


# The Effectiveness of Reading Interventions for English Learners: A Research Synthesis

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## Abstract

This article reviews published experimental studies from 2000 to 2012 that evaluated the effects of providing reading interventions to English learners who were at risk for experiencing academic difficulties, including students with learning disabilities. Criteria included: (a) the study was published in a peer-referred journal, (b) the study was an intervention for English learners at risk or with a learning disability in Grades K–12, (c) data were disaggregated by English learner status if all participants were not English learners, and (d) information about fidelity of implementation was reported. Twelve studies met these criteria. Results of seven studies conducted in kindergarten and first grade indicated significant moderate-to-large effect sizes (ES range, 0.58–0.91) for interventions targeting beginning reading skills. Findings in five of the 12 studies suggested significant moderate-to-large effects in reading or listening comprehension (ES range, 0.47–2.34). The interventions in these studies included explicit instruction, and 10 used published intervention programs. Moderator variables, such as group size, minutes of intervention, and type of personnel delivering the intervention, were not significant predictors of outcomes.

English learners remain the fastest-growing group of students in American schools, with large increases occurring in most regions of the country (U.S. Department of Education, 2011). For a variety of reasons, including the fact that these students have to learn a second or even third language while also mastering grade-level content, they form a significant portion of students who struggle academically. Only 7% of fourth-grade and 3% of eighth-grade English learners score at or above proficiency on reading assessments as compared to 38% and 37% of native English speakers (National Center for Educational Statistics, 2014). These data highlight the importance of instructional interventions to support their academic progress as well as their English language proficiency abilities. However, little is known about the additional

support English learners receive in schools as part of a response-to-intervention model.

Until recently, few published studies have described the effectiveness of interventions and support programs for English learners (Gersten & Baker, 2000; Klingner, Artiles, & Barletta, 2006). Although this situation has begun to improve in the past decade, with an increasing number of rigorous research

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studies investigating the instructional effectiveness of interventions, results of these studies have not been synthesized in a cohesive manner for scientific purposes or to guide practitioners in their implementation of effective interventions for this population of students. In this article, we describe and synthesize this recent research. Our review includes summarizing findings from previous reviews, manifestations of poor education and intervention support for English learners, and the disproportionate overrepresentation and underrepresentation of English learners in special education (August & Hakuta, 1997; August & Shanahan, 2006; Klingner et al., 2006). We also discuss the implications for both future research and practice.

### **Past Syntheses on Interventions for English Learners**

In 2000, Gersten and Baker reviewed research on effective instructional practices for English learners. The authors found few experimental studies and consequently expanded their synthesis to include descriptive and qualitative studies and also incorporated the professional opinions of practitioners with specific expertise in working effectively with English learners (i.e., Noblit & Hare, 1988; Ogawa & Malen, 1991). Studies reviewed included case study research, qualitative research, descriptive studies, and a small number of experiments and quasi-experiments. This analysis was not limited to interventions for struggling English learners in reading but included any research on K–8 instruction. Results of the synthesis suggested several promising approaches for improving instruction for English learners: (a) using vocabulary as a curriculum anchor across multiple subject areas, (b) using graphic organizers and other physical artifacts to reinforce concept acquisition and growth in academic vocabulary, (c) using cooperative and peer-tutoring strategies to enhance engagement and nonthreatening articulation and discussion of newly acquired content, (d) strategically using the native language when neces-

sary, and (e) modulating cognitive and language demands depending on the lesson objectives.

In a more recent review, Klingner et al. (2006) located eight studies conducted since 1997 that met their criteria for credible approaches toward reading instruction for English learners. The evidence base of this review centered on qualitative studies rather than experimental research. Only two of the eight studies reviewed were experimental, and one of the two was conducted in India. The authors articulated what they viewed as promising practices based on the studies reviewed. These promising practices included (a) combining phonological awareness (PA) with other English language development activities, (b) teaching and encouraging the use of reading comprehension strategies in the first and second language, (c) helping students develop a strong foundation in reading in both their native language and in English, and (d) heavy emphasis on rich vocabulary instruction. In summary, findings from both syntheses converge in the importance of providing strong vocabulary instruction and native language support. However, in neither the Gersten et al. (2000) nor the Klingner et al. (2006) syntheses was the evidence base sufficient to draw clear conclusions about best practices. Both were intended to serve as means for delineating promising practices that could subsequently be evaluated with rigorous research.

At the same time, guidance to practitioners regarding how to effectively teach reading to English learners remains a pressing national priority. In response to this demand, the Institute of Education Sciences (IES) has published two practice guides (S. Baker et al., 2014; Gersten et al., 2007) intended to provide specific recommendations as to evidence-based practices for teaching English learners and also to delineate areas where there is no solid evidence base but where expert opinion suggests specific ideas for best practice. The importance of instruction that builds academic language and academic vocabulary was stressed in both documents. In addition, both guides concluded that there was solid empirical evidence for the use of explicit, small-group instruction to improve the reading proficiency of struggling English learners. Explicit instruction provides the

necessary scaffolds students need to understand the concepts taught. Small-group instruction provides English learners with extended opportunities to use English and multiple opportunities to interact closely with the teacher.

Moreover, skilled teachers can take advantage of small-group instructional opportunities to not only provide targeted and modulated instruction to meet the precise needs of individual children but also provide additional opportunities for English learners to speak, hear, and read English. These additional opportunities may help English learners develop their English language proficiency, an important component of comprehension (D. Baker, Park, & Baker, 2013; Farnia & Geva, 2011; Gottardo & Mueller, 2009).

In this article, we extend the findings of previous reviews and the two IES practice guides by calculating the measurable impacts of interventions from published experimental studies that have been conducted since 2000 with English learners identified as at risk or with learning disabilities. We included only experimental studies (i.e., randomized control trials [RCTs]) because we were interested in determining if there were practices with causal evidence of effectiveness that had been subjected to the peer-review process and could be more easily accessed by practitioners. To determine which studies to include, we followed procedures identified by the What Works Clearinghouse (2014) to determine the quality of the methodology. Specifically, we attempted to do the following:

1. Summarize the specific study features and intervention characteristics, including (a) group size, (b) duration, (c) personnel delivering the instruction, (d) intervention content, (e) intervention method, and (f) the counterfactual, that is, the nature of instruction delivered to the control group.
2. Calculate the impact of the interventions on core components of reading, including (a) PA, (b) word reading, (c) passage reading fluency, (d) vocabulary and oral language, and (e) reading

comprehension, including reading cloze measures and listening comprehension measures.

3. Explore the effects of specific moderator variables: group size, duration, and personnel delivering instruction on student outcomes.

## Method

We used the following criteria to identify RCT studies in peer-reviewed journals for review: (a) The study sample comprised English learners in kindergarten through 12th grade who were identified as at risk or with a learning disability (using either standardized tests or valid screening measures), (b) data were disaggregated by English learner status if not all participants were English learners, and (c) information about fidelity of implementation was reported. These criteria were used because they allowed for precise impact estimates to be calculated for English learners specifically and helped ensure how interventions were delivered and the extent to which delivery matched study expectations. After we identified studies that fit these criteria, we used the WWC procedures to calculate the effect sizes and summarize these effects in terms of meaningful categorizations.

During January through March 2013, the search focused on studies from 2000 to 2012 in PsycInfo and ERIC, using the following keywords individually in peer-reviewed journals: *English learners, language minority students, second language learners, intervention, response to intervention, at-risk, learning disabilities, reading difficulty, writing difficulty, and math difficulty*. We then specifically searched for studies in the following journals: *Journal of Educational Psychology, Journal of Learning Disabilities, Learning Disabilities Research & Practice, Learning Disabilities Quarterly, Reading Research Quarterly, Remedial and Special Education, Scientific Studies of Reading, The Journal of Special Education, Exceptional Children, Journal of Literacy Research, and Topics in Language Disorders*. Once we identified potential studies, we read the abstracts and selected for further analysis only

those studies that indicated they used an RCT design and included struggling K–12 English learners as participants (i.e., English learners who were receiving a Tier 2 or Tier 3 intervention). Next, we carefully reviewed the Method section of each article to ensure that the studies met our other criteria. We located three studies that met these criteria but used single-case design methods. We do not reference these studies in this review, but we published a separate technical report on these three studies (see Richards-Tutor, Baker, Gersten, Baker, & Smith, 2014).

Once we identified eligible studies, we used a coding form to summarize the information from each study by two broad categories: (a) features of the research study (i.e., research design, grade level, participant characteristics, setting) and (b) characteristics of the interventions (i.e., group size, duration, personnel delivering the intervention, intervention content, intervention methods). Table 1 presents the features of the research studies, and Table 2 presents the characteristics of the interventions. Two raters independently coded each of the studies, and agreement between the raters was 90% or above for each of the features. Disagreements were resolved through discussions between the two raters.

Our standards were similar to—but not identical to—those used by WWC (<http://ies.ed.gov/ncee/wwc/documentsum.aspx?sid=19>). The only difference was that we did not exclude studies that demonstrated differential attrition as defined by WWC (2014, pp. 11–14). We made this decision about attribution in part because the WWC approach is not currently a commonly used standard for special education research.

We calculated effect sizes for the English learner sample using Hedges'  $g$  as suggested by the WWC (2014, p. 22) to ensure that all the effect sizes in the studies could be interpreted in a similar way (some of the studies also calculated effect sizes using accepted procedures, such as Cohen's  $d$ , but we conducted independent calculations for all studies and effect sizes). Hedges'  $g$  is commonly used and it also corrects for potential error due to small sample size, and many of the studies included in this review had small sample sizes. In most cases, data from the published studies were sufficient to determine

effect sizes. In the few cases where the data for effect size calculations were not available in the publication, we contacted the authors to obtain the necessary information. For two of the studies previously reviewed by the WWC, we requested and received the original WWC analyses of effect sizes for the English learner subsample.

### Calculation of Effect Size

To calculate the effect size, we used an adjusted mean difference in the numerator and the pooled unadjusted standard deviation in the denominator. If adjusted means were not reported, we calculated effect sizes using a difference-in-differences approach to calculate the numerator (i.e., we computed a gain score for both experimental and control groups) and the pooled posttest standard deviation for the denominator. In addition, we corrected alpha levels to account for multiple comparisons (i.e., multiple measures assessing the same outcome) using the Benjamini-Hochberg procedure. We set alpha at .05 for each reading or prereading domain (e.g., PA, reading fluency, comprehension, vocabulary). To analyze potential moderating variables, we conducted three separate regression analyses (i.e., for group size, intervention duration, and personnel delivering the intervention) using the unweighted average effect size across all domains of reading included in each study.

## Results

The comprehensive literature search yielded 12 studies; all addressed reading or prereading skills (i.e., there were no studies in other domains, such as mathematics, science, or writing). We describe characteristics of the set of studies followed by findings organized by objective.

### Features of Research Studies

Table 1 provides specific details regarding features of the intervention studies. The sample sizes for English learners in the studies ranged from 35 to 158. Multiple grade levels were included, although half of the studies were

**Table 1.** Study Features.

Authors	Grade level	Sample size	EL primary language	EL determination	Reading risk determination
O'Connor, Bocian, Beebe-Frankenberger, & Linklater (2010)	K	35	Spanish	CELDT	DIBELS (LNF < 9 and ISF < 7) PPVT (SS < 85)
Solari & Gerber (2008)	K	82	Spanish	Parent survey	PA Vocabulary (criteria not reported)
Vadasy & Sanders (2010)	K	84	28 different languages, including Spanish = 49% Vietnamese = 15% Somali = 6% Chinese = 6% Tagalog = 3%	Parent survey	In bottom half of class on LN, LS (Fuchs et al., 2001), and CTOPP Sound Matching (composite-score z score)
Gunn, Biglan, Smolkowski, & Ary (2000)	K-3	122	Spanish	Not reported	DIBELS composite: both some risk and high risk categories
Vaughn, Linan-Thompson, et al. (2006)	I	69	Spanish	School determination	WLPB LWID (below 25th percentile) Experimenter word reading list (raw score < 2)
Vaughn, Mathes, et al. (2006)	I	48	Spanish	School determination	WLPB LWID (below 25th percentile) Experimenter word reading list (raw score < 2)
Vaughn, Cirino, et al. (2006)	I	190 total (94 in Spanish intervention, 96 in English intervention)	Spanish	School determination	WLPB LWID (below 25th percentile) Researcher developed word reading list (raw score < 2)
Begeny, Ross, Greene, Mitchell, & Whitehouse (2012)	2	21	Spanish	School determination	GORT fluency or comprehension < 10 (SS mean)
Denton, Anthony, Parker, & Hasrouck (2004)	2-5	93 total (n = 22, Grade 2; n = 37, Grade 3; n = 28, Grade 4; n = 6, Grade 5)	Spanish	LAS	Teacher recommendation WRMT: LWID and WA subtests < Grade 1 WRMT: LWID and WA subtests > Grade 1 equivalent = emerging decoding group WRMT: LWID and WA subtests > Grade 1 equivalent = established decoding group

(continued)

**Table 1.** (continued)

Authors	Grade level	Sample size	EL primary language	EL determination	Reading risk determination
Lovett et al. (2008)	2–8	76	Multiple languages, including Portuguese = 49% Spanish = 21%	Parent survey	Teacher referral WRMT: LWID and WA (SS < 85) WRAT-3 (SS < 85)
Wanzek & Roberts (2012)	4	74	Spanish	School determination	Teacher referral GMRT (SS < 25th percentile)
Vaughn et al. (2011)	7–8	42	Spanish	Not reported	TAKS (SS < 30th percentile)

Note. EL = English learner; CELDT = California English Language Development Test; DIBELS = Dynamic Indicators of Basic Early Literacy Skills, 6th ed. (Good & Kaminski, 2002); LNF = Letter Naming Fluency; ISF = Initial Sound Fluency; PPVT = Peabody Picture Vocabulary Test (Dunn & Dunn, 1981); PA = phonological awareness; LN = letter naming; LS = letter sounds; CTOPP = Comprehensive Test of Phonological Processing (Wagner, Torgesen, & Rashotte, 1999); WLPB = Woodcock Language Proficiency Battery (Woodcock, 1991); LWID = Letter Word Identification; WA = Word Attack; GORT = Gray Oral Reading Test (Bryant, Shih, & Bryant, 2009); WRMT = Woodcock Reading Mastery Test (Woodcock, 1987); LAS = Language Assessment Scales (De Avila & Duncan, 1990); WRAT = Wide Range Achievement Test (Wilkinson, 1993); GMRT = Gates-MacGinitie Reading Test (MacGinitie, Dreyer, & Hughs, 2006); TAKS = Texas Assessment of Knowledge and Skills; SS = standard score.



conducted in kindergarten or first grade. One study involved second-grade students (Begeny, Ross, Greene, Mitchell, & Whitehouse, 2012) and one study involved fourth graders (Wanzek & Roberts, 2012). Two studies involved students in the upper elementary grades (Denton, Anthony, Parker, & Hasrouck, 2004; Gunn, Biglan, Smolkowski, & Ary, 2000), and two studies involved students at the middle school level (Lovett et al., 2008; Vaughn et al., 2011).

Half the studies included English learners only (Begeny et al., 2012; Denton et al., 2004; Solari & Gerber, 2008; Vaughn, Cirino, et al., 2006; Vaughn, Linan-Thompson, et al., 2006; Vaughn, Mathes, et al., 2006); the remaining six included both English learners and native English speakers, but we were able to separately analyze the English learner subsample. In all but two of the studies, participants were from homes where Spanish was the primary home language. In the two other studies (Vadasy & Sanders, 2010; Lovett et al., 2008) the English learner participant sample included numerous languages.

*Methods used to determine English learner status.* The majority of studies ( $n = 7$ ) used as their criteria the school designation of English learners (Begeny et al., 2012; Denton et al., 2004; O'Connor, Bocian, Beebe-Frankenberg, & Linklater, 2010; Vaughn, Cirino, et al., 2006; Vaughn, Linan-Thompson, et al., 2006; Vaughn, Mathes, et al., 2006; Wanzek & Roberts, 2012). Three studies used parent questionnaires or interviews to determine the primary language spoken at home (Lovett et al., 2008; Solari & Gerber, 2008; Vadasy & Sanders, 2010), and two studies did not report specifically how English learner status was determined (Gunn et al., 2000; Vaughn et al., 2011).

*Methods used to identify risk status and learning disability.* Three studies included English learners with identified learning disabilities (Lovett et al., 2008; Vaughn et al., 2011; Wanzek & Roberts, 2012) in their sample. The remaining studies included students deemed at risk for learning disabilities, but definitions of how risk

was determined varied. For the six kindergarten and first-grade studies, risk determination typically included screening measures of PA, alphabetic knowledge, or word or pseudoword reading. In contrast, both Solari and Gerber (2008) and O'Connor et al. (2010) used the Peabody Picture Vocabulary Test (Dunn & Dunn, 1981) to determine risk status. The three first-grade studies by Vaughn et al. (Vaughn, Cirino, et al., 2006; Vaughn, Linan-Thompson, et al., 2006; Vaughn, Mathes, et al., 2006) and the Solari and Gerber study assessed students both in their native language (i.e., Spanish) and in English as part of the risk determination process. In the studies that targeted students in second grade and above, all used standardized reading achievement tests for risk determination, and three (Denton et al., 2004; Lovett et al., 2008; Wanzek & Roberts, 2012) also took teacher recommendation into account in determining who was at risk.

### *Intervention Characteristics*

The intensity of an intervention can be determined by many characteristics, but three are common: group size, duration of the intervention, and quality of the personnel delivering the intervention and the associated amount of training they receive (Gersten et al., 2008). We describe these aspects of the studies next, and to provide a more complete picture of the type of instruction students received, we also describe the content and methods used to deliver the intervention and provide details regarding information on the counterfactual (see Table 2).

*Group size.* Two studies (Begeny et al., 2012; Vadasy & Sanders, 2010) used one-on-one tutoring. The remainder used relatively small homogeneous groups of students who read at similar levels of proficiency. Half the studies included groups of three to five, two studies used even smaller groups, and one study (Lovett et al., 2008) included groups as large as eight students.

*Duration of the intervention.* Intervention sessions ranged from 20 to 60 min. The shortest

**Table 2.** Intervention Characteristics.

Authors	Group size and composition	Intervention duration	Interventionist	Intervention program	Intervention content
O'Connor, Boccian, Beebe-Frankenberger, & Linklater (2010)	2-3; homogeneous groups	36 weeks, 3 days per week, 15 min per day (270-1,430 min)	Paraeducators	Ladders to Literacy	Alphabetics, phonological awareness, oral language
Solari & Gerber (2008)	4-5; homogeneous groups	8 weeks, 3 days per week, 20 min per day (480 min)	Research assistants	NA	Phonological awareness, listening comprehension
Vadasy & Sanders (2010)	One-on-one instruction	18 weeks, 4 days per week, 30 min per day (2,160 min)	Paraeducators	NA	Alphabetics, phonological awareness, word reading, spelling, oral language
Gunn, Biglan, Smolkowski, & Ary (2000)	2-3; homogeneous groups	60 weeks, 5 days per week, 25-30 min per day (7,500-9,000 min)	Paraeducators	Reading Mastery and Corrective Reading	Phonological awareness, alphabetics, reading fluency
Vaughn, Liman-Thompson, et al. (2006)	3-5; homogeneous groups	32 weeks, 5 days per week, 50 min per day: (4,560-6,900 min)	Bilingual certified teachers hired by research team	Lectura Proactiva	Letter knowledge, word recognition, fluency, comprehension, oral language skill, vocabulary
Vaughn, Mathes, et al. (2006)	3-5; homogeneous groups	32 weeks, 5 days per week, 40 min per day (6,400 min)	Bilingual certified teachers hired by research team	Proactive Reading	Letter knowledge, word recognition, fluency, comprehension, oracy, vocabulary
Vaughn, Cirino, et al. (2006)	3-5; homogeneous groups	32 weeks, 5 days per week, 50 min per day (4,476-6,402 min)	Bilingual certified teachers hired by research team	Lectura Proactiva or Proactive Reading	Letter knowledge, word recognition, fluency, comprehension, oracy, vocabulary
Begeny, Ross, Greene, Mitchell, & Whitehouse (2012)	One-on-one instruction	20-28 weeks, 2-3 times per week, 10 min per day (600-840 min)	Lead researcher, graduate and undergraduate students	HELPS Fluency Program	Reading fluency, comprehension

*(continued)*



**Table 2.** (continued)

Authors	Group size and composition	Intervention duration	Interventionist	Intervention program	Intervention content
Denton, Anthony, Parker, & Hasrouck (2004)	1–4; homogeneous based on decoding	10 weeks, 3 days per week, 40 min per day (1,200 min)	Undergraduate students	Read Well or Read Naturally	Alphabetics; reading fluency, vocabulary, comprehension
Lovett et al. (2008)	4–8; homogeneous groups based on decoding	21 weeks <sup>a</sup> , 4–5 days per week, 60 min per day (6,300 min)	Certified special education teachers	Reading Mastery or Corrective Reading	Alphabetics; word reading, phonological awareness
Wanzek & Roberts (2012)	2–4; within schools	28 weeks, 5 days per week, 30 min per day (2,550–3,420 min)	Certified teachers hired by research team	Wilson Reading	Word reading, comprehension
Vaughn et al. (2011)	4–5 (not reported)	32 weeks, 5 days per week, 50 min per day (8,000 min)	Certified teachers hired by research team	REWARDS and Wilson Reading	Reading fluency, vocabulary, comprehension

Note. The instructional program and content in the control condition was whatever the district and school typically provided to students. Homogenous refers to academic levels and not English proficiency level or English learner status.

<sup>a</sup>Not reported, calculated by authors.

sessions were the kindergarten studies with 10- to 20-min sessions, whereas most other sessions ranged from 30 to 60 min. Six studies included daily intervention sessions; the remainder varied from twice a week to four times a week. Length of intervention also varied substantially. These factors yielded a large range in the total number of minutes of intervention provided, with the range being from 270 min to 9,000 min. The average intervention was approximately 3,600 min in duration, which equals to about 120 thirty-minute lessons.

*Personnel delivering instruction.* Teachers delivered the instruction in six of the interventions. In three studies, teachers with specific training in bilingual education delivered the interventions (Vaughn, Cirino, et al., 2006; Vaughn, Linan-Thompson, et al., 2006; and Vaughn, Mathes, et al., 2006), and in another, special education teachers delivered the intervention (Lovett et al., 2008). Two studies hired outside teachers to deliver the interventions (Vaughn et al., 2011; Wanzek & Roberts, 2012). Three studies employed paraprofessionals (Gunn et al., 2000; O'Connor et al., 2010; Vadasy & Sanders, 2010), and in three other studies, research assistants, undergraduates, or graduate students delivered the intervention (Begeny et al., 2012; Denton et al., 2004; Solari & Gerber, 2008). In all cases, teachers, paraprofessionals, or research personnel were trained on how to deliver the intervention; they were observed regularly; and they were provided with feedback.

*Content of the interventions.* Half the studies (Denton et al., 2004; Vaughn, Cirino, et al., 2006; Vaughn, Linan-Thompson, et al., 2006; Vaughn, Mathes, et al., 2006; Vaughn et al., 2011; Wanzek & Roberts, 2012) used a comprehensive intervention that covered at least four of the five areas of literacy outlined in the National Reading Panel (Ehri et al., 2001) and the National Literacy Panel for Language Minority Students (August & Shanahan, 2006): phonemic awareness, phonics, fluency, vocabulary, and comprehension. The other half (Begeny et al., 2012; Gunn et al., 2000;

Lovett et al., 2008; O'Connor et al., 2010; Solari & Gerber, 2008; Vadasy & Sanders, 2010) focused on just one or two components of reading. In general, studies that targeted the kindergarten level (e.g., O'Connor et al., 2010) focused on PA and alphabetic knowledge, and studies that targeted the intermediate grades (e.g., Begeny et al., 2012) focused on fluency and comprehension.

Five of the studies included vocabulary as one of the proficiencies (Denton et al., 2004; Vaughn, Cirino, et al., 2006; Vaughn, Linan-Thompson, et al., 2006; Vaughn, Mathes, et al., 2006; Vaughn et al., 2011), and four studies focused on oral language development as a key skill targeted in the intervention (O'Connor et al., 2010; Vaughn, Cirino, et al., 2006; Vaughn, Linan-Thompson, et al., 2006; Vaughn, Mathes, et al., 2006). None of the studies included building of academic vocabulary or academic language as an explicit goal, although we suspect that those with an oral language or vocabulary component probably did address these topics to some extent.

Ten studies used existing curricula in the treatment condition, including Reading Mastery (Engelmann & Bruner, 1995), Corrective Reading (Engelmann, 1988), Read Well (Sprick, Howard, & Fidanque, 1998), Read Naturally (Ihnot, Mastoff, Gavin, & Hendrickson, 1992), Ladders to Literacy (O'Connor, Notari-Syverson, & Vadasy, 2005), HELPS (Begeny, 2009), Wilson Reading System (Wilson, 2002), REWARDS (Archer, Gleason, & Vachon, 2000), or modified versions of existing curricula (i.e., Proactive Reading; Mathes, Menchetti, Wahi, & Grek, 2004). Two studies used a combination of existing curricula and researcher-developed curricula, and the decision about which materials to use was based on the skills taught (Vaughn et al., 2011; Wanzek & Roberts, 2012). Two studies developed and tested novel interventions in the treatment condition (Solari & Gerber, 2008; Vadasy & Sanders, 2010). Note that most of these curricula were developed for use with the general population rather than as specialized curricula for English learners.

In five of the studies, multiple interventions were tested in different treatment groups

(Denton et al., 2004; O'Connor et al., 2010; Solari & Gerber, 2008; Vaughn et al., 2011; Wanzek & Roberts, 2012). Only two studies, as indicated in Table 2, included interventions provided in the students' primary language, in both cases Spanish (Vaughn, Cirino, et al., 2006; Vaughn, Linan-Thompson, et al., 2006).

*Methods of intervention delivery.* The use of systematic, explicit instruction is the best way to describe the treatment intervention across all studies. Common instructional procedures included modeling, scaffolding, and corrective feedback. Three studies described features of intervention delivery that were designed specifically to meet the needs of English learners learning to read in a relatively new language (Denton et al., 2004; Vaughn, Cirino, et al., 2006; Vaughn, Mathes, et al., 2006). These features included using visuals and gestures, building background knowledge or activating prior knowledge, clarifying meanings of words, and showing differences between English and the students' primary language.

*The counterfactual: Nature of comparison group intervention and instruction.* Of the 12 studies, 11 described the control group instruction as "business as usual" or "typical practice." The majority of studies ( $n = 10$ ) provided some information about the control condition; two studies did not (Gunn et al., 2000; Vaughn et al., 2011). Three studies reported that the control group received the school's core reading program, Tier 1 instruction (Begeny et al., 2012; O'Connor et al., 2010; Vadasy & Sanders, 2010). Four studies reported that control students received supplemental intervention from their school in addition to Tier 1 (Denton et al., 2004; Vaughn, Cirino, et al., 2006; Vaughn, Linan-Thompson, et al., 2006; Vaughn, Mathes, et al., 2006). In the Denton study, seven of the students in the control group received supplemental intervention for 60 to 240 min per week, and four received special education services for 60 min per week. In the Vaughn, Linan-Thompson, et al. (2006) study, 14 control students received intervention for an average of 3,822 min. In the Vaughn, Mathes, et al. (2006) study, 29 students

received on average 5,040 min of supplemental intervention. In the Vaughn, Cirino, et al. (2006) study, 27 students in the Spanish control group received on average 2,472 min of intervention, and 28 students in the English intervention received 5,256 min of intervention.

Two studies reported very specific information regarding the control group (Lovett et al., 2008; Wanzek & Roberts, 2012). In the Lovett et al. (2008) study, students in the control group received the school's typical special education language arts program. This program varied across schools and was locally developed. The students received the same number of minutes of instruction (6,300), and the intervention was conducted in similar group sizes (two to eight students). Wanzek and Roberts (2012) reported that eight of the control students received one supplemental intervention, and three received two supplemental interventions. Nine of these students received 200 to 360 min of intervention per week, and two received 25 to 60 min of intervention per week. These interventions typically took place in groups of two to three students, and the program focused on test-taking skills. One of the studies (Solari & Gerber, 2008) used an alternative treatment condition. The alternative treatment condition focused only on PA skills and was delivered in the same group size and for the same number of minutes as the two intervention conditions.

### *Intervention Outcomes*

Table 3 presents the outcomes for English learners in each study, summarized across seven domains. Although the National Reading Panel (Ehri et al., 2001) suggested only five domains in reading, we decided to create three separate domains for comprehension because of research suggesting that comprehension effects depend on how this component is measured (Cutting & Scarborough, 2006) and because for English learners, in particular, we thought the additional precision could be helpful in understanding intervention impact. Thus, we divided comprehension outcomes in the 12 studies into three categories based on

**Table 3.** Outcome Effect Sizes by Measurement Domain.

Study	PA	Phonics/word reading	Passage reading fluency	Vocabulary/oral language	Reading cloze	Reading comprehension	LC
O'Connor, Bocian, Beebe-Frankenberger, & Linklater (2010)	DIBELS PSF ( $g = .91^{***}$ )	—	—	—	—	—	—
Solari & Gerber (2008)	LC concentration: Early PA <sup>a</sup> ( $g = .63$ ) Late PA <sup>a</sup> ( $g = -.14$ ) PA concentration: Early PA <sup>a</sup> ( $g = -.57$ ) Late PA <sup>a</sup> ( $g = -.74$ )	LC concentration: WJ III LWID ( $g = -.19$ ) WJ III WA ( $g = .43$ ) PA concentration: WJ III LWID ( $g = .56$ ) WJ III WA ( $g = -.07$ )	—	—	—	—	LC concentration: WJ III Story Retell ( $g = 2.34^{***}$ ) LC <sup>a</sup> ( $g = 1.73^{**}$ ) Domain average ( $g = 2.04^{***}$ ) PA concentration: WJ III Story Retell ( $g = 1.00^*$ ) LC <sup>a</sup> ( $g = 1.81^{**}$ ) Domain average ( $g = 1.41^*$ )
Vadasy & Sanders (2010) <sup>b</sup>	CTOPP ( $g = .93^{***}$ )	WRMT LWID and WA <sup>c</sup> ( $g = .61^{***}$ )	Passage reading fluency <sup>a</sup> ( $g = .90^{***}$ )	—	WRMT Passage Comprehension ( $g = .47^{***}$ )	—	—
Gunn, Biglan, Smolkowski, & Ary (2000)	—	WJ III LWID ( $g = .24$ ) WJ III WA ( $g = .52^{***}$ )	DIBELS ORF ( $g = .24$ )	—	—	—	—
Vaughn, Linan-Thompson, et al. (2006) Spanish intervention	TOPPS ( $g = .58^*$ )	WLPB-Spanish WA ( $g = .91^{***}$ )	IDEL ORF ( $g = .78^{**}$ )	WLPB-Spanish Picture Vocabulary ( $g = .28$ ) WLPB-Spanish Verbal Analogies ( $g = .30$ )	WLPB-Spanish Passage Comprehension ( $g = .88^{***}$ )	—	WLPB-Spanish LC ( $g = .50^*$ )

(continued)

**Table 3.** (continued)

Study	PA	Phonics/word reading	Passage reading fluency	Vocabulary/oral language	Reading cloze	Reading comprehension	LC
Vaughn, Mathes, et al., (2006) <sup>b</sup> English intervention)	CTOPP ( $g = 1.24^{**}$ )	WLPB-English WA ( $g = .69$ )	DIBELS ORF ( $g = .18$ )	WLPB-English Picture Vocabulary ( $g = .09$ ) WLPB-English Verbal Analogies ( $g = .78^{**}$ ) Domain average ( $g = .43$ )	WLPB-English Passage Comprehension ( $g = .83^{**}$ )	—	WLPB-English Listening Comprehension ( $g = .26$ )
Vaughn, Cirino, et al. (2006) Spanish and English intervention	Spanish intervention: CTOPP ( $g = .38$ ) English intervention: TOPPS ( $g = .82^{**}$ )	Spanish intervention: WLPB Spanish LWID ( $g = .60^{**}$ ) WLPB Spanish WA ( $g = .45$ ) Spanish word reading fluency <sup>a</sup> ( $g = .48^{**}$ ) Domain average (English = $.51^{**}$ ) English intervention: WLPB-English LWID ( $g = .13$ ) WLPB-English WA ( $g = .15$ ) TOWRE <sup>a</sup> ( $g = .41$ )	Spanish intervention: IDEL ORF 1 ( $g = .41$ ) IDEL ORF 2 ( $g = .28$ ) English intervention: DIBELS ORF 1 ( $g = -.39$ ) DIBELS ORF 2 ( $g = .27$ )	Spanish intervention: WLPB-Spanish Picture Vocabulary ( $g = -.14$ ) WLPB-Spanish Verbal Analogies ( $g = .33$ ) English intervention: WLPB-English Picture Vocabulary ( $g = -.17$ ) WLPB-English Verbal Analogy ( $g = -.11$ )	Spanish intervention: WLPB-Spanish Passage Comprehension ( $g = .42$ ) English intervention: WLPB-English Passage Comprehension ( $g = .06$ )	—	Spanish intervention: WLPB-Spanish Listening Comprehension ( $g = .23$ ) English intervention: WLPB-English Listening Comprehension ( $g = -.22$ )

(continued)

**Table 3.** (continued)

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Study	PA	Phonics/word reading	Passage reading fluency	Vocabulary/oral language	Reading cloze	Reading comprehension	LC
Begeny, Ross, Greene, Mitchell, & Whitehouse (2012)	—	—	GORT fluency ( $g = .95$ )	—	—	GORT comprehension ( $g = 1.00^{**}$ )	—
Denton, Anthony, Parker, & Hasrouck (2004)	—	Read Well: WRMT LWID ( $g = .40$ ) WRMT WA ( $g = .33$ ) Modified Read Naturally: WRMT LWID ( $g = -.06$ ) WRMT WA ( $g = -.13$ )	—	—	Read Well: WRMT Passage Comprehension ( $g = .18$ ) Modified Read Naturally: WRMT Passage Comprehension ( $g = .15$ )	—	—
Lovett et al. (2008) <sup>b</sup>	CTOPP Blending ( $g = .59^*$ )	WRMT LWID ( $g = .00$ ) WRMT WA ( $g = .45$ ) WRAT Reading ( $g = .33$ )	—	—	WRMT Passage Comprehension ( $g = .10$ )	—	—
Wanzek & Roberts (2012)	—	Word study intervention: WJIII LWID ( $g = .38$ ) WJIII WA ( $g = 1.09^{**}$ ) Domain average ( $g = .73$ ) Comprehension intervention: WJIII LWID ( $g = .13$ ) WJIII WA ( $g = .49$ ) Responsive intervention: WJIII LWID ( $g = .12$ ) WJIII WA ( $g = .12$ )	—	Word study intervention: GMRT Vocabulary ( $g = -.59$ ) Comprehension intervention: GMRT Vocabulary ( $g = -.03$ ) Responsive intervention: GMRT Vocabulary ( $g = -.05$ )	Word study intervention: WJ III Passage Comprehension ( $g = -.01$ ) Comprehension intervention: WJ III Passage Comprehension ( $g = -.21$ ) Responsive intervention: WJ III Passage Comprehension ( $g = -.12$ )	Word study intervention: GMRT Reading Comprehension ( $g = -.62$ ) Comprehension intervention: GMRT Reading Comprehension ( $g = -.53$ ) Responsive intervention: GMRT Reading Comprehension ( $g = -.33$ )	Word study intervention: WJIII Listening Comprehension ( $g = .41$ ) Comprehension intervention: WJIII Listening Comprehension ( $g = -.42$ ) Responsive intervention: WJIII Listening Comprehension ( $g = .93^*$ )

(continued)



**Table 3.** (continued)

Study	PA	Phonics/word reading	Passage reading fluency	Vocabulary/oral language	Reading cloze	Reading comprehension	LC
Vaughn et al. (2011)	—	Individual intervention: WJIII LWID ( $g = .18$ ) WJIII WA ( $g = -.02$ ) Standardized intervention: WJIII LWID ( $g = .23$ ) WJIII WA ( $g = -.01$ )	—	—	Individual intervention: WJ III Passage Comprehension ( $g = -.05$ ) Standardized intervention: WJ III Passage Comprehension ( $g = .26$ )	—	—

Note. DIBELS = Dynamic Indicators of Basic Early Literacy Skills; PSF = Phoneme Segmentation Fluency; ORF = Oral Reading Fluency; RD = researcher developed; PA = phonological awareness; LC = listening comprehension; WJ III = Woodcock Johnson (3rd ed.; Woodcock, McGrew, & Mather, 2001); LWID = Letter Word Identification; WA = Word Attack; CTOPP = Comprehensive Test of Phonological Processing (Wagner, Torgesen, & Rashotte, 1999); WRMT = Woodcock Reading Mastery Test (Woodcock, 1987); TOPPS = Test of Phonological Processing in Spanish (Francis et al., 2001); WLPB = Woodcock Language Proficiency Battery (Woodcock, 1991); IDEL = Indicadores Dinámicos del Éxito en la Lectura (Good, Bank, & Watson, 2003); GMRT = Gates-MacGinitie Reading Test (MacGinitie, MacGinitie, Dreyer, & Hughs, 2006); GORT = Gray Oral Reading Test (Bryant, Shih, & Bryant, 2009); TOWRE = Test of Word Reading Efficiency (Torgesen, Wagner, & Rashotte, 1999).

<sup>a</sup>Researcher-developed measure.

<sup>b</sup>Studies had high attrition; either overall attrition or differential attrition effect sizes should be interpreted with caution.

<sup>c</sup>The effect size is a mean composite of the two phonics decoding measures.

\* $p \leq .05$ . \*\* $p \leq .01$ .

the measures used: (a) reading cloze passage performance (e.g., Woodcock Reading Mastery Test (Woodcock, 1987)), (b) reading passages with multiple-choice questions, and (c) listening comprehension. Outcomes for measures in English and, if included in the study, primary language measures are reported.

For each domain, we report both standardized and researcher-developed measures that were administered in the studies. Researcher-developed measures are denoted in Table 3. Given the small number of researcher-developed measures, we include these in the ranges and median effect sizes that are reported. For each domain, we report the effect size range as well as the median effect size. We purposely do not report the mean effect size because of the variation in both the features of the studies and the characteristics of the interventions. As a representative effect size for the domain, we believe the median better preserves these variations than the mean, which by definition integrates this variation in the single score estimation process.

Two studies (Vaughn, Cirino, et al., 2006; Vaughn, Linan-Thompson, et al., 2006) provided interventions to students in Spanish. For each of the domains, it is important to consider that the students receiving the Spanish intervention were learning to read in their primary home language with the intention of then transitioning to read in English, whereas students receiving the intervention in English were learning to read in a second language. In these studies, reading outcomes were assessed in Spanish, which we report. None of the other studies reported outcomes in the students' primary language.

**PA.** Seven studies measured PA (Lovett et al., 2008; O'Connor et al., 2010; Solari & Gerber, 2008; Vadasy & Sanders, 2010; Vaughn, Cirino, et al., 2006; Vaughn, Linan-Thompson, et al., 2006; Vaughn, Mathes, et al., 2006). Not surprisingly, all of these studies save for Lovett et al. (2008) targeted students in kindergarten or first grade. Effect sizes ranged from  $-0.74$  to  $1.24$  with a median of  $0.59$ . Significant effect sizes ranged from  $0.58$  to  $1.24$  with a median of  $0.86$ .

O'Connor et al. (2010) found significant effects for PA ( $g = 0.91$ ), which was the main skill targeted in the intervention for this study. Vadasy and Sanders (2010) also found significant effects for PA ( $g = 0.93$ ) for an intervention that included multiple components of reading, and the grades in this study, 2 through 8, suggest other outcomes were of greater importance. In contrast, Solari and Gerber (2008) did not find significant effect sizes on PA measures. However, the treatment condition in this study focused on listening comprehension and the control group received a PA-only intervention, so the lack of effect on PA for the treatment group is not surprising. In the Vaughn studies (Vaughn, Cirino, et al., 2006; Vaughn, Linan-Thompson, et al., 2006; Vaughn, Mathes, et al., 2006), effect sizes were significant for students who received the Spanish intervention, but results were mixed for the English interventions, as shown in Table 3.

**Phonics/word reading.** Ten of the studies included outcome measures of word reading or decoding; most often, word identification and word attack (i.e., ability to decode phonetically regular pseudowords). Effect sizes ranged from  $-0.19$  to  $1.09$  with a median of  $0.33$ . Six studies had significant effect sizes ranging from  $0.48$  to  $1.09$  with a median of  $0.61$ . In three studies, significant effect sizes were found for phonetic decoding (Gunn et al., 2000; Vaughn, Linan-Thompson, et al., 2006; Wanzek & Roberts, 2012), and in one study, a significant effect size was found in a combined measure of word identification and word attack (Vadasy & Sanders, 2010). Typically, the effect sizes were larger for word attack than for word identification. In addition effect sizes tended to be smaller for interventions that were conducted with older students (second grade and above), except for the word study intervention used in the Wanzek and Roberts (2012) study, where the effect sizes ranged from  $0.38$  to  $0.93$ .

**Fluency.** Seven studies included measures of passage reading fluency as an outcome (Begeny et al., 2012; Gunn et al., 2000; Vadasy &

Sanders, 2010; Vaughn et al., 2011; Vaughn, Cirino, et al., 2006; Vaughn, Linan-Thompson, et al., 2006; Vaughn, Mathes, et al., 2006). In each of these studies, fluency was measured using a 1-min timed passage and was scored as number of words read correctly, except the study by Begeny et al. (2012), which used the Gray Oral Reading Test (GORT; (Bryant, Shih, & Bryant, 2009)) fluency subtest to measure fluency. On the GORT fluency subtest, the amount of time it takes to read a passage is recorded and a rate computed. On the fluency measures, effect sizes ranged from  $-0.39$  to  $0.95$  with a median of  $0.28$ . Significant effect sizes were found in only two of the studies. In the Vadasy and Sanders (2010) study, the effect size was  $0.90$  for kindergarten students, and in the Vaughn, Linan-Thompson, et al. (2006) study, the effect size was  $0.78$  on the Spanish measure of reading fluency. In general, we did not find significant effects in passage reading fluency for English learners at risk or with learning disabilities who were taught in English.

*Vocabulary and oral language.* Vocabulary and oral language were measured as an outcome in only four studies (Vaughn, Cirino, et al., 2006; Vaughn, Linan-Thompson, et al., 2006; Vaughn, Mathes, et al., 2006; Wanzek & Roberts, 2012). Effect sizes ranged from  $-0.59$  to  $0.78$  with a median of  $-0.05$ . In only one study (Vaughn, Mathes, et al., 2006) was the effect size statistically significant. In three Vaughn et al. studies (Vaughn, Cirino, et al., 2006; Vaughn, Linan-Thompson, et al., 2006; and Vaughn, Mathes, et al., 2006), vocabulary and oral language were measured using the Picture Vocabulary and Verbal Analogies subtests of the Woodcock Language Proficiency Battery needs citation. Across the three studies and these two measures, the only significant effect was for English Verbal Analogies for first-grade English learners who received the intervention in English ( $g = 0.78$ ); however, the domain average for vocabulary in this study was not significant. For students in fourth grade, across three types of interventions (word study focused, comprehension focused, and responsive based on individual

need), no significant differences were found on vocabulary (Wanzek & Roberts, 2012). Thus, effect on vocabulary was minimal across the set of studies.

*Reading cloze.* Reading cloze measures were used in eight of the studies (Denton et al., 2004; Lovett et al., 2008; Vadasy & Sanders, 2010; Vaughn et al., 2011; Vaughn, Cirino, et al., 2006; Vaughn, Linan-Thompson, et al., 2006; Vaughn, Mathes, et al., 2006; Wanzek & Roberts, 2012). Typically, this skill was measured using the Passage Comprehension subtest from one of the Woodcock batteries. Effect sizes ranged from  $-0.21$  to  $0.88$  with a median of  $0.22$ . Significant effect sizes ranged from  $0.47$  to  $0.88$  with a median of  $0.83$ . In two of the Vaughn studies (Vaughn, Linan-Thompson, et al., 2006; Vaughn, Mathes, et al., 2006) significant effects were found for the reading cloze measure for first-grade students. For the Spanish intervention, Spanish passage comprehension was significant at  $0.88$ , and for the English intervention, English passage comprehension was significant at  $0.83$ . In the Vadasy and Sanders (2010) study, effect sizes were significant on reading cloze for kindergarten students ( $g = 0.47$ ).

*Reading comprehension.* Reading comprehension was measured in only two studies (Begeny et al., 2012; Wanzek & Roberts, 2012). Effect sizes ranged from  $-0.62$  to  $1.00$ , with a median of  $-0.48$ . A significant effect size was found on the GORT reading comprehension measure in the Begeny et al. (2012) study ( $g = 1.00$ ), which provided a reading fluency intervention.

*Listening comprehension.* Five studies measured listening comprehension, with effect sizes ranging from  $-0.42$  to  $2.34$  and a median of  $0.50$ . The pattern of findings is interesting. For upper elementary students, Wanzek and Roberts (2012) found a significant positive effect of  $0.93$  when the intervention was tailored to the student's skill profile but nonsignificant impacts when a one-size-fits-all intervention was used. This result reflects a promising area for future research. For the

kindergartners, Solari and Gerber (2008) found significant positive effects for both their own measure of listening comprehension and the Woodcock Story Retell measure. Only one other effect was significant, for the Spanish reading intervention by Vaughn, Linan-Thompson, et al. (2006).

### *Moderating Variables*

To examine the specific features of the intervention that may have moderated intervention outcomes, we ran regression analyses using the average unweighted effect size as the dependent variable and group size (individual or small group), minutes of intervention (as a continuous variable), and personnel delivering the intervention (research personnel or school-based personnel) as the independent variables. In studies with more than one intervention, we included in the analysis the intervention that we determined the authors hypothesized would have the strongest effect. This was done to ensure that all contrasts were independent, an assumption for ordinary least squares regression. Results indicated that for each regression analysis, no significant relationship was found between the potential moderator variable (group size, minutes of intervention, or personnel delivering the intervention) and the intervention outcomes.

### **Discussion**

In this review, we examined the characteristics and outcomes of intervention studies that included data on English learners who were at risk for reading difficulties or had been identified as having a reading disability. We located 12 studies conducted since 2000 that used an RCT and met our criteria. The number of studies is dramatically smaller than the number of high-quality reading intervention studies that have been conducted with native English speakers over the same time period (see Edmonds et al., 2009; Solis, 2012; Wanzek & Vaughn, 2007; and Wexler, Vaughn, Roberts, & Denton, 2010, for syntheses on reading interventions for non-English learners)

but compares favorably to periods prior to 2000 that addressed interventions with English learners found by Gersten and Baker (2000).

Unfortunately, given the limited sample of studies, the substantial amount of variation in the ages of the participants and types of interventions conducted, and the variations in measuring outcomes, it is difficult to determine patterns across the studies that would help identify potentially relevant trends. In this discussion, we summarize our findings illustrating patterns where possible, discuss the implications of our findings, and provide directions for future research. Regarding the reading interventions in Spanish, it is important to take into account that these interventions are, in a way, different from the English interventions, because in the former the studies used reading in the native language as an approach to providing reading support to struggling English learners, whereas in the latter the studies explored the impact of an intervention in a second language on student reading performance.

### *Features of the Intervention Studies and Their Relationship to Impacts*

Our review revealed a large variability in how English learners were identified and defined across studies. This trend has been an issue for many years, with frequent requests for more consistency in how English learners are identified in research studies. For example, in some of the studies, the school designation of English learners was used, whereas in other studies, researchers used only a home language survey and not an individually administered oral language test.

Given the heterogeneity of the English learner population, in terms of both language proficiency and academic achievement, interventions that may be effective for one group of English learners may not be effective with others (August & Shanahan, 2006). Thus, including specific language proficiency information as well as academic proficiency is important in intervention studies so readers can understand “for whom” the described intervention is effective (Klingner

et al., 2006). The practice of providing greater specification of the student samples is particularly critical for English learners, given the importance of language factors on achievement outcomes.

Across the 12 studies in our sample, only two reported an analysis of the differential effect of English language proficiency on outcomes. In the O'Connor et al. (2010) study, the language proficiency level of participants as measured by the California English Language Development Test did not have an impact on how well kindergarten students responded to the intervention. This is consistent with previous research with English learners on the weak association between language proficiency and reading growth in the early grades, particularly on foundational measures of reading, such as phonemic awareness and decoding (Chiappe, Siegel, & Wade-Woolley, 2002; Gersten et al., 2007). However, it differs from more recent research that found that language proficiency appears to affect early reading skills (D. Baker et al., 2013; Kieffer, 2008). On the other hand, in the Lovett et al. (2008) study, which targeted English learners in Grades 2 through 8, the finding was that students who began the intervention with higher levels of language proficiency responded more positively to the interventions based on measures of phonemic blending and passage comprehension than students who began the intervention at lower levels of language proficiency. These findings are consistent with evidence that English language proficiency has an impact on student outcomes particularly in the upper elementary grades (see Geva & Farnia, 2012; Kieffer, 2010).

More research is needed to determine how varying levels of English language proficiency affect the impact of an intervention. In particular, it may be that growth in basic reading skills (decoding and literal comprehension) is not related to higher levels of English language skill but that growth on higher-level skills, such as comprehension, is. Moreover, it may be that students who are technically exited from English learner status (often called *former English learners*; e.g., Parrish

et al., 2006), but may not have developed the necessary academic English to be successful in school, are noticeably absent from the intervention studies in this review. That is, the English learner sample in these studies may be lower in English language proficiency than the population of English learners currently in American schools. Given this fact and the fact that most studies did not report levels of English language proficiency of the sample, we caution making extrapolations or generalizations from this small set of studies.

### *Intensity Factors of Group Size, Duration, Personnel, and Quality*

Our review indicated there was large variation across interventions in terms of group size, minutes of instruction, and personnel delivering the instruction. As in most meta-analyses, it is hard to disentangle length of intervention from numerous other factors. As discussed earlier, the nature of the counterfactual varied dramatically across studies, ranging from providing no intervention at all to providing the school's typical reading intervention. Thus, although the moderator analyses showed no significant role in predicting effect size, it does not mean that these intensity factors are not relevant.

One hallmark of Tier 2 interventions is delivery of the intervention in small groups (Gersten et al., 2007; Vaughn, Wanzek, Woodruff, & Linan-Thompson, 2007). Research has indicated that reasonably homogeneous small groups are often effective for delivering instruction, particularly for students at risk or with learning disabilities (Ehri et al., 2001; Elbaum, Vaughn, Hughes, & Moody, 1999; Vaughn et al., 2003). Eleven of the interventions reviewed used small-group instruction; two applied the intervention with students individually (Begeny et al., 2012; Vadasy & Sanders, 2010). When we analyzed group size as a moderating variable, we found there was no significant difference between individualized intervention and small-group interventions. It stands to reason that small-group interventions of three to five students might be more effective than either individually delivered interven-



tions or interventions delivered to six or more students, because English learners have more opportunities to practice the skill they are working on as well as their English language proficiency with their peers and the teacher, and the small-group settings provide more opportunities for this than they would get if they were in a large group (D. Baker & Kosty, 2012; Gersten & Jiménez, 1998). However, the results of this research synthesis do not demonstrate consistent, significant positive impacts or even consistently positive effects.

Interventions varied substantially in terms of the amount of instructional time provided. However, length of intervention did not predict magnitude of effect as the moderator analysis indicated. One reason that minutes of intervention may not have influenced effect sizes is that although intervention treatment is longer, so is the instruction provided to the students in the control group. In addition shorter interventions tended to focus on just one or two reading outcomes and often measured only these specific outcomes, which may have accounted for larger effect sizes for these studies. For example, studies that focused on kindergarten students targeted only foundational reading or prereading skills (i.e., O'Connor et al., 2010; Solari & Gerber, 2008). In contrast, studies that focused on multiple components of reading—as many believe is most appropriate for Grades 1 and up—demonstrated quite mixed results. For the intermediate grades, the one study that tailored interventions to students' skill profiles (Wanzek & Roberts, 2012) tended to be much more effective than those with a “one-size-fits-all” approach. This seems a promising direction to pursue for future response-to-intervention research with English learners. However, one should not overgeneralize from the one study. Although it is important to target interventions to the specific skills or proficiencies that students are lacking, at some point in time, it is also necessary to help students orchestrate the various components of reading (D. Baker, Stoolmiller, Good, & Baker, 2011). To date, there is little response-to-intervention research that addresses the issue of orchestration.

For older students in middle school, minutes of instruction did not appear to have an impact on the results. For example, in the Vaughn et al. (2011) study, English learners in middle school received a full year of a Tier 3 reading intervention for 50 min a day, approximately 8,000 min of instruction. This intervention did not yield significant effects, suggesting that older English learners who have significant reading difficulties may need longer and more intensive interventions than younger English learners, a finding that would be consistent with findings from intervention studies with English-only students (Biancarosa & Snow, 2004; Torgesen et al., 2001).

Our moderator variable analysis also indicated that there were no differences between researcher-delivered interventions and the school personnel-delivered interventions. We were surprised but encouraged that there were not differences, because this indicates that, with adequate training, interventions can be delivered by school-based personnel with similar impact.

A characteristic common across all studies was delivery of instruction. All the studies reported using explicit and systematic instruction. Although the level of explicitness and systematicity varied across studies depending on the interventions used, most studies used the following routines and general progression to deliver systematic and explicit instruction: Teachers modeled and demonstrated, teachers led guided practice, students received many opportunities to practice the activities on their own, and review of previously learned content and material was regularly incorporated throughout the intervention. This finding supports a substantial body of evidence on the benefits of using systematic and explicit instructional routines, particularly with students who are at risk or who have a reading disability, regardless of their language status or demographic characteristics (Edmonds et al., 2009; Ehri et al., 2001; Gersten et al., 2007; Swanson, 1999).

The nature of the counterfactual also may play a role in the outcomes of the interventions. However, consistent information regarding the control group instruction was not found across



studies. Also, the number of students in the control group who received intervention and for how many minutes the students received the intervention were not consistent within studies. This is not surprising given the nature of school-based research. Most studies did provide information regarding the core instruction provided to all students and did thorough observations of this instruction.

### *Outcomes of the Interventions*

Although many of the studies measured a variety of outcomes across all areas of reading, interventions that focused on improving foundational skills, such as PA and phonics, with younger students in kindergarten and first grade obtained better and more consistent effects than other outcomes, such as those interventions that focused on improving vocabulary and comprehension. Typically, the effects of intervention on older English learners (fourth grade and above) were minimal except for a few measures across the four relevant studies; only one study (Wanzek & Roberts, 2012) showed significant effects in listening comprehension for older students. As stated previously, the intervention with significant effects was tailored to each student individually, thereby being highly “responsive” to the needs of each individual student. In this manner, the intervention had the characteristics of a model Tier 3 intervention compared to a more proscribed Tier 2 approach. The positive findings in this study suggest, particularly for older English learners perhaps, that an intervention based on individual student patterns of performance might be more effective than even highly intense interventions provided in roughly the same way to all at-risk students.

We could not locate any studies that targeted vocabulary specifically, and only four studies measured vocabulary as an outcome. This was surprising given that vocabulary plays a major role in the reading development of all students but is particularly important for English learners, as suggested by Gersten and Baker (2000) more than a decade ago and by Jiménez, García, and Pearson (1996) almost two decades ago. Even more surprising is that

only four studies have been published on vocabulary interventions for English learners in the past three decades (Carlo et al., 2004; Cena et al., 2013; Perez, 1981; Vaughn-Shavuo, 1990), and none of these studies focused specifically on English learners who were at risk or had learning disabilities.

We are encouraged by the findings in the Solari and Gerber (2008) study, which showed significant effects for listening comprehension on both researcher-developed and standardized measures of listening comprehension in kindergarten for English learners when they were provided an intervention with a strong listening comprehension component. For the most part, many of the interventions paid only cursory attention to developing either oral or written language skills as part of the intervention approach. For many, this seems counterintuitive because of language demands in academic settings. For others, it is understandable because of the challenges associated with intervening systematically in language.

In the Solari and Gerber (2008) study, language skills were taught along with academic skills to support later reading comprehension. It provides an important example of how language instruction can be incorporated into English learner research. The study is also noteworthy because it demonstrated that even students who are not yet proficient in English benefit from an intervention focusing on both language and reading development. Given the increased emphasis on academic language and academic vocabulary in the Common Core State Standards, recent publications on effective instruction for English learners (e.g., S. Baker et al., 2014), and research indicating that students with poor reading comprehension often have language deficits (Catts, Adolf, & Ellis Weismer, 2006; Catts, Compton, Tomblin, & Bridges, 2012), we anticipate—or at least hope for—a surge of studies examining vocabulary and academic language interventions for this population.

Finally, it also was striking to us that so many of the interventions provided were identical to those provided to native speakers. Although this makes perfect sense in kindergarten and early first grade, afterward, we

wonder if more innovative intervention curricula that have a heavy language component might produce stronger effects than the current set of studies.

### *Implications for Future Research*

In our search for studies for this review, we found 12 studies that used an RCT and met our inclusion criteria. More experimental studies ought to be conducted to determine what malleable factors have a significant effect on English learners' academic performance. However, the pace of studies is improving, and the number of studies conducted since 2000 is much greater than similar time periods prior to 2000. In terms of implications for future research, we recommend that researchers (a) focus on the individual differences in English learners, (b) consider development of interventions that focus on language and vocabulary and measures that capture language comprehension, and (c) include the calculations of an "effort variable" to be able to compare interventions.

There are scarce studies that focus on English learners at risk for reading disabilities and even fewer studies that disaggregate the data by student language proficiency. English learners are a very heterogeneous group of students. They vary in terms of language proficiency, academic achievement, and the myriad predictor variables that may have an influence on growth and performance, such as poverty status and proficiency in their primary language. Future research should investigate interventions for English learners at varying language proficiency levels, including students who are technically exited from English learner status. Evaluating how individual differences in language proficiency influence intervention outcomes will allow the field to refine interventions to better meet the needs of these students.

In addition, there is clearly a need to examine the effect of interventions that focus on language development and vocabulary as a core component for English learners at risk and those who have learning disabilities. We found very few studies that included a vocabulary or language development component and even

fewer that measured this domain as a pretest or outcome. Those that did measure vocabulary used typical standardized measures that may not be able to capture the growth students are making in the context of a particular intervention. Better language and vocabulary measures, and better measurement development procedures that can be used in the context of specific studies, are badly needed to more accurately estimate the impact of interventions on language and vocabulary outcomes.

We recommend that future intervention studies include the calculation of an interventionist "effort variable" to guide practitioners in the allocation of resources to support struggling English learners. This effort variable might include minutes of instruction divided by number of students in a group to help the field learn more about what is the most effective amount of time and group size to obtain a desired effect. In addition, a better description of who is delivering the intervention (e.g. a certified teacher, a research assistant, or a trained instructional assistant), and the amount of hours needed to train staff to deliver the intervention with fidelity, could help schools improve the supports they provide English learners. The English learner population will continue to increase, and the achievement gap with non-English learners will not be reduced unless the effect of interventions for English learners at risk or with learning disabilities is rigorously evaluated, to better understand how to effectively support these students.

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