, girls' comprehension of the non-fiction text was explained only by cognitive skills. However, expectancy contributed significant unique variance to girls' comprehension of the fiction text, illustrating that girls who perceived themselves as competent skilled readers consequently performed better for comprehension of this text. Regarding the hypothesis that motivation would be more important for girls' comprehension of the non-fiction text, there was no support for this assumption. However, this prediction was made on the basis of a prediction that girls would prefer and have more interest in the fiction text. To the contrary, overall, girls preferred the non-fiction text and so it may be that motivation was more important for girls' comprehension of the fiction text. As girls may have had less interest for this text and may have found it more boring, motivation would be more critical for their comprehension of this text.

Examining children's text preferences showed that both boys and girls preferred the non-fiction text, which is consistent with the findings of Mohr (2006), though her work was with first-grade children. Much of the extant literature, in contrast, has indicated that more children tend to choose to read fiction texts over non-fiction texts (Clark & Foster, 2005; Coles & Hall, 2002). Even though children in the present study generally preferred the non-fiction text, of the children that preferred the fiction text a significantly higher percentage were girls and of the children who preferred the non-fiction text a marginally higher percentage were boys. This is in line with research by Clark and Foster (2005) who found that a higher percentage of girls, compared to boys, read fiction books, and with research by Coles and Hall (2002) which showed that of children who read non-fiction texts, a larger percentage of these children were boys. It

is important to note, however, that in the current study, children read only one fiction text and one non-fiction text; therefore it is possible that children may have just preferred this particular non-fiction text due to the topic of the text, which was about pirates. Children may have found the fiction text, about camping, less interesting. In order to gain a more accurate view of which text genre children prefer, it would be better to present children perhaps with two texts, one fiction and one non-fiction, that are about the same topic. The results also showed that boys rated the non-fiction text as more enjoyable than did girls. The comparison between boys' and girls' interest for the non-fiction text was also very close to significance, as the adjusted alpha value and the obtained *p* value were both .012. These findings again support the idea that boys, compared to girls, show greater preference for this text genre. However, boys' greater enjoyment for the non-fiction text, compared to girls, did not relate to boys showing significantly better comprehension performance for this text compared to girls.

In terms of cognitive skills and their association with comprehension of the two text genres, both phonological skill and vocabulary were positively associated with comprehension of both texts, though vocabulary was more strongly associated with children's comprehension of the non-fiction text. Research has found that expository texts, compared to narrative fiction texts, contain a higher proportion of words that are technical, or low frequency; whereas narrative fiction texts, compared to expository texts, contain a higher proportion of high frequency words within the English language (Gardner, 2004). Therefore, greater vocabulary knowledge will help children to comprehend expository/informational texts more successfully. However, as previously discussed, it is important to note that in the current study the non-fiction text was narrative and not expository in structure, though it is likely that the vocabulary used in



this text was more unfamiliar and more complex for children to understand. With regard to the ability of these cognitive skills in predicting variance in children's comprehension of the two texts, receptive vocabulary and phonological skill contributed significant unique variance to comprehension of the fiction text and non-fiction text for the whole sample. However, when the analyses were split by sex there was some variation in the predictive value of these cognitive skills. For instance, for boys' comprehension of the fiction text, only phonological skill contributed significant unique variance, whereas for boys' comprehension of the non-fiction text, vocabulary also contributed significant variance. This is again in consonance with the idea that vocabulary is more critical for comprehension of texts that use more unfamiliar and complex vocabulary, such as non-fiction and expository texts. For girls' comprehension, the importance of vocabulary and phonological skill varied according to both the text that comprehension was being assessed on, but also varied in relation to which constructs of motivation were entered into the model after cognitive skills. For instance, for girls' comprehension of the fiction text, when classic theoretical constructs of motivation (i.e., intrinsic motivation, expectancy and value of reading) were entered into the regression, after cognitive skills, neither cognitive skills were found to contribute significant unique variance. In this case, expectancy was the only variable in the model to contribute significant individual variance. However, when components of text-specific motivation were added to the model (i.e., interest and enjoyment for the fiction text), after cognitive skills, phonological skill and receptive vocabulary both contributed unique variance to girls' comprehension of the fiction text. These findings indicate that only certain motivational components may be influential for children's comprehension.

Motivation is thought to drive students to read (i.e., it acts as an energiser) and children who are more motivated to read are thought to be more cognitively engaged when they are reading, resulting in superior reading comprehension performance (Taboada et al., 2009). However, in the present study, motivation was not strongly predictive of reading comprehension. This may be due to the fact that pupils were given the texts to read and had no option but to read them and complete questions on them. Furthermore, this was within the confines of the classroom environment (whilst at their desk). This may explain why motivation explained little additional variance in children's comprehension performance. Within a more natural environment, where pupils select their own texts, the relationship between reading motivation and reading comprehension may differ. Perhaps motivation would have been more strongly predictive of pupils' reading comprehension under different circumstances; though note that most previous studies have also carried out their research under similar conditions. Nevertheless, this is an important consideration of the present study and highlights the importance of considering the research context when developing studies and interpreting results. Another potential limiting factor of the current study relates to the text genres that children's comprehension was assessed for. The majority of studies that have compared children's reading comprehension across genres have examined comprehension for narrative and expository texts. These expository passages are often scientific in nature and their whole purpose is to inform the reader. Although the non-fiction text in the current study aimed to inform the reader, it was also partly entertaining, due to its narrative structure. Therefore the texts could have been too similar to allow any differences to emerge. Nonetheless, it is important to ascertain whether there are differences in the importance of cognitive skills and motivational variables for children's comprehension of fiction and non-fiction texts. Moreover, it is

important to investigate this not solely for non-fiction texts that are scientific, which the majority of previous studies have done, but also for other types of non-fiction text that children will be exposed to in school, such as the historical non-fiction text in the present study. Another limitation of the present study, as in study one, is that only two texts were used to assess comprehension. When examining the influence of different cognitive skills and constructs of motivation on children's comprehension of different text genres, a more valid and reliable way of determining which factors are most important, would be to examine comprehension across a range of fiction and non-fiction texts.

An implication of the present study is that teachers and other educators should seek to expose children to a variety of text genres and that they should not simply conform to gender stereotypes, presupposing that boys will prefer to read non-fiction texts and that girls will prefer to read fiction texts. In the present study it is evident that this was not the case, as a higher percentage of both boys and girls preferred the non-fiction text. Children should be encouraged to read a selection of texts that have different structures and different purposes for reading, as throughout their time at school they will increasingly be required to read a variety of texts to foster learning. In addition, like study one, the results from study two highlight how important cognitive skills are for reading comprehension, therefore teachers should focus on broadening children's vocabulary knowledge, particularly at this age (years 5 and 6), when children are more frequently presented with texts of greater complexity. Teachers, particularly of children in the early years of schooling, should ensure that children develop good phonological skills as this provides a solid foundation for developing proficient reading skill. Teaching of phonics is indeed commonplace in schools in England and children

are now assessed in year one to determine whether they possess adequate phonological decoding skill. Another consideration of the present study is that only children in years five and six were assessed. Future research could examine whether the relationships among cognitive and motivational variables with comprehension, vary across different age ranges. Children in the early years of primary school in particular, predominantly read narrative fiction texts; therefore it is possible that different reading preferences and patterns of relationships between motivation and comprehension could be found in younger children.

In conclusion, the present study is seen as an initial attempt at exploring how cognitive and motivational variables predict pupils' comprehension across text genres. The findings strongly highlight the importance of cognitive skills for comprehension of fiction and non-fiction texts, and suggest that motivation is perhaps not as important for pupils' reading comprehension as the existing literature suggests. Future research should seek to confirm these findings, using a much larger range of fiction and non-fiction texts, to provide a clearer and more accurate picture of the influence of cognitive and motivational factors on children's comprehension of fiction and non-fiction texts. Of course, children's reading in school is not limited to fiction and non-fiction texts, children are exposed to a variety of texts. Therefore future research could also examine the influence of cognitive and motivational variables on children's comprehension of a wider range of text genres.

### **General Discussion**

The two studies documented in the present thesis aimed to establish whether motivation can explain additional variance in children's reading comprehension after accounting for fundamental cognitive skills. Moreover, the studies aimed to investigate

whether motivational constructs differ in their predictive value for children's comprehension of different text genres and texts aimed at different audiences. Both studies have also provided an insight into whether the role of motivation for reading comprehension differs across sexes. In both studies, children's cognitive skills were consistently positively associated with comprehension across text genres (fiction, non-fiction) and texts aimed at different audiences (male-oriented, female-oriented). Moreover, in some circumstances, only cognitive skills explained variance in children's comprehension performance, with motivation variables contributing no significant unique variance, for example in boys' comprehension of the fiction and non-fiction texts, and girls' comprehension of the non-fiction text. Taken together, both studies strongly indicate that cognitive skills explain a large proportion of the variance in children's reading comprehension and that motivation is limited in its capacity to predict further variance in comprehension. That cognitive skills explained a large proportion of the variance in children's comprehension is consistent with the simple view of reading (Gough & Tunmer, 1986), which contends that skilled decoding and linguistic comprehension equates to reading success. Furthermore, the findings are also consistent with the work of Guthrie et al. (1999) who found that, for children in grades three and five, cognitive variables explained a large proportion of variance in their comprehension and that motivation variables could not explain significant further variance after accounting for cognitive skills and children's reading amount.

Receptive vocabulary skill was significantly related to and uniquely predictive of children's comprehension of all text types across both studies, when analyses were conducted on the whole sample. The degree of vocabulary knowledge that children possess is therefore paramount to their reading comprehension skill, though the

direction of this relationship cannot be established. It is reasonable to assume that possessing a broader and deeper vocabulary knowledge facilitates reading comprehension, although there is also evidence that more reading experience and better comprehension of texts enables a child to acquire a broader vocabulary. Oakhill et al. (2003) discuss this possibility, arguing that one should not presume that successful comprehension is the result of greater vocabulary knowledge or intelligence. They argue that it is equally as plausible that good comprehension, probably influenced by more frequent reading, promotes greater performance on intelligence tests for example. In this regard, a child who is a skilled comprehender, perhaps due to reading a wide range of texts, may consequently acquire a broader knowledge of vocabulary.

Regarding motivation and comprehension, expectancy was the motivational construct most consistently associated with reading comprehension across text types, which signifies the importance of children's perceived competence in reading, particularly in comparison to peers, for their reading comprehension. Though, as discussed in study one, this relationship may be reciprocal. Children who feel that they are competent readers are likely to perform more successfully on reading comprehension tasks compared to readers less confident in their ability. In turn, children who perform well on reading tasks will inevitably have greater perceived competence in their reading skill. As previously outlined, it is difficult to determine the directionality of this relationship as causality cannot be inferred. Research has shown that academic self-concept is related to reading comprehension performance for good comprehenders, though not for poor comprehenders (Ehrlich et al., 1993).

Study two, in particular, illustrates that motivation does not always explain additional variance in children's reading comprehension after accounting for cognitive

skills. The extant literature leads researchers to believe that motivation is a robust predictor of reading comprehension, yet the present studies indicate that this may not be the case. Currently, there is an interesting debate regarding a publication bias in scientific research, with only significant results being published in journals (Laws, 2013). Decisions on whether a paper should be published is frequently based on the results obtained (Chambers, 2013), with research journals susceptible to publishing not only the significant, but the most interesting and perhaps new findings, with little interest in null results (Nosek, Spies & Motyl, 2012). Biases in publication criteria means that a study could have good methodological rigour and be a well written piece of research, yet it still may not be published (Nosek et al., 2012). For example, if a researcher finds non-significant results for an effect which previous studies have found a significant effect for, it may be the case that this research will not be published. With regard to the present studies, it is conceivable that the existing motivation and reading comprehension literature could have led researchers to believe that the predictive value of motivation for reading comprehension performance is greater than it realistically is. It is likely that any research which has found non-significant results, regarding motivation and reading comprehension, has subsequently not been published, as this is deemed less interesting and valuable as opposed to research with significant results. This could have therefore inflated researchers' perceptions of the importance of motivation for reading comprehension.

An alternative explanation of the limited ability of motivation to explain variation in children's comprehension scores, in the current studies, could be due to the sample of children examined within the studies. Most researchers investigating reading motivation and reading comprehension assess typical readers and exclude children with

special educational needs from analyses. In the current studies, children with special educational needs and children with English as an additional language were included within all analyses, in order to generate results that are applicable to typical classrooms and to ensure that there were a sufficient number of children included to have enough power for the regression analyses. Research which has included typical readers and children with reading impairments has found that receptive vocabulary is the best predictor of reading comprehension difficulties (Sideridis et al., 2006). Therefore, there was good reason to believe that reading motivation would be similarly important for SEN and EAL children, as much as for typically developing English speaking children.

An important consideration is the age of the participants in the two studies, particularly in terms of the importance of different cognitive skills for children's reading comprehension. For the most part, across both studies, the association between vocabulary and reading comprehension was stronger than the relationship between phonological decoding skill and reading comprehension. Though, this was not always the case. Vocabulary was also, in general, more strongly predictive of children's reading comprehension performance than phonological decoding skill. Had the pupils been in the very early years of schooling, then their phonological decoding skill may have been more important for their reading comprehension. Research conducted by Goff et al. (2005), with children aged between eight and 11 years, found that both receptive vocabulary and phonological decoding skill were significantly positively associated with reading comprehension, but the relationship between receptive vocabulary and reading comprehension was stronger. A final point to consider, with regard to the ages of the pupils in these studies, relates to text preferences. As previously discussed, when children have reached school years five and six of primary



school they are likely to have more well-developed text preferences than children who are much younger and are in the early years of primary school. Indeed, the results showed that boys and girls did have different preferences for the texts, particularly the male-oriented and female-oriented texts in study one. It may have been the case that much younger pupils would have not shown significantly different text preferences.

Teachers and other educators should foster the development of children's cognitive skills, particularly vocabulary knowledge and phonological skill, as the documented studies highlight how integral these skills are to children's reading comprehension. Indeed, the present study could be considered a 'critical test' of the importance of reading motivation for reading comprehension, as reading motivation was entered after the cognitive skills most commonly known to underpin reading comprehension (vocabulary and phonological decoding). This is in contrast to other studies which have often included cognitive variables such as background knowledge of the topic and cognitive strategy use (e.g., Anmarkrud & Bråten, 2009; Taboada et al., 2009) and have examined whether reading motivation predicts additional variance after these cognitive factors. After entering the cognitive skills of vocabulary and phonological decoding, the importance of encouraging children's reading motivation is less clear from the documented studies. Nevertheless, there is a significant body of research to suggest that reading motivation is important for children's reading comprehension and reading engagement (i.e., frequency of reading); therefore supporting children's reading interests and encouraging positive attitudes towards reading should arguably be something that teachers should also foster (i.e., in addition to developing cognitive abilities).

A picture that emerges from both studies is that boys and girls seem to differ in their motivation, though arguably to quite a small extent. For boys, their expectancy (i.e., how proficient they feel they are at reading) is most important for their reading comprehension. So, boys who feel confident in their reading ability seem to show better reading comprehension performance. In contrast, girls' motivation seems to be more varied in terms of which constructs are most influential for their reading comprehension. For example, in study one, value of reading was important for girls' reading comprehension, indicating that girls who think that reading is important, consider it a valuable activity and engage in reading activities more frequently, subsequently comprehend texts more effectively. However, also in study one, expectancy was significantly associated with girls' comprehension of both texts and involvement and text interest contributed significant unique variance to girls' comprehension of the male-oriented text. Furthermore, in study two, expectancy was predictive of girls' comprehension for the fiction text. Brought together, these findings suggest that motivating influences on girls' reading comprehension may vary according to the type of text that they are required to comprehend.

A limitation of the current research is that reading motivation was assessed solely using self-report data in the form of questionnaires. Guthrie et al. (2007) explained how their use of interviews enabled a more detailed account of motivation; though this would not have allowed a quantitative analysis of the results. Nevertheless, perhaps in the present studies a more comprehensive analysis of motivation would have been obtained had motivation been measured in various different ways, such as conducting interviews with teachers and students. The present studies did, however, rectify a limitation identified in the study by Bray and Barron (2004). In the present

studies, children's interest for each of the texts was assessed by questioning children on how interesting they found a text, directly after they had read one individual text. In comparison, Bray and Barron measured children's text-based interest after they had read multiple texts. It is therefore likely that the measure of text interest in the current studies has greater validity, because interest for another text, or interest for the complimentary comprehension questions, had less chance of confounding the desired measure of interest, which was interest for a specific text. There are, however, still some issues pertinent not only to the measurement, but also to the conceptualisation of interest in the present studies. Interest was operationalised as text-based interest, which is a form of situational interest. Text-based interest is interest that is elicited by features of the text. However, it is not clear that the measure of text-based interest in the present studies did not also measure children's individual interests. For instance, a child may have rated the non-fiction text (a text about pirates) as interesting, not because any textual features elicited their interest, but because they have a well-developed personal interest in pirates. However, early developing interest (e.g., situational interest) is elicited by positive affect (Hidi & Renninger, 2006) and in the present studies both interest and enjoyment, which are characteristic of positive affect, were measured. Alternatively, others have suggested that interest in general is generated by an interaction between personal and situational interest (e.g., Bergin, 1999); therefore high interest for a particular text could be a function of both a well-developed personal interest for the topic of the text and of interest triggered by contextual features of the text. Future research could aim to determine specifically whether it is children's personal interests or situational interest (e.g., interest elicited by textual features) which is of primary importance for children's reading comprehension. A possible way of

achieving this would be to consider children's personal interests, in terms of the particular topics that they have a strong interest in, when assessing comprehension.

A further possible limiting factor of the present studies is that regression analyses were conducted on the whole sample and were split by sex, but comparisons were not made between high and low ability readers. The sample in the present studies is likely to be heterogenous as there were a wide ranging level of abilities across the sample, because the sample included not only typically developing children, but also those with special educational needs and children with English as an additional language. It may have been useful to perform analyses with the sample split by ability, for example comparing the predictive value of the cognitive and motivational factors for children categorised as either poor or good comprehenders. By analysing the sample as a whole and by sex, this may have therefore masked possible differences that exist between children with different levels of comprehension skill (Ehrlich et al., 1993). The cognitive and motivational variables that predict the comprehension performance of good comprehenders may be very different to those that predict variance in the comprehension performance of relatively poorer comprehenders. This analysis was not carried out in the present study, as, given the relatively small sample size, any comparisons between good and poor readers (e.g., top and bottom 20% or 30%) would have resulted in too small a sample for the regression analyses. Indeed, the sample sizes for the regressions split by sex were arguably small (a minimum of 10 participants are required for each predictor variable entered). This is a further limitation.

An additional limiting factor in the present studies pertains to Cronbach's alpha values for dimensions of intrinsic motivation in the Motivation for Reading Questionnaire (MRQ). Alpha values were relatively low for involvement and challenge

( $\alpha = .55$  and  $.49$  respectively). In the psychology literature, researchers generally regard an alpha value of  $.70$  as acceptable (Cortina, 1993; Schmitt, 1996), therefore alpha values not only for involvement and challenge, but also for curiosity ( $\alpha = .67$ ) and the expectancy component of the Motivation to Read Profile ( $\alpha = .65$ ) could arguably be considered inadequate. This is a particular issue as low internal reliability can attenuate the relationships among variables (Schmitt, 1996). This could possibly explain the relatively weak associations between reading motivation constructs and comprehension in the present studies. However, internal consistency values are influenced by the number of items in a scale (Streiner, 2003), therefore low alpha values could have been a result of the small number of items comprised in each of the intrinsic motivation dimensions (i.e., curiosity and involvement = 7 items each, challenge = 5 items).

It is important to consider how comprehension has been assessed when interpreting results. The present studies showed how different motivational constructs were predictive of children's comprehension for different text types and, on occasion, vocabulary and phonological skill were also differentially predictive of comprehension of different text types. It is not only the type of text used to assess comprehension which is an issue; there is also evidence to suggest that some published reading comprehension assessments are not comparable as they may be measuring different constructs, despite all purporting to measure the same thing (Keenan, Betjemann & Olson, 2008). In fact, research has shown that the amount of variance in comprehension performance that is explained by different cognitive skills varies as a function of the comprehension assessment (Keenan et al., 2008). Different comprehension assessments can vary in terms of the length of comprehension passages, the tasks/items used to assess comprehension (e.g., multiple choice questions, picture selection, story re-telling)

and whether the assessment is oral or written (Keenan et al., 2008). Hagtvet (2003) measured comprehension performance in two ways: one using a cloze task (filling in missing words) and the other involving story re-telling. Vocabulary was a significant predictor of comprehension performance in terms of written story re-telling, whilst phonemic awareness and syntactical ability were significantly predictive of comprehension on the cloze task. This illustrates how different cognitive skills are important for different measures of comprehension. When interpreting the findings of research, it is important therefore that we take into careful consideration the way in which comprehension is conceptualised and assessed. Future research could therefore explore the cognitive and motivational predictors of comprehension, not only for different text types, but also for different question types used to assess comprehension of different types of text.

In conclusion, the present studies aimed to explore the predictive value of cognitive skills and motivational variables for children's reading comprehension on different text types. The studies also sought to examine whether motivation could explain additional variance in children's comprehension, after accounting for cognitive skills. The findings collectively suggest that cognitive skills explain a large proportion of the variance in children's comprehension across different text types (i.e., male-oriented, female-oriented, fiction and non-fiction texts) and that motivation accounts for an extremely limited proportion of additional variance. The findings are therefore inconsistent with a large body of research, which highlights the importance of reading motivation for children's reading skill. As outlined previously, however, it is possible that studies which have found similar evidence to that of the current studies have not been published. If only certain significant findings are reported, this could inflate

researchers' perceptions of the importance of motivation for pupils' reading comprehension.

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## Appendix A

## Graded Non-Word Reading Test

Name: \_\_\_\_\_ Year: \_\_\_\_\_ Boy / Girl

## Practice items:

feg

wut

hin

mot

kib

## Test items:

hast

tegwop

hognelkrag

kisp

balras

bisgakdip

mosp

molsmitt

joklentos

drant

nolcridd

shodrinmert

prab

twamket

lomcrenkin

sted

stansert

yimterbesfich

gromp

hinshink

ronbikulgan

trolb

chamgalp

foyminlantos

snid

kipthirm

basrelwathrin

twesk

sloskon

wosraltsenbith



## Appendix B

## British Picture Vocabulary Scale II

Name: \_\_\_\_\_ Year: \_\_\_\_\_

Circle: Boy / Girl

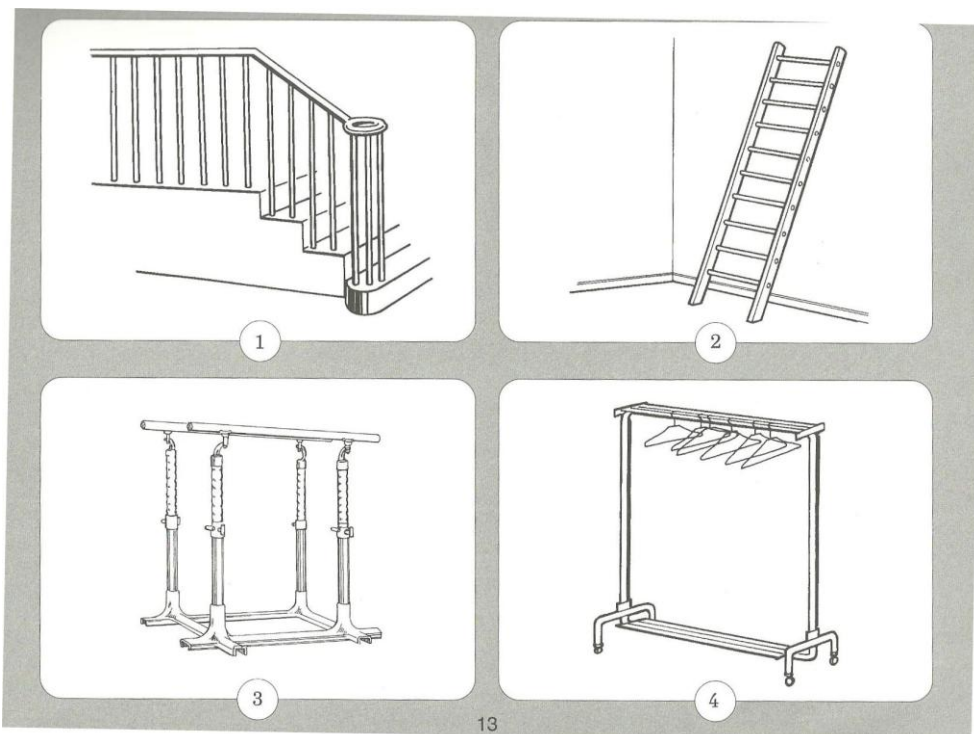
In this booklet there are sets of pictures.

Each picture has a number underneath it.

When I say a word I would like you to circle the number of the picture that best tells the meaning of the word.

Let's do a practice one together:

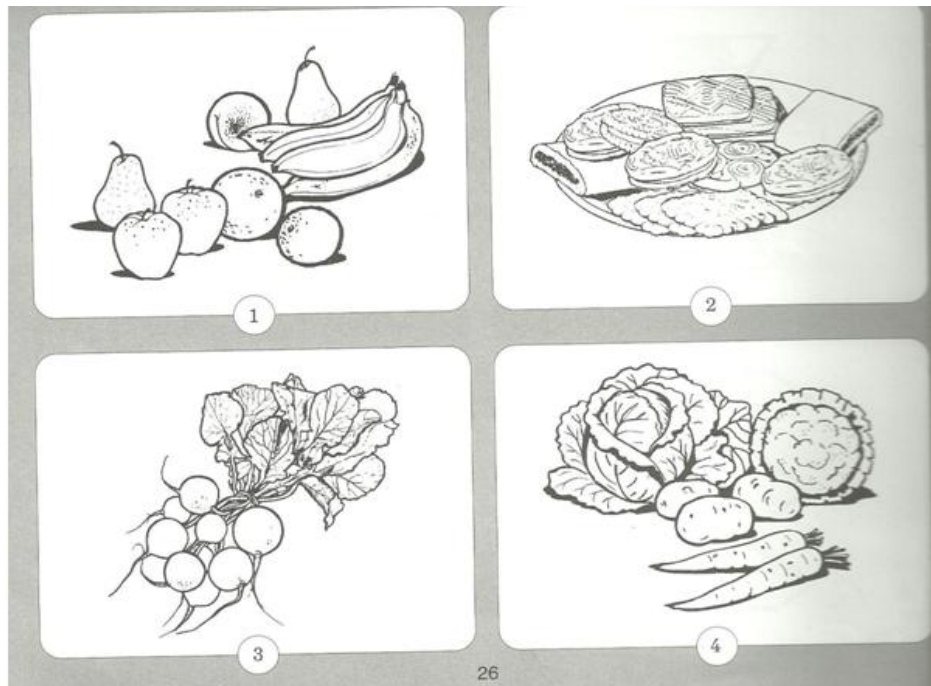
## Practice:



### Set 1



### Set 2



## Appendix C

## Motivation for Reading Questionnaire



These questions ask what you think and feel about reading. This is not a test and there are no right or wrong answers.

Please answer honestly, no-one else will be allowed to see the answers that you give. I will read out all of the questions, you just need to tick the box which is closest to how you feel.

Name: \_\_\_\_\_ Circle: Boy / Girl

Year: \_\_\_\_\_

## Practice:

	Very different from me	A little different from me	A little like me	A lot like me
1. I like reading comic books				

## Start

	Very different from me	A little different from me	A little like me	A lot like me
1. I read about my hobbies to learn more about them				

2. I like hard, challenging books				
3. I read stories about fantasy and make believe				
4. I usually learn difficult things by reading				
5. I enjoy a long, involved story or fiction book				
6. I like to read about new things				
7. I like to read because I always feel happy when I read things that are of interest to me				
8. I like mysteries				
9. If the project is interesting, I can read difficult material				



Half way there!



	Very different from me	A little different from me	A little like me	A lot like me
10. I enjoy reading books about people in different countries				
11. If a book is interesting I don't care how hard it is to read				
12. If the teacher discusses something interesting I might read more about it				

13. I read to learn new information about topics that interest me				
14. I make pictures in my mind when I read				
15. If I am reading about an interesting topic I sometimes lose track of time				
16. I like to read a lot of adventure stories				
17. I have favourite subjects that I like to read about				
18. I feel like I made friends with people in good books				
19. I like it when the questions in books make me think				



Well done, you have finished!

## Appendix D

## Motivation to Read Profile

 Questionnaire 

These questions ask you about your reading. Please give the answer that is most like you, no one else will see the answers you have given.

Name: \_\_\_\_\_ Year \_\_\_\_\_

Circle: Boy / Girl

**Example:** Please tick the one box which is most like you.

1. Maths is .....

- very easy for me
- kind of easy for me
- kind of hard for me
- very hard for me

**Start:** Please tick the one box which is most like you.

1. My friends think I am .....

- a very good reader
- a good reader
- an OK reader
- a poor reader

2. Reading a book is something I like to do .....

- Never
- Not very often
- Sometimes
- Often

3. I read .....

- not as well as my friends
- about the same as my friends
- a little better than my friends
- a lot better than my friends

4. My best friends think reading is .....

- really fun
- fun
- OK to do
- no fun at all

5. When I come to a word I don't know, I can .....

- almost always figure it out
- sometimes figure it out
- almost never figure it out
- never figure it out

6. I tell my friends about good books I read.

- I never do this
- I almost never do this
- I do this some of the time
- I do this a lot

7. When I am reading by myself, I understand .....

- almost everything I read
- some of what I read
- almost none of what I read
- none of what I read

8. People who read a lot are .....

- very interesting
- interesting
- not very interesting
- boring

9. I am .....

- a poor reader
- an OK reader
- a good reader
- a very good reader

10. I think libraries are .....

- a great place to spend time
- an interesting place to spend time
- an OK place to spend time
- a boring place to spend time

11. I worry about what other kids think about my reading .....

- every day
- almost every day
- once in a while
- never



12. Knowing how to read well is .....

- not very important
- sort of important
- important
- very important

13. When my teacher asks me a question about what I have read,  
I .....

- can never think of an answer
- have trouble thinking of an answer
- sometimes think of an answer
- always think of an answer

14. I think reading is .....

- a boring way to spend time
- an OK way to spend time
- an interesting way to spend time
- a great way to spend time

15. Reading is .....

- very easy for me
- kind of easy for me
- kind of hard for me
- very hard for me

16. When I grow up I will spend.....

- none of my time reading
- very little of my time reading
- some of my time reading
- a lot of my time reading

17. When I am in a group talking about stories, I .....

- almost never talk about my ideas
- sometimes talk about my ideas
- almost always talk about my ideas
- always talk about my ideas

18. I would like for my teacher to read books out loud to the class .....

- every day
- almost every day
- once in a while
- never

19. When I read out loud I am a .....

- poor reader
- OK reader
- good reader
- very good reader

20. When someone gives me a book for a present, I feel .....

- very happy
- sort of happy
- sort of unhappy
- unhappy



**You have finished. Thank you very much!**



## Appendix E

## Male and Female-oriented texts

## Male-oriented text: 'On the Plains'

*Bob Lemmons rounds up mustangs, wild horses that live on the plains in the state of Texas, in the United States, for teams of cowboys to use on the long drive.*

It wasn't noon yet, but the sun had already made the Texas plains hotter than an oven. Bob Lemmons pulled his wide-brimmed hat tighter to his head and rode slowly away from the ranch.

'Good luck, Bob!' someone yelled.

Bob didn't respond. His mind was already on the weeks ahead. He walked his horse slowly, being in no particular hurry. That was one thing he had learned early. One didn't capture a herd of mustang horses in a hurry.

Bob looked around him, and as far as he could see the land was flat, stretching unbroken like the cloudless sky over his head until the two seemed to meet. Nothing appeared to be moving except him on his horse, but he knew that a herd of mustangs could be galloping near the horizon line at that moment and he would be unable to see them until they came much closer.

He rode north that day, seeing no sign of mustangs until close to evening, when he came across some tracks. He stopped and dismounted. For a long while he stared at the tracks until he was able to identify several of the horses. It seemed to be a small herd. The tracks were no more than three days old and he

expected to catch sight of the herd in the next day or two. A herd didn't travel in a straight line, but ranged back and forth within what they considered their territory.

He untied his blanket from behind the saddle and laid it out on the ground. Then he removed the saddle from the horse and tied the animal to a post. He took his supper out of the saddlebags and ate slowly as the chilly night air seemed to rise from the plains that a few short hours before had been too hot for a man to walk on. He threw the blanket around his shoulders, wishing he could make a fire. But if he had, the smell of wood smoke in his clothes would have been detected by any herd he got close to.

After eating he laid his head back against his saddle and covered himself with his thick Mexican blanket. The chilliness of the night made the stars look to him like shining slivers of ice. Someone had once told him that the stars were balls of fire, like the sun, but Bob didn't feel them that way.

He thought about the time when he brought in his first herd of mustangs ...

One day several of the cowboys had gone out to capture a herd. The ranch had been short of horses and no one ever thought of buying horses when there were so many wild ones. He had wanted to tell them that he would bring in the horses, but they would have laughed at him. Who'd ever heard of one man bringing in a herd? So he had watched them ride out, saying nothing. A few days later they were back, tired and disgusted.

They hadn't even been able to get close to a herd.

That evening Bob had timidly suggested to Mr Hunter that he be allowed to try. Everyone laughed. Bob reminded them that no one on the ranch could handle a horse like he could, that the horses came to him more than anyone else. The cowboys had acknowledged that that was true, but it was impossible for one man to capture a herd. Bob had said nothing else.

Early the next morning he had ridden out alone ... Three weeks later the cowboys had been sitting outside the ranch one evening and looked up to see a herd of mustangs galloping towards them, led by Bob. Despite their amazement, they had moved quickly to open the gate and Bob had led the horses in.

The next morning, the sun awakened him even before the first arc of its roundness showed over the horizon. He saddled his horse and rode off, following the tracks he had discovered the previous evening. He followed them west until he was certain they were leading him to the Pecos River. He smiled. He knew the horses would come to that river to drink every day. Mustangs never went too far from water.

*Note.* Children were given passage with illustrations, as in the SATs test.

## Female-oriented text: 'You Can Do It'

'Fiona, for goodness' sake, hurry up!'

Her mother's voice, sharp with annoyance, sounded all the way up the stairs to the attic. Fiona scowled and stuck her chin out. 'Do this, Fiona. Take that, Fiona. Bring this downstairs. Carry that upstairs. Don't slouch about, Fiona. We don't have much time.'

Fiona picked up the last of the boxes she was bringing down from the attic, and as she did so, it burst. Without warning it gave way, spewing bills, old photographs, postcards and letters all over the floor. She gazed down in bewilderment at the mess.

She disliked change, she decided, as she gazed at the chaotic pile of papers at her feet, and this change she especially hated. Moving Grampa out of his big old house into that flat. There was never going to be enough space for all his things, and hardly enough room for her to stay every weekend with him as she had done ever since she was small. As she knelt down and began to gather up some of the bits and pieces, she heard her mother's voice again.

'Fiona! Come down this minute!'

Fiona dropped the papers she had in her hand and went to the door.

'Coming,' she shouted.

She trudged down the narrow attic stairs. She could see her mother's face peering up at her from the stairwell.

'Whatever is keeping you up there? We'll have to leave now. I don't want to have Grampa waiting too long on his own at the new flat.'

Fiona walked down the next flight of stairs to the bottom hall. She passed her father on his way out to the back garden.

'Are you going with your mum?' he asked.

Fiona shrugged. 'Looks like it,' she said.

She went out of the front door and helped bundle some boxes and carrier bags into her mother's car.

'You won't be able to get in here now, Fiona. You'll have to stay with your dad and come on later,' her mum was saying.

Fiona watched her mother drive off and then went slowly back upstairs. Her dad must still be sorting out the contents of the shed. She had time to go back up to the attic and gather up the broken box. It was mainly photographs which had spilled out. Memories of her Grampa's life and family.

There was an old one of him in uniform. She picked it up and squinted at it.

He smiled out at her. A strong face with a dark moustache. Fiona sighed. He wasn't like that any more. Not since a stroke\* had left him with shaky legs and quivering muscles.

She decided to get a box to put the photographs in. She twisted round and ran to the stairs.

\* A stroke is a sudden illness affecting parts of the brain, which can cause speech difficulties and loss of feeling in the body.

'Those who hurry fastest are the first to fall' was one of her Grampa's sayings, and it was as if she heard him saying it now, right out loud in her ear as she stumbled on the top step. Seconds later she landed with a crash at the foot of the stairs. Her head hurt, her bottom hurt and her legs throbbed painfully.

Fiona was quite alone in the big empty house. She started to get up. Her legs were caught underneath her body and she tried to heave herself up and straighten them out.

'Oww,' she yelped. A stabbing pain flared in her knees. She moved again, this time more carefully.

The pain was terrible. There were tears crowding in behind her eyelids and her hands were shaking. When she tried to move, both legs hurt badly.

'Now what am I going to do?' Fiona asked herself, looking at the steep, uneven stairs below. She couldn't stand up. She was a prisoner.

Both her parents were so busy at the moment with Grampa being unwell and moving house, that they might not realise anything was wrong, not for a while anyway. But then, Fiona thought, there was someone who usually noticed immediately that she wasn't around. Grampa. Well, he used to, anyway. Things were different now.

The first day he had come home from hospital she hadn't recognised the sick old man whose clothes seemed too big for him. She had pictured herself helping him get better, sorting his cushions, picking flowers for his room. She imagined him smiling and saying, 'Thank you, Fiona'. Then they would play cards and she would win most of the games. But it hadn't been like that at all.



He sat slumped in his chair by the fire most of the day, his eyes were vague and sometimes he dribbled his food. Just like a baby!

She didn't want to sit on the little stool beside his chair and talk. His eyes were always sad, and he hardly ever answered anyone anyway. 'He's not even trying,' Fiona's mum complained. 'He's supposed to exercise his fingers and practise those words, but he just sits all day.'

As the weeks passed and he didn't get much better, he finally agreed to sell the big house and move closer to the rest of the family.

Fiona looked at her watch and groaned. She might have to wait ages before Mum or Dad came. She moved her position. Something was pressing into her back. Something hard with sharp corners. It was a photograph album. Carefully written on the front in her Grampa's writing was



Fiona made a face. She hated baby photographs of herself. Still... it would pass the time, and take her mind off the pain. She flicked it open. There was one of Grampa with his arm around her as she stood in the swimming pool. It seemed silly now she was older, but she had been scared to stand by herself in the water. Her legs had trembled as she stepped away from the tiled side.

'You can do it, Fiona,' Grampa's voice whispered in her ear. 'You can do it.' And he had steadied her until she was confident enough to stand on her own.

'Thanks, Grampa,' she'd said. And he had pulled her hair and said, 'What are friends for?'

What were friends for? Helping each other, she supposed. She could do with some help now... and so could he, she suddenly thought.

A friend to help him now that he had trembling legs, now that he was unsure, with no confidence, maybe a little scared of trying. Fiona felt more tears coming, and this time she didn't stop them.

And she was still tearful, with a grubby, streaked face, when she heard the back door open an hour or so later.

'Dad! Dad!' she yelled frantically as he ran up the stairs.

'You poor thing!' he cried when he saw her.

\*\*\*\*\*

They got back from the hospital at six o'clock.

Grampa was sitting in his chair, hands resting on each knee. He looked up as Fiona came in. His eyes followed her as she limped slowly across the room.

'I suppose neither of us will be able to manage stairs for a while.' Fiona sat down beside him. 'How about a trade?' she suggested. 'I borrow your wheelchair, and you get a turn of my crutches?'

The old man looked at her uncertainly. Fiona giggled.

'We could have races,' she said. She looked at him, full in the face, the first time she had done so since he had been in hospital.

'Where's your mirror?' she asked.

'Mirror?' he repeated.

'You're meant to have a hand mirror by your chair and do your vowel sounds every day,' she said. 'You've not been doing them, have you?' He shook his head slowly.

'Well, it's not good enough,' said Fiona. 'We'll have to make a start right away.' Then she winked at him, and leaning forward close to his head, she whispered.

'You can do it, Grampa. You can do it.'

*Note.* Children were given passage with illustrations, as in the SATs test.

## Appendix F

## Male-oriented text comprehension assessment

Name: \_\_\_\_\_ Year:

Circle: Boy / Girl

In this booklet there are questions about each passage for you to answer.

These questions are about Passage 1 **On the Plains**:

How interesting did you find **On the Plains**? (Please circle your answer)

Not at all

A little

Quite a lot

Alot

How much did you enjoy **On the Plains**? (Please circle your answer)

Not at all

A little

Quite a lot

Alot

Choose the best word or group of words to fit the passage and put a *ring* around your choice.

Bob left the ranch on a

1.  wet  cool  windy  hot day.

He was busy thinking about what he had to do.  
Bob rode north, hoping to see a herd of horses.  
He found some tracks which were

2.

He camped out overnight and felt

3.

He remembered the first time he brought a herd of mustangs back to the ranch.  
The other cowboys had not expected him to

4.

When Bob woke up, he followed the tracks he had found which led towards the

5.

6. What did Bob find out about the horses from their tracks?

---

---

7. **Underline** a phrase which shows how the cowboys felt when they returned without any mustangs.

One day several of the cowboys had gone out to capture a herd. The ranch had been short of horses and no one ever thought of buying horses when there were so many wild ones. He had wanted to tell them that he would bring in the horses, but they would have laughed at him. Who'd ever heard of one man bringing in a herd? So he had watched them ride out, saying nothing. A few days later they were back, tired and disgusted. They hadn't even been able to get close to a herd.

8. In the final paragraph on page 10, it says

*He smiled.*

Why do you think Bob smiled at this point?

---



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9. Choose a word which you think best describes Bob's character.

Explain why you have chosen it, using evidence from the text.

**determined   patient   thoughtful**

I think Bob is \_\_\_\_\_ because

---



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10. The writer uses dots ... (ellipsis) twice on page 10, each time for a different purpose.

Explain the two different purposes.

*he brought in his first herd of mustangs ...*

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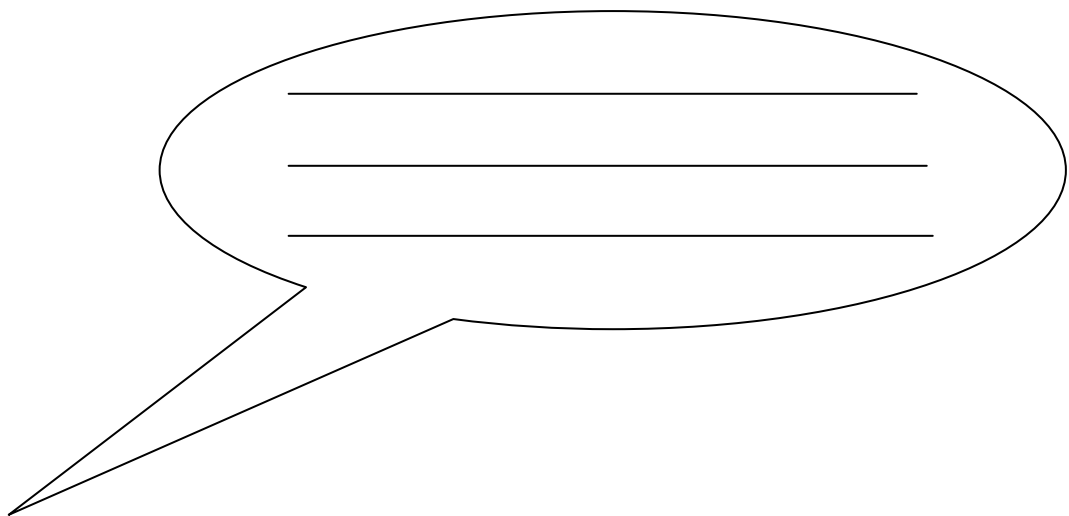
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*Early the next morning he had ridden out alone ...*

---

---

11. When Bob came back with horses for the first time, what do you think the other cowboys might have said to him about what he had done?



A large speech bubble with a tail pointing towards the bottom left. Inside the bubble are three horizontal lines for writing.

12. How does the writer show the difference between the **heat of the day** and the **cold of the night** on the plains?

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How much did you enjoy answering these 12 questions? (Please circle your answer)

**Not at all**

**A little**

**Quite a lot**

**Alot**



## Appendix G

Female-oriented text comprehension assessment

These questions are about Passage 2 **You Can Do It:****How interesting did you find You Can Do It? (Please circle your answer)****Not at all****A little****Quite a lot****Alot****How much did you enjoy You Can Do It? (Please circle your answer)****Not at all****A little****Quite a lot****Alot****Choose the best group of words to fit the passage and put *a ring* around your choice.**

Fiona's grandfather was moving out of his big old house because he had been ill. While she was helping to pack up his belongings Fiona came across a photograph of

1.

Grampa as a baby.

Grampa with her mum.

Grampa and herself by the swings.

Grampa as a young man.

As she was sorting things out, Fiona fell down the stairs and hurt her legs. She couldn't move and as she was waiting for help she found

2.

a photograph album.

some old letters.

a photograph of Grampa in uniform.

a letter from Grampa.

While Fiona waited she remembered how Grampa had

3.

saved her

helped her

played games

read to her

when she was younger.

Fiona waited for a long time but then her dad came into the house and found her

4.

laughing at a photograph

shivering with cold

crying and in pain

sleeping soundly

at the foot of the stairs. He took her to hospital where she was treated.

Then they went to

5.

watch television.

see Mum and Grampa.

collect the old photographs.

help Mum with the packing.

6. Why did Fiona's mother feel annoyed at the beginning of the story? (page 9)

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---

7. Fiona did not like Grampa's new flat because she disliked change. Find **another** reason why she disliked the flat. (page 9)

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---

---

8. Grampa said to Fiona,  
*'Those who hurry fastest are the first to fall.'* (page 11)

Explain what he meant.

---

---

---

9. ... *pain flared in her knees.* (page 12)

Why is this an effective way of describing how Fiona felt after she fell down the stairs?

---

---

---

10. When the box split open:

*It was mainly photographs which had spilled out.*

*Memories of her Grampa's life and family.*

*There was an old one of him in uniform ...*

*A strong face with a dark moustache. (page 11)*

Why do you think the author included these details about how Grampa used to look?

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---

---

11. *But it hadn't been like that at all. (page 12)*

What does this sentence tell you about Fiona's feelings after Grampa came out of hospital?

Explain your answer fully.



12. Just after he came out of hospital (page 12), Grampa felt depressed.

How do you know?

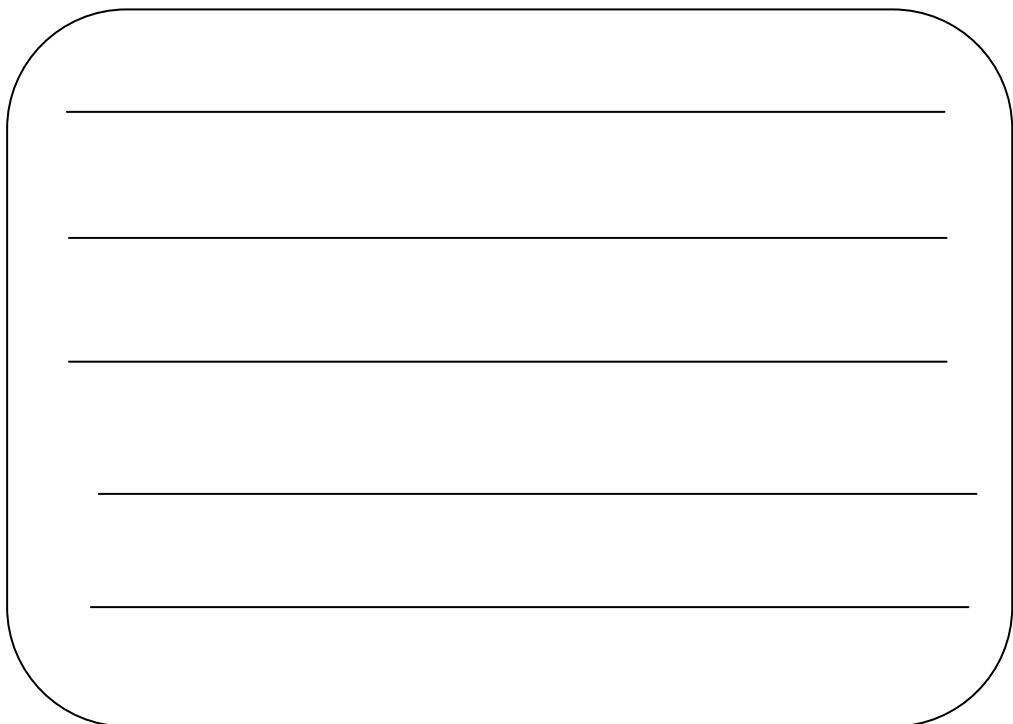
Find and write down **two** pieces of evidence.

1. \_\_\_\_\_

2. \_\_\_\_\_

13. How does Fiona's accident change how she feels about Grampa?

Explain your answer as fully as you can, using parts of the story to help you.



\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

14. Many people write down their thoughts and feelings in their diary.

What do you think Fiona might have written in her diary after visiting Grampa **two weeks after** he had moved to his new flat?

Think about:

- what she thought of the flat;
- her friendship with Grampa.

**SATURDAY**

---

*I went to visit Grampa today.*

---

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15. a) What made Fiona remember things that happened in the past?

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15. b) Why are Fiona's memories important to this story?

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---

**How much did you enjoy answering these 15 questions? (Please circle your answer)**

**Not at all**

**A little**

**Quite a lot**

**Alot**

**Which passage did you prefer? (Please circle your choice)**

**On the Plains**

**You Can Do It**

**Which set of questions did you prefer answering? (Please circle your choice)**

**The questions about  
On the Plains**

**The questions about  
You Can Do It**

## Appendix H

## York Assessment of Reading for Comprehension

## Fiction and non-fiction text comprehension assessments

## Fiction text: 'Camping Trip'

Grandparents, aunts, uncles and cousins, spilled out of their cars to lay claim to the family's portion of the campsite. Uncle Hasan issued instructions to the pole bearers, but George ignored him. He hadn't wanted to come on this holiday in the first place. He threw down his pole, then, with head down and shoulders hunched, he slouched over to a low stone wall and slid down out of sight. He could hear mum giggling and saying "Grump-a-lot is off again!" He hated it when they teased him and used pet names like this. It was going to be a terrible holiday.

Looking up, George was startled to see a dog sprinting past him, trailing a line of sausages; and, in hot pursuit, a little, grey haired, old woman, brandishing a knife. "Gran?" Instinctively he lunged forward and caught the dog's collar; then Gran grabbed the sausages and skilfully flicked the knife. George released his grip, allowing the dog to flee with a single sausage.

Everyone cheered as Grandpa hoisted George onto his shoulders and proclaimed him the Breakfast Hero. George grinned. He realised his judgement had been premature.



**These questions are about the passage called Camping**

**Trip:**

How interesting did you find Camping Trip? (Please circle your answer)

**Not at all**

**A little**

**Quite a lot**

**Alot**

How much did you enjoy Camping Trip? (Please circle your answer)

**Not at all**

**A little**

**Quite a lot**

**Alot**

- 1) What do you think Uncle Hasan was telling the other members of the family to do?
- 2) Where did George hide?
- 3) In this story, what does 'pet name' mean?
- 4) What did mum think about George throwing down the pole and slouching off?
- 5) Who put George onto his shoulders?
- 6) Why was George called the *Breakfast Hero*?

7) At the end of the story, how did George feel about the holiday?

8) In the context of this story, what does 'premature' mean?

How much did you enjoy answering these eight questions? (Please circle your answer)

**Not at all**

**A little**

**Quite a lot**

**Alot**

## Non-fiction text: 'Pirates'

In folktales, books and films, pirates are characterised as romantic heroes. However, in reality, armed with knives, cutlasses and muskets, they were violent criminals.

As European countries expanded their empires into the African, American and Asian continents, the ships used to transport traded or stolen treasures to Europe became the prized targets of pirates. Consequently, from the Sixteenth century onwards, pirates, such as the buccaneers of the Caribbean and the corsairs of the Mediterranean seas, became famous for their daring attacks; and names such as Blackbeard live on today in legends.

Less well remembered are female pirates, such as Grace O'Malley, Mary Read and Anne Bonny, who were all as bold as any men. Females at sea were once considered unlucky, so in the disguise of men they fought as viciously as any of the gang. In 1720, Read and Bonny fought fearlessly to defend their ship from the British navy, while their crew hid below deck. In fact, both women were so disgusted with the men's response that they periodically turned their own guns on them. Both women were captured and condemned to hang, but received a reprieve. Bonny's eventual fate remains a matter for speculation.

Since people first sailed the seas, pirates have followed in their wake, seeking rich pickings, and contemporary pirates now do the same.

**These questions are about the passage called Pirates:**

How interesting did you find Pirates? (Please circle your answer)

**Not at all**

**A little**

**Quite a lot**

**Alot**

How much did you enjoy Pirates? (Please circle your answer)

**Not at all**

**A little**

**Quite a lot**

**Alot**

- 1) According to the passage, how do books and films portray pirates?
- 2) According to the passage, tell me **two** weapons that pirates used.
- 3) Why is it wrong to say that pirates are romantic heroes?
- 4) Who were the buccaneers?
- 5) Why did the female pirates dress up as men?
- 6) In the context of this passage, what does 'bold' mean?
- 7) Who attacked Mary Read's ship?

8) Why did Mary Read and Anne Bonny shoot some of their crew?

How much did you enjoy answering these eight questions? (Please circle your answer)

**Not at all**

**A little**

**Quite a lot**

**Alot**

Which passage did you prefer? (Please circle your choice)

**Camping Trip**

**Pirates**

Which set of questions did you prefer answering? (Please circle your choice)

**The questions about  
Camping Trip**

**The questions about  
Pirates**

Appendix I

Ethical Approval



**Ethics committee  
Department of Psychology**

**Chair: Dr. J. Tipples**

**Committee members: Dr. T. Jellema, Dr. M.E. Large, Dr. P. Skarratt**

**Committee secretary: Ms. G. Paffley**

Monday, June 30, 2014

**NAME OF STUDENT/ASSISTANT (Supervised projects only) .....** Eleanor Ann Gray. . . .  
.....

**NAME OF RESEARCH SUPERVISOR. .** Dr Sarah McGeown. ....

**TITLE OF PROJECT: . . .** Examining how level of interest and text difficulty influence the importance of cognitive and motivational factors for reading skill. ....  
.....

Dear Dr Sarah McGeown and Eleanor Ann Gray,

I have received your application "Examining how level of interest and text difficulty influence the importance of cognitive and motivational factors for reading skill for ethical consideration for research to be carried out in a local school. The work meets the ethical standards required by the British Psychological Society code of ethics. Moreover, you are fully the consent procedures that we have adopted for work in schools (again based on the BPS code of ethics) and therefore, I giving this research permission to go ahead under Chair's action.

Good luck with your research.

A handwritten signature in black ink that reads 'J. Tipples'.

Dr Jason Tipples

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