Running Head: PARENTS' READING-RELATED KNOWLEDGE

"How many sounds in Christmas?" Parents' reading-related knowledge and children's reading acquisition

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Abstract

Teacher reading-related knowledge (phonological awareness and phonics knowledge) predicts student reading, however little is known about the reading-related knowledge of parents. Participants comprised 70 dyads (children from Kindergarten and Grade 1 and their parents). Parents were administered a questionnaire tapping into reading-related knowledge, print exposure, storybook reading, and general cultural knowledge. Children were tested on measures of letter-word knowledge, sound awareness, receptive vocabulary, oral expression and mathematical skill. Parent reading-related knowledge showed significant positive links with child letter-word knowledge and sound awareness, but showed no correlations with child measures of mathematical skill or vocabulary. Furthermore, parent reading-related knowledge was not associated with parents' own print exposure or cultural knowledge, indicating that knowledge about English word-structure may be separate from other cognitive skills. Implications are discussed in terms of improving parent reading-related knowledge to promote child literacy.

Keywords: children's reading acquisition, reading-related knowledge, teachers' reading-related knowledge

Early reading acquisition makes a significant contribution to lifelong reading engagement; it increases vocabulary size, academic success, and world knowledge (Stanovich & Cunningham, 1993; Stanovich & Cunningham, 1997; Stanovich, West, & Harrison, 1995). Therefore, parents and teachers alike have a special interest in fostering successful reading experiences for children. There is a growing consensus that teachers' reading-related knowledge is positively associated with student literacy (Hatcher et al., 2006; McCutchen, Abbott et al., 2002; McCutchen, Harry et al., 2002; Spear-Swerling & Brucker, 2004). However, very little is known about the relationship between parents' reading-related knowledge and the reading skills of their children. The goal of the present study is to investigate the potentially important link between parent knowledge and child skill.

In accordance with the 'simple view' (language comprehension x decoding = reading; Gough & Tunmer, 1986), teachers must be well-versed on how to nurture both language comprehension and decoding abilities in their students. Evans and Shaw (2008) noted that storybook reading was a means of exposing children to more varied and complex linguistic structures than would otherwise be experienced from spoken language. Therefore, one of the ways that language comprehension can be augmented is through storybook reading (Al Otaiba, 2004; Hindman, Connor, Jewkes, & Morrison, 2008).

Given that storybook reading is associated with higher listening comprehension skills and greater vocabulary breadth (Audet, Evans, Williamson, & Reynolds, 2008), knowledge of children's literature is often considered an essential component of language arts instruction (National Reading Panel, 2000). However, a growing body of evidence has reported that listening to storybooks, in and of itself, does not result in measurably elevated reading scores (Aram & Biron, 2004; Evans et al., 2000). Knowledge of storybooks, then, seems to coincide with teaching

strategies targeted at improving only half of Gough's model (i.e., language comprehension). This hypothesis fits nicely with classroom observations. For example, McCutchen noted that teachers who were well versed in children's literature were more likely to engage in storybook reading in the classroom (McCutchen, Abbott et al., 2002), however, they were no more likely to teach children the skills required for learning to reading and spell than their less knowledgeable peers (McCutchen, Harry et al., 2002).

Decoding skills are not learned naturally. In the absence of explicit teaching it is difficult for many children to gain a firm understanding of the alphabetic principle (that printed letters represent the sounds heard in speech). Therefore, teachers must provide experiences beyond storybook reading in order to develop the second component of Gough's model; phonological awareness and phonics knowledge have emerged as key elements for the teaching and learning of decoding.

Phonological awareness is defined as the ability to identify and manipulate individual sounds (phonemes) and units (syllables) within words (Gray & McCutchen, 2006). In a language with an opaque orthography, such as English, it is common for words to have an unequal number of letters and speech sounds. For instance, the word "chap" has four letters, but only three speech sounds: */ch/a/p/*. Reversed, the three speech sounds in "chap" are represented by 5 letters ("patch"). Research has shown that this ability to recognize and manipulate speech sounds is one of the best predictors of children's reading acquisition (Goswami & Bryant, 1992). Moreover, the ability for teachers to 'hear' speech sounds, as demonstrated by their ability to count them, has been associated with effective literacy instruction (Spear-Swerling & Brucker, 2004).

Teachers' phonics knowledge is considered a second critical skill that is positively associated with children's decoding (Cunningham, Perry, Stanovich, & Stanovich, 2004; Moats & Foorman, 2003). Phonics is defined as knowledge of the relationships between specific printed

letters and their corresponding spoken sounds (Ehri, Nunes, Stahl, & Willows, 2001). This ranges from understanding relatively simple concepts (e.g., 'a' is for 'apple'), to the comprehension of more advanced letter-sound pairings (e.g., 'king', 'queen' and 'cat' all start with /*k*/). Phonics also entails knowledge of variable phoneme-grapheme correspondences (e.g., the letter 'c' is usually pronounced /*k*/, unless followed by 'e', 'i', or 'y', in which case it is pronounced /*s*/).

Because of the importance of phonological awareness and phonics knowledge to children's reading acquisition, these abilities have been investigated extensively in populations of teachers. Cunningham and colleagues (2004) studied the disciplinary knowledge of 722 primary teachers. To measure phonological awareness, participants were asked to count the number of speech sounds contained in 11 words. It was found that only 30% of teachers were able to meet the passing criteria of the test (at least 6/11), and only 1% received a perfect score. These findings do not reflect poor reading abilities in American teachers; on the contrary, the perceived ease induced by fluent reading can sometimes obscure many of the complexities inherent in written English. For example, teachers have reported difficulty in differentiating regular and irregular words (words that do not conform to standard letter-sound correspondences). This difficulty is more pronounced when they are presented with an irregular word that is very common (e.g., 55% of teachers failed to identify the word "what" as having atypical spelling patterns) presumably because the familiarity of the word is misinterpreted as being regular.

Although it is not necessary to understand that a word is irregular to be able to pronounce it, the same is not true when it comes to clear, direct, teaching of reading and writing skills. In order to implement synthetic phonics programs (e.g., Johnston & Watson, 2004), teachers must be able to recognize words that can be successfully decoded (e.g. 'dog') from those that cannot (e.g., 'one'). But unfortunately, classroom observations have revealed that teachers frequently

give children frustrating instructions by asking them to "sound out" words that are, at least partially, irregular (Spear-Swerling & Brucker, 2004).

McCutchen, Abbott, et al. (2002) examined the potential benefits of increasing teachers' reading-related knowledge on the reading outcomes of students in kindergarten. Their data showed that improving knowledge of English word-structure during a two week summer workshop was associated with greater amounts of class time dedicated to teaching phonological awareness in the following school year (compared to a control group). Moreover, it was reported that kindergarten teachers who used more explicit methods of teaching the alphabetic principle, regardless of condition, had students who could read more words at the end of the year and who scored higher on measures of phonological awareness.

Studies of teacher training lend further support for the relationship between teacher phonological awareness, phonics knowledge, and student reading acquisition. Spear-Swerling and Brucker (2004) examined the effects of a university language arts course on the reading-related knowledge of pre-service teachers. During the first phase, a group of pre-service teachers was given six hours of instruction on the importance of explicit, systematic teaching of word decoding to early readers; this included information pertaining to phonemic awareness, linguistic terminology, common syllable types, and phonetically irregular words. Pre- and post-tests indicated that teachers who received the intervention had increased reading-related knowledge compared to a control group. During the second phase, a subset of pre-service teachers from the experimental group tutored children in Grade 2. At the end of the study, teachers' post-test scores of word-knowledge correlated with children's advancement in word decoding. The fact that the pre-test scores (taken as a proxy of general aptitude) showed no correlation with student learning, led Spear-Swerling and Brucker to conclude that it was the reading-related knowledge itself that was empirically linked to student reading ability. It is possible that pre-service teachers with

greater aptitudes for learning (and thus higher scores on the post-test reading-related knowledge tasks) were also the most capable educators. However, other investigations have suggested this may not be the case. For instance, McCutchen, Abbott and colleagues (2002) included a cultural literacy test as a measure of general knowledge in addition their language measures. They found that teachers' general cultural knowledge was not associated with how well they performed on the language measures, indicating that it is not breadth of knowledge, but specifically reading-related knowledge that is associated with successful literacy instruction. McCutchen, Abbott et al. concluded that their results established a causal relationship between teacher reading-related knowledge and student reading ability.

In sum, three skill sets have been the source of much inquiry in teachers. The first, knowledge of children's literature, seems to target children's language comprehension. The remaining two skill sets, phonological awareness and phonics knowledge (hereafter referred to as reading-related knowledge) seem to target children's decoding ability.

Parental Contribution to Literacy

Parental involvement in education is a key predictor of student achievement; this relationship is especially salient during the early elementary school years (Eccles & Harold, 1996). Generally, parental involvement is defined in terms of time spent volunteering in the school, attending parent-teacher conferences, and participating in school events (National Reading Panel, 2000). In addition to these activities, the majority of parents also see themselves as being primarily responsibly for their children's reading success (Evans, Fox, Cremaso, & McKinnon, 2004).

Sénéchal and colleagues (Sénéchal, LeFevre, Thomas, & Daley 1998; Sénéchal & LeFevre, 2002) examined the relationship between three variables: (1) parents' knowledge of storybook titles, (2) direct literacy instruction provided by parents, and (3) children's oral and

written language skills. For both Kindergarten (n = 110) and Grade 1 (n = 47) children, storybook reading was associated with oral language skills, but not with written language skills. Only parent-reported teaching made a significant contribution to reading and writing skills.

Jordan, Snow, and Porche (2000) were also interested in the role of parental teaching. They implemented Project EASE (Early Access to Success in Education), with the objective of improving home literacy support. Training sessions were held once a month for five months for the parents of 248 Kindergarten children in the Midwestern United States. During these sessions, a trained parent-educator introduced the monthly theme and provided parents with a take-home guide. Once a week, teachers would send home scripted parent-child activities that complemented the topic for that month. The five themes included vocabulary enrichment, personal event narratives, storybook narratives, discussing information rich books, and learning letters and sounds. The degree of parental participation was positively correlated with the degree of improvement observed in the children. Also, children with the lowest language scores at pre-test were able to acquire the targeted linguistic skills at a faster rate when their parents participated in Project EASE.

The evidence to date suggests that reading-related knowledge in teachers plays an important role in effective reading instruction and that, in many families, informal teaching is taking place in the home prior to, or in addition to, the lessons being taught in school. However, very little is presently known about parents' reading-related knowledge. This study aims to deepen the current understanding of parent content knowledge and its association to children's reading ability. We measured parents' reading-related knowledge (phonological awareness, phonics knowledge), knowledge of children's literature, and cultural knowledge in relation to child measures of receptive vocabulary, oral expression, literacy development, and math skill. In particular, the current study examined the hypothesis that parents' reading-related knowledge is

positively correlated with child measures involving literacy development (letter-word reading and sound awareness). Indeed, we argue that parents' reading-related knowledge is a specialized skill in relation to child literacy, and that it exists independently of the child's general verbal ability, the storybook reading happening in the home, and the general cultural knowledge held by parents. To demonstrate this discriminant validity, we also included child measures (vocabulary and math skills) that were less likely to be directly influenced by parents' reading-related knowledge and parental measures (cultural knowledge) that were less likely to directly affect child reading outcomes.

Method

Participants

The dyads were composed of children in Kindergarten and Grade 1 and the parent/guardian who identified him or herself as the principal reader in the home. The principal reader was defined as the person most likely to read to the child at home. Seventy-one children (28 females and 43 males) and their parent or guardian (62 mothers, 7 fathers, and 2 grandmothers[1]) participated in the study. The data were examined for outliers; consequently, one father was identified as guessing on the ART (score of -.04). He and his daughter were subsequently removed from further analyses. The remaining sample contained 70 parent-child dyads.

The children were recruited from several elementary schools located in southern Ontario and Quebec. All children and parents who participated were proficient in English. The average age of the children at the time of testing was 5 years and 10 months (M = 69.64 months, SD = 5.22, range = 61 to 93 months), and the average age of parents in this sample was 37 years (SD =

[1] Hereafter referred to as "parents" for the purpose of clarity

6.55; range = 26 to 67). Most children lived with both biological parents (87.1% of parents were married or engaged). The remaining children lived with parents who were divorced or separated (4.3%), single (5.7%), or widowed (2.9%).

Annual family income is reported in Table 1. As indicated in the table, the majority of the sample represents middle-class families, with 54.3% of families reporting an annual income of more than $50,000, and 20.0% reporting an income of more than $110,000. Parents were also asked to report the number of years spent in formal schooling, beginning with Kindergarten. On average, parents completed 16 years of education (*SD* = 2.79, range = 10 to 24).

Procedures

The child data was collected as a part of a larger study, in which 232 children from Pre-Kindergarten, Kindergarten and Grade 1 participated. Letters of invitation were sent home with the children and parents who indicated their interest in supporting the current project were subsequently mailed the questionnaire. In all, 162 parent questionnaires were mailed out. Parents who indicated they were interested in participating, but who did not return the questionnaire within four weeks were sent one reminder postcard. The final return-rate was 43.8%.

The children were asked to complete a short series of tasks in order to assess their reading development, receptive vocabulary, oral expression, and mathematics knowledge. Research assistants were trained to administer the tasks in accordance with the standardized testing procedures. The data collection took place in a one-to-one setting at elementary schools in the form of two 20-25 minute sessions. The tasks were completed in the following order during Session 1: Peabody Picture Vocabulary Test, Fourth Edition (PPVT), Woodcock Johnson III Tests of Achievement (WJ) letter-word identification, WJ applied problems. Likewise, for Session 2, the tasks were completed as follows: Oral Written and Language Scales (OWLS) oral expression, WJ sound awareness. The order of first appearance of the two sessions was

counterbalanced over all participants so that an equal number of children started with Session 1 and Session 2. In all tasks, children's responses were recorded discreetly and positive feedback was not contingent on response accuracy. The children were given a sticker, hockey card, or pencil at the end of each session in appreciation for their time.

Parents were asked to complete a brief questionnaire measuring reading-related knowledge, print exposure, and general knowledge. In return for their participation, parents were allowed to select one children's book from a list of available titles and a $10 gift certificate for a local bookstore or movie theatre. When the questionnaire was piloted with graduate students (n = 15) it took approximately 15 minutes to complete. Parents were explicitly asked to fill out the questionnaire without consulting outside sources or support. They were also asked to list the start and end times on their questionnaires. On average, parents reported that it took approximately 14.5 minutes to complete.

Child Measures

Reading subtasks. In order to assess reading ability, the children completed two subtests of the Woodcock Johnson III Tests of Achievement (Woodcock, McGrew, & Mather, 2001): Letter-Word Identification and Sound Awareness. These child measures were chosen because they are believed to be sensitive to very early literacy skills (McCutchen, Abbott et al., 2002). The WJ has been tested for both validity and reliability (Woodcock, McGrew, & Mather, 2001), and is widely used in reading research (Mather, Vogel, Spodak, & McGrew, 1991).

During the Letter-Word Identification task, children were asked to name printed letters and read words that progress gradually from simple, high frequency words (e.g., "keep", "said", "with") to more complex, low frequency words (e.g., "debris", "paraphernalia", "municipality"). Scores on this task have typically been used as a proxy for reading ability (Shrank, McGrew, & Woodcock, 2001).

The Sound Awareness measure involves the analysis and synthesis of phonemes (Shrank, McGrew, & Woodcock, 2001). The questions were presented verbally and children were asked to complete rhyming and deletion tasks. During the rhyming subtask, the researcher labelled three pictures for the children, and then asked them to point out the two pictures that rhyme. Second, the children were asked to complete a phrase with a word that rhymes. For example, "Come and see, it is a ____". A correct response would be one that rhymes with "see", such as "bee", "tree", or "key". For the deletion subtask, children were asked to say a word, but leave off one part (e.g., "Say fireman without saying *fire*" [man], or "Say swimmer without the */er/*" [swim]).

Receptive vocabulary. The children completed the Peabody Picture Vocabulary Test, Fourth Edition (PPVT; Dunn & Dunn, 2007). The PPVT provides a standardized norm of receptive vocabulary for individuals aged 2 years to age 90. The receptive vocabulary task was selected because of the positive relationship between reading ability and vocabulary that has been recorded in the literature (e.g., Ouellette, 2006; Sénéchal et al., 1998; Stanovich & Cunningham, 1997). During this activity, the researcher showed the child a set of four illustrations and verbally stated a target word. The child then indicated which of the pictures corresponded to the target word. The task ended when the child failed to correctly identify eight or more words in a set.

Oral expression. The Oral Expression task of the Oral Written and Language Scales (OWLS) was used to assess the children's comprehension and use of spoken language (Carrow-Woolfolk, 1995). Similar to the PPVT, the raw score for the OWLS Expression scale was converted to a standardized score. The task has been normed for individuals between 5 and 21 years-old. The oral expression scale is comprised of 96 items and two example questions. For each item, the researcher presents the child with a visual stimulus (pictures or written words) and asks the child to answer a question, to complete a sentence, or to generate a sentence. The task gradually increases in complexity, beginning with simple sentence completion.

Mathematics knowledge. The children completed the Applied Problems test, also from the WJ III Achievement Battery (Woodcock, McGrew, & Mather, 2001). The test is a measure of quantitative reasoning, math achievement, and math knowledge. Questions progressed from simple (e.g., Put your finger on the box with two kittens) to more complex (e.g., Three people each have $4.00. How much money do they have all together?).

Parent Measures

Reading-related knowledge. The tasks were adapted from the materials described in Cunningham et al. (2004). Parents were given a list of 11 words and asked to select one of four multiple choice answers in order to indicate the number of speech sounds contained in each word. They were provided with an example in order to illustrate the purpose of the task. In this case the word *meat*, which has three different sounds: */m/ea/t/* was selected to demonstrate that the number of sounds a word are not necessarily equivalent to the number of letters (four) or number of syllables (one) in a word.

The irregular words task measures parents' ability to detect phonetically regular and irregular words (phonics knowledge). Given a list of 37 words, parents were asked to circle the words that contained irregular letter-sound conversion rules (Cunningham et al., 2004). They were also provided with an example ('island') which does not conform to conventional spelling rules. Scores were calculated by summing the number of correctly identified words out of 37 (therefore, parents were given credit for both selecting the irregular words and avoiding the regular words). The raw scores for phonological awareness and phonics knowledge were summed to create a parent reading-related knowledge composite.

Print exposure. Parents were also provided with two checklists to measure print exposure: the Author Recognition Test was adapted from Martin-Chang and Gould (2008; see also Stanovich & West, 1989) and the Title Recognition Test (TRT) was taken from Cunningham

et al., (2004). The Author Recognition Test – Revised (ART-R) contained of a list of popular adult authors from a wide range of genres. Parents were asked to identify the authors that they recognized and were told that the list contained foils (non-authors) to discourage guessing. The ART-R consisted of 75 target authors and 25 foils[2].

The TRT contained a list of popular children's storybook titles. Once again, parents were asked to identify real titles from a list containing foils. The TRT had a total of 35 target storybook titles and 15 foils. Both the ART and TRT have a well-documented association with reading engagement for adult books and storybook reading, respectively (Cipielewski & Stanovich, 1992; Cunningham & Stanovich, 1997; Echols, West, Stanovich, & Zehr, 1996; Martin-Chang & Gould, 2008; Stanovich & West, 1989). When the TRT has been completed by parents in previous studies (e.g., Senechal, Pagan, Lever & Ouellette, 2008), the results have correlated with other measures of home literacy such as reported frequency of bedtime reading, library visits, and exposure to children's books.

In order to calculate the ART-R and TRT scores, the number of correctly identified authors/titles (e.g., 22) was divided by the number of possible correct authors/titles (e.g., 75) to produce a real-author/title ratio. The number of foils that were checked-off (e.g., 1) was then divided by the total number of foils (e.g., 25), before being subtracted from the author/title ratio (such that [22/75] – [1/25] = .25). Therefore, parents were credited for both the number of correctly identified authors/titles as well as the number of foils that were not identified.

General knowledge. A modified version of the Cultural Knowledge Checklist (CKC; Stanovich & Cunningham, 1993) was also included in the parent questionnaire package. The

[2] The original ART-R contained 75 targets and 75 foils (Martin-Chang & Gould, 2008). The number of foils was reduced in order to minimize the duration of the parent questionnaire.

CKC is a proxy measure designed to reveal individual differences in cultural awareness (Stanovich & Cunningham, 1993). Past research has demonstrated that CKC scores are highly correlated with other measures of general knowledge (Cunningham & Stanovich, 1997; Stanovich & Cunningham, 1993), and with high school grade point average (Stanovich & Cunningham, 1993). For this task, parents were asked to check off the names of famous artists, entertainers, military leaders/explorers, musicians/composers, philosophers, and scientists. Foils were included in the list in order to detect guessing. The CKC score was calculated in a similar manner to the ART-R and TRT scores. The measure of cultural knowledge was included to test whether parent general knowledge predicts child reading ability above and beyond measures of reading-related knowledge. For all three checklist measures (ART-R, TRT, CKC), parents identified fewer than one foil on average ($M < .6$, range = 0 – 5).

The complete lists for all of the parent measures (Phoneme Segmentation Task, Irregular Words task, ART-R, TRT, and CKC) can be found in the Appendix along with the selection rate per item.

Results

Table 2 shows the means, standard deviations, and ranges for all child and parent measures. As indicated in Table 2, the children in this sample scored slightly above average on certain measures. In receptive vocabulary, the sample mean (M = 109.73) was higher than the PPVT standardized norm, but still fell within one standard deviation of the expected normal curve (M = 100, SD = 15; Dunn & Dunn, 2007). In addition, WJ measures of Letter-Word and Sound Awareness indicated that children in our sample tended to score approximately 5 months above average as compared to the age-equivalent standardized norms (Woodcock, McGrew, & Mather, 2001).

Parent and Child Correlational Measures

Table 3 presents the partial correlations between all child and parent measures (controlling for the age of the child, parent education, and family income). All five child measures were moderately positively correlated (between $r = .31$ and $r = .79$), however, the magnitude of the associations was not sufficiently large to suggest that the variables were measuring identical constructs. Thus, given that the hypotheses of this investigation involved correlations between specific child variables and parental reading-related knowledge, we elected to analyse the variables separately rather than as a composite or in clusters.

Analyses of parent measures reflected a slightly different pattern. Parent measures of print exposure, shared storybook reading, and cultural knowledge were also positively correlated at a moderate level (between $r = .35$ and $r = .63$). Conversely, the parent measure of reading-related knowledge was not significantly related to any other parent measures suggesting independence of this variable.

The correlational analyses indicated that there was a positive relationship between specific parent and child measures. As can been seen in Table 3, parent print exposure was significantly related to children's receptive vocabulary, but not to child measures of letter-word knowledge, sound awareness, oral expression, or mathematics ability. The proxy for shared storybook reading was significantly related to child measures of sound awareness, receptive vocabulary, oral expression, and mathematics knowledge. It is worth noting, however, that children's letter-word knowledge was not correlated with storybook reading. Finally, parent cultural knowledge was positively associated with child measures of receptive vocabulary and oral expression.

Of central interest to the current study, it was found that parent reading-related knowledge was positively correlated with children's letter-word knowledge, sound awareness, and oral

expression. However, parent reading-related knowledge was not correlated to child measures of receptive vocabulary or mathematics knowledge.

Regression Analyses

A series of hierarchical regression analyses were conducted to examine whether the relationships involving parental reading-related knowledge were accounted for by general verbal ability, a skill that is moderately influenced by heredity (Byrne, Coventry et al., 2009). The PPVT can be used as an index of general verbal skill (Cunningham & Stanovich, 1997), therefore it was entered into the regression model first, followed by parent reading-related knowledge. The β coefficients, the standard errors, and the standardized betas are presented in Table 4. The results indicated that parent reading-related knowledge was a significant predictor of child letter-word knowledge and sound awareness even once the child's general verbal skills were accounted for. However, the same pattern did not hold for oral expression. From a theoretical framework, it is important that parent reading-related knowledge contributes to the prediction of letter-word knowledge and sound awareness beyond general verbal ability. This finding increases our confidence that the relationships involving parental reading-related knowledge were not explained by overall levels of general verbal ability within the biologically related dyad.

Discussion

Current research suggests that reading storybooks to children is an effective practice for building vocabulary and listening skills; however, it does not provide sufficient support for the development of reading. In terms of 'the simple view' (Gough & Tunmer, 1986), storybook reading fosters language comprehension but not decoding. In keeping with this literature, our data show that storybook reading significantly and positively correlated with child measures of receptive vocabulary and oral expression. On the other hand, it did not account for the child's literacy development. This finding is consistent with previous research with both parents and

teachers (Al Otaiba, 2004; Evans & Shaw, 2008; Evans et al. 2000; Hindman et al., 2008; McCutchen, Abbott et al., 2002; McCutchen, Harry et al., 2002; Scarborough & Dobrich, 1994; Sénéchal, 2006; Sénéchal et al., 1998; Sénéchal et al., 2008).

Reading to children was also associated with children's increased sound awareness and mathematics ability. It stands to reason that children who are exposed to a wide variety of books (e.g., books that use rhymes or alliteration) might have a stronger foundation for manipulating speech sounds, but the connection between shared storybook reading and mathematics is more elusive. It is possible that the applied nature of the mathematics test may have influenced this relationship. The math test consisted of word-based problems (e.g., If you had three balloons and someone gave you two more, how many balloons would you have?); perhaps children with more experience listening to stories were better equipped to retain and manipulate information when listening to word problems. Alternatively, parents who are more likely to read to their children might also take a more active role in other parenting activities (e.g., playing counting games, or involving the children in measuring while baking) that directly impact the development of arithmetic skills. Such questions would be interesting to pursue in future research.

Turning to the performance of the parents, we found that print exposure was highly correlated with cultural knowledge and storybook reading. Previous studies (Stanovich & Cunningham, 1993) have suggested that the links between print exposure and cultural knowledge may be causal: individuals who are well-read have wider access to information pertaining to historically important figures and events compared to people who read less often. The positive relationship between print exposure and storybook reading also echoes past research where children's title recognition scores (completed by the children rather than the parents) were correlated to parental print exposure (Sénéchal, LeFevre, Hudson, & Lawson, 1996). In tandem, these results indicate that parents who enjoy reading for pleasure may also enjoy reading to their

children. Finally, the positive association between parental print exposure and child receptive vocabulary was also consistent with past findings (Sénéchal et al., 1996). This connection may be mediated through parental vocabulary. Reading for pleasure has shown positive links with vocabulary scores in adults (Martin-Chang & Gould, 2008). Likewise, parents who use words that are less common while speaking at home, tend to have children with higher vocabulary scores (Evans et al., 2000). Therefore, parents who read more for pleasure may have better vocabularies and be more inclined to use rare words while interacting with their children. However, this hypothesis was beyond the scope of our study as parental vocabulary was not measured here.

The primary goal of the present investigation was to clarify the relationship between parents' reading-related knowledge and their children's early literacy skills. Based on the corpus of research with teachers (e.g., McCutchen, Abbott et al., 2002; McCutchen, Harry et al., 2002), it was expected that parents who had a heightened grasp of phonics knowledge and phonological awareness would have children with better reading skills. The data reported here support this claim. Parents' ability to count speech sounds in words and identify words with irregular spellings was associated with their children's ability to name letters, read words, and manipulate speech sounds. This relationship held even after accounting for the child's own receptive vocabulary – a stringent control that may have partialed out some of the shared variance in the relationship. In comparison, after accounting for child receptive vocabulary, parental knowledge about word-structure was no longer predictive of the child's oral expression. The results of the current investigation provide evidence that the reading-related knowledge of parents has a greater, or more direct, impact on children's reading abilities than their expressive language skills. As to the direction of this relationship, it is possible that parents with superior knowledge of English word-structure are better positioned to maximize the teaching opportunities that occur

in the home (such as joint writing and reading activities), or to ensure that these opportunities occur more frequently. Such an account, while speculative, is parsimonious with the literature on teachers' reading-related knowledge, and thus merits further investigation.

The fact that parent reading-related knowledge and child literacy skills were linked adds a unique contribution to the literature. However, these correlational findings must be interpreted with caution. It is possible that overlapping aptitudes resulting from shared genetics could be explaining parents' apparent contributions to children's reading achievement. Indeed, data from twin studies suggest that the genetic influence on reading ability is considerable. Yet, these data also reveal the important contribution of shared environment (Olson, Keenan et al., 2011). For example, Byrne et al., (2002) found stronger influences from shared environment than genetics on measures of print knowledge, letter phoneme recognition, letter name recognition, and print conventions. They argued that "shared environment effects on print awareness may reflect a very high degree of diversity in the home and preschool conditions that support, or fail to support, this knowledge" (p.68). Related to this point, recent investigations have demonstrated that "teacher/classroom effects", while modest, account for approximately 8% of the variance in early literacy achievement, over and above genetically driven attainment (Byrne et al., 2010). If the correlations reported here were exclusively a result of shared genes it would be difficult to explain the parallel links between teacher skill and child learning noted elsewhere in the literature (Mather et al., 2001; Moats, & Foorman, 2003; Spear-Swerling & Brucker, 2003).

The current study did not aim to refute the clear role that genetic predispositions play in reading skill, but rather to complement these findings by demonstrating how parental reading-related knowledge may contribute to the shared environmental factors that are also key to literacy development. If the findings reported here were simply a bi-product of hereditary endowment, then significant positive correlation should have been observed between all parental and child

measures of ability. Such a prediction was not supported by the data. Parent reading-related knowledge was associated with children's letter-word reading and sound awareness at the exclusion of other child measures (e.g., receptive vocabulary and math) while parents' cultural knowledge was related to children's oral expression and mathematics ability, but not significantly associated with children's letter-word knowledge and sound awareness.

Limitations and Future Directions

This study offered a unique approach to calibrating parent content knowledge in relation to children's literacy. However, some limitations were encountered that should be addressed in future research. First, the majority of the sample population was from a middle-class background (see Table 1). Therefore, our findings should not be generalized to low-socioeconomic communities. Future studies could examine the relationship between parents and children from at-risk families in order to ascertain whether reading-related knowledge is still positively associated with literacy development in children.

Second, the age of the children in this sample (M = 5 years and 10 months) may also impact the generalizability of the findings. It is possible that the observed relationships between the parent and child variables fade over time as the children progress through school. Perhaps in later grades the relationship between parent reading-related knowledge and child literacy is weaker due to the comparative influence of the classroom teacher.

Third, the current investigation used a cultural knowledge checklist as a proxy measure of general knowledge. Previous studies have found that cultural knowledge is correlated with other measures of general knowledge and high school grade point average (Cunningham & Stanovich, 1997; Stanovich & Cunningham, 1993). Although the cultural knowledge checklist has been fruitfully employed in several other research studies (McCutchen, Abbott et al., 2002; McCutchen, Harry et al., 2002), an additional standardized measure of intelligence would add

depth to our current understanding about parent general knowledge in relation to child literacy. It is possible that the cultural knowledge checklist is also culturally skewed; individuals from different backgrounds may have scored lower on items that were not representative of their country of origin. This would result in a lower estimate of general knowledge and could bias the results for some parents. Future research should explore other means of obtaining culturally representative measures of general knowledge that are also efficient and cost effective.

Finally, the correlational nature of the current study does not allow us to infer causation. Although experimental evidence from school-based research would suggest that teacher reading-related knowledge is directly associated with student literacy (McCutchen, Abbott et al., 2002; McCutchen, Harry et al., 2002), this relationship must also be tested with a parent population. Nevertheless, the current investigation is an important first-step in establishing a link between parent reading-related knowledge and child literacy.

Theoretical Implications

The simple view of reading (Gough & Tunmer, 1986) argues that decoding and language comprehension are fundamental to children's reading because they make independent contributions to reading development. The data reported here suggest that this model can be adapted to be used as a basis for creating effective home literacy practices. By targeting different aspects of parental knowledge, it may be possible to enhance both components of the simple view of reading. Our findings add to the corpus of literature showing that asking parents to merely read to their children is not sufficient to develop decoding skills. Conversely, parent reading-related knowledge does not appear to be related to children's language skills. It is essential to support both aspects of the simple view; therefore, by targeting parent reading-related knowledge in addition to storybook reading, it may be possible to enhance the effectiveness of home literacy practices.

Practical Implications

Many home-based literacy programs encourage parents to engage in decoding and storybook activities with their children (Jordan et al., 2000). The current investigation has shown that parents vary in how much they know about irregular spelling patterns (phonics knowledge) and the auditory composition of words (phonological awareness). It is likely, then, that parents with increased content knowledge are more effective when helping their children at home. Although this study focused on children with average reading skills, the same logic would hold for students at-risk for reading failure. If poor readers benefit from explicit instruction at school (Ehri, Satlow, & Gaskins, 2009; Rupley, Blair, Nichols, 2009), it stands to reason that receiving clear and accurate assistance at home would result in comparable gains. Therefore, just as there has been wide spread public support encouraging *all* parents (not just parents of children at-risk) to read to their children, future work may endorse public awareness campaigns educating parents on the importance of reading-related knowledge. If this were the case, parents could be taught about the component parts of reading-related knowledge through mediums such as parent-information nights or informational packages sent from school. Although this mandate might seem onerous, similar programs have been effective for not only promoting storybook reading, but also increasing awareness about homework assistance, conversing with/singing to young children, and internet safety (e.g., Government of Alberta Education, 2011).

Educating parents about the basic properties of phonological awareness and phonics is recommended because, unless taught, reading-related skills are not obvious. Parents who had lower reading-related knowledge scores in our sample were not necessarily poor readers themselves. In fact, we found that parental print exposure and general knowledge were independent of reading-related knowledge (for similar findings see McCutchen, Abbott et al., 2002). This indicates that parents who are well read and knowledgeable about world events do

not necessarily have the expertise to support child literacy. This finding converges with the teacher research (Hatcher et al., 2006; McCutchen, Harry et al., 2002; Spear-Swerling & Brucker, 2004) arguing that the content knowledge required to teach reading is fundamentally different from other instructional skills.

In sum, an overview of the pattern of relationships between parental knowledge and child abilities suggests that parent reading-related knowledge is a specialized skill that holds a unique role in relation to child literacy. Furthermore, it shows that reading-related knowledge is comprised of a distinctive body of expertise that exists independently from parents' own reading habits and general cultural knowledge. The evidence presented here suggests that acting directly on the reading-related knowledge of parents may be an as-of-yet unexamined strategy in the development of children's literacy.

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Genetic and environmental influences on aspects of literacy and language in early childhood: Continuity and change from preschool to Grade 2

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Grapho-Phonemic Enrichment Strengthens Keyword Analogy Instruction for Struggling Young Readers

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Effective Reading Instruction for Struggling Readers: The Role of Direct/Explicit Teaching

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Table 1

Reported Annual Income for Parent-Child Dyads

	Frequency	Percent
10,000.00	7	10.0
30,000.00	4	5.7
50,000.00	12	17.1
70,000.00	9	12.9
90,000.00	7	10.0
110,000.00	8	11.4
130,000.00	8	11.4
>141,000.00	6	8.6
Total	61	87.1
MISSING	9	12.9
TOTAL	70	100.0

Mean = $78,950.82, *SD* = 4.21

Table 2

Mean, SD and Range for all Child and Parent Measures

	Mean	SD	Range	Maximum Score
Child measures				
WJ Letter-Word	74.53	11.35	60 - 126	264
WJ Sound Awareness	75.10	12.74	50 - 131	288
PPVT	109.73	12.24	73 - 140	160
OWLS Expression	97.48	12.26	69 - 124	160
WJ Applied Problems	71.17	8.34	55 - 93	336
Parent measures				
ART	.25	.12	.07 - .57	1.0
TRT	.25	.14	.00 - .70	1.0
CKC	.21	.09	.08 - .43	1.0
RRK	33.04	4.12	22 - 41	48

Note. WJ Letter-Word = Woodcock Johnson III Tests of Achievement - Letter-word identification, WJ Sound Awareness = Woodcock Woodcock Johnson III Tests of Achievement - Sound awareness, PPVT = Peabody Picture Vocabulary Test - Fourth edition, OWLS Expressive = Oral Written and Language Scales - Oral expression task, WJ Applied Problems = Woodcock Johnson III Tests of Achievement – Applied problems, ART = Author Recognition Test - Revised, TRT = Title Recognition Test, CKC = Cultural Knowledge Checklist, RRK = Reading-related knowledge. *$p <$ .05, **$p <$ .01, ***$p <$ .001.

Table 3

Partial Correlations between all Child and Parent Measures, Controlling for Age of Child, Parental Education, and Family Income

	2.	3.	4.	5.	6.	7.	8.	9.
1. Child WJ Letter-Word	.795***	.314*	.486***	.522***	.036	.248	.218	.313**
2. Child WJ Sound Awareness		.469***	.651***	.691***	-.003	.292*	.225	.309*
3. Child PPVT			.528***	.558***	.463***	.415***	.403***	.224
4. Child Oral Expression				.605***	.238	.267*	.312*	.314*
5. Child WJ Applied Problems					.108	.363**	.249	.239
6. Parental ART-R						.553***	.631***	-.030
7. Parental TRT							.350***	.137
8. Parental CKC								.045
9. Parental RRK								

Note. WJ Letter-Word = Woodcock Johnson III Tests of Achievement - Letter-word identification, WJ Sound Awareness = Woodcock Woodcock Johnson III Tests of Achievement - Sound awareness, PPVT = Peabody Picture Vocabulary Test - Fourth edition, Oral Expression = Oral Written and Language Scales - Oral expression task, WJ Applied Problems = Woodcock Johnson III Tests of Achievement – Applied problems, ART = Author Recognition Test - Revised, TRT = Title Recognition Test, CKC = Cultural Knowledge Checklist, RRK = Reading-related knowledge. *$p <$ .05, **$p <$ .01, ***$p <$ .001.

Table 4

Summary of Hierarchical Regression Analyses for Parent Reading-Related Knowledge Predicting Child Letter-Word, Sound Awareness, Oral Expression, and Mathematics Knowledge

	Letter-Word			*Sound Awareness*			*Oral Expression*		
	b	*SE* b	*β*	b	*SE* b	*β*	B	*SE* b	*β*
Step 1									
Constant	47.82	11.98		30.67	12.84		35.87	11.10	
PPVT	.24	.11	.26*	.41	.12	.39***	.56	.10	.56***
Step 2									
Constant	31.59	13.97		13.23	14.98		22.08	13.02	
PPVT	.18	.11	.20	.34	.12	.33**	.51	.10	.51***
RRK	.69	.33	.25*	.74	.35	.24*	.59	.30	.20

Note. For Letter-Word, R^2 = .07 for Step 1, Δ R^2 = .06 for Step 2 (p < .05); for Sound Awareness R^2 = .15 for Step 1, Δ R^2 = .05 for Step 2 (p < .05); for Oral Expression, R^2 = .31 for Step 1, Δ R^2 = .36 for Step 2 (ns); for Applied Problems R^2 = .19 for Step 1, Δ R^2 = .20 for Step 2 (ns). WJ Letter-Word = Woodcock Johnson III Tests of Achievement - Letter-word identification, WJ Sound Awareness = Woodcock Johnson III Tests of Achievement - Sound awareness, PPVT = Peabody Picture Vocabulary Test - Fourth edition, Oral

Expression = Oral Written and Language Scales - Oral expression task, WJ Applied Problems = Woodcock Johnson III Tests of Achievement – Applied problems. *$p < .05$, **$p < .01$, ***$p < .001$.

Appendix

The Complete List of Materials for All Parent Measures

Percentage of Correctly Counted Phonemes on the Phonemic Segmentation Task

Word	% Identified
Sun	47.83%
laughed	79.71%
grass	27.54%
Christmas	23.19%
though	52.17%
psychology	14.49%
scratch	27.54%
Each	23.19%
Say	76.81%
chalk	68.12%
Exit	5.80%

Percentage of Correctly Identified Irregular Words on the Irregular Words Task

Irregular word	% Identified
Does	55.07%
done	37.68%
give	18.84%
have	31.88%
one	34.78%
pint	33.33%
said	42.03%
the	20.29%
was	18.84%
what	23.19%
yacht	73.91%

Percentage of Incorrectly Identified Regular Words on the Irregular Words Task

Foil word	% Identified	Foil word	% Identified
ant	1.45%	pal	2.90%
bed	1.45%	rebate	20.29%
book	5.80%	run	1.45%
but	2.90%	sheep	5.80%
chunk	7.25%	son	14.49%
cake	5.80%	sugar	49.28%
cup	2.90%	swim	0.00%
dog	1.45%	teacher	18.84%
flower	15.94%	ten	2.90%
girl	7.25%	tree	1.45%
hare	23.19%	turn	0.00%
jump	4.35%	watch	28.99%
make	1.45%	want	11.59%

Percentage Recognition of Correctly Identified Items on the Author Recognition Test

Author	% Recognition
V. C. Andrews	71.43
Isaac Asimov	35.71
Margaret Atwood	78.57
Jean M. Auel	8.57
Russell Banks	7.14
David Baldacci	11.43
Carol Berg	2.86
Pierre Berton	25.71
Maeve Binchy	31.43
Judy Blume	78.57
Dan Brown	64.29
Barbara Cartland	11.43
Agatha Christie	91.43
Noam Chomsky	18.57
Wayson Choy	1.43
Tom Clancy	81.43
Arthur C.Clarke	31.43
James Clavell	17.14
Jackie Collins	75.71
Stephen Coonts	24.29
Patricia Cornwell	31.43

Author	% Recognition
Robert Fulghum	20.00
Diana Gabaldon	12.86
Elizabeth George	7.14
Stephen J. Gould	8.57
Sue Grafton	25.71
Andrew Greeley	8.57
John Grisham	80.00
Alex Haley	24.29
Frank Herbert	2.86
S. E. Hinton	15.71
John Jakes	4.29
Erica Jong	11.43
Wayne Johnston	0.00
Robert Jordan	4.29
Laurie King	0.00
Stephen King	100.00
Naomi Klein	8.57
Sophie Kinsella	18.57
Dean Koontz	60.00
Judith Krantz	67.14
Louis L’Amour	18.57

Robertson Davies	21.43	Margaret Laurence	25.71
Jeffery Eugenides	1.43	Ursula LeGuin	7.14
Janet Evanovich	14.29	C. S. Lewis	60.00
Timothy Findley	12.86	Robert Ludlum	54.29
George R.R. Martin	0.00	Carol Shields	7.14
Rohinton Mistry	7.14	Sidney Sheldon	62.86
Ann Marie McDonald	7.14	Danielle Steel	92.86
James Michener	14.29	Amy Tan	20.00
Christopher Moore	1.43	Miriam Toews	4.29
Michael Moore	25.71	Alvin Toffler	1.43
Alice Munro	22.86	J. R. R. Tolkien	72.86
M. Scott Peck	18.57	Penny Vincenzi	7.14
Kate Pullinger	2.86	Alice Walker	12.86
Daniel Quinn	11.43	Joseph Wambaugh	2.86
Anne Rice	78.57	Bob Woodward	1.43
Mordecai Richler	58.57	Paul Zindel	7.14
Robert J. Sawyer	11.43		

Percentage Recognition of Incorrectly Identified Foils on the Author Recognition Test

Foil Author	% Identified
Christopher Barr	0.00
Gary Beauchamp	0.00
Lauren Benjamin	0.00
Thomas Bever	0.00
Elliot Blass	2.86
Jennifer Butterworth	0.00
Katherine Carpenter	1.43
Suzanne Clarkson	4.29
Edward Cornell	2.86
W. Patrick Dickson	4.29
Robert Emery	12.86
Martin Ford	0.00
Howard Gardner	2.86
Sheryl Green	0.00
Mimi Hall	1.43
Frank Kiel	1.43
Pricilla Levy	1.43
Morton Mendelson	2.86
James Morgan	0.00
David Perry	0.00
Robert Siegler	10.00

Mark Strauss	1.43
Tracy Tomes	0.00
Ava Wight	2.86
Steve Yussen	2.86

Percentage Recognition of Correctly Identified Items on the Title Recognition Test

Title	% Recognition
Are You My Mother?	57.14
Bartholomew and the Oobleck	14.29
Because I Love You	55.71
Bedtime for Frances	27.14
Biscuit	40.00
Brown Bear, Brown Bear, What Do You See?	45.71
Chicka Chicka Boom Boom	70.00
Chrysanthemum	10.00
Click Clack Moo	32.86
Cloudy With a Chance of Meatballs	42.86
Corduroy	62.86
Cups for Sale	5.71
Danny and the Dinosaur	25.71
Dog Heaven	4.29
Eloise	48.57
Father Bear Comes Home	14.29
Flat Stanley	37.14
Follow the Drinking Gourd	4.29
Gerald McBoing Boing	21.43
Goodnight Moon	64.29
Guess How Much I Love You	60.00

Harold and the Purple Crayon	30.00
House on East Eighty-Eighth Street	1.43
If You Give A Pig a Pancake	52.86
Jamberry	4.29
Kofi and His Magic	2.86
Moo, Baa, LA, LA, LA	15.71
Oh, the Places You'll Go	44.29
Runaway Bunny	34.29
The Adventures of Chatterer the Squirrel	0.00
The Fall of Freddie and the Leaf	1.43
The Going to Bed Book	12.86
The Last of the Really Great Whangdoodles	0.00
The Story of Ferdinand	14.29
Where the Wild Things Are	64.29

Percentage Recognition of Incorrectly Identified Foils on the Title Recognition Test

Foil Title	% Identified
Backyard Safari	10.00
Blame it on Billy	2.86
Blueberry Kazoo	1.43
Cootie Catchers	4.29
Down by David's Pond	2.86
Down by the Sea	15.71
Grandmother's Surprise	2.86
My Friend the Mailman	4.29
Open Up	0.00
The Clock with No Hands	1.43
The Colors of Me	10.00
The Muffin Maker	0.00
The Rabbit Acrobats	0.00
Wacky Wendell	4.29
What Rhymes with Orange?	8.57

Percentage Recognition of Correctly Identified Items on the Cultural Knowledge Checklist

ame	% Recognition	Name	% Recognition
Artist items		Entertainer items	
Alexander Calder	8.57	Rowan Atkinson	67.14
Paul Cezanne	42.86	Judd Apatow	15.71
John Constable	7.14	Fred Astaire	91.43
Salvador Dali	54.29	Lionel Barrymore	12.86
Helen Frankenthaler	0.00	Sarah Bernhardt	48.57
Paul Gauguin	30.00	Humphrey Bogart	97.14
Winslow Homer	10.00	Charlie Chaplin	100.00
Henri Matisse	48.57	Don Cheadle	40.00
Jackson Pollack	38.57	Greta Garbo	85.71
Diego Riviera	4.29	Katherine Hepburn	97.14
Norman Rockwell	75.71	Harry Houdini	90.00
Auguste Rodin	31.43	Lorne Michaels	40.00
Jørn Utzon	0.00	Vaslav Najinsky	1.43
Jan Vermeer	10.00	Paul Robeson	4.29
Andy Warhol	81.43	Will Rogers	61.43
Andrew Wyeth	1.43	Mae West	80.00

Name	% Recognition
Military leader and explorer items	
Omar Bradley	10.00
Romeo Dallaire	32.86
Francis Drake	22.86
Leif Erikson	24.29
David Farragut	1.43
Robert E. Lee	48.57
Douglas MacArthur	50.00
Peter MacKay	25.71
Ferdinand Magellan	57.14
George C. Marshall	8.57
Horatio Nelson	14.29
George Patton	60.00
John Pershing	1.43
Colin Powell	78.57
Marco Polo	84.29
Walter Raleigh	22.86

Name	% Recognition
Musician/composer items	
Jann Arden	90.00
Louis Armstrong	81.43
Irving Berlin	44.29
Aaron Copland	17.14
Duke Ellington	50.00
Stephen Foster	21.43
George Gershwin	55.71
Woody Guthrie	30.00
George Harrison	85.71
Charles Ingus	0.00
Scott Joplin	14.29
Francis Scott Key	11.43
Gustav Mahler	14.29
Cole Porter	32.86
Arturo Sandoval	7.14
John Phillip Sousa	15.71

Name	% Recognition
Philosopher items	
Edmund Burke	7.14
Rene Descartes	42.86
John Dewey	14.29
Siddhartha Gautama	7.14
Friedrich Hegel	12.86
Thomas Hobbes	11.43
L. Ron Hubbard	25.71
David Hume	17.14
Immanuel Kant	15.71
John Locke	15.71
Friedrich Nietzsche	34.29
William of Ockham	0.00
Jean Jacques Rousseau	25.71
Bertrand Russell	1.43
Jean Paul Satre	30.00
Baruch Spinoza	0.00

Name	% Recognition
Scientist items	
Neils Bohr	17.14
José Bonaparte	8.57
Marie Curie	71.43
Michael Faraday	14.29
Enrico Fermi	1.43
Werner Heisenberg	2.86
James Clerk Maxwell	1.43
Gregor Mendel	14.29
Issac Newton	90.00
J. Robert Oppenheimer	37.14
Linus Pauling	12.86
Max Planck	11.43
Susan Soloman	0.00
Edward Teller	2.86
James Watson	28.57
Ferdinand Zeppelin	17.14

Percentage Recognition of Incorrectly Identified Foils on the Cultural Knowledge Checklist

Foil	% Identified
Artist items	
Matthew Fayland	1.43
William Hatter	1.43
Leah Reid	1.43
Candis Walbeck	0.00
Entertainer items	
Johnny Hillock	0.00
Jackson Hogg	0.00
Aaden Neilson	0.00
Janaki Sridhar	0.00
Military leader and explorer items	
Tiffany Leigh Brien	0.00
Matthew Dwyer	1.43
Christopher Maro	1.43
Katherine E. Pierce	2.86
Musician/composer items	
Justin A. Digsby	2.86
Howard Krafft	0.00
Marcus Napier	1.43
Anthony Russeck	0.00
Philosopher items	
Derek Friedman	0.00
Lane Griffith	0.00
Damion Hirsch	1.43
Robert Villante	1.43
Scientist items	
Malachi Berk	0.00
Judd Dorset	0.00
Parker Drummond	0.00
Franklin Tessier	4.29