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Within- and Cross-Language Relations Between Oral Language Proficiency and School Outcomes in Bilingual Children With an Immigrant Background: A Meta-Analytical Study

Mariëlle J. L. Prevoo, Maike Malda, Judi Mesman, and Marinus H. van IJzendoorn
Leiden University

*Sixteen meta-analyses were conducted to examine relations of typically developing bilingual immigrant-background children's oral language proficiency in their first and second language with the school outcomes of early literacy (*k = *41), reading (*k = *61), spelling (*k = *9), mathematics (*k = *9), and academic achievement (*k = *9). Moderate to strong within-language relations were found for all school outcomes (.22 <* r *< .43), and cross-language relations for early literacy and reading (.12 <* r *< .22). Within-language relations were stronger than cross-language relations (.14 <* d *< .35). Only 6 out of 96 moderator effects tested were significant. Based on our findings, we propose a task-dependent bidirectional transfer hypothesis: The strength of cross-language transfer depends on the type of language proficiency task and the type of school outcome. Stimulating oral language proficiency in both languages can be a key factor in improving school outcomes of bilingual immigrant background children.*

Keywords: oral language proficiency, school outcomes, bilingual, immigrant, meta-analysis

Bilingualism—competence in two languages—is a widespread phenomenon (Edwards, 2004), with the percentage of students that belong to a language minority in the United States expected to increase to 40% in 2030 (Thomas & Collier, 2002). The number of bilingual children with an immigrant background is increasing worldwide. These children often show less favorable school outcomes compared to their monolingual peers (e.g., Aud et al., 2012; Fleischman, Hopstock, Pelczar, & Shelley, 2010), which may be due to disadvantages in proficiency in the language of education. Several studies with bilingual children

with an immigrant background have reported positive associations between language proficiency and the school outcomes of early literacy, reading, spelling, mathematics, and general academic achievement in both the first language (L1) and the second language (L2; e.g., Atwill, Blanchard, Christie, Gorin, & Garcia, 2010; Bang, Suárez-Orozco, Pakes, & O'Connor, 2009; Barrett, Barile, Malm, & Weaver, 2012; Hammer, Lawrence, & Miccio, 2007; Raynolds & Uhry, 2010), whereas others failed to find such positive associations (e.g., S. Y. Kim & Chao, 2009; Scarpino, Lawrence, Davison, & Hammer, 2011). The associations between language proficiency and school outcomes can differ depending on whether language proficiency and the school outcome are measured for the same language (within-language relations) or for different languages (cross-language relations). Insight in the strength and direction of these relations can add to the theoretical knowledge base on cross- and within-language relations and inform interventions targeted at improving the school outcomes of bilingual children with an immigrant background.

In the current study, a set of meta-analyses of 86 studies including 23,049 children is performed to test the hypotheses that in bilingual children with an immigrant background, oral language proficiency is positively related to school outcomes within and across both the ethnic and the host language, the effect that moderator variables have on the strength of these relations and the hypotheses that within- or cross-language relations in one language will be comparable in strength to the same relations in the other language, and within-language relations are stronger than cross-language relations.

All over the world, children with an immigrant background grow up bilingually, because their L1 is different from the language of their host country, their L2. Numbers of immigrants are increasing worldwide, mainly due to labor migration as a result of globalized economic activity (United Nations Population Fund, 2006). In the United States, most of the language minority children are Hispanic (Klein, Bugarin, Beltranena, & McArthur, 2004). In recent years, the number and percentage of Hispanic and Asian students in the United States have increased, with Hispanic students now making up 23% of the total school enrollment (Aud et al., 2012). The percentage of language minority students in the United States is expected to increase to 40% in 2030 (Thomas & Collier, 2002). The increasing flow of immigrants is also one of the main factors behind multilingualism in European countries (Tabouret-Keller, 2004). Overall, 12% of the inhabitants of the 27 countries of the European Union are first-generation and 5% second-generation migrants (Eurostat, 2011). These migrants are likely to be language minorities in their host countries. In Canada, 20% speak a language other than English or French, with most of the language minorities speaking an Asian language (Statistics Canada, 2006).

Bilingualism can have certain cognitive advantages. Several studies have shown that bilingual children generally perform better than monolingual children on executive control tasks, working memory, metalinguistic awareness, abstract and symbolic representation skills, and spatial perspective taking (Adesope, Lavin, Thompson, & Ungerleider, 2010; Barac & Bialystok, 2012; Bialystok, 2007; Greenberg, Bellana, & Bialystok, 2013; Poulin-Dubois, Blaye, Coutya, & Bialystok, 2011). The need to switch between two languages is thought to be

responsible for these cognitive advantages. Brain areas related to cognitive control are also engaged in L2-related brain activity (Abutalebi, 2008). The advantages can differ dependent on the degree of balanced bilingualism and the age of onset of bilingualism (Bialystok & Barac, 2012; Luk, De Sa, & Bialystok, 2011). The cognitive skills in which bilinguals generally excel might support them in their academic performance (Best, Miller, & Jones, 2009; Yeniad, Malda, Mesman, van IJzendoorn, & Pieper, 2013).

Despite the cognitive advantages of bilingualism, most bilingual children with an immigrant background generally score lower on standardized reading and math assessments (Aud et al., 2012; Entorf & Minoiu, 2005; Fleischman et al., 2010) and are more likely to have repeated a grade or to drop out of high school (Child Trends Data Bank, 2012, 2013). This disadvantage in school achievement can be partly explained by the less favorable socioeconomic status (SES) of many immigrant families. Children from families with a lower SES generally show less favorable school outcomes. Asian American students are an exception, in terms of achievement as well as of SES, because they generally score higher than their monolingual counterparts on standardized assessments and their families' SES is comparable to that of native families (Chen & Stevenson, 1995; Fleischman et al., 2010). For bilingual children with an immigrant background, the possible cognitive advantages of bilingualism apparently do not outweigh their less favorable position in education compared to their monolingual counterparts.

In addition to differences in academic achievement between bilinguals and monolinguals, there is substantial variation within bilingual groups. Children's oral language proficiency—their proficiency in speaking and understanding spoken language (in their L1 or L2)—is one of the variables related to these achievement differences. Previous research with bilingual children has shown that oral language proficiency is positively related to the early literacy skills of phonological awareness, letter knowledge, and initial awareness of literacy concepts (e.g., Atwill et al., 2010; Dickinson, McCabe, Clark-Chiarelli, & Wolf, 2004; Hammer & Miccio, 2006) and to reading (e.g., Marx & Stanat, 2012; Melby-Lervag & Lervag, 2011), spelling (e.g., Abu-Rabia & Siegel, 2002; Raynolds & Uhry, 2010), mathematics (e.g., Barrett et al., 2012; Kleemans, Segers, & Verhoeven, 2011), and general academic achievement (e.g., Garnett, 2012; Hoff, 2013). However, some studies found no relation of oral language proficiency with these school outcomes (e.g., Abu-Rabia, 1999; Buriel & Cardoza, 1988; Durgunoğlu, Nagy, & Hancin-Bhatt, 1993; S. Y. Kim & Chao, 2009). Furthermore, there are also studies that found negative effects of L1 proficiency on school outcomes (e.g., Liu, Benner, Lau, & Kim, 2009; Scarpino et al., 2011; Swanson, Rosston, Gerber, & Solari, 2008).

There are several theories explaining cross-language relations, relations between a predictor measured in one language and an outcome measured in the other language. Some of these theories suggest positive and others negative cross-language relations. Insight in which of these theories is applicable in the relation between oral language proficiency and school outcomes can provide useful information on which language to stimulate in order to improve school outcomes. According to the *interdependence hypothesis* (Cummins, 1979), L1 competence positively relates to L2 competence, because competence in L2 is partly based on

competence in L1. In other words, cross-language transfer takes place. More recently, an *interdependence continuum* (Proctor, August, Snow, & Barr, 2010) has been suggested, in which the strength of the interdependence is hypothesized to be dependent on the resemblance in languages and the type of L1 and L2 skills. This idea of interdependence between languages is confirmed by neuroimaging studies, in which the same neural structures (particularly the left inferior frontal gyrus and superior temporal gyrus) were found to be responsible for both L1 and L2 processing (Abutalebi, 2008; Buchweitz & Prat, 2013).

However, according to the *threshold hypothesis* (Cummins, 1979), L1 proficiency has to be of a sufficient level for this positive transfer to take place. Neuroimaging studies have also shown that the similarity in brain activation between L1 and L2 was higher for more proficient bilinguals (Buchweitz & Prat, 2013). In addition, the *script-dependent hypothesis* (Geva & Siegel, 2000; Ryan & Meara, 1991) assumes that the type of errors made in L2 are influenced by L1 and dependent on the degree of similarity between the scripts of the two languages. Furthermore, the relation between oral proficiency in one language and school outcomes in the other language could also take the form of *subtractive bilingualism*, which refers to learning L2 skills at the expense of L1 skills (Butler & Hakuta, 2004).

Language education policies have frequently changed, in North America as well as in Europe, and it is still the subject of debate whether the ethnic language should be incorporated in education or whether the focus should be on education in and of the host language (Mackey, 2004; Tabouret-Keller, 2004). Insight in the strength and directions of the relation between proficiency in L1 and L2 and school outcomes in both languages can inform future decisions on language policies. A meta-analytic approach is particularly powerful to examine the relations between language proficiency and school outcomes in both L1 and L2 for bilingual children with an immigrant background, and the potential moderators of these relations, because it combines the results of several previous studies and analyzes the causes of divergent outcomes in terms of differences in design of the studies. In addition, meta-analyses in which within- and cross-language relations between oral proficiency and school outcomes are compared can add to the theoretical knowledge base on interdependency between two languages in bilinguals and the generalizability of these findings to different samples of bilingual children with an immigrant background.

Moderators

Divergent findings between studies regarding the relation between language proficiency and school outcomes may result from differences in sample and procedural characteristics, which therefore need to be tested as moderators in the meta-analyses. Relevant sample characteristics that could serve as potential moderators are sample size, SES, immigrant generation, age or grade level, L1 education, whether or not it is a Spanish sample in the United States, and gender; relevant procedural characteristics are the language proficiency measure, the type of language proficiency, language modality, type of school outcome (early literacy, reading, spelling, mathematics, or general academic achievement), the outcome measure, the type of

early literacy, reading or spelling that is measured, publication year, and the use of covariates.

Sample size is one of the sample characteristics that can potentially moderate the relation between oral language proficiency and school outcomes. Publication bias is more likely for studies with small sample sizes and effect sizes for published studies with small samples may therefore be inflated (Slavin & Smith, 2008). Overall, we expect stronger relations between language proficiency and school outcomes in studies with smaller sample sizes.

SES is an important variable to consider, because immigrant background families are more likely than native families to have a low SES or live in poverty (Aud et al., 2012), though the magnitude and direction of this SES difference are dependent on their immigration history (Entorf & Minoiu, 2005). There is evidence that part of the difference in school outcomes between bilingual children with an immigrant background and monolingual nonmigrant children—the achievement gap—can be accounted for by SES (Barrett et al., 2012; Glick & Hohmann-Marriott, 2007; Hammer & Miccio, 2006). However, the influence of SES on school performance has been shown to differ strongly between countries (Entorf & Minoiu, 2005), and the achievement gap does not always disappear when SES is controlled for (Marx & Stanat, 2012). Because children from low-SES families are less likely to experience stimulating home environments that enable them to transfer their initial language skills into better school outcomes (Buckingham, Beaman, & Wheldall, 2014), the strength of the relation between language proficiency and school outcomes may differ between SES groups.

Regarding the immigrant generation to which children belong, one might expect that the gaps in academic achievement are smaller for children from later immigrant generations. However, there is an *immigrant paradox*, referring to the phenomenon that the achievement gaps with monolingual peers widen for later generations. Paradoxical associations between length of residence or immigrant generation and adjustment outcomes have been found in several domains, and SES-related stressors and segregation into low-SES schools and neighborhoods might play a role in that paradox because these SES effects are more pronounced in later generations (Fuligni, 1998; Suárez-Orozco, Rhodes, & Milburn, 2009). First- and second-generation youth are more likely to complete secondary school than their peers from third or later immigrant generations (Glick & White, 2004). Second-generation students are less motivated to work hard for school success than their first-generation peers (Kaufman, 2004). However, ethnic language use and proficiency are generally lower in later immigrant generations, whereas host language use and proficiency are higher (Hakuta & D'Andrea, 1992). This paradoxical pattern of a decrease in achievement on various school outcomes combined with an increase in host language use and proficiency over generations may lead to differences between immigrant generations in the relation between language proficiency and school outcomes.

The potential moderating effect of the age or grade level can be explained by the framework of the *simple view of reading* (Hoover & Gough, 1990), which suggests that the importance of language proficiency for reading increases in later grades, when the focus of reading instruction moves from word recognition to comprehension. The same might be true for other school outcomes, for which the

importance of language proficiency might increase with increasing linguistic complexity of the educational instructions and tasks and the effects might thus be moderated by age or grade level.

The effects of language proficiency on school outcomes might be related to whether or not the child receives some form of L1 education. L2 proficiency has been shown to be positively influenced by monolingual as well as two-way immersion programs, whereas L1 proficiency fares better in a two-way immersion or transitional bilingual program (Barnett, Yarosz, Thomas, Jung, & Blanco, 2007; Slavin, Madden, Calderón, Chamberlain, & Hennessy, 2011).

The host country and ethnic background might also play a moderating role. Most of the studies in which the relation between language proficiency and school outcomes was investigated have been conducted with Hispanic children in the United States, which is not surprising given the (increasing) size of this immigrant background group (Aud et al., 2012; Klein et al., 2004). Findings of these studies cannot be generalized to other bilingual samples in other countries without caution, because countries differ in their immigration policies and history (Entorf & Minoiu, 2005). In addition, Spanish and English are orthographically comparable. In accordance with the *script-dependent hypothesis* (Geva & Siegel, 2000; Ryan & Meara, 1991), studies with Spanish-English bilinguals might therefore show different outcomes than studies with other L1-L2 combinations that show less resemblance in their orthographies.

Gender differences have been found in oral language proficiency as well as in school outcomes. Girls outperform boys in language skills and academic achievement (Bouchard, Trudeau, Sutton, Boudreault, & Deneault, 2009; Demie, 2001). Also, mothers of girls generally use the ethnic language more in the communication with their child than mothers of boys (Hammer, Lawrence, Rodriguez, Davison, & Miccio, 2011). The relation between language proficiency and school outcomes can also differ for boys and girls. Bilingualism has been found to be advantageous compared to monolingualism for the academic achievement of boys but made no difference for girls (Lutz & Crist, 2009).

Procedural characteristics that are relevant to test as potential moderators in the meta-analyses of the relations between oral language proficiency and school outcomes are the language proficiency measure, the type of language proficiency, language modality, type of school outcome (early literacy, reading, spelling, mathematics, or general academic achievement), the outcome measure, the type of early literacy, reading or spelling that is measured, publication year, and the use of covariates. We expect that the relation between oral language proficiency and school outcomes is stronger for proficiency measures that show larger resemblance to the skill measured in the outcome, and for outcome measures that are more language-related, such as early literacy, reading, and spelling (as opposed to mathematics and general academic achievement). Studies that were published earlier might show different results than more recent studies, for example, because of changes in the immigrant population or in the education system. The use of covariates is included as a moderator to check for differences between studies for which we had raw correlations available and studies for which we did not.

Hypotheses

In sum, bilingual children with an immigrant background show less favorable school outcomes, despite the possible cognitive benefits of bilingualism. Oral proficiency in both L1 and L2 might have an effect on these children's school outcomes, but the strength and direction of the effects might be different for L1 and L2. In addition, whether these effects are also present across (rather than within) different languages needs further investigation. In this study, we synthesize the available findings on the relation between oral language proficiency and school outcomes of bilingual children with an immigrant background by means of meta-analyses. We aim to test the following hypotheses:

Hypothesis 1: L1 and L2 oral language proficiency are positively related to school outcomes measured in the same language (within-language relations).

Hypothesis 2: There are positive cross-language relations between L1 or L2 oral language proficiency and school outcomes.

Hypothesis 3: Relations are expected to be stronger when the sample is larger, when SES is higher, when respondents are from an earlier immigrant generation, and when respondents are older. Also, relations are expected to be stronger when L1 is also incorporated in education, when the proficiency measure shows higher resemblance to the skill measured in the outcome, and when the outcome measure is more language-related. The potential moderating effects of whether or not it is a Spanish-English sample in the United States, gender, publication year, and use of covariates will be tested in an exploratory way.

Hypothesis 4: The strengths of L1 and L2 within-language relations between oral language proficiency and school outcomes are similar.

Hypothesis 5: The strengths of L1-L2 and L2-L1 cross-language relations between oral language proficiency and school outcomes are similar.

Hypothesis 6: Within-language relations between oral language proficiency and school outcomes are stronger than cross-language relations.

Method

Literature Search

To identify relevant published studies, we searched the electronic databases Web of Science, ERIC, and PsycINFO by using the keywords immigrant, bilingual*, "second language learn*," "dual language learn*," multilingual*, "foreign language learn*" combined with "language proficiency," "language fluency," "verbal fluency," "language development," "language ability," "language skill*," lexic*, vocabulary, grammar, syntax, semantics, "language competenc*," "language acquisition," "language knowledge," "language attainment," "language learning," "language achievement," "language score," "verbal score," "language performance," "expressive language," "receptive language," "language outcome," "language grade," "oral expression," "language progress," and with child*, infan*, adolescen*, toddler, preschooler, baby, babies, and youth. To exclude articles concerning children bilingual in sign language and a spoken

language, we added NOT "sign OR gesture." This search was finalized in August 2013. In addition, we checked the reference lists of the collected articles and of relevant review articles (August et al., 2006; Bialystok, 2007; Costigan et al., 2010; Figueredo, 2006; Garnett, 2012; Hammer & Miccio, 2006; Hoff, 2013; Kristen et al., 2010 ; Marx & Stanat, 2012; Schmid, 2001) and a meta-analysis (Melby-Lervag & Lervag, 2011) for relevant published studies.

Studies were included if they reported on the relation between oral language proficiency and any type of school outcome in a sample of bilingual children with an immigrant background. The following inclusion criteria were used: (a) the study was reported in a journal article written in English; (b) the maximum mean age of respondents was 18 years; (c) respondents had an immigrant background (studies with, e.g., adoptees, returnees, or children living in a bilingual area were excluded); (d) respondents were bilingual, and outcome data were available specifically for the bilingual (sub)sample; (e) respondents were developing typically (studies with children with, for example, dyslexia, specific language impairment, or learning disabilities were excluded); and (f) the child's oral receptive and/or expressive language proficiency in the L1, L2, or both was analyzed as a predictor of one or more school outcomes, or both constructs were measured concurrently.

The risk of error and bias due to inclusion or exclusion of studies (Shelby & Vaske, 2008) was reduced by using several search engines and including all studies that reported a statistic reflecting the relation between language proficiency and school outcomes. To make sure that the inclusion criteria could be interpreted unambiguously, 50 articles were assessed for eligibility by two raters in each phase of the screening process (screening of abstracts and screening of full-texts). In case of disagreement, the coders discussed and reconsidered the criterion to get to a full consensus on the in/or exclusion of these 100 articles (50 abstract screening and 50 full-text screening).

We found 95 studies reported in 98 articles that met our search criteria. However, 9 of these studies (from 10 articles) could not be included in our meta-analysis, because they did not report usable effect size data (see Figure 1). The studies included in the meta-analysis had sample sizes ranging from 19 to 2,843. Eighty-six studies provided a total of 320 correlations for various within- or cross-language relations of several of the school outcomes early literacy skills, reading, spelling, math, and general academic achievement to be used in the meta-analyses. Fourteen studies provided only early literacy outcomes, 27 only reading outcomes, 2 only spelling, 3 only math, and 4 only academic achievement. All other studies provided results on several school outcomes. Overall, 41 studies reported on oral proficiency and early literacy (n = 4,589), 61 on oral proficiency and reading (n = 18,820), 9 on oral proficiency and spelling (n = 1,405), 9 on oral proficiency and math (n = 6,811), and 9 on oral proficiency and general academic achievement (n = 5,094). Table S1 (available in the online journal) provides an overview of all the studies included in the meta-analyses.

Moderators

The so-called apples and oranges problem and the issue of mixing studies that differ in methodological quality (Shelby & Vaske, 2008) were dealt with by

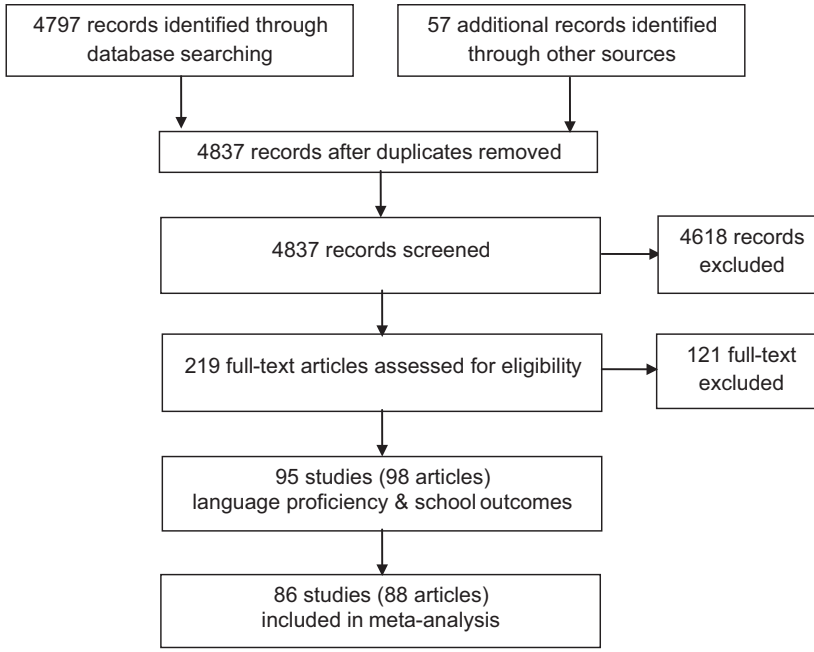

FIGURE 1. *Flow chart of literature search and selection.*

coding moderators such as sample size, use of covariates, and measurement of language proficiency, and testing their influence on the meta-analytic results. The coding scheme for characteristics of studies, samples, predictors, and outcomes is presented in Table 1. For each scale, a minimum of 20 studies (23%) were coded by two coders to assess intercoder reliability. Cohen's kappa was computed for categorical variables, and intraclass correlations for continuous variables. The average agreement was .96 (range .88–1.00) for both the categorical and the continuous variables.

Two types of moderators were coded: sample and procedural characteristics. Sample moderators included sample size, SES, whether or not the sample consisted of Spanish-English bilinguals in the United States, L1 education, immigrant generation, gender, and age or grade level at the first measurement. Initially, we also coded whether L1 had the same or a different script as L2 or whether a combination of various L1s was present in the sample. However, because the subcategories for this variable were too small, we decided to combine this variable with L2 and the country of origin into one variable indicating whether the study used a Spanish-English bilingual sample in the United States. Procedural moderators included publication year, use of covariates, measurement of language proficiency, type of language proficiency, language modality, type of outcome, measurement of outcome, type of early literacy (if relevant), type of reading (if relevant), type of spelling (if relevant), and cross-/within-language relations.

TABLE 1

Coding system for studies on language proficiency and school outcomes

Variable	Codes
Sample characteristics	
Sample size	*N* of total bilingual sample
SES	1 = Predominantly low SES
	2 = Other
	3 = Unclassifiable
Immigrant generation	1 = ≥75% first
	2 = ≥75% second or later
	3 = Unclassifiable
Age/grade level	1 = Preschool/kindergarten (0–6 years)
	2 = Grades 1–3 (6–9 years)
	3 = Grades 4–8 (9–14 years)
	4 = Grades 9–12 (14–18 years)
L1 education	1 = ≥75% separate L1 classes
	2 = ≥75% bilingual/transitional program
	3 = ≥75% L2 immersion
	4 = Unclassifiable
Spanish-English U.S. sample?	0 = No
	1 = Yes
Gender	1 = ≥75% female
	2 = ≥75% male
	3 = Unclassifiable
Procedural characteristics	
Measurement of language proficiency	1 = Tested
	2 = Self-reported
	3 = Teacher-reported
Type of language proficiency	1 = Vocabulary
	2 = Grammar/syntax/morphology
	3 = General proficiency[a]
Language modality	1 = Receptive
	2 = Expressive
	3 = Both
Type of outcome	1 = Early literacy skills
	2 = Reading
	3 = Spelling
	4 = Mathematics
	5 = Academic achievement
Measurement of outcome	1 = Tested
	2 = School grade
	3 = Both

(continued)

TABLE 1 (CONTINUED)

Variable	Codes
Type of early literacy (if relevant)	1 = Phonological skills
	2 = Letter knowledge
	3 = Early awareness of literacy concepts
	4 = General measure of early literacy[a]
Type of reading (if relevant)	1 = (Pseudo)word reading
	2 = Reading comprehension
	3 = General reading score[a]
Type of spelling (if relevant)	1 = Receptive
	2 = Expressive
	3 = Both
Cross-/within-language relation	1 = L1-L1
	2 = L2-L2
	3 = L1-L2
	4 = L2-L1
Publication year	Year in which the article was published
Use of covariates	0 = Zero-order correlations
	1 = Partial correlations/regression

Note. SES = socioeconomic status; L1 = first language; L2 = second language.
[a]General measures are measures that used a combination of aspects of the overall construct or were based on a combined effect size of different specific measures of the overall construct.

These procedural characteristics were coded separately for each combination of predictor and outcome variables. Outliers of continuous moderator variables were Winsorized to be one higher than the next highest value or one lower than the next lowest value of the particular variable (Dixon, 1960).

Statistical Analyses

Using the program Comprehensive Meta-Analysis (CMA; Borenstein, Rothstein, & Cohen, 2005), a total of 16 meta-analyses were performed for all possible within- and cross-language relations for each of the five school outcomes. In addition, the differences between correlations across and within L1 and L2 were also meta-analyzed for each school outcome. An overview of all these analyses is provided in Figure 2. For each cross- or within-language relation of each school outcome, an effect size (correlation) was computed. For the additional analyses of the differences between correlations, the standardized differences (*d*) were computed for each school outcome as effect size to compare within- and cross-language relations in one language with the same relations in the other language and to compare within-language relations with cross-language relations.

For studies that reported a nonsignificant finding without providing the exact statistics, a conservative nonsignificant zero effect size was used (Mullen, 1989). For studies that reported several correlations for one cross- or

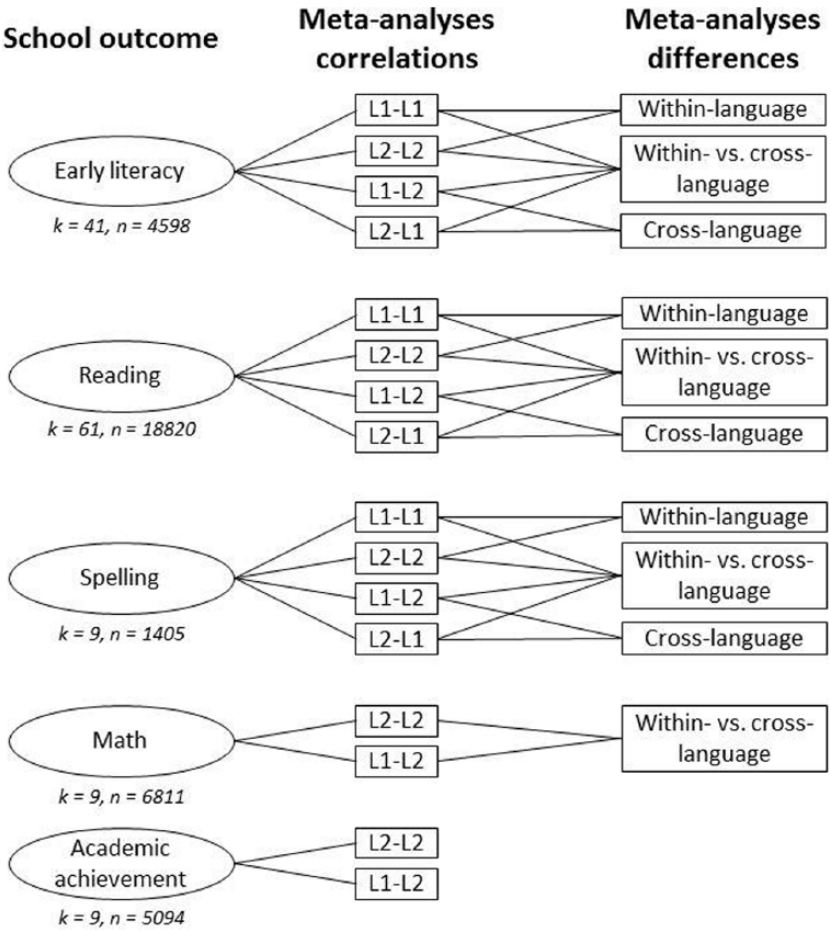

FIGURE 2. *Overview of meta-analyses.*
Note. LI = first language; L2 = second language.

within-language relation between language proficiency and a school outcome, combined effect sizes were computed using comprehensive meta-analysis. We never used multiple findings from the same study within a single analysis, to ensure that the effect sizes were independent of one another. To take the heterogeneity of study outcomes into account, random effect models were used as the mode of analysis for significance tests and moderator analyses (Borenstein, Hedges, & Rothstein, 2007; Shelby & Vaske, 2008). Random effect models allow for random differences between studies because of variations in procedures, measures, or settings, which go beyond sampling errors on the subject level (Lipsey & Wilson, 2001). *Q* statistics were computed to

test the homogeneity of effect sizes (Borenstein et al., 2005). Also, 95% confidence intervals (CIs) were computed for all effect sizes. To test the influence of possible adjustments of the sample for publication bias, the trim and fill method was used (Duval & Tweedie, 2000).

To assess differences between effect sizes for specific subsets grouped by moderators, Q statistics and their p values were computed. Contrasts were only tested when at least two of the subsets consisted of at least four studies (Bakermans-Kranenburg, van IJzendoorn, & Juffer, 2003). Therefore, type of measurement of language proficiency and of school outcomes could not be tested as moderators. Furthermore, for moderators that had a category "unclassifiable," this category was not included in moderator analyses. As a result, gender could not be tested as a moderator.

Results

Language Proficiency in Relation to Early Literacy and Reading

The results of the meta-analyses for within-language relations between language proficiency and early literacy are presented in Table 2, and the results for cross-language effects in Table 3. Overall, there were moderate within-language correlations for both L1 and L2 between language proficiency and early literacy ($.33 < r < .37$), which corroborates Hypothesis 1 for this outcome. The cross-language correlations were weaker ($.21 < r < .22$), though still significant. Hypothesis 2 is thus also confirmed for early literacy. Regarding the moderators listed in Hypothesis 3, type of proficiency was a significant moderator for L1 within-language and L1-L2 cross-language relations, with studies in which vocabulary was used as language proficiency measure showing a stronger correlation than studies in which a general language proficiency measure was used. No other moderator effects were significant.

The results of the meta-analyses for within-language relations between language proficiency and reading are presented in Table 4, and the results for cross-language effects in Table 5. Overall, there were strong within-language correlations for both L1 and L2 between language proficiency and reading ($r = .40$), which is a confirmation of Hypothesis 1 for this outcome. The cross-language correlation from L1 to L2 was weaker ($r = .12$), though still significant, whereas there was no significant effect of L2 proficiency on L1 reading ($r = .07$), so Hypothesis 2 only partly holds true. Regarding the moderators from Hypothesis 3, L1 education was a significant moderator of the L2 within-language relation between oral proficiency and reading, with a less strong correlation for children in L2 immersion compared to children following separate L1 classes or a bilingual or transitional education program. Also, the within-language correlations between oral proficiency and reading were higher with increasing age, as shown by the significant moderator effect of age or grade level for these relations. For the L1 within-language relation, type of reading was also a significant moderator, with a less strong effect in studies in which (pseudo)word reading was used as reading proficiency measure compared to studies that measured reading comprehension. None of the other moderator effects were significant.

(Text continues on p. 22.)

TABLE 2

Meta-analytic results of studies of within-language relations between oral proficiency and early literacy

	L1 relations					L2 relations				
(Sub)set of studies	*k*	*n*	*r*	95% CI	$Q^{a,b}$	*k*	*n*	*r*	95% CI	$Q^{a,b}$
Total set	25	2,704	.33**	[.26, .39]	71.96**	42	4,075	.37**	[.33, .41	76.90**
Sample characteristics										
SES[c]										1.81
Low						27	2,808	.38**	[.34, .43]	
Other						4	382	.30**	[.17, .43]	
Unclassifiable						11	885	.36**	[.27, .44]	
Spanish-English U.S.					0.83					0.12
No	9	482	.37**	[.26, .48]		21	1,604	.36**	[.30, .42]	
Yes	16	2,222	.31**	[.23, .38]		21	2,471	.38**	[.32, .43]	
L1 education[d]					1.68					2.52
Separate classes	6	345	.42**	[.28, .54]		7	449	.43**	[.32, .52]	
Bilingual/transitional	6	980	.32**	[.19, .43]		9	1,061	.36**	[.27, .45]	
L2 immersion	5	472	.29**	[.15, .42]		9	964	.32**	[.24, .40]	
Unclassifiable	8	907	.30**	[.18, .42]		17	1,601	.39**	[.32, .45]	
Immigrant generation[c]										0.92
First						8	606	.41**	[.31, .50]	
Second or later						10	1,135	.33**	[.25, .42]	
Unclassifiable						24	1,708	.37**	[.32, .43]	
Age/grade level[e]					0.01					0.46
Preschool/kindergarten	17	2,212	.31**	[.23, .38]		17	1,533	.39**	[.33, .45]	
Grades 1–3	5	336	.32**	[.17, .46]		20	2,153	.36**	[.31, .42]	
Grades 4–8						4	329	.39**	[.25, .51]	

(continued)

TABLE 2 (CONTINUED)

(Sub)set of studies	L1 relations					L2 relations				
	k	*n*	*r*	95% CI	$Q^{a,b}$	*k*	*n*	*r*	95% CI	$Q^{a,b}$
Procedural characteristics										
Use of covariates[c]										0.05
Zero-order correlations						38	3,600	.37**	[.33, .42]	
Partial correlation/ regression						4	475	.36**	[.24, .47]	
Type of proficiency[f]					13.40**					0.79
Vocabulary	12	1,238	.40**	[.33, .47]		19	1,871	.38**	[.33, .43]	
General proficiency	10	1,310	.19**	[.11, .28]		20	2,048	.35**	[.30, .40]	
Language modality					0.38					1.87
Receptive	11	1,082	.32**	[.21, .41]		14	1,181	.33**	[.26, .40]	
Expressive	4	655	.37**	[.21, .52]		7	1,083	.40**	[.32, .48]	
Both	10	967	.33**	[.21, .43]		21	1,811	.38**	[.32, .43]	
Type of early literacy[g]					0.00					0.00
Phonological skills	20	1,744	.32**	[.25, .39]		29	2,565	.37**	[.32, .42]	
General early literacy	4	932	.32**	[.17, .45]		10	1,112	.37**	[.29, .45]	

Note. CI = confidence interval; SES = socioeconomic status; LI = first language; L2 = second language.
[a]*Q* statistic for total set stands for homogeneity (*df* [degrees of freedom] = *k* − 1), *Q* statistic for moderator for effect of contrasts (*df* = number of subgroups − 1). [b]For moderators that have a category "unclassifiable," the *Q* statistic reported in this table does not include the unclassifiable category. [c]SES and immigrant generation, and use of covariates could not be tested as a moderator for L1 relations, because group sizes were too small. [d]Studies with a mix of several L1 education methods excluded in analysis of L1 relations. [e]Studies from Grades 4–8 excluded in analysis of L1 relations and from Grades 9–12 excluded in both analyses. [f]Studies that used grammar/syntax/morphology as language proficiency indicator excluded. [g]Studies with letter knowledge as early literacy measure excluded.
*$p < .05$.
**$p < .01$.

TABLE 3

Meta-analytic results of studies of cross-language relations between oral proficiency and early literacy

	L1-L2 relations					L2-L1 relations				
(Sub)set of studies	*k*	*n*	*r*	95% CI	$Q^{a,b}$	*k*	*n*	*r*	95% CI	$Q^{a,b}$
Total set	28	2,726	.21**	[.14, .29]	100.55**	18	1,617	.22**	[.15, .29]	32.72*
Sample characteristics										
SES[c]					0.05					
Low	19	2,022	.22**	[.13, .31]						
Other	4	259	.25*	[.03, .44]						
Unclassifiable	5	445	.17	[−.02, .34]						
Spanish-English U.S.					1.17					0.03
No	10	669	.27**	[.14, .39]		7	397	.21**	[.09, .34]	
Yes	18	2,057	.18**	[.09, .28]		11	1,220	.23**	[.14, .31]	
L1 education[d]					2.06					0.89
Separate classes	7	482	.30**	[.14, .45]		5	285	.24**	[.09, .38]	
Bilingual/transitional	6	647	.18	[−.01, .35]						
L2 immersion	7	635	.13	[−.03, .29]		4	387	.17*	[.02, .31]	
Unclassifiable	8	962	.24**	[.09, .37]		7	882	.22**		
Immigrant generation[c]					0.18					
First	5	375	.25**	[.06, .43]						
Second or later	5	643	.19	[−.01, .37]						
Unclassifiable	18	1,708	.21**	[.11, .31]						
Age/grade level[e]					1.21					2.97
Preschool/ kindergarten	15	1,848	.23**	[.14, .31]		11	1,185	.24**	[.16, .32]	
Grades 1–3	10	722	.15*	[.04, .26]		4	276	.09	[−.06, .24]	

(continued)

TABLE 3 (CONTINUED)

(Sub)set of studies	L1-L2 relations					L2-L1 relations				
	k	*n*	*r*	95% CI	$Q^{a,b}$	*k*	*n*	*r*	95% CI	$Q^{a,b}$
Procedural characteristics										
Type of proficiency[f]					10.87**					1.47
Vocabulary	13	1,318	.29**	[.22, .37]		9	678	.25**	[.15, .34]	
General proficiency	12	1,252	.10*	[.02, .19]		6	783	.16**	[.04, .27]	
Language modality[g]					1.58					0.34
Receptive	9	668	.24**	[.11, .37]		7	520	.24**	[.12, .34]	
Expressive	4	710	.29**	[.11, .46]						
Both	15	1,348	.17*	[.06, .27]		10	967	.19**	[.10, .28]	
Type of early literacy[c,h]					0.06					
Phonological skills	19	1,456	.24**	[.15, .32]						
General early literacy	8	1,182	.22*	[.09, .34]						

Note. CI = confidence interval; SES = socioeconomic status; LI = first language; L2 = second language. Use of covariates could not be tested as a moderator, because group sizes were too small.

[a]*Q* statistic for total set stands for homogeneity (*df* [degrees of freedom] = *k* − 1), *Q* statistic for moderator for effect of contrasts (*df* = number of subgroups − 1). [b]For moderators that have a category "unclassifiable," the *Q* statistic reported in this table does not include the unclassifiable category. [c]SES, immigrant generation, and type of early literacy could not be tested as moderators for L2–L1 relations, because group sizes were too small. [d]Studies with bilingual/transitional programs excluded in analysis of L2–L1 relations. [e]Studies from Grades 4–8 and Grades 9-12 excluded. [f]Studies that used grammar/syntax/morphology as language proficiency indicator excluded. [g]Studies with expressive proficiency measure excluded in analysis of L2–L1 relations. [h]Studies with early concepts of print as early literacy measure excluded.

*$p < .05$.

**$p < .01$.

TABLE 4

Meta-analytic results of studies of within-language relations between oral proficiency and reading

	L1 relations					L2 relations				
(Sub)set of studies	*k*	*n*	*r*	95% CI	$Q^{a,b}$	*k*	*n*	*r*	95% CI	$Q^{a,b}$
Total set	34	5,372	.40**	[.34, .45]	142.68**	59	160,08	.40**	[.35, .46]	839.46**
Sample characteristics										
SES					0.82					2.78
Low	20	2,446	.37**	[.30, .44]		34	7,597	.38**	[.31, .44]	
Other	8	2,583	.31**	[.20, .42]		13	4,333	.47**	[.36, .56]	
Unclassifiable	6	343	.62**	[.50, .71]		12	4,078	.40**	[.28, .51]	
Spanish-English U.S.					0.09					0.06
No	11	1,872	.41**	[.31, .51]		28	9,994	.41**	[.33, .48]	
Yes	23	4,671	.39**	[.33, .46]		31	6,014	.40**	[.32, .47]	
L1 education					0.72					10.44**
Separate classes	9	589	.45**	[.33, .55]		10	600	.46**	[.33, .58]	
Bilingual/transitional	13	3,667	.39**	[.30, .48]		15	3,923	.47**	[.37, .56]	
L2 immersion	7	512	.41**	[.27, .52]		18	5,711	.30**	[.20, .40]	
Unclassifiable	5	604	.33**	[.17, .47]		16	5,774	.42**	[.31, .51]	
Immigrant generation					0.55					0.87
First	4	318	.45**	[.29, .58]		9	1,856	.46**	[.32, .59]	
Second or later	7	465	.36**	[.23, .48]		16	5,204	.38**	[.27, .48]	
Unclassifiable	23	4,589	.40**	[.33, .46]		34	8,948	.40**	[.33, .47]	
Age/grade level[c]					15.79**					8.07*
Preschool/kindergarten	10	1,559	.29**	[.19, .38]		7	3,581	29**	[.15, .42]	
Grades 1–3	14	3,227	.41**	[.33, .48]		36	5,738	.39**	[.33, .45]	
Grades 4-8	8	456	.57**	[.47, .66]		13	3,686	.50**	[.41, .58]	

(continued)

TABLE 4 (CONTINUED)

(Sub)set of studies	L1 relations					L2 relations				
	k	*n*	*r*	95% CI	$Q^{a,b}$	*k*	*n*	*r*	95% CI	$Q^{a,b}$
Procedural characteristics										
Use of covariates					0.54					1.23
Zero-order correlations	26	2,376	.41**	[.34, .47]		42	6,767	.42**	[.36, .48]	
Partial correlation/ regression	8	2,996	.36**	[.25, .47]		17	9,241	.36**	[.26, .45]	
Type of proficiency					1.56					0.56
Vocabulary	14	1,427	.42**	[.33, .50]		20	4,818	.38**	[.28, .48]	
Grammar/syntax/ morphology	4	193	.48**	[.30, .63]		4	193	.47**	[.23, .66]	
General proficiency	16	3,752	.37**	[.28, .44]		35	1,0997	.41**	[.33, .48]	
Language modality					3.78					0.42
Receptive	14	1,465	.33**	[.24, .42]		20	5,895	.38**	[.28, .48]	
Expressive	7	2,851	.44**	[.33, .54]		6	2,858	.44**	[.27, .58]	
Both	13	1,056	.44**	[.35, .53]		33	7,255	.41**	[.33, .48]	
Type of reading					6.28*					4.40
(pseudo)word reading	17	1,285	.32**	[.23, .40]		18	4,051	.31**	[.21, .42]	
Reading comprehension	11	3,385	.46**	[.37, .54]		19	5,669	.42**	[.33, .51]	
General reading score	6	702	.46**	[.33, .57]		22	6,288	.55**	[.37, .53]	

Note. CI = confidence interval; SES = socioeconomic status; LI = first language; L2 = second language.
[a]*Q* statistic for total set stands for homogeneity (*df* [degrees of freedom] = *k* − 1), *Q* statistic for moderator for effect of contrasts (*df* = number of subgroups − 1). [b]For moderators that have a category "unclassifiable," the *Q* statistic reported in this table does not include the unclassifiable category. [c]Studies in which language proficiency was measured in Grades 9–12 or for which this age/grade information was missing excluded.
*$p < .05$.
**$p < .01$.

TABLE 5

Meta-analytic results of studies of cross-language relations between oral proficiency and reading

	L1-L2 relations					L2-L1 relations				
(Sub)set of studies	*k*	*n*	*r*	95% CI	$Q^{a,b}$	*k*	*n*	*r*	95% CI	$Q^{a,b}$
Total set	33	5,221	.12**	[.05, .19]	184.84**	23	3,205	.07	[−.01, .15]	89.82**
Sample characteristics										
SES					1.28					2.30
Low	19	2,990	.11*	[.02, .20]		15	1,821	.05	[−.05, .14]	
Other	9	1,501	.20**	[.06, .33]		5	1,142	.20*	[.03, .36]	
Unclassifiable	5	730	.01	[−.18, .19]						
Spanish-English U.S.					0.57					1.07
No	11	1,714	.16*	[.03, .28]		9	571	.13	[−.01, .26]	
Yes	22	4,144	.10*	[.01, .19]		14	2,634	.04	[−.06, .14]	
L1 education					5.85					4.91
Separate classes	10	633	.22**	[.12, .32]		7	4,59	.14*	[.01, .28]	
Bilingual/transitional	8	1,904	.21**	[.11, .31]		6	1,760	.15*	[.02, .27]	
L2 immersion	10	950	.07	[−.03, .17]		5	382	−.03	[−.18, .13]	
Unclassifiable	5	1,734	−.08	[−.20, .03]		5	604	−.03	[−.17, .12]	
Immigrant generation					3.56					0.00
First	5	375	.27**	[.11, .42]		4	318	.12	[−.18, .39]	
Second or later	9	2,086	.05	[−.07, .16]		6	378	.12	[−.13, .36]	
Unclassifiable	19	2,760	.11**	[.03, .20]		13	2,509	.05	[−.05, .15]	
Age/grade level[c]					1.30					0.30
Preschool/kindergarten	5	1,117	.15*	[.00, .29]		5	557	.05	[−.11, .22]	
Grades 1–3	17	2,186	.13**	[.04, .22]		13	2,320	.09	[−.01, .19]	
Grades 4–8	7	928	.04	[−.10, .18]		4	268	.03	[−.17, .23]	

(continued)

TABLE 5 (CONTINUED)

(Sub)set of studies	L1-L2 relations					L2-L1 relations				
	k	*n*	*r*	95% CI	$Q^{a,b}$	*k*	*n*	*r*	95% CI	$Q^{a,b}$
Procedural characteristics										
Use of covariates[d]					0.00					
Zero-order correlations	26	3,003	.12**	[.03, .20]						
Partial correlation/regression	7	2,218	.12	[−.04, .27]						
Type of proficiency					4.30					1.53
Vocabulary	8	2,186	.18**	[.06, .31]		7	873	.04	[−.10, .19]	
Grammar/syntax/ morphology	4	193	.26*	[.05, .44]		4	193	.20	[−.02, .40]	
General proficiency	21	3,932	.07	[−.01, .15]		12	2,139	.06	[−.06, .17]	
Language modality[e]					1.68					1.28
Receptive	6	458	.06	[−.11, .23]		9	867	−.01	[−.15, .13]	
Expressive	4	1,568	.22*	[.04, .38]						
Both	23	3,195	.11*	[.02, .19]		11	899	.10	[−.03, .23]	
Type of reading[f]					3.72					0.84
(Pseudo)word reading	12	754	.16*	[.04, .28]		14	1,068	.09	[−.03, .20]	
Reading comprehension	7	1,735	.20**	[.06, .33]						
General reading score	14	2,732	.05	[−.06, .15]		7	953	.00	[−.14, .15]	

Note. CI = confidence interval; SES = socioeconomic status; LI = first language; L2 = second language.
[a]*Q* statistic for total set stands for homogeneity (*df* [degrees of freedom] = *k* −- 1), *Q* statistic for moderator for effect of contrasts (*df* = number of subgroups − 1). [b]For moderators that have a category "unclassifiable," the *Q* statistic reported in this table does not include the unclassifiable category. [c]Studies from Grades 9–12 or for which age/grade information was missing excluded. [d]Use of covariates could not be tested as a moderator for L2–L1 relations, because group sizes were too small. [e]Studies with expressive language proficiency measure excluded in analysis of L2-L1 relations. [f]Studies with reading comprehension as reading measure excluded in analysis of L2-L1 relations.
*$p < .05$.
**$p < .01$.

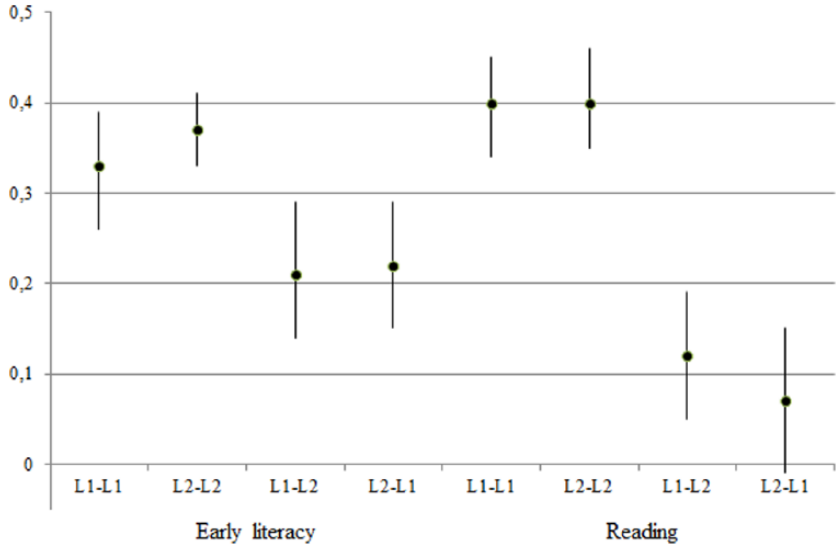

FIGURE 3. *Correlations and 95% confidence intervals of oral proficiency with early literacy and reading for each combination of languages.*

In Figure 3, the correlations of oral language proficiency with early literacy and reading and the 95% CIs of these correlations are presented. The outcomes of the trim and fill procedure (Duval & Tweedie, 2000) showed no indication for publication bias, which means that the *file drawer* problem (Shelby & Vaske, 2008) does not affect our results. Funnel plots are presented in Figure 4.

Language Proficiency in Relation to Other School Outcomes

Within-language relations for the three other school outcomes—spelling, math, and academic achievement—are presented in Table 6 and cross-language relations in Table 7. For all three outcomes, there were significant moderate to strong within-language effects ($.22 < r < .43$), confirming Hypothesis 1, but no significant cross-language effects ($-.08 < r < .21$). Hypothesis 2 does thus not hold true for these school outcomes. Except for the comparison between Spanish-English samples from the United States and other samples, which could be tested for L1-L2 relations of academic achievement, moderators could not be tested for spelling, math, and academic achievement, because group sizes were too small. The comparison between Spanish-English samples from the United States and other samples was not a significant moderator of the L1-L2 relation between language proficiency and academic achievement ($Q = 3.27$, $p = .07$).

Comparison of Cross- and Within-Language Relations in L1 and L2

The results presented above suggest that effects measured in L1 did not differ substantially from the same effect measured in L2, whereas within-language

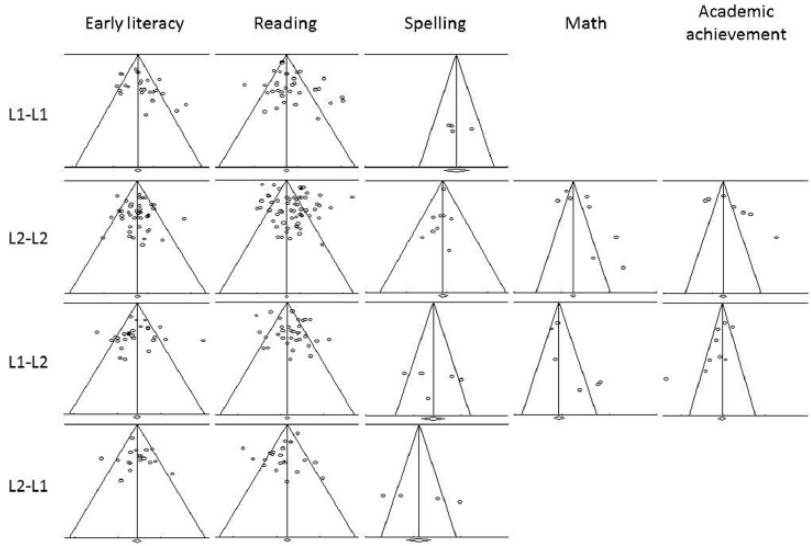

FIGURE 4. *Funnel plots for all meta-analyses of relations between language proficiency and school outcomes.*
Note. LI = first language; L2 = second language. In all funnel plots Fisher's *z* on the *x*-axis ranges from −0.5 to 1.0. The standard error on the *y*-axis ranges from 0.4 to 0.0 for early literacy and reading and from 0.2 to 0.0 for spelling, math, and academic achievement.

TABLE 6
Meta-analytic results of studies of within-language relations between oral proficiency and spelling, math, and academic achievement

	L1 relations					L2 relations				
School outcomes	*k*	*n*	*r*	95% CI	*Q*[a]	*k*	*n*	*r*	95% CI	*Q*[a]
Spelling	4	247	.43**	[.32, .53]	2.03**	9	1,405	.42**	[.38, .46]	16.67**
Math						8	6,351	.24**	[.13, .34]	104.33**
Academic achievement						7	4,018	.22**	[.08, .36]	115.97**

Note. CI = confidence interval.
[a]*Q* statistic stands for homogeneity (degrees of freedom = $k - 1$).
*$p < .05$.
**$p < .01$.

relations between oral language proficiency and school outcomes were stronger than cross-language relations. The results of meta-analyses of the standardized differences between correlations are presented in Table 8. Regarding within-language relations, only one significant difference between L1 and L2 was found,

TABLE 7

Meta-analytic results of studies of cross-language relations between oral proficiency and spelling, math, and academic achievement

	L1-L2 relations					L2-L1 relations				
School outcomes	*k*	*n*	*r*	95% CI	*Q*[a]	*k*	*n*	*r*	95% CI	*Q*[a]
Spelling	5	284	.21	[−.01, .41]	13.28*	4	247	.08	[−.27, .41]	22.93**
Math	6	1,443	.07	[−.07, .21]	22.59**					
Academic achievement	9	2,372	−.08	[−.18, .02]	39.05**					

Note. CI = confidence interval.
[a]*Q* statistic for stands for homogeneity (degrees of freedom = $k - 1$).
*$p < .05$.
**$p < .01$.

with a stronger within-language relation between language proficiency and early literacy in L2 than in L1 ($d = -.06$, $p < .05$), so Hypothesis 4 is confirmed for all school outcomes except early literacy. There were no significant differences between within-language relations in L1 versus L2 for reading or spelling. Also, no significant differences between cross-language relations in L1 versus L2 were found, which corroborates Hypothesis 5. For the comparison between within- and cross-language effects, all differences that we could test were significant, confirming Hypothesis 6. All effects pointed in the same direction, namely, that within-language relations were stronger than cross-language relations between oral language proficiency and school outcomes. The significant moderators for these effects were consistent with the differences in effects between subgroups reported in Tables 2 to 5.

Discussion

The results of the current meta-analyses show that within-language relations between the oral language proficiency and the school outcomes of bilingual children with an immigrant background were substantial and significant. In addition, these relations were significantly stronger than cross-language relations between oral proficiency and school outcomes. Within-language relations between oral proficiency and the school outcomes of early literacy, reading, spelling, mathematics, and academic achievement were moderate to strong. For cross-language relations, only weak positive relations were found for L1 oral proficiency with L2 early literacy and L2 reading, and for L2 oral proficiency with L1 early literacy.

Within-Language Relations

The positive within-language relations that we found were in line with our expectations. Oral language proficiency, particularly in the language of education, is important to communicate with the teacher and to understand explanations and instructions in class and is thus likely to support positive school outcomes (Hoff, 2013). The school outcomes in the areas of early literacy, reading, and spelling are

TABLE 8

Meta-analytic results of differences between correlations of language proficiency with school outcomes

	Within-language					Cross-language					Within vs. cross				
School outcomes	*k*	*n*	*d*	95% CI	Q^a	*k*	*n*	*d*	95% CI	Q^a	*k*	*n*	*d*	95% CI	Q^a
Early literacy	21	2,142	−.06*	[−.11, .00]	29.90	18	1,617	.01	[−.05, .07]	22.73	28	2,726	.14**	[.07, .21]	76.87**
Reading	24	3,361	−.00	[−.08, .07]	83.30**	19	2,736	.06	[−.01, .12]	38.01**	35	4,889	.20**	[.15, .26]	91.16**
Spelling	4	247	.01	[−.12, .14]	2.88	4	247	.11	[−.02, .23]	0.81	5	284	.24*	[.00, .48]	15.53**
Math											6	1,697	.35**	[.13, .56]	75.82

Note. CI = confidence interval.

[a]*Q* statistic for stands for homogeneity (degrees of freedom = $k - 1$).

*$p < .05$.

**$p < .01$.

strongly language-related. For these outcomes, language proficiency not only does play a role in the understanding of instructions but is also an integral part of the task itself. It is thus not surprising that the relations of oral language proficiency with these outcomes were stronger compared to relations with mathematics and general academic achievement.

The number of studies reporting on L1 within-language relations between oral language proficiency and school outcomes was smaller than the number of studies reporting on L2 within-language relations, which is not surprising given that education in L1 is not always provided. For those studies that reported within-language relations in both languages, the strength of within-language relations did not differ significantly for L1 and L2 in the case of reading and spelling outcomes, whereas for early literacy within-L2 relations were stronger than within-L1 relations.

Cross-Language Relations

The positive cross-language associations between L1 oral proficiency and L2 early literacy and reading found in our meta-analyses are in line with the *interdependence hypothesis* (Cummins, 1979), which states that competence in L2 is partly based on competence in L1. This would converge with findings from neuroimaging studies that the same brain regions are active in L1 and L2 processing (Abutalebi, 2008; Buchweitz & Prat, 2013). However, cross-language relations were less strong than within-language relations. The *threshold hypothesis* (Cummins, 1979) states that L1 proficiency has to be of a sufficient level for positive cross-language transfer to take place. However, from the cross-language relations that we found, it cannot be inferred whether this hypothesis holds true. It is possible that the positive cross-language relations we found would have been stronger when only respondents with a certain basic L1 proficiency level had been taken into account or weaker for samples with a more limited L1 proficiency.

To test this hypothesis, we would need studies that include (sub)samples with L1 proficiency above or below a certain threshold. However, only four of the studies in our meta-analyses used a basic L1 proficiency level, dominance in L1 over L2 or L2 over L1, or an equal proficiency in L1 and L2 as a selection criterion (Anthony et al., 2009; Arab-Moghaddam & Sénéchal, 2001; Gholamain & Geva, 1999; Gorman, 2012), and none reported relations between oral language proficiency and school outcomes for different levels of L1 proficiency. In addition to the L1-L2 relations, there was a positive correlation between L2 oral proficiency and L1 early literacy, which means that for this school outcome transfer from one language to the other is bidirectional. This might be explained by the fact that early literacy instruction is likely to take place in L2 and that development of this skill in L2 might trigger the acquisition of corresponding skills in L1 (Meisel, 2004).

As we did not find any significant negative cross-language relations, the *subtractive bilingualism* hypothesis, which assumes that L2 develops at the expense of L1, was not supported (Butler & Hakuta, 2004). Instead, we propose a *task-dependent bidirectional transfer hypothesis* stating that in addition to within-language effects of oral language proficiency on school outcomes, cross-language transfer from L1 to L2, and reversed, can take place and that the strength of this

transfer depends on the type of oral language proficiency task and the type of school outcome. This hypothesis should be tested further in future research. With regard to the improvement of school outcomes of bilingual children with an immigrant background, this hypothesis suggests that it is important to consider whether stimulation in L1 will be beneficial for a particular school outcome and for which type of stimulation chances of transfer are highest.

Moderator Effects

Only 6 of 96 tested moderator effects were found to be significant. The only significant procedural moderator was the language proficiency measure, showing that the within- and cross-language associations of L1 oral proficiency with early literacy in L1 and L2 were generally stronger for studies that used vocabulary as language proficiency measure compared to studies that used a general proficiency measure. A possible explanation for this moderator effect is that vocabulary and early literacy are more strongly related because they are both measured at the word level, whereas a general proficiency measure also includes measures at the sentence or paragraph levels. Neuroimaging studies have shown that word-level conceptual representations converge across languages, whereas at the sentence or paragraph level grammatical rules and representations need to be appropriately selected for the comprehension and production of a certain target language (Buchweitz & Prat, 2013). Thus, because general oral language proficiency measures also include grammatical aspects whereas early literacy tasks only require word-level skills, general proficiency measures may have less strong within- and cross-language relations with early literacy.

Four significant sample moderator effects were found, including child grade level, type of reading proficiency measure, and participation in L1 language classes or bilingual programs. Within-language relations between oral proficiency and reading were moderated by the grade level or age of the children. Also, the type of reading proficiency measure moderated the relation between L2 proficiency and L2 reading. The relation was stronger when reading comprehension was used as reading proficiency measure compared to (pseudo)word reading. The influence of both of these moderators is in line with the simple view of reading (Hoover & Gough, 1990), which suggests that the importance of language proficiency for reading increases in later grades, when the focus in reading instruction moves from word recognition to comprehension. In other words, oral language proficiency is more important for reading comprehension than for word reading, and this type of reading proficiency is more prominent in later grades.

The relation between L2 proficiency and L2 reading was stronger for samples in which the majority of the respondents took part in L1 language classes outside the regular school program or were enrolled in a bilingual or transitional program, compared to samples in which the majority of respondents were in an L2 immersion program. It may seem counterintuitive that the relation in L2 is less strong when children are educated in L2 only. However, the importance of programs emphasizing language development in both languages is supported by a review of effective reading programs for English language learners (Cheung & Slavin, 2005). Furthermore, reading programs intended for use with English-proficient students are typically adapted and emphasize vocabulary and oral language more

when used with English language learners (Cheung & Slavin, 2005). It may thus be that extra attention for language education in general makes children with bilingual educational input profit more. This idea is supported by the trend toward stronger cross-language relations between oral proficiency and reading for subgroups with some form of L1 education, which can be inferred from the correlations coefficients presented in Table 5, which are higher for the subcategories with some form of L1 education than for the L2 immersion category.

None of the other sample or procedural characteristics (sample size, SES, immigrant generation, whether or not it is a Spanish-English sample in the United States, gender, publication year, and use of covariates) showed significant moderator effects. For some of these variables this was contrary to our expectations. Based on the literature on achievement gaps (Barrett et al., 2012; Marx & Stanat, 2012) and the immigrant paradox (Fuligni, 1998; Suárez-Orozco, Rhodes, et al., 2009), we expected the relations to be stronger for samples with a higher SES and from an earlier immigrant generation. Our meta-analytic results, however, did not confirm these expectations and instead show that the relation between oral language proficiency and school outcomes is rather stable across various moderators as it is influenced by only 6 out of 96 sample and procedural characteristics.

Publication Bias

Despite the fact that unpublished articles were not included in our analyses and publication bias seems common in psychological sciences (Ferguson & Heene, 2012), we did not find indications for such bias, according to funnel plot inspection and the trim and fill procedure (Duval & Tweedie, 2000). Most studies included in our meta-analyses of relations between oral language proficiency and school outcomes reported correlations for more than one language or more than one school outcome. In such studies, it is more likely that null findings that otherwise may not have been published and thus would have led to publication bias are now reported in addition to positive relations found for the other language or school outcome. For those studies that compared a bilingual and a monolingual sample (e.g., Burgoyne, Whiteley, & Hutchinson, 2011; Silvén & Rubinov, 2010), such null findings in the bilingual sample are more likely to be reported to show contrasts between bilinguals and monolinguals. Moreover, none of the studies included in our meta-analyses of the differences between within- and cross-language effects reported this difference as a study result, which makes it unlikely to find any publication bias for those findings.

Limitations and Recommendations

Some limitations of the input for the meta-analyses and related recommendations for future research can be noted. First, the numbers of studies that included spelling, math, or academic achievement as an outcome were relatively low. Therefore, some of the within- and cross-language comparisons and most of the moderator effects could not be tested for these outcomes. The significant relations that we found in the meta-analyses of the few studies available point to a positive relation between oral language proficiency and these school outcomes. Future research should study these relations further in different immigrant background samples, so that future meta-analyses on this topic can include more studies and

thus draw more firm conclusions and also test moderator effects. Second, many studies did not report details on potentially important moderators, such as SES, the presence or absence of L1 education, and immigrant generation. Thus for these variables, there were fewer studies to include in the moderator analyses, which have hampered the identification of moderator effects. Future studies in this field could include specific information on these sample characteristics. Third, there were only very few studies that examined a combination of an L1 and L2 with the same script, other than Spanish and English. Therefore, L1 (coded as Spanish/other language with same script as L2/other language with different script as L2/combination of various L1s) could not be taken into account as a separate moderator variable. Future studies could focus on bilingual samples with same-script languages other than English and Spanish, so that future meta-analyses could test the effects of resemblance in scripts on the relation between oral language proficiency and school outcomes.

Despite the rigorous methodology of meta-analysis, there are also some potential weaknesses (Shelby & Vaske, 2008). How we dealt with the so-called apples and oranges problem, the issue of mixing studies that differ in methodological quality, heterogeneity of study outcomes, the risk of error and bias due to inclusion or exclusion of studies, and the independency of effect sizes is described in the Method section. As described earlier the *file drawer* problem does not affect our results, as there were no indications of publication bias. We chose to use the conventional, uncorrected alpha level of 5% for significance testing in order to explore potentially important moderators that should be replicated in future work. With a Bonferroni correction, no moderator effect would have survived the stricter alpha level. We thus managed to show that the effects found may be independent of moderators examined in the current meta-analysis, and at the same time suggest some moderators to be included in future studies.

Implications

The findings of our meta-analyses are relevant to education policies and practices aimed at bilingual children's academic development. We found that stimulation of both L1 and L2 can be supportive for immigrant background children's educational achievement, which could contribute to narrowing the achievement gap with native-born children, and that L1 skills do not develop at the expense of L2 skills. Among bilingual children with an immigrant background, children who are more proficient in oral language generally have better school outcomes. These children may also be those who profit most from the cognitive advantages of bilingualism (Adesope et al., 2010) and therefore fare better in school. This means that we should not only try to close the achievement gap between immigrant-background and native-born children but at the same time try to prevent a potential achievement gap within immigrant-background groups, caused by language proficiency differences.

The few moderator effects that were found suggest that the attention for oral language proficiency should be continued throughout children's school career, because the importance of oral proficiency is higher at higher grade levels with more focus on reading comprehension. Previous studies have shown positive effects of bilingual education programs on L2 proficiency (Barnett et al., 2007;

Slavin et al., 2011). Our analyses add to that knowledge by showing that additional education in L1 can also foster the relation between L2 proficiency and school outcomes. In areas with large communities of a certain language minority in North America as well as in Europe, there is indeed a call for incorporating L1 in education (Mackey, 2004; Tabouret-Keller, 2004). For the ongoing debate on language education policies our findings suggest that L1 might be included in education to obtain the best possible school outcomes in L2.

Conclusion

In conclusion, our findings show moderate to strong within-language relations between the oral language proficiency of bilingual children with an immigrant background and their school outcomes, and also some weaker but significant cross-language relations. No negative cross-language relations were found. Thus, the meta-analyses do not provide support for the hypothesis of *subtractive bilingualism*. Based on our findings, we propose a *task-dependent bidirectional transfer hypothesis*. In addition to within-language effects of oral language proficiency on school outcomes, cross-language transfer can take place and the strength of this transfer effect depends on the type of oral language proficiency task and the type of school outcome. Stimulating oral language proficiency in both languages can be a key factor in improving the school outcomes of bilingual children with an immigrant background.

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References

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

*Abu-Rabia, S. (1999). Attitudes and psycholinguistic aspects of first language maintenance among Russian-Jewish immigrants in Israel. *Educational Psychology*, *19*, 133–148. doi:10.1080/0144341990190202

*Abu-Rabia, S., & Siegel, L. S. (2002). Reading, syntactic, orthographic, and working memory skills of bilingual Arabic-English speaking Canadian children. *Journal of Psycholinguistic Research*, *31*, 661–678. doi:10.1023/a:1021221206119

Abutalebi, J. (2008). Neural aspects of second language representation and language control. *Acta Psychologica*, *128*, 466–478. doi:10.1016/j.actpsy.2008.03.014

Adesope, O. O., Lavin, T., Thompson, T., & Ungerleider, C. (2010). A systematic review and meta-analysis of the cognitive correlates of bilingualism. *Review of Educational Research*, *80*, 207–245. doi:10.3102/0034654310368803

*Anthony, J. L., Solari, E. J., Williams, J. M., Schoger, K. D., Zhang, Z., Branum-Martin, L., & Francis, D. J. (2009). Development of bilingual phonological awareness in Spanish-speaking English language learners: The roles of vocabulary, letter knowledge, and prior phonological awareness. *Scientific Studies of Reading*, *13*, 535–564. doi:10.1080/10888430903034770

*Arab-Moghaddam, N., & Sénéchal, M. (2001). Orthographic and phonological processing skills in reading and spelling in Persian/English bilinguals.

International Journal of Behavioral Development, *25*, 140–147. doi:10.1080/01650250042000320

*Atwill, K., Blanchard, J., Christie, J., Gorin, J. S., & Garcia, H. S. (2010). English-language learners: Implications of limited vocabulary for cross-language transfer of phonemic awareness with kindergartners. *Journal of Hispanic Higher Education*, *9*, 104–129. doi:10.1177/1538192708330431

*Atwill, K., Blanchard, J., Gorin, J. S., & Burstein, K. (2007). Receptive vocabulary and cross-language transfer of phonemic awareness in kindergarten children. *Journal of Educational Research*, *100*, 336–345. doi:10.3200/joer.100.6.336-346

Aud, S., Hussar, W., Johnson, F., Kena, G., Roth, E., Manning, E., . . .Notter, L. (2012). *The condition of education 2012*. Washington, DC: U.S. Department of Education, National Center for Education Statistics.

August, D., Snow, C., Carlo, M. S., Proctor, C. P., Rolla San Francisco, A., Duursma, E., & Szuber, A. (2006). Literacy development in elementary school second-language learners. *Topics in Language Disorders*, *26*, 351–364. doi:10.1097/00011363-200610000-00007

Bakermans-Kranenburg, M. J., van IJzendoorn, M. H., & Juffer, F. (2003). Less is more: Meta-analyses of sensitivity and attachment interventions in early childhood. *Psychological Bulletin*, *129*, 195–215. doi:10.1037/0033-2909.129.2.195

*Bang, H. J., Suárez-Orozco, C., Pakes, J., & O'Connor, E. (2009). The importance of homework in determining immigrant students' grades in schools in the USA context. *Educational Research*, *51*, 1–25. doi:10.1080/00131880802704624

Barac, R., & Bialystok, E. (2012). Bilingual effects on cognitive and linguistic development: Role of language, cultural background, and education. *Child Development*, *83*, 413–422. doi:10.1111/j.1467-8624.2011.01707.x

Barnett, W. S., Yarosz, D. J., Thomas, J., Jung, K., & Blanco, D. (2007). Two-way and monolingual English immersion in preschool education: An experimental comparison. *Early Childhood Research Quarterly*, *22*, 277–293. doi:10.1016/j.ecresq.2007.03.003

*Barrett, A. N., Barile, J. P., Malm, E. K., & Weaver, S. R. (2012). English proficiency and peer interethnic relations as predictors of math achievement among Latino and Asian immigrant students. *Journal of Adolescence*, *35*, 1619–1628. doi:10.1016/j.adolescence.2012.08.002

Best, J. R., Miller, P. H., & Jones, L. L. (2009). Executive functions after age 5: Changes and correlates. *Developmental Review*, *29*, 180–200. doi:10.1016/j.dr.2009.05.002

Bialystok, E. (2007). Cognitive effects of bilingualism: How linguistic experience leads to cognitive change. *International Journal of Bilingual Education and Bilingualism*, *10*, 210–223. doi:10.2167/beb441.0

Bialystok, E., & Barac, R. (2012). Emerging bilingualism: Dissociating advantages for metalinguistic awareness and executive control. *Cognition*, *122*, 67–73.

Borenstein, M., Hedges, L., & Rothstein, D. (2007). *Meta-analysis: Fixed effect vs. random effects*. Retrieved from http://www.meta-analysis.com/downloads/Meta-analysis%20fixed%20effect%20vs%20random%20effects.pdf

Borenstein, M., Rothstein, D., & Cohen, J. (2005). *Comprehensive meta-analysis: A computer program for research synthesis*. Englewood, NJ: Biostat.

Bouchard, C., Trudeau, N., Sutton, A., Boudreault, M.-C., & Deneault, J. (2009). Gender differences in language development in French Canadian children between 8 and 30 months of age. *Applied Psycholinguistics*, *30*, 685–707. doi:10.1017/S0142716409990075

Buchweitz, A., & Prat, C. (2013). The bilingual brain: Flexibility and control in the human cortex. *Physics of Life Reviews*, *10*, 428–443. doi:10.1016/j.plrev.2013.07.020

Buckingham, J., Beaman, R., & Wheldall, K. (2014). Why poor children are more likely to become poor readers: The early years. *Educational Review*, *66*, 428–446.

*Burchinal, M., Field, S., Lopez, M. L., Howes, C., & Pianta, R. (2012). Instruction in Spanish in pre-kindergarten classrooms and child outcomes for English language learners. *Early Childhood Research Quarterly*, *27*, 188–197. doi:10.1016/j.ecresq.2011.11.003

*Burgoyne, K., Kelly, J. M., Whiteley, H. E., & Spooner, A. (2009). The comprehension skills of children learning English as an additional language. *British Journal of Educational Psychology*, *79*, 735–747. doi:10.1348/000709910X504122

*Burgoyne, K., Whiteley, H. E., & Hutchinson, J. M. (2011). The development of comprehension and reading-related skills in children learning English as an additional language and their monolingual, English-speaking peers. *British Journal of Educational Psychology*, *81*, 344–354. doi:10.1348/000709910x504122

*Buriel, R., & Cardoza, D. (1988). Sociocultural correlates of achievement among three generations of Mexican American high school seniors. *American Educational Research Journal*, *25*, 177–192. doi:10.3102/00028312025002177

Butler, Y. G., & Hakuta, K. (2004). Bilingualism and second language acquisition. In T. K. Bhatia & W. C. Ritchie (Eds.), *The handbook of bilingualism* (pp. 114–144). Malden, MA: Blackwell.

*Carlisle, J. F., & Beeman, M. M. (2000). The effects of language of instruction on the reading and writing achievement of first-grade Hispanic children. *Scientific Studies of Reading*, *4*, 331–353. doi:10.1207/s1532799xssr0404_5

*Carlisle, J. F., Beeman, M. M., Davis, L. H., & Spharim, G. (1999). Relationship of metalinguistic capabilities and reading achievement for children who are becoming bilingual. *Applied Psycholinguistics*, *20*, 459–478. doi:10.1017/S0142716499004014

Chen, C., & Stevenson, H. W. (1995). Motivation and mathematics achievement: A comparative study of Asian-American, Caucasian-American, and East Asian high school students. *Child Development*, *66*, 1215–1234. doi:10.1111/j.1467-8624.1995.tb00932.x

Cheung, A., & Slavin, R. E. (2005). Effective reading programs for English language learners and other language-minority students. *Bilingual Research Journal*, *29*, 241–267. doi:10.1080/15235882.2005.10162835

*Chiappe, P., Glaeser, B., & Ferko, D. (2007). Speech perception, vocabulary, and the development of reading skills in English among Korean- and English-speaking children. *Journal of Educational Psychology*, *99*, 154–166. doi:10.1037/0022-0663.99.1.154

Child Trends Data Bank. (2012). *Indicators on children and youth: High school drop-out rates*. Bethesda, MD: Author. Retrieved from http://www.childtrends.org/?indicators=high-school-dropout-rates

Child Trends Data Bank. (2013). *Indicators on children and youth: Children who repeated a grade*. Bethesda, MD: Author. Retrieved from www.childtrends.org/wp-content/uploads/2012/10/99_Children_Who_Repeated_a_Grade.pdf

*Chow, H. P. H. (2004). The effects of ethnic capital and family background on school performance: A case study of Chinese-Canadian adolescents in Calgary. *Alberta Journal of Educational Research*, *50*, 321–326.

Costigan, C. L., Hua, J. M., & Su, T. F. (2010). Living up to expectations: The strengths and challenges experienced by Chinese Canadian students. *Canadian Journal of School Psychology*, *25*, 223–245. doi:10.1177/0829573510368941

Cummins, J. (1979). Linguistic interdependence and the educational development of bilingual children. *Review of Educational Research*, *49*, 222–251. doi:10.3102/00346543049002222

*Da Fontoura, H. A., & Siegel, L. S. (1995). Reading, syntactic, and working memory skills of bilingual Portuguese-English Canadian children. *Reading and Writing*, *7*, 139–153. doi:10.1007/BF01026951

*Dawe, L. (1983). Bilingualism and mathematical reasoning in English as a second language. *Educational Studies in Mathematics*, *14*, 325–353. doi:10.1007/BF00368233

Demie, F. (2001). Ethnic and gender differences in educational achievement and implications for school improvement strategies. *Educational Research*, *43*, 91–106. doi:10.1080/00131880110040968

*Dickinson, D. K., McCabe, A., Clark-Chiarelli, N., & Wolf, A. (2004). Cross-language transfer of phonological awareness in low-income Spanish and English bilingual preschool children. *Applied Psycholinguistics*, *25*, 323–347. doi:10.1017/s0142716404001158

Dixon, W. J. (1960). Simplified estimation from censored normal samples. *Annals of Mathematical Statistics*, *31*, 385–391. doi:10.1214/aoms/1177705900

*Droop, M., & Verhoeven, L. (2003). Language proficiency and reading ability in first- and second-language learners. *Reading Research Quarterly*, *38*, 78–103. doi:10.1598/rrq.38.1.4

*Duran, L., Roseth, C., Hoffman, P., & Robertshaw, M. B. (2013). Spanish-speaking preschoolers' early literacy development: A longitudinal experimental comparison of predominantly English and transitional bilingual education. *Bilingual Research Journal*, *36*, 6–34. doi:10.1080/15235882.2012.735213

*Durgunoğlu, A. Y., Nagy, W. E., & Hancin-Bhatt, B. J. (1993). Cross-language transfer of phonological awareness. *Journal of Educational Psychology*, *85*, 453–465. doi:10.1037/0022-0663.85.3.453

Duval, S., & Tweedie, R. (2000). Trim and fill: A simple funnel-plot-based method of testing and adjusting for publication bias in meta-analysis. *Biometrics*, *56*, 455–463. doi:10.1111/j.0006-341X.2000.00455.x

Edwards, J. (2004). Foundations of bilingualism. In T. K. Bhatia & W. C. Ritchie (Eds.), *The handbook of bilingualism* (pp. 7–31). Malden, MA: Blackwell.

*Ekstrand, L. H. (1976). Adjustment among immigrant pupils in Sweden. *International Review of Applied Psychology*, *25*, 167–188. doi:10.1111/j.1464-0597.1976.tb00869.x

Entorf, H., & Minoiu, N. (2005). What a difference immigration policy makes: A comparison of PISA scores in Europe and traditional countries of immigration. *German Economic Review*, *6*, 355–376. doi:10.1111/j.1468-0475.2005.00137.x

Eurostat. (2011). *Migrants in Europe: A statistical portrait of the first and second generation*. Luxembourg: Publications Office of the European Union.

*Farver, J. A. M., Xu, Y., Lonigan, C. J., & Eppe, S. (2013). The home literacy environment and Latino Head Start children's emergent literacy skills. *Developmental Psychology*, *49*, 775–791. doi:10.1037/a0028766

Ferguson, C. J., & Heene, M. (2012). A vast graveyard of undead theories: Publication bias and psychological science's aversion to the null. *Perspectives on Psychological Science*, *7*, 555–561. doi:10.1177/1745691612459059

Figueredo, L. (2006). Using the known to chart the unknown: A review of first-language influence on the development of English-as-a-second-language spelling skill. *Reading and Writing*, *19*, 873–905. doi:10.1007/s11145-006-9014-1

Fleischman, H. L., Hopstock, P. J., Pelczar, M. P., & Shelley, B. E. (2010). *Highlights from PISA 2009: Performance of U.S. 15-year-old students in reading, mathematics, and science literacy in an international context*. Washington, DC: National Center for Education Statistics.

Fuligni, A. J. (1998). The adjustment of children from immigrant families. *Current Directions in Psychological Science*, *7*, 99–103. doi:10.1111/1467-8721.ep10774731

*García-Vázquez, E., Vázquez, L. A., López, I. C., & Ward, W. (1997). Language proficiency and academic success: Relationships between proficiency in two langauges and achievement among Mexican American students. *Bilingual Research Journal*, *21*, 395–408. doi:10.1080/15235882.1997.10162712

Garnett, B. (2012). A critical review of the Canadian empirical literature: Documenting generation 1.5's K-16 trajectories. *TESL Canada Journal*, *29*, 1–24.

Geva, E., & Siegel, L. (2000). Orthographic and cognitive factors in the concurrent development of basic reading skills in two languages. *Reading and Writing*, *12*, 1–30. doi:10.1023/A:1008017710115

*Geva, E., & Yaghoub Zadeh, Z. (2006). Reading efficiency in native English-speaking and English-as-a-second-language children: The role of oral proficiency and underlying cognitive-linguistic processes. *Scientific Studies of Reading*, *10*, 31–57. doi:10.1207/s1532799xssr1001_3

*Geva, E., Yaghoub-Zadeh, Z., & Schuster, B. (2000). Understanding individual differences in word recognition skills of ESL children. *Annals of Dyslexia*, *50*, 121–154. doi:10.1007/s11881-000-0020-8

*Gholamain, M., & Geva, E. (1999). Orthographic and cognitive factors in the concurrent development of basic reading skills in English and Persian. *Language Learning*, *49*, 183–217.

Glick, J. E., & Hohmann-Marriott, B. (2007). Academic performance of young children in immigrant families: The significance of race, ethnicity, and national origins. *International Migration Review*, *41*, 371–402. doi:10.1111/j.1747-7379.2007.00072.x

Glick, J. E., & White, M. J. (2004). Post-secondary school participation of immigrant and native youth: The role of familial resources and educational expectations. *Social Science Research*, *33*, 272–299. doi:10.1016/j.ssresearch.2003.06.001

*Gonzalez, J. E., Reid, R., Synhorst, L., & Tostado, B. (2006). A comparison of the early language and literacy skills of migrant versus nonmigrant preschool children: A pilot study. *Multiple Voices for Ethnically Diverse Exceptional Learners*, *9*, 149–167.

*Gorman, B. K. (2012). Relationships between vocabulary size, working memory, and phonological awareness in Spanish-speaking English language learners. *American Journal of Speech-Language Pathology*, *21*, 109–123. doi:10.1044/1058-0360(2011/10-0063)

*Gottardo, A. (2002). The relationship between language and reading skills in bilingual Spanish-English speakers. *Topics in Language Disorders*, *22*(5), 46–70. doi:10.1097/00011363-200211000-00008

*Gottardo, A., Chiappe, P., Yan, B., Siegel, L., & Gu, Y. (2006). Relationships between first and second language phonological processing skills and reading in Chinese-English speakers living in English-speaking contexts. *Educational Psychology*, *26*, 367–393. doi:10.1080/01443410500341098

*Gottardo, A., & Mueller, J. (2009). Are first- and second-language factors related in predicting second-language reading comprehension? A study of Spanish-speaking children acquiring English as a second language from first to second grade. *Journal of Educational Psychology*, *101*, 330–344. doi:10.1037/a0014320

*Grant, A., Gottardo, A., & Geva, E. (2011). Reading in English as a first or second language: The case of grade 3 Spanish, Portuguese, and English speakers. *Learning Disabilities Research & Practice*, *26*, 67–83. doi:10.1111/j.1540-5826.2011.00327.x

Greenberg, A., Bellana, B., & Bialystok, E. (2013). Perspective-taking ability in bilingual children: Extending advantages in executive control to spatial reasoning. *Cognitive Development*, *28*, 41–50. doi:10.1016/j.cogdev.2012.10.002

*Guglielmi, R. S. (2008). Native language proficiency, English literacy, academic achievement, and occupational attainment in limited-English-proficient students: A latent growth modeling perspective. *Journal of Educational Psychology*, *100*, 322–342. doi:10.1037/0022-0663.100.2.322

Hakuta, K., & D'Andrea, D. (1992). Some properties of bilingual maintenance and loss in Mexican background high-school students. *Applied Linguistics*, *13*, 72–99. doi:10.1093/applin/13.1.72

*Hammer, C. S., Lawrence, F. R., & Miccio, A. W. (2007). Bilingual children's language abilities and early reading outcomes in Head Start and kindergarten. *Language, Speech, and Hearing Services in Schools*, *38*, 237–248. doi:10.1044/0161-1461(2007/025)

Hammer, C. S., Lawrence, F. R., Rodriguez, B., Davison, M. D., & Miccio, A. W. (2011). Changes in language usage of Puerto Rican mothers and their children: Do gender and timing of exposure to English matter? *Applied Psycholinguistics*, *32*, 275–297. doi:10.1017/S014271641000041X

Hammer, C. S., & Miccio, A. W. (2006). Early language and reading development of bilingual preschoolers from low-income families. *Topics in Language Disorders*, *26*, 322–337. doi:10.1097/00011363-200610000-00005

Hoff, E. (2013). Interpreting the early language trajectories of children from low-SES and language minority homes: Implications for closing achievement gaps. *Developmental Psychology*, *49*, 4–14. doi:10.1037/a0027238

*Hoover, W. A., & Gough, P. B. (1990). The simple view of reading. *Reading and Writing*, *2*, 127–160. doi:10.1007/BF00401799

*Jean, M., & Geva, E. (2009). The development of vocabulary in English as a second language children and its role in predicting word recognition ability. *Applied Psycholinguistics*, *30*, 153–185. doi:10.1017/S0142716408090073

Kaufman, J. (2004). The interplay between social and cultural determinants of school effort and success: An investigation of Chinese-immigrant and second-generation Chinese students' perceptions toward school. *Social Science Quarterly*,*85*, 1275–1298. doi:10.1111/j.0038-4941.2004.00276.x

*Kempert, S., Saalbach, H., & Hardy, I. (2011). Cognitive benefits and costs of bilingualism in elementary school students: The case of mathematical word problems. *Journal of Educational Psychology*, *103*, 547–561. doi:10.1037/a0023619

*Kieffer, M. J. (2012). Early oral language and later reading development in Spanish-speaking English language learners: Evidence from a nine-year longitudinal study. *Journal of Applied Developmental Psychology*, *33*, 146–157. doi:10.1016/j.appdev.2012.02.003

*Kieffer, M. J., & Lesaux, N. K. (2008). The role of derivational morphology in the reading comprehension of Spanish-speaking English language learners. *Reading and Writing*, *21*, 783–804. doi:10.1007/s11145-007-9092-8

*Kieffer, M. J., & Vukovic, R. K. (2013). Growth in reading-related skills of language minority learners and their classmates: More evidence for early identification and intervention. *Reading and Writing*, *26*, 1159–1194. doi:10.1007/s11145-012-9410-7

*Kim, S. Y., & Chao, R. K. (2009). Heritage language fluency, ethnic identity, and school effort of immigrant Chinese and Mexico adolescents. *Cultural Diversity & Ethnic Minority Psychology*, *15*, 27–37. doi:10.1037/a0013052

*Kim, Y.-S. (2012). The relations among L1 (Spanish) literacy skills, L2 (English) language, L2 text reading fluency, and L2 reading comprehension for Spanish-speaking ELL first grade students. *Learning and Individual Differences*, *22*, 690–700. doi:10.1016/j.lindif.2012.06.009

*Kleemans, T., Segers, E., & Verhoeven, L. (2011). Cognitive and linguistic precursors to numeracy in kindergarten: Evidence from first and second language learners. *Learning and Individual Differences*, *21*, 555–561. doi:10.1016/j.lindif.2011.07.008

Klein, S., Bugarin, R., Beltranena, R., & McArthur, E. (2004). *Language minorities and their educational and labor market indicators: Recent trends*. Washington, DC: U.S. Department of Education, National Center for Education Statistics.

Kristen, C., Edele, A., Kalter, F., Kogan, I., Schulz, B., Stanat, P., & Will, G. (2011). The education of migrants and their children across the life course. *Zeitschrift Fur Erziehungswissenschaft*, *14*, 121–137. doi: 10.1007/s11618-011-0194-3

*Lervåg, A., & Aukrust, V. G. (2010). Vocabulary knowledge is a critical determinant of the difference in reading comprehension growth between first and second language learners. *Journal of Child Psychology and Psychiatry*, *51*, 612–620. doi:10.1111/j.1469-7610.2009.02185.x

*Lesaux, N. K., Crosson, A. C., Kieffer, M. J., & Pierce, M. (2010). Uneven profiles: Language minority learners' word reading, vocabulary, and reading comprehension skills. *Journal of Applied Developmental Psychology*, *31*, 475–483. doi:10.1016/j.appdev.2010.09.004

*Lindsey, K. A., Manis, F. R., & Bailey, C. E. (2003). Prediction of first-grade reading in Spanish-speaking English-language learners. *Journal of Educational Psychology*, *95*, 482–494. doi:10.1037/0022-0663.95.3.482

Lipsey, M. W., & Wilson, D. B. (2001). *Practical meta-analysis*. Thousand Oaks, CA: Sage.

*Liu, L. L., Benner, A. D., Lau, A. S., & Kim, S. Y. (2009). Mother-adolescent language proficiency and adolescent academic and emotional adjustment among Chinese American families. *Journal of Youth and Adolescence*, *38*, 572–586. doi:10.1007/s10964-008-9358-8

*López, L. M., & Greenfield, D. B. (2004a). The cross-language transfer of phonological skills of Hispanic Head Start children. *Bilingual Research Journal*, *28*, 1–18. doi:10.1080/15235882.2004.10162609

*López, L. M., & Greenfield, D. B. (2004b). The identification of preliteracy skills in Hispanic Head Start children. *NHSA Dialog*, *7*, 61–83. doi:10.1207/s19309325nhsa0701_6

Luk, G., De Sa, E., & Bialystok, E. (2011). Is there a relation between onset age of bilingualism and enhancement of cognitive control? *Bilingualism: Language and Cognition*, *14*, 588–595. doi:10.1017/s1366728911000010

Lutz, A., & Crist, S. (2009). Why do bilingual boys get better grades in English-only America? The impacts of gender, language and family interaction on academic achievement of Latino/a children of immigrants. *Ethnic and Racial Studies*,*32*, 346–368. doi:10.1080/01419870801943647

Mackey, W. F. (2004). Bilingualism in North America. In T. K. Bhatia & W. C. Ritchie (Eds.), *The handbook of bilingualism* (pp. 607–641). Malden, MA: Blackwell.

*Mancilla-Martinez, J., & Lesaux, N. K. (2010). Predictors of reading comprehension for struggling readers: The case of Spanish speaking language minority learners. *Journal of Educational Psychology*, *102*, 701–711. doi:10.1037/a0019135

*Manis, F. R., Lindsey, K. A., & Bailey, C. E. (2004). Development of reading in grades K-2 in Spanish-speaking English-language learners. *Learning Disabilities Research & Practice*, *19*, 214–224. doi:10.1111/j.1540-5826.2004.00107.x

Marx, A. E., & Stanat, P. (2012). Reading comprehension of immigrant students in Germany: Research evidence on determinants and target points for intervention. *Reading and Writing*, *25*, 1929–1945. doi:10.1007/s11145-011-9307-x

Meisel, J. M. (2004). The bilingual child. In T. K. Bhatia & W. C. Ritchie (Eds.), *The handbook of bilingualism* (pp. 91–113). Malden, MA: Blackwell.

Melby-Lervag, M., & Lervag, A. (2011). Cross-linguistic transfer of oral language, decoding, phonological awareness and reading comprehension: A meta-analysis of the correlational evidence. *Journal of Research in Reading*,*34*, 114–135. doi:10.1111/j.1467-9817.2010.01477.x

*Miller, J. F., Heilmann, J., Nockerts, A., Iglesias, A., Fabiano, L., & Francis, D. J. (2006). Oral language and reading in bilingual children. *Learning Disabilities Research & Practice*, *21*, 30–43. doi:10.1111/j.1540-5826.2006.00205.x

Mullen, B. (1989). *Advanced basic meta-analysis*. Hillsdale, NJ: Erlbaum.

*Mumtaz, S., & Humphreys, G. W. (2002). The effect of Urdu vocabulary size on the acquisition of single word reading in English. *Educational Psychology*, *22*, 165–190. doi:10.1080/01443410120115247

*Nakamoto, J., Lindsey, K. A., & Manis, F. R. (2007). A longitudinal analysis of English language learners' word decoding and reading comprehension. *Reading and Writing*, *20*, 691–719. doi:10.1007/s11145-006-9045-7

*Nakamoto, J., Lindsey, K. A., & Manis, F. R. (2008). A cross-linguistic investigation of English language learners' reading comprehension in English and Spanish. *Scientific Studies of Reading*, *12*, 351–371. doi:10.1080/10888430802378526

*Nakamoto, J., Lindsey, K. A., & Manis, F. R. (2012). Development of reading skills from K-3 in Spanish-speaking English language learners following three programs of instruction. *Reading and Writing*, *25*, 537–567. doi:10.1007/s11145-010-9285-4

*Páez, M., & Rinaldi, C. (2006). Predicting English word reading skills for Spanish-speaking students in first grade. *Topics in Language Disorders*, *26*, 338–350. doi:10.1097/00011363-200610000-00006

*Pasquarella, A., Chen, X., Lam, K., Luo, Y. C., & Ramirez, G. (2011). Cross-language transfer of morphological awareness in Chinese-English bilinguals. *Journal of Research in Reading*, *34*, 23–42. doi:10.1111/j.1467-9817.2010.01484.x

*Portes, A., & Schauffler, R. (1994). Language and the second generation: Bilingualism yesterday and today. *International Migration Review*, *28*, 640–661. doi:10.2307/2547152

Poulin-Dubois, D., Blaye, A., Coutya, J., & Bialystok, E. (2011). The effects of bilingualism on toddlers' executive functioning. *Journal of Experimental Child Psychology*, *108*, 567–579. doi:10.1016/j.jecp.2010.10.009

*Proctor, C. P., August, D., Carlo, M. S., & Snow, C. (2006). The intriguing role of Spanish language vocabulary knowledge in predicting English reading comprehension. *Journal of Educational Psychology*, *98*, 159–169. doi:10.1037/0022-0663.98.1.159

*Proctor, C. P., August, D., Snow, C., & Barr, C. D. (2010). The interdependence continuum: A perspective on the nature of Spanish–English bilingual reading comprehension. *Bilingual Research Journal*, *33*, 5–20. doi:10.1080/15235881003733209

*Proctor, C. P., Carlo, M., August, D., & Snow, C. (2005). Native Spanish-speaking children reading in English: Toward a model of comprehension. *Journal of Educational Psychology*, *97*, 246–256. doi:10.1037/0022-0663.97.2.246

*Proctor, C. P., Silverman, R. D., Harring, J. R., & Montecillo, C. (2012). The role of vocabulary depth in predicting reading comprehension among English monolingual and Spanish-English bilingual children in elementary school. *Reading and Writing*, *25*, 1635–1664. doi:10.1007/s11145-011-9336-5

*Quiroga, T., Lemos-Britton, Z., Mostafapour, E., Abbott, R. D., & Berninger, V. W. (2002). Phonological awareness and beginning reading in Spanish-speaking ESL first graders: Research into practice. *Journal of School Psychology*, *40*, 85–111. doi:10.1016/s0022-4405(01)00095-4

*Raynolds, L. B., & Uhry, J. K. (2010). The invented spellings of non-Spanish phonemes by Spanish-English bilingual and English monolingual kindergarteners. *Reading and Writing*, *23*, 495–513. doi:10.1007/s11145-009-9169-7

*Reese, L., Garnier, H., Gallimore, R., & Goldenberg, C. (2000). Longitudinal analysis of the antecedents of emergent Spanish literacy and middle-school English reading achievement of Spanish-speaking students. *American Educational Research Journal*, *37*, 633–662. doi:10.3102/00028312037003633

*Rinaldi, C., & Páez, M. (2008). Preschool matters: Predicting reading difficulties for Spanish-speaking bilingual students in first grade. *Learning Disabilities*, *6*, 71–86.

*Roberts, T. A. (2005). Articulation accuracy and vocabulary size contributions to phonemic awareness and word reading in English language learners. *Journal of Educational Psychology*, *97*, 601–616. doi:10.1037/0022-0663.97.4.601

*Roberts, T. A., & Neal, H. (2004). Relationships among preschool English language learner's oral proficiency in English, instructional experience and literacy development. *Contemporary Educational Psychology*, *29*, 283–311. doi:10.1016/j.cedpsych.2003.08.001

*Rolla San Francisco, A., Carlo, M., August, D., & Snow, C. E. (2006). The role of language of instruction and vocabulary in the English phonological awareness of Spanish-English bilingual children. *Applied Psycholinguistics*, *27*, 229–246. doi:10.1017/s0142716406060267

*Rolla San Francisco, A., Mo, E., Carlo, M., August, D., & Snow, C. (2006). The influences of language of literacy instruction and vocabulary on the spelling of Spanish-English bilinguals. *Reading and Writing*, *19*, 627–642. doi:10.1007/s11145-006-9012-3

*Royer, J. M., & Carlo, M. S. (1991). Transfer of comprehension skills from native to second language. *Journal of Reading*, *34*, 450–455.

Ryan, A., & Meara, P. (1991). The case of the invisible vowels: Arabic speakers reading English words. *Reading in a Foreign Language*, *7*, 531–540.

Scarpino, S. E., Lawrence, F. R., Davison, M. D., & Hammer, C. S. (2011). Predicting bilingual Spanish-English children's phonological awareness abilities from their preschool English and Spanish oral language. *Journal of Research in Reading*,*34*, 77–93. doi:10.1111/j.1467-9817.2010.01488.x

Schmid, C. L. (2001). Educational achievement, language-minority students, and the new second generation. *Sociology of Education*, 71–87.

*Shany, M., Geva, E., & Melech-Feder, L. (2010). Emergent literacy in children of immigrants coming from a primarily oral literacy culture. *Written Language and Literacy*, *13*, 24–60. doi:10.1075/wll.13.1.02sha

Shelby, L. B., & Vaske, J. J. (2008). Understanding meta-analysis: A review of the methodological literature. *Leisure Sciences*, *30*, 96–110. doi:10.1080/01490400701881366

*Silvén, M., & Rubinov, E. (2010). Language and preliteracy skills in bilinguals and monolinguals at preschool age: effects of exposure to richly inflected speech from birth. *Reading and Writing*, *23*, 385–414. doi:10.1007/s11145-009-9206-6

Slavin, R. E., Madden, N., Calderón, M., Chamberlain, A., & Hennessy, M. (2011). Reading and language outcomes of a multiyear randomized evaluation of transitional bilingual education. *Educational Evaluation and Policy Analysis*, *33*, 47–58. doi:10.3102/0162373711398127

Slavin, R. E., & Smith, D. (2008). *Effects of sample size on effect size in systematic reviews in education*. Retrieved from http://www.bestevidence.org/methods/eff_sample_size_review_mar_2008.pdf

Statistics Canada. (2006). *The evolving linguistic portrait, 2006 census*. Retrieved from www12.statcan.ca/census-recensement/2006/as-sa/97-555/pdf/97-555-XIE2006001-eng.pdf

*Suárez-Orozco, C., Pimentel, A., & Martin, M. (2009). The significance of relationships: Academic engagement and achievement among newcomer immigrant youth. *Teachers College Record*, *111*, 712–749.

Suárez-Orozco, C., Rhodes, J., & Milburn, M. (2009). Unraveling the immigrant paradox: Academic engagement and disengagement among recently arrived immigrant youth. *Youth & Society*, *41*, 151–185. doi:10.1177/0044118x09333647

*Swanson, H. L., Rosston, K., Gerber, M., & Solari, E. (2008). Influence of oral language and phonological awareness on children's bilingual reading. *Journal of School Psychology*, *46*, 413–429. doi:10.1016/j.jsp.2007.07.002

*Swanson, H. L., Saez, L., & Gerber, M. (2004). Do phonological and executive processes in English learners at risk for reading disabilities in Grade 1 predict performance in Grade 2? *Learning Disabilities Research & Practice*, *19*, 225–238.

*Swanson, H. L., Sáez, L., & Gerber, M. (2006). Growth in literacy and cognition in bilingual children at risk or not at risk for reading disabilities. *Journal of Educational Psychology*, *98*, 247–264. doi:10.1037/0022-0663.98.2.247

*Swanson, H. L., Saez, L., Gerber, M., & Leafstedt, J. (2004). Literacy and cognitive functioning in bilingual and nonbilingual children at or not at risk for reading disabilities. *Journal of Educational Psychology*, *96*, 3-18. doi:10.1037/0022-0663.96.1.3

Tabouret-Keller, A. (2004). Bilingualism in Europe. In T. K. Bhatia & W. C. Ritchie (Eds.), *The handbook of bilingualism* (pp. 662–688). Malden, MA: Blackwell.

Thomas, W., & Collier, V. (2002). *A national study of school effectiveness for language minority students' long-term academic achievement*. Berkeley, CA: Center for Research on Education, Diversity & Excellence.

*Uchikoshi, Y., & Marinova-Todd, S. H. (2012). Language proficiency and early literacy skills of Cantonese-speaking English language learners in the US and Canada. *Reading and Writing*, *25*, 2107–2129. doi:10.1007/s11145-011-9347-2

United Nations Population Fund. (2006). *State of world population 2006*. New York, NY: Author.

*Verhoeven, L. (2000). Components in early second language reading and spelling. *Scientific Studies of Reading*, *4*, 313–330. doi:10.1207/s1532799xssr0404_4

*Verhoeven, L. (2007). Early bilingualism, language transfer, and phonological awareness. *Applied Psycholinguistics*, *28*, 425–439. doi:10.1017/S0142716407070233

*Wang, M., Cheng, C., & Chen, S.-W. (2006). Contribution of morphological awareness to Chinese-English biliteracy acquisition. *Journal of Educational Psychology*, *98*, 542–553. doi:10.1037/0022-0663.98.3.542

*Yaghoub Zadeh, Z., Farnia, F., & Geva, E. (2012). Toward modeling reading comprehension and reading fluency in English language learners. *Reading and Writing*, *25*, 163–187. doi:10.1007/s11145-010-9252-0

Yeniad, N., Malda, M., Mesman, J., van IJzendoorn, M. H., & Pieper, S. (2013). Shifting ability predicts math and reading performance in children: A meta-analytical study. *Learning and Individual Differences*, *23*, 1–9. doi:10.1016/j.lindif.2012.10.004

*Yesil-Dagli, U. (2011). Predicting ELL students' beginning first grade English oral reading fluency from initial kindergarten vocabulary, letter naming, and phonological awareness skills. *Early Childhood Research Quarterly*, *26*, 15–29. doi:10.1016/j.ecresq.2010.06.001

*Yeung, A. S., Marsh, H. W., & Suliman, R. (2000). Can two tongues live in harmony: Analysis of the National Education Longitudinal Study of 1988 (NELS88) longitudinal data on the maintenance of home language. *American Educational Research Journal*, *37*, 1001–1026. doi:10.2307/1163500

Authors

MARIËLLE J. L. PREVOO is a postdoctoral researcher at the Centre for Child and Family Studies, Leiden University, Wassenaarseweg 52, 2333 AK Leiden, Netherlands; e-mail: *prevoomjl@fsw.leidenuniv.nl*. She holds an MSc in health education and promotion from Maastricht University, Netherlands and a PhD in Child and Family Studies from Leiden University, Netherlands. Her previous background is in speech and language therapy. Her research focuses on (bilingual) language development and the role of language in parenting.

MAIKE MALDA is an assistant professor at the Department of Clinical Child and Adolescent Studies, Leiden University, Wassenaarseweg 52, 2333 AK Leiden, Netherlands; e-mail: *m.malda@fsw.leidenuniv.nl.* She holds a PhD in cross-cultural psychology from Tilburg University, Netherlands. Her research focuses on cognition and child development, with a special emphasis on cross-cultural themes.

JUDI MESMAN is a professor of parenting and education in the multicultural society at the Centre for Child and Family Studies, Leiden University, Wassenaarseweg 52, 2333 AK Leiden, Netherlands; e-mail: *mesmanj@fsw.leidenuniv.nl*. She is Scientific Director of the Institute of Education and Child Studies at Leiden University. She holds a PhD in social and behavioral sciences from Erasmus University Rotterdam, Netherlands. Her main research theme is the influence of early childhood parenting on child social-emotional and cognitive development, with a special emphasis on the role of culture and gender.

MARINUS H. VAN IJZENDOORN is a professor at the Centre for Child and Family Studies, Leiden University, Wassenaarseweg 52, 2333 AK Leiden, Netherlands; e-mail: *vanijzen@fsw.leidenuniv.nl*. He is Director of the Program for Emotion and Attachment Research Leiden. He holds a PhD from the Free University of Berlin/Max Planck Institute for Human Development and Education, Germany. His expertise is in the field of attachment and emotion regulation, meta-analysis, moral development, genetics of parenting, and differential susceptibility.