Published in final edited form as:

J Res Read. 2017 May ; 40(2): 199–217. doi:10.1111/1467-9817.12080.

The Comprehension Problems for Second-Language Learners with Poor Reading Comprehension despite Adequate Decoding: A Meta-Analysis

Mercedes Spencer and Richard K. Wagner

Florida State University and the Florida Center for Reading Research

Abstract

We conducted a meta-analysis of 16 existing studies to examine the nature of the comprehension problems for children who were second-language learners with poor reading comprehension despite adequate decoding. Results indicated that these children had deficits in oral language ($d = -0.80$), but these deficits were not as severe as their reading comprehension deficit ($d = -2.47$). Second-language learners also had weaker oral language skills compared to native-speaking children regardless of comprehension status ($d = -0.84$). We discuss theoretical and practical implications of the finding that second-language learners who are poor at reading comprehension despite adequate decoding have deficits in oral language but the deficit is not sufficient to explain their deficit in reading comprehension.

Keywords

meta-analysis; specific reading comprehension deficits; language minority; reading comprehension; oral language

Reading comprehension is defined as the process of engaging with text for the purpose of extracting and constructing meaning and is strongly correlated with future academic and life outcomes (NICHD, 2000; Snow, 2002). Yet, a significant proportion of second-language learners are at an increased risk of developing reading problems in the future (August & Shanahan, 2006). In the United States, less than 6% of fourth graders who are second-language learners are scoring at or above proficiency in reading comprehension (NCES, 2013). These statistics become more alarming in eighth grade, when only 3% of second-language learners are at or above proficiency in reading comprehension. In the present meta-analysis, we investigated the reading comprehension and oral language skills of second-language learners who have been identified as having specific reading comprehension deficits (SCD).

It is estimated that approximately 10% of children have SCD (i.e., poor reading comprehension in spite of relatively normal decoding skills; Nation & Snowling, 2000). These individuals are also referred to as poor comprehenders, less-skilled comprehenders,

and unexpected poor comprehenders in the literature. The proportion of children with SCD may be larger in second-language learner populations based on the fact that both second-language learners and children with SCD often have associated oral language weaknesses (Farnia & Geva, 2011; Spencer, Quinn, & Wagner, 2014). Thus, the identification and remediation of children with SCD may be an even greater concern for second-language learners.

Reading Comprehension and Oral Language Weaknesses in Second-language Learners

In the present study, second-language learner status was operationalized as having a native language is not the societal language and includes individuals with varying levels of proficiency, from fluent bilinguals to individuals with limited English proficiency. It is not uncommon for second-language learners to have reading comprehension difficulties (NCES, 2013; Verhoeven, 2000), especially when having limited second language proficiency (Kieffer, 2008). For example, Lesaux & Kieffer (2010) examined the prevalence of reading difficulties across a sample of 581 native speakers and language-minority children. Struggling readers were identified as scoring at or below the 35th percentile on measures of reading comprehension and oral language. Using these criteria, a significantly larger proportion of language-minority children were identified as struggling readers (60% prevalence) compared to native speakers (40% prevalence).

The importance of examining the oral language skills in children with SCD who are also second-language learners is underscored by the fact that second-language learners who have reading comprehension difficulties concurrently tend to have weaknesses in multiple domains of oral language, including vocabulary knowledge (Lesaux & Kieffer, 2010), morphological awareness (Kieffer, 2014), listening comprehension (Geva & Massey-Garrison, 2010), and syntactic awareness (Swanson, Rosston, Gerber, & Solari, 2008). Moreover, second-language learners rarely catch up to their native-speaking peers (NCES, 2013). This finding is troubling because second-language oral language performance has a profound impact on second-language reading comprehension (Lesaux, Crosston, Kieffer, & Pierce, 2010). Thus, it is perhaps not surprising that second-language learners are at an increased risk for reading comprehension problems (Snow et al., 1998) and have higher rates of reading problems than native speakers (NCES, 2013).

The goal of the current meta-analysis is to better understand the underlying nature of the comprehension deficits for second-language learners with SCD. The framework of the present meta-analysis is based on the framework used in two previous investigations (Authors, 2016a; Spencer et al., 2014).

Alternative Hypotheses about the Nature of the Comprehension Weaknesses for Second-language Learners with SCD

We examined three hypotheses about the nature of the comprehension problems for second-language learners with SCD.

Hypothesis one: Second-language learners with SCD have comprehension problems that are specific to reading

It is possible for children to have adequate decoding in the face of poor reading comprehension because children with SCD may be using additional cognitive resources to supplement their decoding, allowing fewer resources for the comprehension process (Perfetti, 1985). Because oral language does not rely on decoding, oral language comprehension would not be subject to the impairment found for reading comprehension. An additional explanation for the absence of oral language weaknesses may result from differences between spoken and written language (e.g., Akinnaso, 1982; Chafe, 1982; Perfetti et al., 2005). Moreover, some studies report adequate vocabulary for children with SCD, and it also is possible oral language impairments seen in second-language learners with SCD may not extend to their native language (Rosston, 2008).

Hypothesis two: Second-language learners with SCD have comprehension problems that are general to both reading and oral language

Listening comprehension and reading comprehension are highly related skills (Swanson et al., 2008; Geva & Farina, 2012), and children with reading comprehension weaknesses frequently have corresponding oral language deficits (e.g., Catts et al., 1999).

The simple view of reading (Gough & Tunmer, 1986; Hoover & Gough, 1990) asserts that reading comprehension is the product of decoding and oral language. Based on this framework, children with good decoding and comprehension are good readers; children with poor decoding and comprehension are garden-variety poor readers; children with good comprehension but poor decoding have dyslexia; and finally, children with poor comprehension but good decoding have SCD. Thus, for children with SCD, weaknesses in oral language provides the only other explanation for their poor reading comprehension performance (Nation & Snowling, 2000). Evidence in support of this view is that children with SCD have difficulty completing oral language tasks (e.g., Li & Kirby, 2010; Nation et al., 2010).

Hypothesis three: Second-language learners with SCD have comprehension problems that extend to oral language but are less severe for oral language than for reading

Children with SCD by definition have weaknesses in reading comprehension; however, given the mixed results found across studies that provide support for Hypotheses One and Two, it is possible that the oral language weaknesses found in this subgroup of readers is not as severe as their reading comprehension. It may be that children with SCD have comprehension deficits that are general to reading and oral language and that the added cognitive demand of reading comprehension results in greater deficits for comprehending text. Empirical evidence for Hypothesis Three is provided by studies showing that although children with SCD do have weaknesses in oral language, their deficit in reading comprehension is substantially greater than their deficit in oral language (Authors, 2016a, 2016b).

The Present Study

Numerous systematic reviews prioritize reading comprehension and its component skills, and a significant proportion have focused on struggling readers. However, few meta-analyses tend to focus exclusively on second-language learner populations. Of these reviews, few have focused on language and literacy skills outside of the context of intervention and assessment effects. To our knowledge, no meta-analysis to date explicitly investigates SCD in a population of second-language learners.

In the present review, we compared the reading comprehension and oral language performance of second-language learners with and without SCD, and we compared the reading comprehension and oral language performance of second-language learners with SCD with native speakers who also had SCD.

Method

Study Collection

The present meta-analysis spans studies published from January 1, 1970 to October 2, 2015. Relevant studies were located using electronic database keyword searches and included *PsycINFO*, *ERIC*, *Medline*, and two publisher databases, *Taylor and Francis* and *Sage Journals*. We also searched *ProQuest Dissertations* in an effort to be as inclusive as possible and to reduce the likelihood of publication bias. We used title-based keyword combinations related to reading comprehension, SCD, poor comprehenders, struggling readers, and reading disability that was combined with abstract-based keywords related to second-language learners, dual language, English language learner, bilingual, and language-minority samples. We also contacted authors who had at least two relevant publications and hand-searched the references of included studies.

Inclusionary criteria and final study selection—To be included, studies had to include: (a) original data; (b) second-language learner samples; (c) individuals between 4 and 18 years of age; (d) measures of reading comprehension, decoding, and oral language; (e) samples of individuals with SCD and typical readers; and (f) be published in English.

The initial search yielded 265 results. After eliminating duplicates and studies that did not report original data or include a sample of second-language learners with SCD, 20 studies remained. An additional 11 studies were excluded because they did not include acceptable measures of reading comprehension, oral language, or decoding. Three studies did not report necessary data; however, we contacted the authors and were able to obtain these data. We also searched the references of relevant studies, which added an additional study to the analysis. We additionally had access to an existing raw dataset that included second-language learners with SCD. Across nearly all studies, English was the minority language, the language of schooling, and the language of testing (i.e., for group classification and for oral language assessment).¹ Two studies included cross-linguistic measures, but neither

¹For Ronberg & Petersen (2015), the language of schooling and testing was Danish. Danish was the minority language for some children and the native language for others.

study identified groups of readers across both sets of cross-linguistic tasks.² Two studies included a mixture of native speakers and second-language learners.³ Studies were coded for sample sizes as well as information related to reading comprehension and oral language measures, including means and standard deviations, *t*-tests and/or *F*-tests.

Moderators—We additionally coded participant age, language, and type of oral language measure (i.e., vocabulary knowledge, listening comprehension, syntactic or semantic knowledge, narrative recall, and comprehensive oral language) as possible moderators.

All studies were coded twice to establish inter-coder reliability; studies were coded based on study features, and reading comprehension- and oral language-related constructs. Inter-coder reliability was calculated using Cohen's kappa and the intra-class correlation. Reliability for the study features was .92; reliability for the reading comprehension- and oral language-related constructs was 1.00 and .93, respectively; the overall reliability exceeded acceptability of kappa and intra-class correlation values .70 (overall reliability = .94). Discrepancies were resolved through discussion or by referring to the article.

The final sample included $n = 16$ studies for between-group comparisons of reading comprehension ($k_{rc} = 25$) and oral language ($k_{ol} = 46$) for children with second-language learner status. Additional between-group comparisons of second-language learners with SCD to native-speaking children with SCD included $n = 11$ studies ($k_{rc} = 17$) for reading comprehension and oral language ($k_{ol} = 26$).

Results

Meta-Analytic Methods

All analyses were conducted using Microsoft Excel (Version 14.0) and Robumeta in R (Fisher & Tipton, 2015). Effect sizes were calculated using Hedge's *g* (Hedges, 1982), which is Cohen's *d* (Cohen, 1977) after correcting for small sample sizes. Studies were coded so that negative effect size estimates indicated lower performance for children with SCD. Random-effects models were used (Shadish & Haddock, 2013). Random-effects models were appropriate given that I^2 , which is an estimate of the percentage of variance due to heterogeneity as opposed to random sampling error, was high across most comparisons. Statistical dependencies created by multiple effect sizes from the same studies were handled using robust variance estimation in Robumeta (Fisher & Tipton, 2015).

Effect Size Analyses

Comparisons of second-language learners with SCD to typically-developing second-language learners

—Twenty-five comparisons were made for the reading comprehension performance of children with SCD to typical readers (Study $n = 16$). There were 7,017 children with SCD ($M_{pc} = 438.63$, $SD_{pc} = 592.61$, range = 14 – 1,460) whose performance was compared with 29,464 typical readers ($M_{td} = 1,841.50$, $SD_{td} = 2,542.54$;

²Li & Kirby (2014) included a measure of Chinese reading comprehension, and Rosston (2008) included measures of Spanish reading comprehension and oral language; however, group classification was solely based on English measures.

³Etmanskies et al. (2014) and Ronberg & Petersen (2015) included mixed language samples.

range = 14 – 6,391). The average sample-weighted effect size was negative, large, and statistically significant [random-effects: $d = -2.47$ (CI $-2.69, -2.26$)]. This indicates that children with SCD attained mean scores on reading comprehension that were significantly lower than children without SCD. Given that children with SCD were selected on the basis of having below-average reading comprehension scores, this outcome was not surprising (see Table 1). There was substantial variability in effect size estimates due to heterogeneity, $I^2 = 94.62\%$ (see Table 2 and Figure 1). We additionally conducted sensitivity analyses to investigate whether varying values of rho (ρ) from 0 to 1 in .20 increments affected tau squared (τ^2), the subsequent weights, and the average weighted effect size estimate. Varying values of ρ had negligible effects, which indicates the observed effect size was robust.

Forty-six comparisons were made for the oral language performance of children with SCD to typical readers (Study $n = 16$). There were 6,878 children with SCD ($M_{pc} = 429.87$; $SD_{pc} = 579.88$; range = 14 – 1,494) whose performance was compared with 28,762 typical readers ($M_{td} = 1,797.61$; $SD_{td} = 2,489$; range = 14 – 6,298). In most cases, oral language was measured at the word level ($k = 29$) rather than at the sentence ($k = 9$) or passage level ($k = 8$), and most assessments had a spoken ($k = 36$) rather than written administration format ($k = 10$). The average sample-weighted effect size was negative, large, and statistically significant [random-effects: $d = -0.80$ (CI $-0.91, -0.69$)]. This suggests that children with SCD attained lower scores on measures of oral language than did typical readers (see Figure 2). Additionally, there was substantial variability in effect size estimates across studies due to heterogeneity, $I^2 = 88.08\%$ (see Table 2). Sensitivity analyses revealed that the observed effect size was robust.

Comparisons of second-language learners with SCD to native-speaking children with SCD

Seventeen comparisons were made for the reading comprehension performance of second-language learners with SCD to native-speaking children with SCD (Study $n = 11$). There were 6,900 second-language learners with SCD ($M_{pc} = 627.23$; $SD_{pc} = 633.65$; range = 15 – 1,514) whose performance was compared with 16,072 native-speaking children with SCD ($M_{pc} = 1,461.05$; $SD_{pc} = 1,455.50$; range = 7 – 3,236). The average sample-weighted effect size was negative, small, and non-significant [random-effects: $d = -0.06$ (CI $-0.13, 0.02$)]. Thus, there were no reliable differences in the reading comprehension performance across the two groups of readers (see Figure 3). There was moderate variability in effect size estimates across studies due to heterogeneity, $I^2 = 74.61\%$ (see Table 2). Sensitivity analyses revealed that the observed effect size was robust.

Twenty-six comparisons were made for the oral language performance of second-language learners with SCD to native-speaking children with SCD (Study $n = 11$). There were 6,258 second-language learners with SCD ($M_{pc} = 568.89$; $SD_{pc} = 566.48$; range = 15 – 1,436) whose performance was compared with 15,327 native-speaking children with SCD ($M_{pc} = 1,393.40$; $SD_{pc} = 1,384.58$; range = 7 – 3,016). The average sample-weighted effect size estimate was negative, large, and statistically significant [random-effects: $d = -0.84$ (CI $-0.89, -0.79$)]. This suggests that second-language learners with SCD performed significantly poorer than their native-speaking peers even when native-speakers were similarly characterized as having SCD (see Figure 4). There was moderate variability in

effect size estimates across studies due to heterogeneity, $I^2 = 48.58\%$ (see Table 2). Sensitivity analyses revealed that the observed effect size was robust.

Moderator Analyses

Given the amount of variability due to heterogeneity, we examined the possible moderating effect of age, language, and type of oral language measure on the effect size estimates generated for the comparisons of reading comprehension and oral language performance (see Table 3). Due to the dependency of effect size estimates across studies, we used robust variance estimation to conduct moderator analyses (Fisher & Tipton, 2015).

Age was a significant moderator for comparisons of reading comprehension, $\beta = .79$, $p < .01$, $t(4.37) = 3.39$. Younger second-language learners with SCD tended to have poorer performance on measures of reading comprehension compared to older children ($d = -2.61$ versus $d = -1.85$). Age was not a significant moderator for comparisons of oral language, $\beta = .25$, $t(3.91) = 1.10$; however, these results should be approached cautiously because the degrees of freedom for the model were less than four. Language was not a significant moderator for reading comprehension, $\beta = -.09$, $t(4.41) = -0.91$, or oral language, $\beta = -.07$, $t(4.25) = -1.14$. Because type of oral language measure varied both within and across studies, we conducted a hierarchical moderator analysis to account for the nested nature of the data. Type of oral language measure was a non-significant moderator of effect size estimates, $\beta_{\text{mean}} = 0.11$, $t(6.14) = 1.05$ and $\beta_{\text{center}} = -0.05$, $t(2.08) = -0.62$. Given that the degrees of freedom were less than four for the group-centered estimate, these results must be interpreted cautiously; however, conducting a non-hierarchical moderator analysis resulted in the same finding, $\beta = -.02$, $t(7.55) = -0.32$.

Discussion

In the present meta-analysis, we investigated the nature of the comprehension problem for second-language learners with SCD based on three hypotheses: (a) comprehension deficits are specific to reading, (b) comprehension deficits are general to both reading and oral language, or (c) comprehension deficits extend beyond the domain of reading but are more severe for reading than for oral language. The results of the current review support the third hypothesis: Second-language learners with SCD have profound oral language weaknesses ($d = -0.80$), but these weaknesses are not as severe as their reading comprehension deficit ($d = -2.47$).

When compared to native-speaking children with SCD, second-language learners with SCD exhibited greater oral language deficits ($d = -0.84$); their reading comprehension performance was comparable ($d = -0.06$). Regardless of the fact that both groups were identified as having SCD using identical methods in most instances, second-language learners performed substantially poorer than native speakers in oral language. These findings add to a growing body of literature that demonstrates that second-language learners are at an increased risk of developing oral language problems relative to monolingual speakers (NCES, 2013). Therefore, the outcome of present review support and extend the findings of other investigations examining children with SCD by focusing on this subgroup of readers within the second-language learner population. Similar to other studies, we found that

children with SCD attained lower mean scores on measures of vocabulary knowledge, listening comprehension, semantic knowledge, and syntax compared to typical readers (e.g., Geva & Massey-Garrison, 2013).

The Reading Comprehension and Oral Language Discrepancy

The outcome that second-language learners with SCD have reading comprehension weaknesses that are substantially greater than their oral language weakness is an intriguing one. Nonetheless, there are several possible explanations for this pattern of findings.

First, for many studies, decoding accuracy rather than fluency was used to document adequate decoding. Children who skillfully use decoding strategies, such as an application of phonics rules, can accurately decode words but may not decode with sufficient fluency to support comprehension (Perfetti, 1985; Torgesen & Hudson, 2002). Second, oral language tends to be less complex than written language (Akinnaso, 1982; Chafe, 1982). As a result, oral language weaknesses are likely to be exacerbated when more elaborate language comprehension is required. Moreover, the comprehension of text-based information relies more on background knowledge than does the comprehension of oral language (Wolfe & Woodwyck, 2010), which is a robust predictor of reading comprehension and further differentiates children with SCD from children without SCD (Cain et al., 2001). A third possibility is regression to the mean. In most studies, children were categorized as having SCD based on their performance on one measure of reading comprehension. Such methods can lead to an overrepresentation of children with reading comprehension scores that are below their true score. As a result, children who are selected in this way will regress to their true score on other measures that are correlated with reading comprehension (i.e., oral language). Yet, given the large discrepancy between reading comprehension and oral language performance ($d = -1.67$), it is unlikely that regression to the mean fully accounts for these findings.

Theoretical Implications

The outcome of the current review supports the simple view of reading (Gough & Tunmer, 1986; Hoover & Gough, 1990). This view argues that reading comprehension is the interactive product of decoding and linguistic comprehension; children with SCD have substantial weaknesses in reading comprehension because their oral language weaknesses interact with their decoding rather than making an independent contribution. In the same way, the present findings are in support of comprehensive interaction models of reading comprehension that highlight the importance of the interplay between an individual's linguistic skills (e.g., Perfetti & Hart, 2002). Proficient readers are those who are able to simultaneously engage with multiple informational inputs provided within the text and utilize reader-based knowledge, such as background knowledge (e.g., Elbro & Buch-Iversen, 2013; Perfetti & Stafura, 2014).

If second-language learners with SCD have a latent decoding deficit, any theory of reading that acknowledges the importance of decoding would provide an explanation for the results of the present review. If genuine differences between oral and written language exist, the pattern of findings could be explained by theories that emphasize the combined influence of

textual features and background knowledge because information encountered in text is more likely to contain unfamiliar topics, more academic vocabulary, and more syntactically complex sentences (Akinnaso, 1982; Chafe, 1982). This may differentially affect the comprehension of textual language compared to oral language and may make the comprehension of text a more cognitively-demanding process.

Practical Implications

The knowledge that second-language learners with SCD have oral language weaknesses is advantageous for the identification of this subpopulation of readers. Oral language measures can be administered relatively early and are powerful tools for identifying children who may be at risk for developing reading comprehension problems in the future (e.g., Nation et al., 2010). Therefore, the current findings provide additional justification for including measures of oral language within test batteries designed to identify children who are at risk for reading failure.

The present results are informative for remediating reading comprehension difficulties as well. Because oral language deficits are associated with SCD, second-language learners who are identified as being at risk for SCD should be provided within high-quality targeted instruction and interventions that incorporate oral language. Intervention studies targeting children with SCD show that teaching oral language within a well-structured instructional program is beneficial (Snowling & Hulme, 2012). Therefore, effective instruction and intervention practices should be comprehensive and include activities that build reading fluency and oral language proficiency (NICHD, 2000; Snow et al., 1998).

It is important to acknowledge, however, that different types of oral language measures may be differentially predictive. For example, Li and Kirby (2014) found that Gates-MacGinitie vocabulary was most predictive of SCD whereas a base identification morphological awareness task did not sufficiently differentiate children with SCD from typical readers. Across studies, oral language was commonly measured using a spoken format that assessed oral language ability at the word level, which may have been an easier task compared to assessments at the sentence or passage level and may further explain the discrepancy between reading comprehension and oral language (Geva, 1999). Additionally, the language of administration may be an important indicator of how predictive a particular oral language measure will be. For instance, in Rosston's (2008) investigation, the English measures were more predictive compared to the Spanish measures. These findings encourage careful consideration for which measures to use when identifying second-language learners who may be at risk for SCD.

The present review also calls attention to how children with SCD are identified, as researchers have identified children with SCD in multiple ways. Ronberg and Petersen (2015) explicitly investigated the potential impact of variable identification criteria for children with SCD and found that identification discrepancies lead to identification rates between 0.8% and 22%. Although discrepancy in identification criteria is not specific to children with SCD (e.g., Fuchs, Fuchs, & Compton, 2004), it remains an important issue because such discrepancies can lead to over- or under-identification.

It is also important to consider the language of assessment. Across nearly all studies, second-language learners with SCD were identified using English measures (i.e., the minority language). Only two studies included measures in children's native language in addition to the second language; none identified children using both measures. In both instances, children's performance was less severe for their native language than English; however, this may be partially due to the fact that identification criteria did not extend to these measures. It is certainly possible that if Li & Kirby (2014) and Rosston (2008) had extended their operationalization of SCD across both languages, they may have identified a smaller proportion of individuals who exhibited more severe oral language deficits than was observed in the present review. Moreover, the impact of oral language skills on reading comprehension can vary as a function of first- versus second-language assessment (see Lesaux, et al., 2010).

Limitations and Future Directions

There are several limitations of the present meta-analysis that need to be addressed. First, the aims of the current review focused only on second-language learners and included a large proportion of Spanish-speaking children. Thus, the findings may not extend to other populations of readers. Second, the majority of studies included in the current meta-analysis were not longitudinal, meaning that we are unable to draw any definitive causal conclusions about the relations between reading comprehension and oral language. Third, there is a general dearth of studies that include second-language learners with SCD, which limited the number of studies that could be included in the present review. We maintain that it is important for additional research to be conducted in order to further examine the reading comprehension and oral language skills in second-language learners with SCD.

In sum, second-language learners with SCD have substantial oral language weaknesses; however, their oral language impairment is not as severe as their reading comprehension deficit. Thus, the majority of these children do not have intact oral language skills, but their weakness in oral language does not provide a sufficient explanation for their observed reading comprehension problem. It is important to test potential alternative explanations for these findings and to more extensively investigate second-language learners with SCD. In this way, we will better advance our understanding of the nature of language and literacy deficits for a potentially significant number of second-language learners.

Acknowledgments

This research was supported by Grant Number P50 HD52120 and 1F31HD087054-01 from the National Institute of Child Health and Human Development, Grant Number R305F100005, Grant Number R305F100027, and Grant Number R305B090021 from the Institute for Education Sciences.

References

References marked with an asterisk indicate studies included in the meta-analysis.

Akinnaso FN. On the differences between spoken and written language. *Language and Speech*. 1982; 25:97–125. doi:10.1177/002383098202500201.

- August, DL., Shanahan, T. Developing literacy in second-language learners: Report of the National Literacy Panel on Language-Minority Children and Youth. Lawrence Erlbaum Associates; Mahwah, NJ: 2006.
- Authors. 2016a.
- Authors. 2016b.
- Cain K, Oakhill JV, Barnes MA, Bryant PE. Comprehension skill, inference making ability, and the relation to knowledge. *Memory & Cognition*. 2001; 29:850–859. doi: 10.3758/BF03196414. [PubMed: 11716058]
- Catts HW, Fey ME, Zhang X, Tomblin JB. Language basis of reading and reading disabilities: Evidence from a longitudinal investigation. *Scientific Studies of Reading*. 1999; 3:331–361. doi: 10.1207/s1532799xssr0304_2.
- Chafe, W. Integration and involvement in speaking, writing, and oral language. In: Tannen, D., editor. *Spoken and Written Language: Exploring Orality and Literacy*. Ablex; Norwood: 1982. p. 35-53.
- Cohen, J. *Statistical Power Analysis for the Behavioural Sciences*. Academic Press; New York: 1977.
- Elbro C, Buch-Iversen I. Activation of background knowledge for inference making: Effects on reading comprehension. *Scientific Studies of Reading*. 2013; 17:435–452. doi: 10.1080/10888438.2013.774005.
- *Etmanskie JM, Partanen M, Siegel LS. A longitudinal examination of the persistence of late emerging reading disabilities. *Journal of Learning Disabilities*. 2014;1–15. doi:10.1177/0022219414522706.
- Farnia F, Geva E. Cognitive correlates of vocabulary growth in English language learners. *Applied Psycholinguistics*. 2011; 32:711–738. doi:10.1017/S0142716411000038.
- Fisher, Z., Tipton, E. Robumeta: Robust variance metaregression. R package (Version 1.6). 2015.
- *Florida Department of Education. Unpublished raw data. 2016. [Florida PMRN Data].
- Fuchs D, Fuchs LS, Compton DL. Identifying reading disabilities by responsiveness-to-instruction: Specifying measures and criteria. *Learning Disability Quarterly*. 2004; 27(4):216–227. doi: 10.2307/1593674.
- Geva E. Issues in the assessment of reading disabilities in L2 children—beliefs and research evidence. *Dyslexia*. 2000; 6(1):13–28. [PubMed: 10840504]
- Geva E, Farnia F. Developmental changes in the nature of language proficiency and reading fluency paint a more complex view of reading comprehension in ELL and EL1. *Reading and Writing: An Interdisciplinary Journal*. 2012; 25:1819–1845. doi:10.1007/s11145-011-9333-8.
- *Geva E, Massey-Garrison A. A comparison of the language skills of ELLs and monolinguals who are poor decoders, poor comprehenders, or normal readers. *Journal of Learning Disabilities*. 2013; 46:387–401. doi:10.1177/0022219412466651. [PubMed: 23213049]
- Gough PB, Tunmer WE. Decoding, reading, and reading disability. *Remedial and Special Education*. 1986; 7:6–10. doi:10.1177/074193258600700104.
- Hedges LV. Estimation of effect size from a series of independent experiments. *Psychological Bulletin*. 1982; 92:490. doi: 10.1037/0033-2909.92.2.490.
- Hoover WA, Gough PB. The simple view of reading. *Reading and writing*. 1990; 2:127–160. doi: 10.1007/BF00401799.
- Kieffer MJ. Catching up or falling behind? Initial English proficiency, concentrated poverty, and the reading growth of language minority learners in the United States. *Journal of Educational Psychology*. 2008; 100(4):851. doi:10.1037/0022-0663.100.4.851.
- *Kieffer MJ. Morphological awareness and reading difficulties in adolescent Spanish-speaking language minority learners and their classmates. *Journal of Learning Disabilities*. 2014; 47:44–53. doi:10.1177/0022219413509968. [PubMed: 24219915]
- *Kieffer MJ, Vukovic RK. Components and context: Exploring sources of reading difficulties for language minority learners and native English speakers in urban schools. *Journal of Learning Disabilities*. 2012; 45:433–452. doi:10.1177/0022219411432683. [PubMed: 22293684]
- Lesaux NK, Kieffer MJ. Exploring sources of reading comprehension difficulties among language minority learners and their classmates in early adolescence. *American Educational Research Journal*. 2010; 47(3):596–632. doi:10.3102/0002831209355469.

- Lesaux NK, Crosson AC, Kieffer MJ, Pierce M. Uneven profiles: Language minority learners' word reading, vocabulary, and reading comprehension skills. *Journal of Applied Developmental Psychology*. 2010; 31:475–483. doi:10.1016/j.appdev.2010.09.004. [PubMed: 21243117]
- *Lesaux NK, Lipka O, Siegel LS. Investigating cognitive and linguistic abilities that influence the reading comprehension skills of children from diverse linguistic backgrounds. *Reading and Writing*. 2006; 19:99–131. doi:10.1007/s11145-005-4713-6.
- *Li M, Kirby JR. Unexpected poor comprehenders among adolescent ESL students. *Scientific Studies of Reading*. 2014; 18:75–93. doi:10.1080/10888438.2013.775130.
- *Mahapatra S, Das JP, Stack-Cutler H, Parrila R. Remediating reading comprehension difficulties: A cognitive processing approach. *Reading Psychology*. 2010; 31:428–453. doi: 10.1080/02702710903054915.
- Microsoft. Microsoft Excel [computer software]. Microsoft; Redmond, Washington: 2010.
- Nation K, Cocksey J, Taylor JSH, Bishop DVM. A longitudinal investigation of early reading and language skills in children with poor reading comprehension. *Journal of Child Psychology and Psychiatry*. 2010; 51:1031–1039. doi:10.1111/j.1469-7610.2010.02254.x. [PubMed: 20456536]
- Nation K, Snowling MJ. Factors influencing syntactic awareness skills in normal readers and poor comprehenders. *Applied Psycholinguistics*. 2000; 21:229–241.
- National Assessment of Educational Progress. The nation's report card: Reading 2013. National Assessment of Educational Progress at grades 4 and 8. U.S. Department of Education; Washington, DC: 2013.
- National Early Literacy Panel. Developing early literacy: Report of the National Early Literacy Panel. Executive Summary. National Institute for Literacy; Washington, DC: 2008.
- National Institute of Child Health and Human Development. Report of the National Reading Panel. Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction. U.S. Government Printing Office; Washington, D.C.: 2000. (NIH Publication No. 00-4769)
- Perfetti, CA. Reading ability. Oxford University Press; New York, NY: 1985.
- Perfetti, CA., Hart, L. The lexical quality hypothesis. In: Verhoeven, L., editor. Precursors of functional literacy. Benjamins; Philadelphia: 2002. p. 189-213.
- Perfetti, CA., Landi, N., Oakhill, J. The acquisition of reading comprehension skill. In: Snowling, MJ., Hulme, C., editors. The science of reading: A handbook. Blackwell Publishing; Malden, MA: 2005. p. 227-247.
- Perfetti C, Stafura J. Word knowledge in a theory of reading comprehension. *Scientific Studies of Reading*. 2014; 18:22–37. doi:10.1080/10888438.2013.827687.
- *Ronberg LF, Petersen DK. How specific are specific comprehension difficulties? An investigation of poor reading comprehension in nine-year-olds. *Scandinavian Journal of Educational Research*. 2015:1–18. doi:10.1080/00313831.2014.996594.
- *Rosston, KJ. Doctoral dissertation. 2008. Language and cognitive characteristics of Spanish-speaking bilingual word callers (poor comprehenders). Retrieved from Dissertation Abstracts International Section A: Humanities and Social Sciences (No. AAI3345252)
- Shadish, WR., Haddock, CK. Combining estimates of effect sizes. In: Cooper, H., Hedges, LV., Valentine, JC., editors. The handbook of research synthesis and meta-analysis 2nd edition. Russell Sage; New York: 2013. p. 257-277.
- Snow, C. Reading for understanding: Toward an R&D program in reading comprehension. RAND; Santa Monica, CA: 2002.
- Snow, C., Burns, MS., Griffin, P. Preventing reading difficulties in young children. National Academy Press; Washington, DC: 1998.
- Snowling MJ, Hulme C. Interventions for children's language and literacy difficulties. *International Journal of Language & Communication Disorders*. 2012; 47:27–34. doi:10.1111/j.1460-6984.2011.00081.x. [PubMed: 22268899]
- Spencer M, Wagner RK, Quinn JM. Specific reading comprehension disability: Major problem, myth, or misnomer? *Learning Disabilities Research and Practice*. 2014; 29:3–9. doi: 10.1348/000709904773839833. [PubMed: 25143666]

- Swanson HL, Rosston K, Gerber M, Solari E. Influence of oral language and phonological awareness on children's bilingual reading. *Journal of School Psychology*. 2008; 46(4):413–429. doi:10.1016/j.jsp.2007.07.002. [PubMed: 19083366]
- Torgesen, JK., Hudson, R. Reading fluency: critical issues for struggling readers. In: Samuels, SJ., Farstrup, A., editors. *Reading fluency: The forgotten dimension of reading success*. International Reading Association; Newark, DE: 2006. p. 130-158.
- Verhoeven L. Components in early second language reading and spelling. *Scientific Studies of Reading*. 2000; 4(4):313–330. doi:10.1207/S1532799XSSR0404_4.
- Wolfe MB, Woodwyk JM. Processing and memory of information presented in narrative or expository texts. *British Journal of Educational Psychology*. 2010; 80(3):341–362. doi: 10.1348/000709910X485700. [PubMed: 20128958]

Author Manuscript

Author Manuscript

Author Manuscript

Author Manuscript

Highlights

What is already known about this topic:

- Children with specific reading comprehension deficits account for a significant proportion of the population.
- Children with specific reading comprehension deficits also tend to have corresponding oral language weaknesses.

What this paper adds:

- There is a general paucity of research examining second-language learners who also meet criteria for having specific reading comprehension deficits; the current paper addresses this by focusing exclusively on this population of children.
- In the present paper, we find substantial oral language differences between second-language learners with and without specific reading comprehension deficits.
- We additionally find significant differences in oral language performance between second-language learners and native-speaking children who are both characterized as having specific reading comprehension deficits.

Implications for theory, policy, or practice:

- The knowledge that children with specific reading comprehension deficits also tend to have oral language weaknesses is important for the identification and remediation of children with comprehension difficulties because it justifies the inclusion of oral language assessments in test batteries designed to identify this subgroup of readers; it also supports the notion that oral language should be taught within targeted instruction/intervention programs designed to improve the reading comprehension skills of this subgroup of readers.
- The knowledge that second-language learners with specific reading comprehension deficits perform substantially poorer on measures of oral language compared to native-speaking children with specific reading comprehension deficits highlights the importance of providing additional oral language supports for second-language learners.
- The findings of the current paper provide additional support for multiple theories of research comprehension, including the Simple View of Reading and comprehensive theories of reading comprehension that emphasize the importance of linguistic and meta-linguistic knowledge.

Figure 1.

Effect sizes and confidence intervals comparing the reading comprehension of children with specific reading comprehension deficits (SCD) to typical readers. Negative effect size estimates indicate that children with SCD attained lower scores. FDE PMRN = Florida Department of Education, Progress Monitoring and Reporting Network.

Figure 2.

Effect sizes and confidence intervals comparing the oral language performance of children with specific reading comprehension deficits (SCD) to typical readers. Negative effect size estimates indicate that children with SCD attained lower scores. FDE PMRN = Florida Department of Education, Progress Monitoring and Reporting Network.

Figure 3.

Effect sizes and confidence intervals comparing the reading comprehension of second-language learners with specific reading comprehension deficits (SCD) to native-speaking children with SCD. Negative effect size estimates indicate that second-language learners attained lower scores than monolingual speakers. FDE PMRN = Florida Department of Education, Progress Monitoring and Reporting Network.

Figure 4.

Effect sizes and confidence intervals comparing the oral language performance of second-language learners with specific reading comprehension deficits (SCD) to native-speaking children with SCD. Negative effect size estimates indicate that second-language learners attained lower scores than monolingual speakers. FDE PMRN = Florida Department of Education, Progress Monitoring and Reporting Network.

Table 1

Studies Included within the Present Meta-Analysis (Study n = 16)

Study Authors	Reading Comprehension Criteria	Decoding Criteria	Age	Study N	Language(s) Spoken
Eimanskie, Partanan, & Siegel (2014)	SCD: 25 th percentile TR: 35 th percentile	SCD/TR: 35 th percentile	<i>M</i> = 9.76 years	SCD = 32 TR = 694	European, Middle Eastern, South and East Asian, and <i>English</i>
FDE PMRN (2003–2008)	SCD: < 25 th percentile	SCD/TR: > 30 th percentile	Grades 1 and 2	SCD = 494 – 2,073; 1,379 – 4,199 ^c TR = 1,906 – 6,789	Not specified; <i>English</i>
Geva & Massey-Garrison (2013)	SCD: 30 th percentile ^a TR: > 40 th percentile ^a	SCD/TR: > 40 th percentile ^b	<i>M</i> = 10.8 years	SCD = 15; 7 ^c TR = 48	Portuguese, Punjabi, Tamil, Urdu, Chinese, Russian, and <i>English</i>
Kieffer (2014)	SCD: < 25 th percentile TR: > 25 th percentile	SCD/TR: > 25 th percentile	Grade 6	SCD = 22; 15 ^c TR = 42	Spanish and <i>English</i>
Kieffer & Vukovic (2013)	SCD: < 25 th percentile	SCD/TR: > 25 th percentile	<i>M</i> = 6.92 – 9.92 years	SCD = 13 – 20; 6 – 14 ^c TR = 23 – 34	Spanish, Arabic, French, Punjabi, and <i>English</i>
Lesaux, Lipka, & Siegel (2006)	TR: > 25 th percentile SCD: 25 th percentile	SCD/TR: 35 th percentile	<i>M</i> = 9.82 years	SCD = 18; 65 ^c TR = 63	Cantonese, Mandarin, Korean, or Farsi and <i>English</i>
Li & Kirby (2014)	TR: 35 th percentile SCD: < 70 th tile CI	SCD: Within 1 <i>SD</i> of the sample mean TR: Within 20% of the CI	<i>M</i> = 13.54 years	SCD = 33 TR = 28	Chinese and <i>English</i>
Mahapatra, Das, Stack-Cutler, & Parrila (2010)	TR: Within 20% CI SCD: Significantly weak TR: Within the average range	SCD/TR: Within the average range	<i>M</i> = 9.4 years	SCD = 14 TR = 14	Hindi and <i>English</i>
Ndlvou (2010)	SCD: > 30 th percentile ^a TR: > 40 th percentile ^a	SCD/TR: > 40 th percentile ^b	<i>M</i> = 9.5 – 11.58 years	SCD = 19; 7 ^c TR = 52	Portuguese, Punjabi, Tamil, Chinese, and <i>English</i>
Ronberg & Petersen (2015)	SCD: < 25 th percentile or 1 <i>SD</i> below the mean TR: > 25 th percentile and 85 th percentile	SCD: > 40 th percentile	9 – 10 years	SCD = 6 – 13 TR = 44	Turkish, Albanian, Arabic, Macedonian, Moroccan, Urdu, Faroese, English, and <i>Danish</i>
Rosston (2008)	SCD: < 25 th percentile TR: > 35 th percentile	SCD/TR: > 35 th percentile	<i>M</i> = 10.67	SCD = 29 – 30 TR = 35	Spanish and <i>English</i>

Note. Language of testing in italics. FDE PMRN = Florida Department of Education, Progress Monitoring and Reporting Network; SCD = Specific reading comprehension deficits; TR = Typical readers; *M* = Mean; SD = Standard deviation.

- ^aRelative to the language group;
- ^bRelative to the whole sample;
- ^cNative-speakers.

Table 2

Average Effect Size Estimates, 95% Confidence Intervals (CI), and Heterogeneity (I^2) across Studies (Study n = 16)

Comparisons	Variables	<i>k</i>	Effect Size		
			<i>d</i>	95% CI	<i>I</i> ²
SLL SCD and SLL TR					
	Reading comprehension	25	−2.47	[−2.69, −2.26]	94.62
	Oral language	46	−0.80	[−0.91, −0.69]	88.08
SLL SCD and NS SCD					
	Reading comprehension	17	−0.06	[−0.13, 0.02]	74.62
	Oral language	26	−0.84	[−0.89, −0.79]	48.58

Note. *k* = Number of effect sizes; NS = Native speakers; SLL = Second-language learners; SCD = Specific reading comprehension deficits; TR = Typical reader.

Table 3

Metaregressions for Comparisons of Second-Language Learners with SCD to Typical Readers (Study n = 16)

Variable	Moderator	β	<i>t</i> -value
Reading comprehension			
	Age	.79 ^{**}	3.39
	Language	-.09	-0.91
Oral language			
	Age	.25	1.10
	Language	-.07	-1.14
	Measure ^a	.11	1.05
	Measure ^b	-.05	-0.62

Note.

^aMean centered;^bGroup centered.^{**}
p < .01.