The Relation Between Syntactic Awareness and Contextual Facilitation in Word Reading: What Is the Role of Semantics?

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Abstract

Objective: Our objective was to examine the role of semantics in the relation between syntactic awareness and contextual facilitation in word reading. **Methods:** Grade 3 children ($N = 77$) completed a syntactic awareness task in which we manipulated the possible reliance on semantic information. They also completed a task of word reading in isolation and in context from which we calculated a score of contextual facilitation. **Results:** We found an association between children's performance in the syntactic awareness task and contextual facilitation in word reading. Importantly, however, we found an association only when children could rely on semantic information in the syntactic awareness task, and not when the semantic information was limited. **Conclusions:** These findings suggest that syntactic awareness acts together with semantics to foster the use of context in word reading, which has important implications for theories of reading development. **Keywords:** Syntactic awareness, contextual facilitation, word reading, semantics.

Highlights

What is already known about this topic

- Syntactic awareness, as measured by traditional tasks, facilitates word reading in context.

What this paper adds

- Syntactic awareness facilitates word reading in context specifically when the syntactic awareness task allows reliance on semantic information.

Implications for theory, policy or practice

- Our findings specify theories of reading development by suggesting that syntactic awareness acts together with semantics to foster the use of context in word reading.

The Relation Between Syntactic Awareness and Contextual Facilitation in Word Reading: What Is the Role of Semantics?

Syntactic awareness is a metalinguistic skill that represents people's awareness of the structure of their language at the sentence level (Tunmer, Nesdale, & Wright, 1987). It is generally measured by asking participants to judge or manipulate the order of the words within sentences (e.g., Cain, 2007). Children's syntactic awareness skills have been found to be associated with their ability to read words, even beyond numerous control variables such as age, intelligence, memory, vocabulary, and phonological awareness (e.g., Blackmore & Pratt, 1997; Cain, 2007; Rego & Bryant, 1993; Tunmer et al., 1987; but see Muter, Hulme, Snowling, & Stevenson, 2004). Tunmer et al. (1987) hypothesised that use of context could explain this relation between syntactic awareness and word reading. The objective of the present study was to examine whether syntactic awareness alone is associated with use of context during word reading, or whether the associations is driven by the semantic information contained in syntactic awareness tasks.

According to top-down and interactive theories of word reading (e.g., Goodman, 1967; Rumelhart, 1994), children use their higher-level linguistic abilities, such as their semantic knowledge and syntactic awareness skills, to perform lower-level tasks such as word reading in context. For instance, when a child struggles to read the word *generous*, he might recognise that this word is an adjective if it is preceded by the segment *The lady was*. In combination with any partial decoding of the word (e.g., beginning in /ɡ/ or /dʒ/, ending in /əs/), this syntactic awareness would reduce the number of possible pronunciations for the word (e.g., *gorgeous*, *generous*) and thus facilitate its reading.

Tunmer et al. (1987) proposed that such use of context could explain why performance in syntactic awareness tasks is typically found to be associated with performance in word reading. However, we are aware of only one empirical study that directly tests this

hypothesis, moving beyond general associations between syntactic awareness and word reading that do not take the effect of context into account (e.g., Blackmore & Pratt, 1997; Cain, 2007; Tunmer et al., 1987). Rego and Bryant (1993) measured 5-year-old children's syntactic awareness with a word-order correction task (e.g., correcting "John the bike rides" to "John rides the bike"). The children were also asked to read a list of isolated words of increasing difficulty. This allowed the researchers to identify the first 10 words that each child read inaccurately. Five months later, the researchers presented the children with those 10 words (which were different for each child) along with a meaningful sentence that was read aloud. Rego and Bryant found that children's syntactic awareness predicted their accuracy in word reading in context, or contextual facilitation, after controlling for age, intelligence, memory, and vocabulary. This finding suggests that syntactic awareness facilitates word reading by fostering the use of contextual cues, supporting Tunmer et al.'s hypothesis.

There is, however, an alternative explanation. Syntactic awareness, as measured by Rego and Bryant (1993) and in most studies to date, relies heavily on the meaning of the words in the sentences. In fact, Rego and Bryant themselves argued that "all existing tests of syntactic awareness are tests of semantic awareness as well" (p. 236; see also, e.g., Gombert, 1992; Nation & Snowling, 2000). For example, in the scrambled sentence "John the bike rides," children need to use their knowledge of the meaning of the words, or they might produce the incorrect answer "The bike rides John." Given children's likely reliance on semantic cues to complete syntactic awareness tasks, it might be that syntactic awareness skills support use of context in reading only when semantic skills are involved as well. This hypothesis resonates with recent research suggesting that syntactic skills do not contribute to reading in context over and above semantic skills (Eason, Sabatini, Goldberg, Bruce, & Cutting, 2013).

In the present study, we examined the role of semantics in the relation between syntactic awareness and contextual facilitation in word reading. We did so by measuring syntactic awareness with a task in which we manipulated the possible reliance on semantic information. Following Rego and Bryant (1993), we also assessed reading of words in isolation and reading of words presented within an oral context to calculate children's contextual facilitation in word reading. We measured both accuracy and reaction time to offer a more complete representation of children's reading skills (Meisinger, Bloom, & Hynd, 2010; Nathan & Stanovich, 1991). We targeted Grade 3 children because they are developing readers who have been shown to be able to complete these key measures of syntactic awareness and contextual facilitation in word reading (Nation & Snowling, 1998, 2000). We also included several control measures (i.e., age, repetition effect, nonverbal intelligence, working memory, vocabulary, phonological awareness, and text comprehension) to ensure that any relation we found between syntactic awareness and contextual facilitation in word reading was not solely due to these variables.

We conducted hierarchical regression analysis to test whether syntactic awareness could predict contextual facilitation in word reading beyond controls. We hypothesised that children's performance in the syntactic awareness task would be associated with their performance in the contextual facilitation task. Importantly, if children's syntactic awareness skills are helpful in making use of context during reading independently from semantic skills, then there should be such an association even when the reliance on semantic information is limited in the syntactic awareness task. This would offer strong support to Tunmer et al.'s (1987) hypothesis. However, if children's syntactic awareness skills are helpful in making use of context during reading only when they are intertwined with semantic skills, then there should be an association only when the reliance on semantic information is possible in the syntactic awareness task.

Method

Participants

We recruited 79 Grade 3 children who spoke English as their first language from two rural and four urban public schools in Nova Scotia, Canada. Following Tabachnick and Fidell (2007), we removed two participants from the analyses because they were univariate outliers on the contextual facilitation task (zs < -3.82). This ensured that we conducted our analyses on a homogeneous sample of children. This sample of 77 participants was within the normal range for measures of nonverbal intelligence, working memory, phonological awareness, text comprehension, and word reading fluency (see statistics for the first Sight Word Efficiency subtest), as indicated by the standard scores in Table 1. The mean age of participants (38 boys and 39 girls) was 8.86 years (SD = 0.29).

Measures

Syntactic awareness task. We used Nation and Snowling's (2000; Experiment 1b) dative sentence correction task, which was designed to assess syntactic awareness while manipulating the possible reliance on semantic information (see Appendix A for a list of the items). Children were read a scrambled sentence and asked to make it sound right by changing the order of the words. They were not allowed to see the written sentence but could ask for up to two repetitions. There were four practice items and 20 test items. Half were semantically determined (e.g., "Put on the plate the sweets the donkey"), such that only one answer, based on the meaning of the words, was possible (e.g., "The donkey put the sweets on the plate"). The other half were non-semantically determined (e.g., "To the monkey gave the elephant the rabbit"), such that several answers were possible and the meaning of the words provided little information for producing a correct answer (e.g., "The monkey/elephant/rabbit gave the monkey/elephant/rabbit to the monkey/elephant/rabbit"). For all items, only answers

that were syntactically correct and semantically plausible were scored as correct, given that all animals were able to do the actions described in the sentences.

The original task (Nation & Snowling, 2000) was slightly modified to balance word frequencies across the semantically and the non-semantically determined conditions. This balancing was important to ensure that children did not perform better in one condition simply because the words in that condition were more frequent. Out of the 60 nouns (three in each of the 20 sentences), 18 were replaced by one from another sentence of the original task. In two sentences, the verb *put* was also replaced by *placed*. With those changes, the frequencies of the words in the semantically and non-semantically determined sentences were equivalent (p = .88; Zeno, 1995).

Contextual facilitation in word reading task. We assessed contextual facilitation in word reading with a task that was originally designed by Nation and Snowling (1998) for that purpose (see Appendix B for a list of the items). The task consisted in two parts, which were done on different days (see the Procedure section for more details). It was presented on one of two identical Toshiba laptops using DirectRT (Jarvis, 2008). Since our study focused on individual differences, the two parts of the task were done in the same order for all participants (see Mollon, Bosten, Peterzell, & Webster, 2017).

The first part of the task was word reading in isolation. After seeing a fixation cross on a white screen for 1 second, participants saw a word presented in black 40-point Arial font. Participants were asked to read the word into the microphone of a headset. The word disappeared as soon as participants began to pronounce it. A sensitivity level was set for each participant before this part of the task to ensure that their voice and no background noise would make the words disappear.

The second part of the task was word reading in context. After seeing a fixation cross on a white screen for 1 second, participants heard all of a sentence except the last word

through the headset while the screen remained blank (e.g., “The bottles were stacked in the…”) Then, the last word of the sentence appeared on the screen (e.g., “cellar”). Participants were asked to read the word on the screen into the microphone. The word disappeared as soon as participants began to pronounce it. As for word reading in isolation, a sensitivity level was set for each participant before this part of the task.

The same 60 test items were used in both parts of the task: 48 target items (Nation & Snowling, 1998) and 12 filler items (West & Stanovich, 1978). The target items made sense with the sentences but their predictability was low. The filler items made no sense with the sentences and were used to discourage guessing of the sentence’s last word throughout the second part of the task (e.g., “The girl climbed up the… night”). There were also two practice items at the beginning of each part. The order of the items was the same in the two parts of the task and for all participants.

The experimenter recorded participants’ word reading accuracy, and the software recorded reaction time as time taken between the appearance of the words and their disappearance as participants began to pronounce them. The experimenter also recorded any invalid reaction times, that is, reaction times that were calculated based on another sound than participants’ reading of the words (e.g., coughing). These invalid reaction times, as well as the reaction times for inaccurately read items, were removed from the analyses. Using only the 48 target items, we calculated relative contextual facilitation scores using Nation and Snowling’s (1998) equations:

$$\text{Contextual facilitation in accuracy} = \frac{\text{Total accuracy in context} - \text{Total accuracy in isolation}}{48 - \text{Total accuracy in isolation}} \quad (1)$$

$$\text{Contextual facilitation in reaction time} = \frac{\text{Mean reaction time in isolation} - \text{Mean reaction time in context}}{\text{Mean reaction time in isolation}} \quad (2)$$

These scores were relative to children’s level of word reading in isolation. This ensured that children with high levels of word reading in isolation, who did not have the opportunity to

improve greatly when reading in context, did not automatically get lower contextual facilitation scores (see Nation & Snowling, 1998; Tunmer and Chapman, 1998).

Control measures. Because participants read the same words in the isolation and context parts of the contextual facilitation task, we wanted to control for any repetition effect in word reading. To do so, we used the Sight Word Efficiency subtest from the Test of Word Reading Efficiency (Torgesen, Wagner, & Rashotte, 1999), in which participants were given 45 seconds to read a list of 104 words on a sheet of paper as quickly and accurately as possible. This subtest was completed twice, and the repetition effect was calculated using an equation parallel to (1):

$$\text{Repetition effect} = \frac{\text{Total accuracy at Time 2} - \text{Total accuracy at Time 1}}{104 - \text{Total accuracy at Time 1}} \quad (3)$$

Although this equation uses accuracy only, the repetition effect also takes into account speed, as the subtest is a timed task.

We also included nonverbal intelligence, working memory, vocabulary, phonological awareness, and text comprehension as controls because of their association with both syntactic awareness and word reading (Cain, 2007; Cormier & Kelson, 2000; Deacon, Benere, & Castles, 2012; Melby-Lervåg, Lyster, & Hulme, 2012; Plaza & Cohen, 2003). Nonverbal intelligence, working memory, phonological awareness, and text comprehension were measured with standardised tasks, and vocabulary was measured with a shortened version of a standardised task. We assessed nonverbal intelligence with the Matrix Reasoning subtest from the Wechsler Abbreviated Scale of Intelligence (Wechsler, 1999), working memory with the Digit Span subtest from the Wechsler Intelligence Scale for Children (Wechsler, 2003), phonological awareness with the Elision subtest from the Comprehensive Test of Phonological Processing (Wagner, Torgesen, Rashotte, & Pearson, 2013), and text comprehension with the Comprehension subtest of the Gates-MacGinitie Reading Tests (MacGinitie, MacGinitie, Maria, Dreyer, & Hughes, 2007). We assessed vocabulary with a

shortened version of the Peabody Picture Vocabulary Test (Dunn & Dunn, 1997), in which one out of every four items was included. This shortened version was validated by Sparks and Deacon (2015) in Grade 1 to 3 children.

Procedure

Participants were assessed in a quiet room in their school by a trained research assistant. All the tasks were presented to participants in three sessions that took approximately 45 minutes each; this included other tasks that were part of a larger research project and are not reported here. The second and third sessions took place, on average, 1.48 (*SD* = 0.94) and 3.87 (*SD* = 2.39) days after the first one, respectively. In the first session, participants completed word reading in isolation and the Sight Word Efficiency subtest. In the second session, they completed the shortened version of the Peabody Picture Vocabulary Test, the Digit Span subtest, the Elision subtest, the syntactic awareness task, word reading in context, and the Sight Word Efficiency subtest. In the third session, they completed the Comprehension subtest. All standardised tasks (and the shortened version of the Peabody Picture Vocabulary Test) were administered and scored according to the corresponding manual's guidelines.

Results

All analyses were conducted in SPSS 25.0. We used multiple imputation to replace missing data (3%). This method is considered as one of the best for dealing with missing data because it does not require that the data be missing completely at random and it is appropriate for several types of analyses, such as regression (Tabachnick & Fidell, 2007). The results of our regression analyses were the same when missing data were not imputed. A visual inspection of the data indicated that the error distributions were within the range of normality (Cohen, Cohen, West, & Aiken, 2003). Descriptive statistics of and correlations between the measures are presented in Tables 1 and 2, respectively. Participants were 61% accurate on the

semantically determined sentences and 48% accurate on the non-semantically determined sentences, and the correlation between these two measures of syntactic awareness was strong. Each measure of syntactic awareness was also correlated with most measures of word reading, positively for accuracy and negatively for reaction time. Moreover, there was evidence of contextual facilitation in word reading, as both measures of contextual facilitation (accuracy and reaction time) were significantly different from 0 (ps < .005).

To investigate the role of semantics in the relation between syntactic awareness and contextual facilitation in word reading, we conducted four hierarchical regression analyses. The first two had contextual facilitation score based on accuracy as the dependent variable, and the last two had contextual facilitation score based on reaction time as the dependent variable. Control variables of age, repetition effect, nonverbal intelligence, working memory, vocabulary, phonological awareness, and text comprehension were entered first in all models. Then, performance on the semantically determined sentences or performance on the non-semantically determined sentences was entered as the second step.

The results are summarised in Table 3. Performance on the semantically determined sentences explained a significant 17% of unique variance in contextual facilitation based on reaction time (p < .001). In contrast, performance on the non-semantically determined sentences did not explain any significant amount of variance in contextual facilitation based on reaction time (p = .41). Finally, none of the measures of syntactic awareness explained any significant amount of variance in contextual facilitation based on accuracy (ps > .63). This pattern of results is consistent with the correlations reported in Table 2. Notably, the two correlations involving contextual facilitation in reaction time (rs = .24 and .02) were significantly different from one another (z = 2.08, p = .04).

Discussion

The objective of this study was to examine the role of semantics in the relation between syntactic awareness and contextual facilitation in word reading. To do so, we used a measure of syntactic awareness in which we manipulated the possible reliance on semantic information. We found an association between children's performance in the syntactic awareness task and their benefit, in terms of reaction time, of reading words in context versus in isolation. Although we did not replicate this result with our measures of word reading accuracy, this association is in accordance with the one other study investigating this question (Rego & Bryant, 1993). Importantly, however, we found an association only when children could rely on semantic information in the syntactic awareness task, and not when the semantic information was limited. This result suggests that syntactic skills need to be intertwined with semantic skills in order to influence use of context during reading.

Our findings broadly align with those of a recent study with 10- to 14-year-old children (Eason et al., 2013). In that study, children were assessed on their semantic and syntactic skills separately, as well as on their fluency in reading words presented in stories. The authors found that children's syntactic skills did not contribute to their fluency in reading words in context over and above their semantic skills. Similarly, our results are in accordance with Nation and Snowling's (1998) finding that listening comprehension, which incorporates both semantics and syntax, is the best predictor of contextual facilitation.

Our findings are also important for models of reading development. On one hand, they bring support to theories that propose top-down mechanisms to explain word reading in children. For example, according to Rumelhart's (1994) interactive model of reading, children use their semantic knowledge and syntactic awareness skills to read words in context. This mechanism could explain why we found that children who performed better in the syntactic awareness task also performed better in the contextual facilitation task. On the other hand, however, our findings serve to specify those theories by highlighting the crucial role of

semantics when reading words in context. This conclusion challenges Tunmer et al.'s (1987) hypothesis, which focuses on syntactic awareness to explain contextual facilitation in word reading. A more precise version of this hypothesis could be that together, semantic and syntactic skills play a role in word reading in context.

Even though some of our results are in line with Rego and Bryant's (1993) results, it is also worth considering two interesting differences between these two sets of findings. First, we found an association between syntactic awareness and contextual facilitation in reaction time, whereas Rego and Bryant found an association between syntactic awareness and contextual facilitation in accuracy. This discrepancy could be due to the age of participants: 5 years in Rego and Bryant's study and 8 and 9 years in ours. It might be that children's individual differences in accuracy are more relevant when they are younger and that their reaction time in reading, or fluency, becomes increasingly important as they get older (Juul, Poulsen, & Elbro, 2014). This is hard to evaluate because Rego and Bryant did not include a measure of reaction time and neither study included a wide age range. As such, a prudent interpretation of our findings would be that syntactic and semantic skills act together in benefitting children's *fluency* when reading in context.

The second notable difference between the findings of Rego and Bryant (1993) and ours is the amount of variance explained in the regressions: Rego and Bryant predicted 44% of the variance in contextual facilitation, whereas we predicted only 25%. One possible explanation for this is the unexpectedly large standard deviations we observed for our measures of contextual facilitation (see Table 1). This was especially the case for reaction time in word reading in isolation. This large standard deviation could be due to variation in children's willingness to answer quickly, which might not have been as much of an issue in word reading in context since children were prompted with a sentence. There is also an important methodological difference between Rego and Bryant's study and ours. Both studies

contrasted word reading in context to that in isolation, but the time between the two conditions was five months in Rego and Bryant's study and only a few days in ours. The longer gap in Rego and Bryant's study is likely to have introduced variance that is not related to contextual facilitation but that could be explained by other predictors captured by the authors, such as variance in children's rate of reading development. Regardless of the differences between Rego and Bryant's study and ours, the low amount of variability explained in our study indicates that other variables are likely to predict contextual facilitation. One possibility is that children's depth of vocabulary knowledge, in contrast with their vocabulary breadth (as assessed in the present study), could explain additional variance in contextual facilitation (see Ouellette, 2006).

A number of limitations should be considered when thinking through implications of our study. First, the non-semantically determined sentences (e.g., "The monkey gave the elephant to the rabbit") might have seemed stranger to the children than the semantically determined ones (e.g., "The donkey put the sweets on the plate"), which might explain the lower performance (4.79 vs. 6.09) and the lower reliability (.67 vs. .76). This could be partly responsible for our non-significant results. Second, we interpreted our findings as indicating that syntactic awareness and semantic skills are responsible for benefits of reading in context, but it could be the opposite: Children's reading in context could help them develop their syntactic awareness and semantic skills (e.g., Cunningham, 2005). A longitudinal study could help answer this question. Third, our measure of syntactic awareness only included one type of sentences: active sentences with a direct object followed by an indirect object. Similarly, our measure of contextual facilitation in word reading included mainly nouns. Other studies should include a wider range of sentence and word types to confirm our findings. Finally, in our study, like in Rego and Bryant's (1993), the context was presented orally and children

only read the last word of each sentence. Future research could test word reading in context in a more naturalistic way by providing a written context for children to read.

In sum, this study showed that the more children were aware of word order in sentences, the more they benefited from context in reading. Critically, this relation held only when children could use semantic information to reorder the sentences, and not when they had to rely mainly on syntax. These findings suggest that syntactic awareness acts together with semantics to foster the use of context in word reading, which has important implications for theories of reading development (e.g., Rumelhart, 1994; Tunmer et al., 1987).

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Table 1

Descriptive Statistics of the Syntactic Awareness Measures, the Contextual Facilitation Measures, and the Control Measures

Measure (maximum score)	*M*	*SD*	Skewness[a]	Reliability[b]
Syntactic awareness measures				
1. Semantically determined sentences (10)	6.09	2.57	-0.63	.76
2. Non-semantically determined sentences (10)	4.79	2.49	-0.11	.67
Contextual facilitation measures				
1. Accuracy (see Equation 1)	0.11[c]	0.22	-0.40	
a) Word reading in isolation (48)	27.85	11.60	-1.07	.96
b) Word reading in context (48)	30.32	11.01	-1.38	.96
2. Reaction time (see Equation 2)	0.09[c]	0.27	-0.05	
a) Word reading in isolation	1593.47	1164.51	3.78	.93
b) Word reading in context	1253.91	479.96	1.17	.75
Control measures				
1. Repetition effect (see Equation 3)	0.10	0.13	-0.05	
a) First Sight Word Efficiency subtest (104)	57.27	16.51	-1.04	.93[d]

Standard score (*M* = 100; *SD* = 15)	103.09	16.47		
b) Second Sight Word Efficiency subtest (104)	61.43	18.50	-1.24	.93[d]
2. Nonverbal intelligence (32)	14.94	6.64	0.14	.93[d]
Standard score (*M* = 50; *SD* = 10)	46.65	10.99		
3. Working memory (32)	13.04	2.89	0.35	.86[d]
Standard score (*M* = 10; *SD* = 3)	8.96	2.94		
4. Vocabulary (51)	32.59	4.71	0.19	.76
5. Phonological awareness (34)	22.91	6.52	-0.37	.91[d]
Standard score (*M* = 10; *SD* = 3)	8.97	2.82		
6. Text comprehension (48)	27.38	11.17	-0.08	.93[d]
Standard score (*M* = 50; *SD* = 21.06)	43.75	21.90		

Note. Raw scores are reported, unless otherwise specified.

[a]The skewness values of the variables used in the regression analyses are all smaller than |1|. [b]Reliabilities higher than .65 can be interpreted as acceptable for research purposes (e.g., DeVellis, 1991; Hair, Black, Babin, & Anderson, 2010; Roszkowski & Spreat, 2011). [c]These values are significantly higher than 0 (*p*s < .005). [d]These are the reliabilities reported in the manual. All other reliabilities were calculated for this sample.

Table 2

Correlations Between the Syntactic Awareness (SA) Measures, the Contextual Facilitation (CF) Measures, and the Control Measures

	SA measures		CF measures						Control measures							
Measure	1	2	3	a	b	4	a	b	5	a	b	6	7	8	9	10
SA measures																
1. Semantically determined sentences	–															
2. Non-semantically determined sentences	.57*	–														
CF measures																
3. Accuracy (see Equation 1)	-.01	-.01	–													
a) Word reading in isolation	.58*	.54*	-.09	–												
b) Word reading in context	.61*	.56*	.20	.94*	–											
4. Reaction time (see Equation 2)	.24†	.02	-.06	-.03	-.01	–										
a) Word reading in isolation	-.05	-.36*	-.01	-.53*	-.49*	.53*	–									
b) Word reading in context	-.34*	-.46*	.01	-.60*	-.61*	-.16	.67*	–								
Control measures																
5. Repetition effect (see Equation 3)	.19	.10	.20	.23*	.38*	.11	-.18	-.34*	–							

a) First Sight Word Efficiency subtest	.58*	.55*	.06	.88*	.87*	.03	-.45*	-.60*	.32*	–					
b) Second Sight Word Efficiency subtest	.56*	.50*	.14	.83*	.88*	.08	-.45*	-.64*	.58*	.95*	–				
6. Nonverbal intelligence	.16	.24*	.10	.20	.24*	-.09	-.15	-.13	.10	.20	.21	–			
7. Working memory	.41*	.36*	.14	.53*	.57*	-.06	-.28*	-.31*	.12	.55*	.52*	.40*	–		
8. Vocabulary	.45*	.44*	.09	.40*	.44*	-.02	-.38*	-.48*	.25*	.40*	.42*	.18	.25*	–	
9. Phonological awareness	.55*	.43*	.00	.68*	.70*	-.02	-.37*	-.45*	.12	.60*	.56*	.34*	.46*	.34*	–
10. Text comprehension	.60*	.54*	-.01	.76*	.68*	-.13	-.48*	-.48*	.22†	.67*	.61*	.12	.41*	.48*	.46*	–

Note. †$p < .10$. *$p < .05$.

Table 3

Hierarchical Regression Analyses Predicting Contextual Facilitation (Accuracy and Reaction Time) From Syntactic Awareness (Semantically and Non-Semantically Determined Sentences)

Predictor	Accuracy			Reaction Time		
	B (*SE*)	β	*p*	*B* (*SE*)	β	*p*
1. Age	-0.01 (0.10)	-.02	.89	-0.14 (0.12)	-.15	.24
Repetition effect	0.33 (0.27)	.19	.22	0.31 (0.28)	.14	.27
Nonverbal intelligence	0.00 (0.00)	.03	.83	0.00 (0.01)	-.11	.49
Working memory	0.01 (0.01)	.17	.26	0.00 (0.02)	.04	.79
Vocabulary	0.00 (0.01)	.08	.57	0.00 (0.01)	.03	.81
Phonological awareness	0.00 (0.01)	-.10	.56	0.00 (0.01)	.05	.74
Text comprehension	0.00 (0.00)	-.11	.49	0.00 (0.00)	-.18	.31
2. Semantically determined sentences	-0.01 (0.01)	-.08	.63	0.06 (0.02)	.57	< .001
Total R^2	.09			.25		
2. Non-semantically determined sentences	0.00 (0.02)	-.04	.80	0.01 (0.02)	.13	.41
Total R^2	.09			.09		

Appendix A

Items Used in the Syntactic Awareness Task

Semantically Determined Sentences

The kangaroo the ball chased to the goal.

The ball the zebra kicked to the corner.

The parrot on the shelf put the book.

In the bag the mouse the bananas placed.

Pushed to the shop the cart the monkey.

To the garage drove the tiger the car.

Put on the plate the sweets the donkey.

In the bag the sweets the leopard placed.

To the garden followed the monkey the sign.

Put the giraffe on the wall the picture.

Non-Semantically Determined Sentences

To the elephant showed the snake the lion.

To the monkey gave the elephant the rabbit.

To the horse the tiger drove the mouse.

Kicked to the mouse the fish the zebra.

The monkey to the dog followed the horse.

The dog the horse gave to the tiger.

The cat the donkey to the mouse pushed.

Chased the giraffe the rat to the dog.

The snake to the dog the rabbit passed.

The horse the fish pushed to the mouse.

Appendix B

Items Used in the Contextual Facilitation in Word Reading Task

Target Items

Barry helps me with homework as he is my tutor.

After the football match, there was chaos.

They lined-up ready for the shoot.

The train pulled into the depot.

The knight pulled out his dagger.

The truck stopped at the gas station for some diesel.

The girls rowed the boat to the island.

The mudguards on my bike are chrome.

For Christmas, she had a necklace and a brooch.

When it's dry we play in the garden.

The bottles were stacked in the cellar.

Blue is bright, turquoise is more subtle.

After she finished her work, Judy got paid.

After George's accident, he was left with a scar.

Tom was in a boat, Tim in a canoe.

I went shopping with my mom and my aunt.

John went to the bank as he needed some cash.

The style of his coat was classic.

Her favourite breakfast was eggs and sausage.

Her jacket and shoes were both made of suede.

Jeff won the race and Tim came in ninth.

The horse likes to kick and stamp.

My mom likes to cook rice and curry.

The ship sailed across the ocean.

She sang while he played the guitar.

The fox was free but on the path was a dead hound.

The fruit tasted bitter.

The car was parked in the market square.

She was worried so she asked for help from her friend.

She saw a beautiful black mare.

Jenny's favourite colour was blue but Rosie liked beige.

My mother asked me to tell the truth.

Her favourite flower was the orchid.

The class joined in the chorus.

Everyday my father likes to shave.

John came quickly, he just took a moment.

In his eye he had a glint.

When making a cake remember to use a sieve.

Mr. Jones is in the army, he is a colonel.

Her shirt was made of denim.

I heard her struggling with the latch.

The room was nice because of the lovely view.

There was a lot of blood as she had cut her vein.

The boat sailed along the canal.

John wanted to watch a film but Tom preferred a cartoon.

We end our assembly at school with a hymn.

The girl sat across the aisle.

She said the flowers and the champagne were divine.

Filler Items

The boy swam underneath the closet.

The squirrel ran around the light.

The bird flew above the stove.

The fireman answered the horse.

The girl climbed up the night.

The man drove the picture.

The policeman blew the letter.

The rabbit ran into the bridge.

The rock broke the money.

The dog ran after the chair.

The cat drank the treasure.

The plan flew above the banana.