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Lang. Teach. (2016), **49.3**, 301–338 © Cambridge University Press 2016
doi:10.1017/S0261444816000070

State-of-the-Art Article

Language learning impairment in sequential bilingual children

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We review and synthesize empirical evidence at the intersection of two populations: children with language learning impairment (LLI) and children from immigrant families who learn a single language from birth and a second language beginning in early childhood. LLI is a high incidence disorder that, in recent years, has been referred to by researchers and clinical educators as specific language impairment (SLI), primary language impairment (PLI), developmental language disorder or language disorder not otherwise specified. Over the past two decades, significant international attention has been directed at the LLI-sequential bilingual learner interface. Researchers have developed linguistic profiles of children with LLI who are learning different language pairs, investigated the diagnostic accuracy of various measures and, more recently, examined the relative efficacy of different treatment protocols. Participants in these studies range in age from 3 to 12 years. A main goal of this review is to relate available evidence to key theoretical and pedagogical issues. An additional aim is to indicate main areas of need for future research.

1. Introduction

LLI refers to impaired acquisition and use of first and subsequent languages due to some inefficiency in a child's internal language learning system. This inefficiency is presumed to be present from birth (e.g., Benasich & Tallal 2002), although symptoms are not clinically apparent until the child fails to meet later language acquisition milestones. There is no obvious cause for the language difficulty; thus, children with clinical sensory, intellectual, physical, or social-emotional deficits are excluded from an LLI diagnosis. For children with LLI, poor ability in language is also not explained by environmental differences.

In research, educational and clinical settings, LLI has different names including PLI, SLI, developmental language disorder, mixed receptive-expressive language disorder, or simply language disorder (American Psychiatric Association 2013). These names reflect differing theoretical perspectives, varied responses to accrued evidence, institutional and disciplinary conventions, as well as personal preferences among concerned stakeholders. Nomenclature

https://doi.org/10.1017/S0261444816000070 Published online by Cambridge University Press

is an important issue of current international discussion; at the time of this writing there is no consensus on a preferred term for the high-incidence condition considered here (e.g., Bishop 2014; Reilly et al. 2014). Throughout this review, we use LLI as the 'best for now' option. This term describes the main area of impairment (language) but does not exclude the subtle cognitive processing weaknesses documented in affected children. It is also theory neutral and this term is favored by experts in the international community (Bishop 2014).

We focus on 3- to 12-year-old children with LLI who learn a single minority home language from birth (L1) and a second community language (L2) beginning in early childhood. To emphasize the continued relevance of both languages, we refer to these learners as developing sequential bilinguals rather than L2 learners. A main goal of this review is to relate available evidence to key theoretical and pedagogical issues. To anchor subsequent discussion, we begin with an overview of LLI in the monolingual context.

2. Overview of LLI

Children with LLI demonstrate persistently delayed or impaired language ability as compared to age peers, in the face of otherwise normal development. This delay may be in the child's ability to understand language, to produce it, or in both. The LLI diagnosis is made behaviorally, using a combination of inclusionary and exclusionary criteria. That is, for a diagnosis of LLI, a child must perform significantly below expectations in language development yet not exhibit hearing impairment, autism, global developmental delays, or intellectual impairment.

Within the monolingual English-speaking population in the United States, LLI prevalence at school entry has been estimated at 7.6% (Tomblin et al. 1997). Previously published estimates, obtained from monolingual populations in Canada and the United States, ranged from 2.1% to 10.4% (Law et al. 2000). Discrepancies in these estimates are attributed to the relatively inconspicuous nature of LLI (Tomblin et al. 1997), to variability in prevalence across development, to differences in tools used for identification, and to variations in study methodology. The societal and personal consequences of LLI are substantial; longitudinal investigations in Canada and the UK have noted poorer long-term outcomes for affected children across a range of areas (Clegg et al. 2005; Johnson, Beitchman & Brownlie 2010). Children with LLI are less likely than unaffected peers to complete secondary schooling, to obtain high-paying employment, or to have many close friends. Thus, there are strong incentives to improve accuracy and timeliness in LLI identification as well as the efficacy of LLI treatment. The core symptoms of LLI manifest differently, based on the child's age or developmental stage as well as the features of the language being learned. The earliest clinical sign of language difficulty may be a failure to use a variety of words and word combinations by a child's second birthday. Such children are usually considered LATE TALKERS and many later go on to meet criteria for LLI (see Rescorla 2011 for a review). During the preschool years, slow acquisition of the grammatical system is considered a hallmark of LLI. Preschool-aged children with LLI make more grammatical errors than unaffected peers across languages, although the nature of the errors differs with linguistic

https://doi.org/10.1017/S0261444816000070 Published online by Cambridge University Press

typology. For example, Kuwaiti Arabic-speaking children with LLI make more errors in marking noun plurals than typically developing peers (Abdalla, Aljenaie & Mahfoudhi 2013); children learning Italian have difficulty with articles and direct object clitics (Bortolini, Caselli & Leonard 1997); and Cantonese-speaking children with LLI omit verb aspect markers (Fletcher et al. 2005). As children progress into the school years, overt grammatical errors may decrease or disappear, but a variety of other linguistic symptoms may emerge. School-aged children with LLI produce less fluent and elaborated discourse, both in narrative and informational contexts (Scott & Windsor 2000). Difficulty comprehending classroom discourse, and reduced academic vocabulary, challenge learning in traditional educational settings (e.g., Paul & Norbury 2012). School-aged children with LLI are also at high risk for reading difficulty (e.g., Catts et al. 2008) and may struggle to produce written language (Scott & Windsor 2000). There is ultimately a close relationship between LLI and language-based learning disabilities (Paul & Norbury 2012), such that many children with LLI meet criteria for specific learning disorders and similar diagnostic categories within the educational system. Determining the exact degree of overlap between these populations is outside the scope of this review.

Although language is the most obvious area of weakness in children with LLI, it is not the only one. A robust body of evidence clearly shows that subtle, subclinical inefficiencies in processing nonlinguistic information are part of the LLI profile (Leonard 2014). We highlight these weaknesses in three major domains: processing speed, working memory, and attention. Children with LLI are slower to detect and respond to the presence of tones or shapes (Kohnert & Windsor 2004), to mentally rotate simple shapes (Miller et al. 2001), to search an array for a target shape (Leonard et al. 2007), or to complete simple arithmetic problems (Windsor et al. 2008). They demonstrate deficits in working memory skills that extend beyond verbal stimuli to nonlinguistic targets such as spatial locations (Vugs et al. 2013). Children with LLI also demonstrate poorer sustained selective attention abilities, for nonlinguistic as well as linguistic stimuli (Ebert & Kohnert 2011). Additional nonlinguistic weaknesses have been found outside the realm of cognitive processing, including reduced skill on fine motor, gross motor, and praxis tasks (Zelaznik & Goffman 2010), and difficulty with emotion regulation (Fujiki, Brinton & Clarke 2002).

Theoretical accounts of LLI can be generally characterized as DOMAIN SPECIFIC or DOMAIN GENERAL. Domain-specific accounts attribute LLI to deficits in a cognitive system specialized to produce linguistic representations (e.g., van der Lely, Jones & Marshall 2011). From this perspective, subtle weaknesses in nonlinguistic cognitive processing may coexist with the more prominent language impairment in LLI, but are not causally related.

In contrast, domain-general accounts posit that broader cognitive weaknesses (in particular, the three areas outlined above) account for the obvious language deficits seen in LLI. For example, subtle slowing in information processing might leave linguistic input vulnerable to decay, hindering learning (Leonard et al. 2007), and reduced working memory capacity could limit the transfer of new linguistic information to long-term knowledge (Montgomery, Magimairaj & Finney 2010). Within the past decade, a third explanation of LLI has gained traction: Ullman & Pierpont (2005) proposed that deficits in the procedural learning system explain the combined linguistic, cognitive, motor, and neuroanatomical characteristics of children with LLI. Subsequent investigations of the procedural deficit hypothesis have

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provided conflicting results (cf., Gabriel et al. 2012; Lum et al. 2012), and thus this idea – though promising – has not yet resolved the controversy over the root cause or causes of LLI.

In summary, monolingual speakers of different languages with LLI represent a well-established, albeit heterogeneous, clinical group who experience significant difficulties in language despite otherwise typical development. Subtle, subclinical nonlinguistic deficits accompany the characteristic language impairment (e.g., Leonard et al. 2007). The cause of LLI remains an area of active exploration and scientific debate. Ultimately, the underlying cause has important implications for the identification and treatment of this disorder for monolingual as well as bilingual children.

3. Sequential bilingual learners: characteristics and comparisons with LLI

3.1 Typical sequential bilingual learners

Children with LLI are defined in reference to peers with typical language development. To make a valid comparison, these peers should have comparable social and educational experiences. For young sequential bilingual learners, then, this reference group is composed of children who have consistent and robust experiences with a single L1 from birth and with an L2 beginning at some point during childhood. In this review, the L2 learners of interest are mainly children from immigrant or indigenous families who learn a home language that is different from the majority community language(s). This type of L2 learner is well represented in almost every country; examples include Spanish or Vietnamese L1 learners in the US, native Punjabi or Cantonese speakers in the UK or Canada, Turkish or Arabic L1 learners in Germany or Sweden and children in Mexico who speak Nahuatl or Mayan as their home language. For many sequential bilingual children, the L1 is considered a MINORITY LANGUAGE either because there are fewer opportunities to use this language or because there is less social prestige associated with L1 proficiency. The linguistic characteristics of this typically developing population provide the reference for bilingual learners with LLI.

By definition, early sequential bilinguals are initially more skilled in their home language. The L1 is not fully mastered when the L2 is introduced and, over time, shifts may occur from relative strength or DOMINANCE in the L1 to the L2. Sociolinguistic factors such as the language of education play key roles in this dominance shift (Wright, Taylor & Macarthur 2000). For many minority L1 speakers, L2 learning begins in early childhood and accelerates with immersion in majority language educational programs, becoming the more proficient language by late childhood or adolescence (e.g., Jia, Aaronson & Wu 2002; Verhoeven 2007; Sheng, Lu & Kan 2011; Pham & Kohnert 2014). For example, Pham & Kohnert (2014) longitudinally tracked growth in lexical access and vocabulary skills among 33 Vietnamese L1 learners in the US. Children began the study, on average, at age 7 years and were tracked annually for four years. At initial testing, performance was better in Vietnamese (L1) across tasks. Both L1 and L2 (English) skills grew across the four-year period, but gains in the L2 significantly outpaced those in the L1; for example, expressive vocabulary scores grew at a

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rate of 11% per year in English compared to 3% per year in Vietnamese. Ultimately, this growth pattern resulted in a gradual shift to English (L2) dominance by study completion.

Even a brief discussion of the DOMINANCE SHIFT must acknowledge potential differences in the timing and extent of the shift across the various subcomponents and skill sets that compose language. For both monolingual and bilingual children, language acquisition is a prolonged process; different language skills or subsystems may experience rapid growth or refinement during particular developmental periods, or in association with certain experiences (Chondrogianni & Marinis 2011). Studies investigating both languages of sequential bilingual children find that at different points during the dynamic process of language acquisition, learners may perform some tasks better in the L1 and other tasks better in the L2 (e.g., Ordóñez et al. 2002; Peña, Bedore & Zlatic-Giunta 2002; Kan & Kohnert 2008). Therefore, even when there is an overall shift from relative strength in the L1 to the L2, the timing may not be uniform across language tasks and subsystems (Kohnert & Bates 2002; Pham & Kohnert 2014).

Shifting patterns of absolute and relative differences in L1-L2 performance across tasks and over time are consistent with the COMPLEMENTARITY PRINCIPLE OF BILINGUALISM (Grosjean 2010). In its essence, the complementarity principle asserts that proficiency follows use; the languages in bilingual or multilingual speakers may be developed and used for different, albeit complementary, purposes. Therefore, differences in relative areas of functional strength within a bilingual, between the two languages, are to be expected. This point is exemplified by a large cross-sectional study of 3- to 10-year-old children in Canada: Bialystok and colleagues (Bialystok et al. 2010) found that at all age levels, monolingual groups scored significantly better than their sequential bilingual age peers on an English vocabulary comprehension test. The effect was robust and large (Cohen's $d = 0.83$ for the difference in scores between the two groups). Researchers were quick to point out, however, that the bilingual group scores were within the normal range of variation. The monolingual-bilingual vocabulary difference was largely confined to words that reflect home life; school vocabulary for children in the two groups was more comparable, underscoring the relevance of the complementarity principle.

An additional relevant feature of developing sequential bilingual learners is the presence and nature of within-child, cross-language associations. Hypothetically, two languages within a sequential bilingual learner may coexist without interaction or be interdependent, with the presence of one language affecting acquisition or use of the other. Mere coexistence should yield no statistical associations between performance on select tasks in the L1 and the L2. In contrast, interdependence should produce negative or positive correspondences between the L1 and the L2 (e.g., De Bot, Lowie & Verspoor 2007).

Despite the relative nascence of this investigative line, several studies document significant cross-language associations for sequential bilingual learners at various ages and developmental stages, learning different pairs of languages. For example, Verhoeven (2007) investigated a number of language skills (including receptive and expressive vocabulary, sentence repetition, story comprehension, and grammatical comprehension) in a group of 75 kindergartners learning Turkish as the L1 and Dutch as the L2 in the Netherlands. A factor analysis of the children's performance in both the L1 and the L2 showed a one-factor solution, meaning that for these sequential bilingual learners, there was strong interdependence between their two languages. In addition, both languages also contributed cross-linguistically

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to the development of early reading skills. In younger children learning a very different pair of languages (Hmong as the L1 and English as the L2), Kan & Kohnert (2008) found a positive association between lexical comprehension (or picture identification) in the L1 and lexical production (or picture naming) in the L2. However, for these same participants the ability to quickly learn a novel sequence of English phonemes to name an unfamiliar object (fast mapping) was negatively correlated with Hmong vocabulary knowledge, suggesting some type of temporary cross-linguistic interference (Kan & Kohnert 2008; 2012). When retelling stories in each of their languages, preschool-age participants who used more different words in Hmong (L1) also used a more diverse vocabulary in English (L2) (Kohnert, Kan & Conboy 2010). Finally, a number of studies demonstrate better spoken L1 skills are positively associated with early L2 reading skills for Spanish-English sequential bilinguals in the US (e.g., López & Greenfield 2004; Miller et al. 2006).

In contrast, a recent review and meta-analysis of the relationship between the L1 and the L2 vocabulary scores in school-aged Spanish-English bilingual children (Branum-Martin et al. 2009) identified positive, neutral, and negative relationships across various published studies. Meta-analytic results showed correlations near zero between the two languages for individual students, at least when vocabulary is measured using standardized tests (Branum-Martin et al. 2009). Across studies, it is clear that the L1 and the L2 are interdependent, but that the strength and direction of L1-L2 relations varies. A number of factors may play into this variability, such as the age of the children studied, the sociolinguistic context of the study, the relative linguistic proficiency of participants, and perhaps the cognitive abilities of the participants (Kan & Kohnert 2012; Kohnert 2013). Sorting out the factors underlying cross-linguistic relationships is a key area of research need, not only to understand typical bilingual development but also to understand how best to support the language growth of bilingual children with LLI.

Thus far, we have considered linguistic characteristics of typically developing sequential bilingual children. The relevant characteristics of these bilingual learners extend beyond strictly linguistic skills, however. Children who are proficiently bilingual have been shown to outperform monolingual peers on both metalinguistic tasks and specific types of cognitive tasks (see Adesope et al. 2010; Bialystok, Craik & Luk 2012 for reviews). Metalinguistically, bilingual children show enhanced skills in areas such as phonemic awareness and grammaticality judgment. Cognitively, bilingual children outperform monolinguals on a variety of nonlinguistic tasks, particularly in the area of attentional control (Adesope et al. 2010). These advantages have been interpreted as evidence of enhanced cognitive control, resulting from the need to manage two separate language systems (Bialystok et al. 2012). Though most studies have included bilingual children already highly proficient in both languages, at least one recent study showed that attentional control advantages may begin to emerge with as little as one year of systematic L2 exposure (Poarch & van Hell 2012). Thus, evidence for cognitive and metalinguistic advantages in sequential bilingual children is mounting, and this evidence may have important implications for bilingual children with LLI.

The purpose of our review of typical sequential bilingual learners was to establish developmental patterns with key implications for bilingual peers with LLI. Several such patterns emerge. Children who speak minority L1s frequently shift to L2 dominance during

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childhood, with the exact timing varying substantially both across and within children (i.e., different language skills may grow at different rates and show different patterns of dominance). Bilinguals cannot be characterized as the sum of two monolinguals, for multiple reasons; they demonstrate unique profiles of relative cross-linguistic areas of strength, frequently driven by patterns of use, and the presence of cross-linguistic associations is a unique feature of bilinguals. Finally, the presence and interdependence of two languages within one developing child has clear cognitive consequences. Alongside these unique features of young bilingual learners, investigators have documented some performance similarities between monolingual children with LLI and typically developing sequential bilingual children. We turn next to the literature comparing these groups.

3.2 Comparing L2 learners to monolingual children with LLI

One prominent research question within the past two decades has been how typically developing sequential bilingual children compare to monolingual peers with and without LLI. That is, a number of studies have conducted three-way group comparisons with typical sequential bilingual children, typical monolingual children, and monolingual children with LLI. This line of work tests the tenets of basic language acquisition theories by comparing the influence of decreased language experience (i.e., sequential bilingual children performing in the L2) to that of impaired language learning (i.e., children with LLI). From a practical standpoint, these three-way comparisons provide an opportunity to identify possible fault lines that could separate typical sequential bilingual learners from age peers with LLI.

Within this line of work, the comparisons have spanned a broad range of linguistic and nonlinguistic skills, including vocabulary, grammar, narrative skills, new word learning, recall of phoneme sequences, and the processing of visual and auditory nonlinguistic information (e.g., Paradis 2005; Gutiérrez-Clellen, Simon-Cereijido & Wagner 2008; Windsor et al. 2008; Kohnert, Windsor & Ebert 2009; Marinis & Saddy 2013). The language tasks are generally administered in the only language of the monolingual comparison groups, which is the L2 of the sequential bilingual participants.

In many of these comparisons, typical sequential bilingual learners perform indistinguishably from their monolingual age peers with LLI on a wide range of language tasks, even when the typical bilingual group has many years of L2 experience (e.g., Kohnert et al. 2009). Comparable performance between typically developing Spanish-English sequential bilinguals and English-speaking monolingual children with LLI has been documented on a number of lexical-semantic measures, including standardized tests of receptive vocabulary, speeded picture naming tasks, and measures of verbal recall (Umbel et al. 1992; Kohnert et al. 2009). Verhoeven et al. (2011) reported nearly identical group means on a word definition task in Dutch for monolingual Dutch-speaking children with LLI (n = 137) and for typically developing L2 Dutch learners (whose first languages included Turkish, Moroccan, and Surinamese; n = 321). In contrast to the lack of differentiation between typical bilingual learners and monolinguals with LLI, significant differences between typical bilingual and typical monolingual groups are a frequent finding: that is, when considering only the L2, school-aged typically developing bilinguals know fewer words, name pictures

https://doi.org/10.1017/S0261444816000070 Published online by Cambridge University Press

more slowly, and create poorer word definitions (e.g., Kohnert et al. 2009; Verhoeven et al. 2011).

Similar patterns are found outside the realm of lexical-semantic tasks. There has been particular interest in comparisons of grammatical patterns between typical L2 learners and monolingual LLI, due to the prominence of grammar in theories of LLI and in clinical practice. A frequent finding from this literature is that typical L2 learners may make grammatical errors that mirror those made by monolingual children with LLI. For example, patterns of Dutch grammatical errors – including omissions of definite determiners and incorrect adjective-noun agreement – were found to be the same for six- to eight-year-old children with LLI and same-aged peers learning Dutch as the L2 (Orgassa & Weerman 2008). Moreover, similar patterns were found in younger (4- and 5-year-old) typically developing monolingual Dutch-speaking peers, suggesting the error patterns show a typical but delayed sequence of development. In French, both typically developing L2 speakers and monolingual children with LLI tend to omit past and future tense verb markings and copula verbs (Paradis & Crago 2000). Similar findings exist in Spanish (Gutiérrez-Clellen, Simon-Cereijido & Wagner 2008) and Swedish (Håkansson 2001).

A potentially important factor in comparisons between typical sequential bilinguals and monolinguals with and without LLI is socioeconomic status. Sequential bilingual children frequently live in first- or second-generation immigrant families; in many countries, such families experience fewer employment opportunities and higher rates of poverty (Kerr & Kerr 2011). Because poverty is associated with less frequent and less rich language exposure for children (Hart & Risley 1995), socioeconomic status may have a confounding influence on comparisons between monolinguals and sequential bilingual language development if not carefully controlled.

Recently, some researchers have taken a closer look at specific error types to better compare bilingual and LLI development (Chondrogianni & Marinis 2012; Marinis & Saddy 2013; Armon-Lotem 2014). For example, Armon-Lotem (2014) used sentence completion and sentence repetition tasks to investigate prepositions and verb inflectional morphology in Hebrew. The 5- to 7-year-old participants were typical Hebrew L2 learners, with either English or Russian as their L1, and monolingual Hebrew speaking children with LLI. Results showed that prepositions and verb inflectional morphology were loci of difficulty for both the typical bilingual participants and the Hebrew-only participants with LLI. However, a closer analysis of errors revealed that the number and nature of errors differed for the groups. The typical L2 learners tended to produce errors of commission, characterized largely by substitutions based on L1 features. In contrast, the monolingual LLI errors were characterized as omission of the whole morpheme or feature reduction. Differences in error patterns may surface on grammatical comprehension tasks as well. A detailed analysis of the comprehension of passives by typically developing Turkish-English bilinguals and English-only speakers with LLI revealed group differences in errors and in the time needed to process and interpret sentences (Marinis & Saddy 2013). As this body of literature grows, it may be possible to utilize careful analysis of grammatical errors in production, or perhaps error patterns in comprehension, to rule out LLI in L2 learners.

Three-way comparisons have also extended to nonlinguistic processing skills. Given the well-documented subtle processing inefficiencies in monolingual children with LLI (in

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areas such as processing speed and working memory), it is possible that performance on nonlinguistic cognitive tasks could separate monolingual children with LLI from typically developing monolingual and bilingual peers. Indeed, Kohnert et al. (2009) found that typically developing Spanish-English 8- to 11-year-old bilinguals and monolinguals performed comparably, and better than English-only children with LLI, on a host of experimental nonlinguistic processing tasks. For example, tasks measuring response speed for pushing one of two different buttons in response to a visual cue, or requiring participants to determine if sequences of presented tones were the same or different, separated children with LLI from typical bilingual and monolingual peers. Accuracy in a mental rotation task produced a similar result. Of note, group differences did not reach significance on other tasks (such as pushing a single button in response to an auditory or visual stimulus, or searching for a target digit in an array). There may be a minimal level of task complexity needed to tease out the relatively subtle processing difficulties of children with LLI; further studies in this area should extend and clarify these results.

Finally, it is important to note that although identifying a task that reveals significant group differences in performance between typical L2 learners and monolingual children with LLI advances basic understanding of language, the practical applications are limited. Group-level differences must be verified with investigations of diagnostic accuracy, beginning with sensitivity and specificity analyses at different cutoff points and progressing to the development of positive and negative likelihood ratios (e.g. Dollaghan & Horner 2011). The calculation of positive and negative likelihood ratios advances consideration of diagnostic tasks to the individual level, which is ultimately critical for practical clinical applications.

In addition, standards of comparisons for bilingual children must go beyond monolingual peers. As discussed previously, the bilingual is more than and different than the sum of his or her component languages, and bilingual children may often experience different socioeconomic circumstances than monolingual children. Thus, although comparisons to monolinguals on select tasks may be useful to rule out LLI in some typically developing sequential bilinguals, they cannot be used to identify LLI. Rather, diagnostic tasks must be investigated in samples that also include bilingual children with LLI. Though studies of this population were historically rare, in recent years the literature characterizing sequential bilingual children with LLI as compared to their typically developing bilingual peers has rapidly grown. We review the trends in this emerging literature next, before returning to the questions of accurate identification and assessment of bilingual children with LLI.

4. Sequential bilingual learners with LLI

Thus far we have considered two populations separately: children with LLI and typically developing sequential bilinguals. We now consider the intersection of these groups. The number of sequential bilingual learners with LLI is unknown, although it is generally held that LLI rates are similar across monolingual and bilingual populations. Because LLI is presumably due to some underlying inefficiency in learning and/or processing language, both the L1 and the L2 will be affected in bilingual children. An expanding body of empirical

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literature now profiles the language skills of bilingual children with LLI in both first and subsequent languages (Windsor et al. 2010; Iluz-Cohen & Walters 2012; Sheng et al. 2012; Verhoeven, Steenge & van Balkom 2012; Ebert, Pham & Kohnert 2014; Squires et al. 2014).

One of the most often asked questions is whether bilingual children with LLI are 'worse off' than their monolingual peers (see Kohnert & Medina 2009; Paradis 2010). The simple response from the available evidence that best speaks to this question is NO. Given comparable social circumstances, economic resources, and educational support, monolingual children with LLI do not outperform bilingual learners with LLI on isolated language tasks (Armon-Lotem 2010; Windsor et al. 2010; Spoelman & Bol 2012; To, Law & Li 2012; see Kohnert & Medina 2009 for a review). Using the appropriate standard of comparison in these studies is crucial; when children with LLI are compared to children matched for age and language background, there appears to be no difference in the severity of deficit for bilinguals and monolinguals with LLI (Windsor et al. 2010). Studies that have claimed children with LLI are disadvantaged by bilingualism have relied on tasks administered only in the bilinguals' L2, ignoring the existence of L1 (Orgassa & Weerman 2008; Verhoeven et al. 2011); findings of reduced performance on some tasks in L2 may be consistent with the literature on typically developing sequential bilinguals, but such investigations fail to consider the full communicative profile and skills of children learning two languages.

Although bilingual children with LLI may not fare worse than their monolingual peers with LLI, by definition they perform below typically developing, age-matched peers with similar cultural and language learning experiences, in both the L1 and the L2. Linguistic weaknesses among sequential bilingual learners with LLI have been documented at multiple language levels, as reviewed in the following section. We focus our discussion on studies that have simultaneously considered both the L1 and the L2 as they provide a more complete profile of developing bilinguals.

4.1 Dual language profiles in bilingual LLI

At the sublexical level, the repetition of nonsense words (known as nonword repetition or NWR) has been investigated in several studies of bilingual children with LLI. Results of these works robustly indicate that bilingual children with LLI repeat nonsense words less accurately than typically developing bilingual peers in both the L1 and the L2, a result found for English-French bilinguals in Canada (Elin Thordardottir & Brandeker 2013), Turkish-Dutch bilinguals in the Netherlands (Verhoeven et al. 2012); and Spanish-English bilinguals in the United States (Gutiérrez-Clellen & Simon-Cereijido 2010; Windsor et al. 2010). NWR is thought to measure phonological memory, though it may tap into multiple linguistic abilities (see Ebert et al. 2014 for discussion). Thus, NWR appears to be an area of weakness for bilingual children with LLI, as it is for their monolingual peers.

At the lexical level, LLI is reflected in reduced performance on a number of linguistic measures. First, bilingual children with LLI are likely to show reduced vocabulary in both languages relative to their typically developing peers, as measured in picture identification and naming assessments (e.g., Gibson, Peña & Bedore 2014). Reduced vocabulary size among bilingual children with LLI is also reflected in smaller lexical diversity in connected

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discourse. For example, when 5- to 7-year-old English-Hebrew bilingual children living in Israel narrated familiar stories to picture stimuli, those with LLI produced significantly fewer different words, and had smaller type-token ratios (or the ratio of unique words to total words produced) than children without LLI (Iluz-Cohen & Walters 2012). Group membership accounted for 22.4% and 36.7% of the variance in these lexical measures. Similar results were found for Spanish-English bilinguals in the US (Simon-Cereijido & Gutiérrez-Clellen 2009); children with LLI produced fewer different words in both L1 and L2 narratives than unaffected peers. We do note that in a few studies, measures of lexical diversity have not shown significant between-group differences for LLI versus typically developing groups (Ooi & Wong 2012; Jacobsen & Walden 2013), though the lack of significance may relate to sample size, methods of language sampling, or other differences among the various participant groups.

In addition, there is evidence that bilingual children with LLI show reduced vocabulary depth, or overall semantic knowledge, in comparison to typically developing bilingual peers. Sheng and colleagues (Sheng et al. 2012; 2013) have shown that school-aged Spanish-English bilingual children with LLI demonstrate relatively poor semantic depth in comparison to their typically developing peers. Specific deficits include weaker semantic networks, as measured by children's ability to generate words associated with a target lexical item, and poor semantic convergence, as measured by the ability to generate expected associations for the lexical target (rather than unusual responses). Such differences were evident in each language, as well as when languages were combined using conceptual scoring.

At the sentence level, dual-language weaknesses for bilingual children with LLI are expected to manifest in increased grammatical errors, shorter utterances, and reduced sentence comprehension. Grammatical deficits have been a traditional focus of the LLI literature for bilinguals, as they are for monolinguals, though a substantial percentage of studies have examined these deficits in only one language (e.g., Gutiérrez-Clellen et al. 2008; Verhoeven et al. 2011; Blom et al. 2013). Again, the focus here is on those that have considered both languages. For example, Swedish investigators considered grammatical development in Arabic-Swedish bilingual children aged 4 to 7 years (Håkansson, Salameh & Nettelbladt 2003; Salameh, Håkansson & Nettelbladt 2004). A series of tasks in Arabic and in Swedish, designed to elicit specific grammatical structures, were administered to ten children with LLI and ten typically developing bilingual peers matched for age and parental education (Håkansson et al. 2003). Results showed that the children with LLI, like their typically developing peers, acquired grammatical structures in a predictable order in both languages. Unlike their typical peers, however, the children with LLI were at earlier stages of grammatical development in both Swedish and Arabic. The same children were then followed for a year to examine rates of grammatical development (Salameh et al. 2004); as a group, the children with LLI continued to progress slowly through the expected sequence of grammatical development in both languages, with individual instances of regression in one language or the other.

Further evidence of sentence-level linguistic deficits in bilingual children with LLI can be found in analyses of utterance length and complexity. Works that have compared mean length of utterance (MLU) in bilingual children with LLI to their typically developing bilingual peers have consistently found significantly shorter MLU for children with LLI (Sanz-Torrent et al.

https://doi.org/10.1017/S0261444816000070 Published online by Cambridge University Press

2008; Ooi & Wong 2012; Jacobsen & Walden 2013). For example, Ooi & Wong (2012) found that the presence of LLI accounted for 32% of the variance in English MLU for a group of 18 Cantonese-English bilingual preschoolers. Although it is perhaps unsurprising that this classic indicator of language development would reflect LLI in bilingual children, additional work in this area may reveal more nuanced patterns of deficit. The degree to which bilingual children with LLI show shorter spontaneous MLUs is likely to depend on specific language pairs, patterns of input, and age. For example, there may be a greater difference in English MLU between children with and without LLI than in Spanish MLU, due to language-specific trajectories of MLU growth (Bedore et al. 2010).

Finally, a limited number of studies have considered the overall quality of discourse produced by bilingual children with LLI. In a recent longitudinal study, Squires et al. (2014) asked a group of 21 Spanish-English bilingual children with LLI and a set of 21 matched peers without LLI to retell stories in English and in Spanish to wordless picture books at two time points: kindergarten and first grade. The stories were scored for both microstructural (e.g., mental and linguistic verbs, subordinating conjunctions, and elaborated noun phrases) and macrostructural (e.g., character, setting, and initiating events) elements. The typically developing children received higher macrostructural scores at both time points and in both languages. In addition, the scores of the typically developing children grew at a faster rate than those of the children with LLI.

In contrast, Iluz-Cohen & Walters (2012) found no differences in story macrostructure between English-Hebrew bilinguals with and without LLI. Children in this study were of comparable age (5 and 6 years old) to those studied by Squires et al. (2014); however, they did not receive a model of the story before telling it, perhaps contributing to the conflicting cross-study results. The small number of participants (nine children with LLI and eight without) studied by Iluz-Cohen & Walters (2012) may also have contributed to the insignificant differences in story macrostructure, though significant between-group differences existed on other measures in this study. It is also possible that the severity of LLI within the impaired group differed across studies; LLI severity has not yet been considered systematically for bilingual children, and will be an important point for future research. There is some evidence of reduced story comprehension in both languages for bilingual children with LLI (Verhoeven et al. 2012), suggesting that discourse-level deficits are found receptively as well as expressively. Additional investigations to clarify differing results in expressive story macrostructure, to confirm story comprehension deficits, and to consider other forms of discourse (such as expository tasks for older children) will help to complete the linguistic profile of bilingual children with LLI.

An additional aspect of the linguistic profile is language growth over time. For typical minority sequential bilingual learners, differential rates of L1 and L2 growth are expected, often resulting in greater proficiency in the L2 when that is the majority community and educational language. At the same time, the L1, or home language, is maintained or continues to develop, albeit at a somewhat slower pace. This may not be the case for minority L1 learners with LLI. Some reports suggest that, in the absence of robust and systematic support, there is a greater risk of L1 loss or decline over time for minority bilingual children with LLI (Restrepo & Kruth 2000; Salameh et al. 2004). Ebert et al. (2014) considered changes in lexical processing skills associated with age in a cross-sectional sample of Spanish-English

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bilingual children with LLI, aged 6 to 11 years. Like their typically developing bilingual age peers, this group of children showed stronger performance in the L2 than in the L1 on tasks such as receptive vocabulary testing, expressive vocabulary testing, and rapid automatic naming. Correlations between age and task performance showed significantly better L2 skills in older children, but minimal association between age and L1 skill. That is, lexical skills in L1 appeared to plateau for many participants. Sheng et al. (2013) also suggested a possible plateau in L1 skills for school-aged bilingual children with LLI, again for Spanish-English bilingual children in the US.

Developmental stage may be an important facet of these results. Longitudinal studies of Spanish-English preschoolers with LLI have shown growth in L1 and the L2 over time (Gutiérrez-Clellen, Simon-Cereijido & Sweet 2012; Simon-Cereijido, Gutiérrez-Clellen & Sweet 2013) rather than plateaus or loss. Other possible factors in language growth for children with LLI include sociolinguistic context, typological similarity between languages, and the presence of intervention to support language growth (Gutiérrez-Clellen et al. 2012; Simon-Cereijido et al. 2013). Additional studies that vary these parameters (e.g., studies of different language pairs, in different countries, and with varying levels of support for each language) will help to establish the dual-language growth patterns of bilingual children with LLI. Ultimately, treatment studies may be most valuable in establishing language growth over time for bilingual learners with LLI, as all of these parameters can be varied within a longitudinal design.

Overall, the literature to date has clearly established the presence of weaknesses in both languages of sequential bilingual children with LLI, presumably due to a more general inefficiency in the intrinsic language learning system. In bilingual LLI, differences in relative L1 and L2 skills within individuals are also expected over time and across language subsystems, as they are with typical bilingual learners. Additional research is needed to expand our understanding of bilingual LLI, considering different language pairs and social contexts. Attention to individual variation, including disorder severity, and within-learner interactions between the L1 and the L2 should prove valuable. For example, investigations of how these factors influence rates of code-switching in bilingual LLI (e.g., Gutiérrez-Clellen, Simon-Cereijido & Leone 2009; Greene, Peña & Bedore 2012) highlight their complex interaction as well as the need for further careful study.

Profiles of bilingual LLI children necessarily encompass both the L1 and the L2, but may also need to extend beyond language. Basic cognitive processing differences have been implicated in LLI as well as in typical bilingualism. As such, we next consider cognition in bilingual LLI.

4.2 Cognition and bilingual LLI

A small but growing literature has begun to consider the cognitive characteristics of bilingual children with LLI (Kohnert, Windsor & Pham 2009; Engel de Abreu, Cruz-Santos & Puglisi 2014). Presumably, the subtle nonlinguistic cognitive weaknesses present in monolingual children with LLI would also be present in affected bilingual children, but until recently few studies had considered this question. Engel de Abreu et al. (2014) recently compared the

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verbal working memory, visuospatial working memory, selective attention, and attentional control skills of 15 Portuguese-Luxembourgish children with LLI to a group of 33 typically developing bilingual peers. The children with LLI fell below their peers on one verbal working memory measure (digit span) and the attentional control task (a flanker task), though not on the visuospatial working memory tasks or the selective attention task (a search task). Due to the relatively small samples, the comparisons which did reach significance showed very large effect sizes (e.g., $d = 0.99$ for the group difference on the attentional control task). In a larger sample of children ($n = 233$) within the US, Kohnert, Windsor & Pham (2009) found that Spanish-English bilingual children with LLI scored below typically developing peers on nonlinguistic measures of tonal working memory and visual processing speed. Moreover, these measures helped distinguish between children with and without LLI when both mono- and bilingual children were included in the sample.

As work on cognitive characteristics of bilingual children with LLI moves forward, it will be crucial to consider the intersection of cognitive advantages associated with bilingualism (Bialystok, Craik & Luk 2012) with the subtle areas of weakness present in children with LLI. It is not yet clear if the apparent cognitive advantage of bilingualism could act as a buffer against the cognitive weaknesses associated with LLI. In Engel de Abreu's recent (2014) work with Portuguese-Luxembourgish bilinguals, the bilingual children with LLI performed equivalently to a group of typically developing monolingual Portuguese speakers on the attentional control task, though they showed significant deficits in comparison to bilingual peers. In other words, the pattern of results suggested that bilingual experience could mitigate against impairments associated with LLI. However, it is important to note that the study did not contain a group of monolinguals with LLI, who would provide an important benchmark for this hypothesis.

It is also possible that bilingual cognitive advantages are not manifested in children with LLI, either because their development depends on language proficiency or because they overlap with areas of cognitive weakness in children with LLI. A recent result from English-Hebrew bilingual children (Iluz-Cohen & Armon-Lotem 2013) may provide preliminary evidence for this. Preschool-aged participants in the study were classified according to their proficiency in both languages, and children classified as having low proficiency in both languages performed below peers with high proficiency in one or both languages on nonlinguistic assessments of cognitive control. It is important to note, however, that the authors used the term 'low language proficiency' rather than LLI to describe the participants and that monolingual children were not included in the study. It is clear that more work is needed to establish the cognitive characteristics of bilingual children with LLI.

We have now considered the linguistic profiles of bilingual children affected by LLI as well as questions of language growth, dominance, and cognition. With this enhanced cognitive, linguistic, and developmental profile established, we shift to the clinical implications of this information. As with monolingual children with LLI, for bilingual children with LLI timely identification, comprehensive assessment, and effective intervention are needed to ameliorate negative long-term effects. The key difference, of course, is that monolingual children with LLI need one language to be successful in their different communicative environments and bilingual children with LLI need two.

https://doi.org/10.1017/S0261444816000070 Published online by Cambridge University Press

5. Identification and assessment of LLI in bilingual children

The findings discussed above have numerous implications for clinical identification and assessment with bilingual children. In discussing these implications, we distinguish between IDENTIFICATION – the process of determining which bilingual children have LLI and which do not – and ASSESSMENT, or the complete characterization of an individual child that is necessary for developing a comprehensive treatment plan. For both monolingual and bilingual children with LLI, different tasks may suit these different purposes.

5.1 Identification: clinical markers

Accurate identification of LLI may be difficult, even for children learning only a single language. For children learning two languages, the difficulty may be greatly magnified (see Armon-Lotem, de Jong & Meir 2015; Kohnert 2013 for discussion). One approach to improving diagnostic accuracy is to identify CLINICAL MARKERS, or tasks that are both sensitive and specific to LLI across different developmental stages and languages. For monolingual children with LLI, three major candidates for clinical markers have emerged: poor accuracy on NWR; poor repetition of sentences (called sentence repetition, sentence imitation, or recalling sentences); and omission of tense-marking morphemes (see Archibald & Joanisse 2009). All three of these characteristics have been extended to the bilingual LLI population, albeit in slightly different ways.

The omission of tense-marking morphemes is a characteristic of LLI that is largely restricted to monolingual English-speaking populations. Indeed, as discussed earlier, there is some evidence that typically developing L2 learners of English exhibit the same grammatical characteristics (e.g., Paradis 2005), and that specific grammatical profiles of LLI differ cross-linguistically. However, there have been several recent investigations of the validity of specific grammatical markers for the identification of LLI in L2 learners in both English and a variety of other languages. Based on narrative data in Dutch from 7- to 9-year-old children, Verhoeven et al. (2011) argued that omission of an agreement marker in the third-person singular verb form is a possible clinical marker of LLI in both monolingual and bilingual children learning the language (cf., Blom et al. 2013). The conclusion was based on four-way group comparisons of error rates between monolingual children with and without LLI as well as bilingual children learning L2 Dutch. Both groups with LLI made more of this type of agreement error than their unaffected peers, whereas the same pattern was not evident on other types of errors (such as past tense marking). In a similar vein, Rothweiler, Clahsen and colleagues (Rothweiler, Chilla & Clahsen 2012; Clahsen et al. 2014) have argued that subject-verb agreement errors constitute a marker of LLI in both monolingual and bilingual (L2) learners of German, based on the longitudinal development of grammar in small groups of German-speaking children with LLI.

Grammatical markers of LLI in L2 learners of English have also been considered, but results have differed according to developmental stage of the participants and the language pairs studied. For preschool children aged 3 to 6 years learning Cantonese and English in

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Malaysia, MLU and an overall rating of syntactic development (Index of Productive Syntax, or IPSyn) from spontaneous language samples showed promise in discriminating children with and without LLI (Ooi & Wong 2012). For school-age children (aged 8 to 10) living in New York City, USA, and acquiring Spanish and English, failure to mark past tense verbs characterized a group of children with LLI (compared to younger, typically developing bilingual children; Jacobson & Livert 2010). Further work with the same population suggested that word and morpheme omissions in both languages (Jacobson & Walden 2013) predicted children's LLI status.

Though the search for grammatical markers of LLI in bilingual children is an active area of research, it is clear that there are a number of challenges to be met. First, the literature to date is largely based on small samples of children, as well as on group-level comparisons; fewer studies have included individual diagnostic accuracy measures (see Ooi & Wong 2012; Morgan, Restrepo & Auza 2013 for examples). In some cases, application of diagnostic accuracy measures has led to the opposite conclusion from group-level studies (Blom et al. 2013). More work is needed to establish diagnostic accuracy, even for markers identified as promising. Moreover, it appears likely that not only will specific markers need to be identified and verified for each language, there may also be unique markers for different ages (cf., Jacobson & Livert 2010; Ooi & Wong 2012), for different language pairs (even given the same L2), and for bilingual versus monolingual children (Morgan et al. 2013). Thus, while it is important to understand grammatical characteristics of sequential bilingual learners with and without LLI, the pursuit of clinical markers may face fewer challenges in areas less susceptible to variation in experience.

The remaining two proposed markers, NWR and sentence repetition, have the potential to be more universal because a single criterion (i.e., poor repetition accuracy) would be used across languages. Moreover, both NWR and sentence repetition have been classified as language-based processing tasks (e.g., Elin Thordardottir & Brandeker 2013). Such tasks are designed to reflect real-time proficiency in the learning, recall, or manipulation of either novel or very familiar language stimuli, and therefore to draw less heavily on accrued linguistic knowledge (Thordardottir & Brandeker 2013). In theory, such tasks could level the playing field for bilingual and monolingual learners. In particular, both NWR and sentence repetition may tap aspects of memory related to language learning (Ebert 2014), reducing the emphasis on accrued linguistic knowledge.

As we have discussed, there is indeed a substantial literature demonstrating poor performance on NWR tasks for sequential bilingual children with LLI. Furthermore, a number of studies on NWR have extended beyond group-level comparisons to individual diagnostic accuracy measures. NWR was identified as promising in a recent meta-analysis of the diagnostic accuracy of various language tasks for the identification of LLI in Spanish-English bilingual children in the US (Dollaghan & Horner 2011); positive and likelihood ratios for the task (+ 9.0 and 0.2, respectively) indicate good diagnostic utility for the task. In Canada, Paradis and colleagues (Paradis, Schneider & Sorenson Duncan 2013) found NWR performance in the L2 to discriminate between bilingual children with and without LLI; children in this study spoke a wide variety of L1s (including Assyrian, Farsi, Punjabi, and Somali) bolstering the diagnostic utility of NWR across a diverse set of language learning situations.

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There is also an emerging literature on the diagnostic utility of sentence repetition for bilingual children (e.g., Komeili & Marshall 2013; Ziethe, Eysholdt & Doellinger 2013). In a retrospective analysis of language tasks for mono- and bilingual children in Germany, Ziethe and colleagues (2013) found significant group differences in sentence repetition performance between groups with and without LLI; the authors argue that sentence repetition shows promise as a marker of LLI in bilingual as well as monolingual children, though the study did not provide effect sizes or diagnostic accuracy calculations. Thordardottir & Brandeker (2013) used a French sentence repetition test to identify LLI in 5-year-old children living in Canada. Study groups included monolingual French-speaking children with and without LLI as well as bilingual children (learning French as the L2) with and without LLI. Sentence repetition showed good sensitivity to LLI for the monolingual (93%) and bilingual (92%) children as well as adequate specificity for the monolingual children (86%); however, specificity within the bilingual group was poor at 57%. In other words, this study found that typically developing bilingual children may be falsely identified as having LLI when only sentence repetition is used.

This last finding highlights an important caveat in the literature on the use of NWR and sentence repetition to identify bilingual children with LLI. Both tasks have shown some promise for accurate identification of bilingual children with LLI and, as language-based processing measures, both have the potential to reduce bias in assessment by reducing emphasis on past experience. However, it is important to emphasize that these tasks appear to be LESS influenced by previous linguistic experience, rather than UN-influenced by this experience. In the same study, Thordardottir & Brandeker (2013) found that, while sentence repetition and NWR were less influenced by language-specific experience than vocabulary scores, performance on these tasks was still significantly related to the percentage of time a child spent using the language of the task. Similar findings of lower performance for bilingual children than monolingual peers (with and without LLI) can be found for Finnish-Swedish bilingual kindergartners on sentence repetition (Westman et al. 2008) and for Spanish-English bilingual children on NWR (Windsor et al. 2010). At present, strong performance on these tasks may effectively rule out LLI for typical bilingual children (Kohnert et al. 2005; Gutiérrez-Clellen & Simon-Cereijido 2010; Windsor et al. 2010) but poor performance may need to be combined with other indicators to provide an unequivocal positive identification of LLI in bilingual children. Even for the most studied group of bilingual children with LLI, Spanish-English speakers in the United States, Dollaghan & Horner's (2011) meta-analysis found no single measure to be optimal for separating children with LLI from typical peers.

Continued research in the area of clinical makers and the identification of LLI in bilinguals could provide new options. For example, a recent international initiative in Europe aimed to develop a set of LLI identification tasks across a wide array of languages (see Armon-Lotem et al. 2015 for a summary of this work), with promising candidates identified. However, it must be acknowledged that perhaps no single task will ever serve as an adequate clinical marker in LLI, given the heterogeneity of children with LLI as well as developing bilinguals. Creating composite clinical markers – i.e., groups of tasks, perhaps implemented in both languages, which jointly possess adequate sensitivity and specificity – may be a more valid approach for identifying LLI in bilingual children. It is possible that identification composites could include nonlinguistic tasks as well; such assessments do completely strip away the

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effects of linguistic experience and have shown promise in improving identification of LLI in diverse groups (Kohnert et al. 2009), but much more work is needed to establish these tasks.

5.2 Alternatives to clinical markers in the identification of LLI

It may also be that an alternative to clinical markers is a better approach to the identification of LLI. In monolingual speakers, performance on standardized, norm-referenced assessments has been proposed as the 'gold standard' for identification of LLI (Tomblin et al. 1997) and is commonly used in clinical scenarios. However, this is not yet the case for sequential bilingual children. There has unquestionably been progress in developing norm-referenced assessments for specific, high-density groups (e.g., in the US, creation of the Bilingual English-Spanish Assessment, Peña et al. 2014). However, the tremendous heterogeneity of sequential bilingual children combined with the resources necessary for adequate standardization of these instruments may render this approach impractical on a universal level. Instruments normed on MONOLINGUAL populations do have value in ruling out LLI, as bilingual children who are able to score within monolingual norms in one or more languages are not affected by LLI. Use of monolingual instruments to positively identify LLI, or to characterize a bilingual child's linguistic strengths and weaknesses, is a dubious (albeit common) clinical practice (De Lamo White & Jin 2011; Williams & McLeod 2012).

Instead, at present the 'gold standard' for identification of bilingual children with LLI appears to be clinician, teacher, and parent concern with language development (e.g., Peña, Gillam & Bedore 2014). Many of the studies reviewed thus far have used clinician judgment (e.g., Peña et al. 2014), identification through the educational system (e.g. Engel de Abreu et al. 2014), and/or parent concern with language development (e.g., Gutiérrez-Clellen et al., 2008) to identify bilingual children with LLI for their study. In addition, there is literature to support the diagnostic accuracy of parental concern (Restrepo 1998; Paradis et al. 2013). For example, although Paradis et al. (2013) found NWR to have good diagnostic accuracy in the diverse group of Canadian bilingual children referenced above, a parental questionnaire regarding language development had better diagnostic accuracy than NWR or any other single language measure. The diagnostic utility of parental concern and clinician judgment should not be discounted.

There is one final, important alternative to clinical markers and norm-referenced assessments in the identification of LLI for sequential bilingual children. Dynamic assessment is a cross-disciplinary evaluation approach based in Vygotsky's learning theory (Lantolf 2009). It focuses on the PROCESS rather than the PRODUCT of learning, potentially isolating the construct of interest in LLI (i.e., language learning ability) (e.g., Kapantzoglou, Restrepo & Thompson 2012; Martin 2012). Though a variety of specific techniques may fall under the umbrella term DYNAMIC ASSESSMENT, all integrate an aspect of teaching into the assessment. The primary outcome of the assessment may be a comparison of the child's performance before and after the teaching phase (e.g., Peña, Iglesias & Lidz 2001); the examiner's rating of modifiability, meaning how easily the child responds to the teaching (Kapantzoglou et al.

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2012); an assessment of the child's learning strategies or motivation (e.g., Ukrainetz et al. 2000); or a combination of these measures.

This approach is gaining increasing attention for its ability to accurately identify bilingual children with LLI (e.g., Peña et al. 2001; Kapantzoglou et al. 2012; Martin 2012; Hasson et al. 2013; Peña, Gillam & Bedore 2014). Within the United States, investigations of dynamic assessment for bilingual children with LLI have focused on word learning and story-telling skills. For example, recent work by Peña and colleagues (2014) shows that, when bilingual children are given models and explicit instruction in how to construct high-quality narratives in the L2, typically developing children respond better to the intervention than those with LLI. Clinician ratings of modifiability robustly differentiated between the two groups. In the UK, a structured dynamic assessment tool for preschoolers (Hasson et al. 2013) has been developed. The assessment contains teaching phases for expressive vocabulary, phonology and sentence structure, and initial work shows promise in differentiating bilingual children with and without LLI (Hasson et al. 2013). Dynamic assessment appears to be a promising approach, though additional work is needed to test it for learners of L2s other than English, to validate it in larger participant samples, and to verify its accuracy in more typical clinical conditions (including limited testing time and administration by less experienced clinicians).

5.3 Complete assessment

Thus far we have focused primarily on the question of accurate identification of sequential bilingual children with LLI rather than the necessary components of a complete assessment for this population. Our focus has reflected the state of the literature, which also emphasizes accurate identification. But identification is only the first step in clinical service delivery for LLI. A complete assessment will likely include many of the tasks we have already discussed, including interviews or questionnaires to collect parent and teacher views, processing-based tasks such as NWR, static assessments of language knowledge such as standardized tests, and perhaps dynamic assessment procedures as well. An additional important component of a complete assessment is the collection of language samples, such as narratives. Language samples are an ecologically valid task (Costanza-Smith 2010) and may provide a supportive, familiar context for eliciting a valid view of a child's language production abilities (Cleave et al. 2010). Language samples have already been highlighted in our previous discussion, as a number of the findings regarding dual-language deficits and potential grammatical markers of LLI have stemmed from analyses of language samples. Here we reiterate their clinical utility as an assessment tool; in a single assessment task, they provide a means of analyzing not only grammatical errors but also overall linguistic productivity, verbal fluency, lexical development, and even code-switching between languages (Gutiérrez-Clellen et al. 2008; Bedore et al. 2010). Some evidence suggests that assessment results may differ between standardized tests and language samples (Cleave et al. 2010; Ebert & Scott 2014), suggesting that they provide a unique source of information in assessment.

Perhaps most importantly, there is a consensus that a complete assessment must consider both languages of the developing bilingual child (Gutiérrez-Clellen & Simon-Cereijido 2010; De Lamo White & Jin 2011; Kohnert 2013). It is clearly unrealistic to expect that a bilingual

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clinician, fluent in the individual child's L1 and L2, will be available for each assessment of a bilingual child. Instead, consideration of a minority L1 in assessment could take a variety of forms, including detailed interviews with parents and other family members regarding development and current skills in the home language (Paradis, Emmerzael & Sorenson Duncan 2010); collaboration with interpreters or bilingual support personnel to directly assess L1 performance (Guiberson & Atkins 2012); or administration of select measures that may be prerecorded by fluent L1 speakers and interpreted by a monolingual clinician (e.g., a sentence comprehension task with a pointing response; an NWR task).

6. Treatment of bilingual children with LLI

For all children with LLI, the goal of treatment is to improve their language skills and thus their academic and social outcomes. However, meeting this goal consistently and efficiently is a challenge for clinical practitioners. Sequential bilingual children present an additional challenge: whether they SHOULD receive treatment in two languages has historically been a central question in the literature on treating bilingual children with LLI (see Kohnert & Medina 2009). A belief that children with communication disorders such as LLI cannot successfully learn two languages has been pervasive, leading to frequent clinical recommendations to focus on only one language in treatment. As discussed above, current evidence indicates that bilingualism does not 'disadvantage' children with LLI. Within the treatment literature, multiple sources of evidence show that active support of both languages is best clinical practice for sequential bilingual children with LLI. Here we review the possible benefits of dual-language support alongside the historical challenges to its provision, and then consider recent empirical work investigating treatment programs for sequential bilinguals with LLI. This work not only supports the conclusion that dual-language support is effective but also extends our discussion to HOW such support may be achieved.

6.1 Benefits of dual-language support for sequential bilingual children with LLI

For children who have received systematic input in a minority home language and are subsequently identified as having LLI, the question of whether to treat one language or two is practically manifested as whether or not to actively treat the minority L1. That is, because there tend to be few clinicians who can provide direct support in the child's L1 and because educational systems tend to emphasize the L2, the majority L2 receives support and the question becomes whether the minority L1 can also be addressed. Numerous rationales for actively supporting the L1 have now been identified. The first reflects the communicative needs of sequential bilingual children. Systematic exposure to a minority L1 implies that the child is a member of a family and possibly a broader community that uses the L1. If the child shifts towards exclusive use of the L2, communication breakdowns with family and community become likely. Though direct evidence from children with LLI is lacking, the broader literature on sequential bilingual language development supports the conclusion that

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loss of proficiency in the L1 has a host of negative psychosocial consequences (e.g., Phinney et al. 2001). The need for L1 proficiency, combined with the lack of evidence that L1 growth detracts from L2 proficiency, lays a solid foundation for bilingual rather than monolingual treatment for this population.

In fact, some recent literature has suggested that bilingualism is actually beneficial for children with LLI, both in linguistic and nonlinguistic areas. It is possible that exposure to greater linguistic complexity – achieved through experience with two distinct linguistic systems – could enhance language learning for bilingual children with LLI (Roeper 2012). Armon-Lotem (2010) offers a summary of evidence that would support this conclusion; the grammatical errors made by bilingual children with LLI have in some cases suggested greater linguistic knowledge than their monolingual impaired peers, perhaps because the bilingual children have been able to draw on knowledge of their L1. Armon-Lotem (2010) concludes that bilingualism may in fact be facilitative for children with LLI. Empirical validation of this interesting perspective is an important area for future investigation.

The possibility of bilingual cognitive advantages must also be considered in a discussion of maintaining bilingualism in children with LLI. As previously discussed, bilingual advantages in attentional control and metalinguistic awareness have largely not yet been explored in children with LLI. Should these advantages extend to children with LLI and thus mitigate the cognitive and metalinguistic weaknesses associated with LLI, there would be yet another clear argument for supporting bilingual development in children with LLI.

6.2 Challenges to dual-language support in LLI

Despite the benefits of dual-language support for children with LLI, it is clear that the recommendation is not always adopted by clinical practitioners. Survey data from several countries confirms that the predominant clinical practice remains treatment in one language only (e.g., Jordaan 2008; Williams & McLeod 2012). For example, a recent international survey of speech-language pathologists across 13 countries (Jordaan 2008) showed that bilingual children were receiving monolingual treatment in 87% of cases. Reasons cited for this were a combination of relatively few bilingual service providers (74% of respondents were monolingual) and perceived pressure to use the language of education and the language of the community in order to succeed. Thus, professional resistance appears to be one challenge in the implementation of dual-language treatment for children with LLI. Continuing to educate clinical practitioners – and to provide them with high-quality evidence of the efficacy of dual-language services – remains a crucial priority for the field.

Additional practical challenges exist in the provision of dual-language services for children with LLI. First, if 'dual-language services' is interpreted as the provision of direct treatment services in both the L1 and the L2, there is a gross mismatch between the workforce of clinical practitioners and the client base in most countries. That is, the majority of qualified speech-language professionals are monolingual in many countries; even in locations with greater numbers of bilingual service providers, it remains very difficult to match the diversity of minority languages with qualified providers (see Jordaan 2008; Pham, Kohnert & Mann

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2011 for discussion). In other cases, policies preventing direct treatment in a home language may exist, particularly in school-based settings.

6.3 Empirical studies of treatment for bilingual children with LLI

Thus far, our discussion of treatment for bilingual children with LLI has focused on logical arguments and practical obstacles surrounding the language or languages to be targeted in treatment. There is a small but growing empirical literature that directly examines the results of treatments provided to bilingual children with LLI. In reviewing this work, we classify studies based on the measures of treatment progress they employed. Until very recently, treatment studies with bilingual children with LLI measured progress in terms of learning on the linguistic stimuli that were trained in treatment sessions. Most commonly, participants were taught a set of words, and progress was measured in terms of performance on probes of the targeted words. We discuss conclusions from this foundational work first, before considering studies that have used more generalized measures of progress – such as omnibus measures of language, measures derived from spontaneous language samples, and measures of domains not directly targeted in treatment.

6.3.1 Learning of trained stimuli in the L1 and the L2

Table 1 summarizes six published studies that have examined gains on trained stimuli made by sequential bilingual children with LLI within a language treatment program. The table highlights both diversity in the literature (in terms of the participant ages, the delivery method and intensity of treatment, and the treatment methods) and lack thereof (most studies have included Spanish-English bilinguals; vocabulary has been the most common target; and, until very recently, small-group or single-subject studies were the norm). The earliest studies (Perozzi 1985; Perozzi & Sanchez 1992; Elin Thordardottir, Ellis Weismer & Smith 1997) targeted vocabulary and reported learned words within the L2 only. Although the methods of instruction differed notably, the conclusion of all three studies was consistent: L2 vocabulary can be acquired as quickly or even more quickly when the words are taught in both the L1 and the L2 (i.e., bilingually) as compared to being taught in one language only. This finding is notable because it contradicts the assumption that the amount of time spent working in the L2 will directly correlate with learning in the L2. In all three studies, the amount of treatment received was held constant across the bilingual and L2-only treatment programs. Thus, less time was spent working on the L2 in the bilingual treatment conditions. This conclusion appears to apply to preschoolers (Perozzi 1985; Elin Thordardottir et al. 1997) and to young school-aged children (Perozzi & Sanchez 1992).

More recent studies of vocabulary treatment for bilingual children with LLI have replicated findings of comparable gains in the L2 between L2-only and bilingual treatments; however, these studies have also extended the measurement of treatment gains to the L1. In a large group study of Spanish-English preschoolers with LLI, Restrepo, Morgan & Thompson (2013) compared four treatment conditions crossing content (vocabulary versus

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Table 1 Intervention studies for sequential bilingual children with LLI examining trained stimuli only

	Participants			Treatment				Outcomes	
Citations	N	Ages	Languages	Conditions	Description	Setting	Dose	Measures	Main Findings
Thordardottir et al. (1997)	1	4;11	Icelandic, English	1. L2-only 2. BI	Focused-stimulation targeting functional vocabulary	Ind	50 min/day, 2 × week = 14 sessions total	Production of trained vocabulary, L2 only	L2 words learned equally quickly in L2-only and BI conditions
Motsch, H. & Riehemann, S. (2008)	51[a]	8;6-10;1	L1 NK, L2 German	L2-only	'context-optimization' targeting grammatical case	Class-room based	Mean = 17 min/day, 4 days/wk, 12 weeks = 12 hours total	Trained grammatical cases, L2 only	No interaction between bilingualism and TX efficacy; BI group significantly more impaired in case-marking at pre-treatment test
Perozzi (1985)	2[a]	4;4	Spanish, English	1. L1 then L2 2. L2-only	Drill instruction targeting receptive vocabulary	Ind	Specified only in total number of trials	Identification of trained words, L2 only	Fewer total trials for L1 + L2 than for L2-only; Instruction in L1 accelerated L2 learning
Perozzi & Sanchez (1992)	38	Mean = 6;8	Spanish, English	1. L1 then L2 2. L2-only	Drill instruction targeting comprehension of prepositions and pronouns	Ind	Specified only in total number of trials	Identification of trained words, L2 only	Fewer total trials for L1 + L2 than for L2-only; Instruction in L1 accelerated L2 learning

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Table 1 Continued

	Participants			Treatment				Outcomes	
Citations	N	Ages	Languages	Conditions	Description	Setting	Dose	Measures	Main Findings
Pham et al. (2011)	1	3;11	Vietnamese, English	1. L2-only 2. BI	Drill instruction targeting receptive vocabulary; L1 TX provided via audio recordings, computer, and L2-only teacher	Ind	2 × 10 min/day; total of 45 sessions over 12.5 weeks[b]	Identification of trained words, L1 & L2	L2: words learned equally quickly in L2-only and bilingual conditions. L1: gains seen via indirect treatment method
Restrepo, Morgan & Thompson (2013)	202[a,c]	3;7-5;8	Spanish, English	1. L2-only, math 2. L2-only, vocabulary 3. BI, math 4. BI, vocabulary	Vocabulary conditions used dialogic reading, rich definitions, language support techniques[c]	Small group within pre-school	45 min/day × 4 days/wk × 12 weeks	Identification and production of trained words, L1 & L2	L1: BI vocabulary condition most effective L2: BI and L2-only vocabulary conditions equally effective (better than math programs)

Note. Ind = Individual, min = minute, TX = treatment, BI = bilingual, NK = not known. For all studies, N includes only participants who were sequential bilingual children with LLI. Age is reported as year; month.

[a]Studies marked with [a] included additional participants (not listed here) who showed typical language development or who spoke only one language.

[b]Divided over 4 sub-studies: 1 = 10 sessions in 2 weeks; 2 = 12 sessions in 1 month; 3 = 12 sessions in 1 month; 4 = 11 sessions in 2.5 weeks.

[c]The Gutiérrez-Clellen & Simon-Cereijido studies summarized in Table 2 report on the same treatment program and an overlapping participant sample.

math) with language of delivery (bilingual versus L2-only). The vocabulary treatment was delivered within the classroom by trained teachers, and incorporated dialogic book reading and interactive activities supported by techniques such as rich definitions, scaffolding conversations, expanding, and modeling. This vocabulary instruction program was more effective than the math curriculum in both languages. A comparison of L2 outcomes of the bilingual and L2-only vocabulary programs echoed previous literature: outcomes were not statistically different between the programs despite the difference in time spent working on L2 words. In the L1, however, the group that received bilingual vocabulary instruction learned significantly more Spanish words; for example, on the receptive vocabulary probe, children in the bilingual vocabulary group averaged a gain of about 14 words whereas those in the remaining treatment groups averaged 7–8 word gains (out of a possible 45 words).

Pham et al. (2011) also measured both L1 and L2 gains in a single-subject- design study investigating receptive vocabulary learning in a Vietnamese-English bilingual preschooler. Treatment in this study was delivered in brief (ten-minute) sessions conducted through a combination of computerized audio recordings and visual stimuli with direct support from the classroom teacher; this procedure allowed the teacher to address an L1 she did not speak. Consistent with other studies reviewed here, treatment of words in L2-only and bilingually resulted in comparable accuracy in the L2 (with the participant requiring about five treatment sessions to master five to eight new words). Gains were also seen in the L1; in fact, there was evidence that some words treated in L2-only were understood in the L1 after treatment. The authors suggest that increased attention to task resulting from the treatment may have contributed to this generalization.

The final study in Table 1 (Motsch & Riehemann 2008) is unlike the others in several respects. Instead of vocabulary, treatment in this study targeted morphosyntax, specifically case-marking in German. Perhaps more importantly, the study was not restricted to bilingual children; only about half of the participants were bilingual, and all assessment and treatment took place in the L2, German. However, the study does contain an important finding for the treatment of bilingual children with LLI: there was no interaction between bilingual status and rate of change in the treatment program. Bilingual children gained about 18.5 percentage points in their accuracy of marking the accusative case and 14.6 percentage points for the dative case, in comparison to 28.0 and 13.2 percentage-point average gains for monolingual children. Thus, these school-aged sequential bilingual children with LLI made statistically equivalent progress in treatment targeting L2 morphosyntax as did their monolingual peers, though it should be noted that they began treatment with lower levels of accuracy in grammatical case-marking (in the L2) than their monolingual peers.

The literature on learning of trained linguistic stimuli by bilingual children with LLI clearly supports the conclusion that bilingual vocabulary instruction is at least as effective as L2-only instruction at teaching words in the L2. A variety of treatment approaches appear to be effective in teaching vocabulary, including drill to associate words with picture stimuli (Perozzi 1985; Perozzi & Sanchez 1992; Pham et al. 2011), semi-structured play with focused stimulation (Elin Thordardottir et al. 1997), and classroom-based dialogic book reading and interactive instruction (Restrepo et al. 2013). Recent results indicate that bilingual vocabulary treatment is more effective for learning words in the L1 than L2-only treatment (Pham et al. 2011; Restrepo et al. 2013). Generalization from the L2 to the L1 may be possible, but

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evidence to date is limited to picture identification contexts (Pham et al. 2011). Finally, school-aged sequential bilinguals receiving morphosyntactic instruction in the L2 acquire the trained L2 morphosyntactic forms, and do so at the same rate as monolingual peers (Motsch & Riehemann 2008).

6.3.2 Generalized outcomes of language treatment

The acquisition of trained linguistic forms is a crucial foundation for any language treatment program. Given the number of linguistic forms to be learned, however, an optimal language treatment program will have a broader impact on children's language knowledge or even their language learning ability. Thus, treatment typically must generalize beyond the trained stimuli in order to have a significant impact on daily communication. The need for generalization is even greater for sequential bilingual children, who must learn the forms of two language systems to communicate successfully. Within the past few years, a handful of publications have addressed the question of whether sequential bilingual children with LLI can generalize beyond trained stimuli by reporting generalized outcomes of language treatment programs. These studies are summarized in Table 2.

With one exception, the studies in Table 2 report results from two large treatment projects conducted with Spanish-English sequential bilingual children within the US. The first project, the VOLAR program (Gutiérrez-Clellen et al. 2012; Simon-Cereijido et al. 2013; Simon-Cereijido & Gutiérrez-Clellen 2014), has compared L2-only and bilingual treatment programs using academic enrichment activities to target vocabulary and overall language growth. The treatment program is the same as the vocabulary treatment condition reported in Restrepo et al. (2013) but additional language outcomes are reported in these works. Gutiérrez-Clellen et al. (2012) and Simon-Cereijido et al. (2013) report predictors of overall L1 and L2 growth in 188 four-year-old children with LLI, all of whom began the treatment program with little to no proficiency in the L2 (English). Measures of language growth included production of target words in a picture description task, measures of utterance length (MLU) and lexical diversity in narrative language samples, and a sentence repetition task (reported in the L1 only). Growth in L2 MLU was predicted by the language of intervention; that is, children who received bilingual intervention made greater gains in L2 MLU with a large effect size ($d = 1.79$ for MLU in words). In addition, children who began with higher levels of L1 proficiency (as measured by L1 MLU) showed more rapid growth in L2 MLU; again, this effect was large ($d = 0.89$). The interaction between treatment program (bilingual vs. L2-only) and initial L1 MLU approached significance, as the difference in growth rate (faster gains for those with higher initial L1 MLUs) was greater in the L2-only condition. Assuming that L1 MLU is a good marker of overall linguistic development in these L1-dominant preschool children, this result suggests that those with less severe language impairment were better able to take advantage of L2 input. In the L1, however, very limited differences between the bilingual and L2-only intervention programs were identified. Instead, children continued to grow in their L1 skills during the nine weeks of intervention and the five months following intervention, regardless of the program of intervention.

https://doi.org/10.1017/S0261444816000070 Published online by Cambridge University Press

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Table 2 Intervention studies examining outcomes outside of trained stimuli

	Participants		Treatment			Outcomes	
Citations	N	Ages	Conditions	Description	Dose	Measures	Findings
Ebert et al. (2014); Pham, Ebert & Kohnert (2015)	59	5;6-11;2	1. L2-only 2. BI 3. Nonlinguistic cognitive processing 4. Delayed TX control	Small-group, computer-interventionist hybrid	75 min × 4/wk × 6 wks	• Std testing in L1 & L2: omnibus language & vocabulary • NWR in L1 & L2 • Nonlinguistic measures of processing speed, working memory & sustained selective attention	• L2 & cognitive skills: gains for all active TX conditions using multiple measures • L1: only BI condition made gains • Evidence of cross-domain transfer (cognition to language and vice versa)
Ebert et al. (2012)	2	7;5-8;4	Nonlinguistic cognitive processing	Individual, computer-interventionist hybrid	75 min × 4/wk × 4 wks	• Repeated measures of nonlinguistic processing speed, L1 NWR, and L2 NWR sentence repetition & RAN • Pre- & post-std testing in L1 & L2: omnibus language & vocabulary	• Gains in nonlinguistic processing, L1, and L2 on repeated measures • Individual variability in standardized test gains
Thordardottir et al. (2015)	29	3;9-5;8	1. L2 only via SLP 2. BI (L1 via parent, L2 via SLP) 3. Delayed TX control	• Individual sessions • Focused stimulation of vocabulary and syntactic structures	50 min × 1/wk × 16 wks	• Vocabulary probes in L2 (trained & untrained stimuli) • Syntactic constituents in a story retell in L2 • Std testing in L2: vocabulary, omnibus language • MLU in language sample in L1& L2	• L2 vocabulary: Significant gains in probes for treated groups (vs. ctrl) with large effect sizes (η^2 = .46 for receptive and =.53 for expressive vocabulary) • Nonsignificant gains in L2 syntax & test scores • No gains in MLU for L1 or L2

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Table 2 Continued

	Participants		Treatment			Outcomes	
Citations	N	Ages	Conditions	Description	Dose	Measures	Findings
Gutiérrez-Clellen et al. (2012); Simon-Cereijido et al. (2013)	188[a]	4;1-4;11[b]	1. L2-only 2. BI	• Small group within preschool • Academic enrichment activities with general language support techniques (recasting, reduced rate, visual cues)	45 min × 4/wk × 12 wks	• Narrative language sample measures in L1 & L2: o MLU o NDW o Total number of verbs • Target words produced in picture description task in L1 & L2 • Sentence repetition task in L1 only	• L2 (MLU growth): greater for BI TX than L2-only, especially for children who started with low L1 MLU • L1: no difference between L2-only TX and BI TX (BI > L2-only on one measure, sentence repetition, at one time point of four)
Simon-Cereijido & Gutiérrez-Clellen (2014)	52 LLI, 55 TD	Mean = 4;5	1. BI academic enrichment 2. 'as usual' curriculum: less language emphasis, higher proportion of L2	• Classroom based • Delivered by preschool teachers	45 min × 4/wk × 9 wks	• Narrative language sample measures in L1 & L2: o MLU o NDW o Total number of verbs	For combined group (TD + LLI), BI >ctrl for lexical measures but not MLU For LLI group only,[c] roughly comparable gains for ctrl vs. TX group in L1 and greater gains for TX group in L2

Notes. Table summarizes published intervention studies that measured effects outside of trained stimuli.
Multiple publications from the same set of participants are summarized in a single row (e.g., Ebert, Kohnert, et al. 2014; Pham et al. 2015).
BI = bilingual, ctrl = control, LLI = language learning impairment, MLU = mean length of utterance, NDW = number of different words, SLP = speech-language pathologist, std = standard, TD = typically developing, TX = treatment.
Age is reported as year; month.
[a]Participant sample overlaps with the one reported in Restrepo et al. 2013.
[b]All children were reported to be 4 years of age; no mean or range given.
[c]Data from children with LLI not subjected to hypothesis testing. Reported results stem from effect sizes and qualitative analysis, for limited group (N = 20)

Finally, the same program has now been implemented in school-readiness classrooms for at risk children, which include both typically developing preschoolers and those with LLI (Simon-Cereijido & Gutiérrez-Clellen 2014). This work has compared the experimental VOLAR treatment program (offering bilingual vocabulary and general language support) to a 'business as usual' preschool curriculum that offers minimal language support and, although bilingual to some extent, primarily uses the L1 for non-instructional time. Although results for the group of children with LLI have not yet been subjected to hypothesis testing (Simon-Cereijido & Gutiérrez-Clellen 2014), the results for the combined group (of children with and without LLI) remain supportive of the bilingual intervention program: lexical diversity in both the L1 and the L2 improved more for children who received the experimental treatment program than for those who received the 'business as usual' curriculum, with medium effect sizes ($d = 0.44$ and $d = 0.43$ for the number of different words in the L1 and the L2, respectively). MLU did not differ between the groups in either language; average MLU for both the experimental and control groups increased over time in both languages.

The second project was conducted with 59 school-aged children living in the Midwestern United States (Ebert et al. 2014; Pham, Ebert & Kohnert 2015). As in other studies, L2-only treatment was compared to a bilingual treatment program. However, a third treatment condition within this project targeted cognitive processing skills such as attention and speed of processing in the nonlinguistic domain. This treatment condition explored the hypothesis that subtle impairments in nonlinguistic cognitive processing contribute to language learning deficits in LLI (see Ebert et al. 2014). The nonlinguistic cognitive processing treatment was piloted in a single case experimental design study (Ebert, Rentmeester-Disher & Kohnert 2012) in which it showed effects in both the L1 and the L2.

In the three-treatment group study (Ebert et al. 2014) analyses immediately following treatment showed that children in all three active treatment groups made significant gains in the L2 and some gains in nonlinguistic cognitive processing skills, whereas children in a delayed treatment control group did not. The gains in the L2 were comparable between the L2-only and bilingual treatment groups, with no statistically significant differences and roughly similar effect sizes (averaging $d = 0.43$ across the L2 outcome measures). In the L1, however, gains were smaller across groups. Effect sizes for the active treatment groups averaged $d = 0.18$ across L1 outcome measures, and statistically significant gains were seen only by children who received bilingual treatment. Three months following the completion of treatment (Pham et al. 2015), children continued to show growth on L2 measures and maintenance of the L1 (new growth in the L1 was limited). Though children in the bilingual treatment condition continued to show comparable L2 growth to those in the L2-only condition, their advantage in L1 growth was no longer significant at this follow up.

The final study in Table 2 summarizes a recent group treatment study involving preschool children (aged 4 to 6) living in Montreal (Elin Thordardottir et al. 2015). Participants in the study spoke a variety of home languages (including Arabic, Japanese, Punjabi, and Tamil) and were learning French as the L2. A total of 29 participants were divided into three groups: one received treatment delivered by a certified speech therapist in the L2 only; one received treatment delivered in the L2 by a certified speech therapist and in the L1 by a parent, within the same session; and one served as a delayed treatment control. Both active treatment groups received a focused stimulation approach targeting vocabulary and

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syntactic structures, in which targets are modeled repeatedly within meaningful contexts (see Ellis Weismer & Robertson 2006). Outcome measures in this study spanned each of the categories discussed here (i.e., trained linguistic stimuli and generalized linguistic outcomes). On probes of trained vocabulary items in the L2, both treatment groups made more gains than the delayed treatment control, with group membership explaining 46.3% of variance in receptive vocabulary gains and 53.2% of variance in expressive vocabulary gains. On more generalized measures of L2 growth (including a score for the inclusion of grammatical constituents in a story retell task and a set of French language standardized tests), all children made gains but those in active treatment did not significantly outpace those in the delayed treatment control.

Finally, there were no significant gains in MLU for either language. Thus, the L2-only and bilingual interventions were indistinguishable across all outcomes. Though on the surface this result appears contradictory to the previous findings that L1 gains can be achieved through bilingual treatment (Elin Thordardottir et al. 1997; Simon-Cereijido et al. 2013; Ebert et al. 2014), the treatment programs were not comparable in all respects. The L2 intervention was delivered by a trained professional whereas the L1 was supported by parents alone; moreover, the participation of the parents in therapy sessions was reportedly low. As discussed by study authors, it is unclear if the type of parent-participation therapy implemented was a good cultural match for participating parents. In addition, the only index of L1 gains, MLU, did not prove sensitive to gains in either language.

The projects highlighted in this section have taken on the formidable task of demonstrating generalized gains of language treatment in sequential bilingual children with LLI. To some degree, results across the three major projects support similar conclusions. First, gains in the L2 are at least equivalent (Ebert et al. 2014; Elin Thordardottir et al. 2015; Pham et al. 2015) if not superior (Gutiérrez-Clellen et al. 2012) for children who receive bilingual treatment in comparison to those who receive L2-only treatment. This message is highly consistent with the literature on learning of trained stimuli and again poses a very strong challenge to the 'time on task' hypothesis. Bilingual children with LLI can clearly generalize treatment gains to novel linguistic stimuli and tasks in the L2, and do so after treatment in L2 only, the L1 and the L2, or even treatment that directly targets cognitive processing skills rather than language. Indeed, the latter result highlights the ability of bilingual children with LLI to generalize across domains, from cognition to language. Although more work is needed to determine the conditions under which cross-linguistic and cross-domain generalization is most likely, its occurrence in treatment studies is most consistent with domain-general theories of LLI, which posit direct links between language and cognition, and with theories of bilingual development that highlight relationships across languages (e.g., De Bot et al. 2007).

In the L1, however, the interpretation of findings is more complex. It would be expected that children who receive bilingual treatment programs would make larger L1 gains than those who receive no direct treatment in the L1. This prediction has received some empirical support, although results have not always reached statistical significance or been found on all L1 measures. One possible factor in this result is the social context and status of the L1 within the children's family and community. For the two major projects reviewed here that found evidence of superior L1 gains following bilingual treatment, there were notable differences in overall rates of L1 growth: Simon-Cereijido et al. (2013) found significant growth across

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time for nearly all L1 skills across all groups of participants, whereas Pham et al. (2015) found flat rates of L1 growth across measures and treatment conditions. Sociolinguistic factors and age may play a role in this contrast. The preschoolers in Simon-Cereijido et al. (2013) had little to no L2 proficiency at the start of the treatment program, suggesting that they were living in a predominantly L1-speaking environment. In contrast, the school-aged children in Pham et al. (2015) attended L2-only schools and were in the process of transitioning to L2 dominance (Ebert et al. 2014). These very strong social influences may have interacted with the effects of the treatment programs, perhaps obscuring differential effects on L1 growth. More research – particularly work in different sociolinguistic environments and on different language pairs – is needed to clarify these patterns. The results of the third project (Elin Thordardottir et al. 2015) make clear that not all support of the L1 is automatically sufficient to produce gains in that language.

Regardless, the literature to date does not justify the conclusion that generalization from the L2 to the L1 is automatic. When given L2-only support, or a minimal level of L1 support (Thordardottir et al. 2015), L1 gains may not be apparent. And, although bilingual children with LLI may be able to make some language gains via improvements in nonlinguistic cognitive processing skills (Ebert, Kohnert et al. 2014), this mechanism alone may not provide sufficient support for long-term gains in L1 (Pham et al. 2015). Future work will need to consider the optimal means of supporting the L1, including perhaps a combination of cognitive processing activities and direct treatment of L1 skills. In particular, investigation of effective means of collaboration with parents to support L1 growth is needed. In monolingual children, parent-delivered treatments have been shown to be effective (Roberts & Kaiser 2011). Preliminary treatment evidence with younger simultaneous bilingual children with low vocabulary also shows that parents can implement dialogic reading treatment to bolster L1 lexical skills (Tsybina & Eriks-Brophy 2010). For young developing sequential bilinguals, collaboration with parents remains one of the most feasible, logical and ethical means of supporting the L1 (Kohnert et al. 2005) and it is crucial that culturally valid collaborative models be developed and tested for treatment effectiveness. Finally, there is a clear need for additional investigations of treatment in children who speak home languages other than Spanish, and in domains other than vocabulary, as the majority of studies to date have focused on these areas.

7. Summary and conclusions

Here we have reviewed the key characteristics of sequential bilingual children with LLI. Practitioners who encounter bilingual children with LLI should expect to see a range of linguistic weaknesses in both the L1 and the L2 in comparison to typically developing peers with similar linguistic backgrounds. They may also find a unique pattern of cognitive strengths and weaknesses driven by the intersection of bilingual cognitive advantages and cognitive weaknesses associated with LLI. There is no single task that practitioners can rely on to identify LLI in bilingual children, though poor sentence repetition, inaccurate nonword repetition, or specific productive grammatical errors may ultimately contribute to

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accurate identification. Dynamic assessment, parent interview, and language sampling may also form important components of identification and assessment. It is crucial for practitioners to consider both languages in assessment to form a profile of strengths and weaknesses. Finally, there are numerous rationales for supporting two languages in treatment for bilingual children with LLI, and an emerging literature on generalization of treatment gains across languages and domains. A major challenge going forward will be to clearly establish effective ways for practitioners to maximize generalization and to accomplish dual-language support, particularly in cases of language mismatch between child and clinician.

References

Abdalla, F., K. Aljenaie & A. Mahfoudhi (2013). Plural noun inflection in Kuwaiti Arabic-speaking children with and without specific language impairment. *Journal of Child Language* 40.1, 139–168.

Adesope, O. O., T. Lavin, T. Thompson & C. Ungerleider (2010). A systematic review and meta-analysis of the cognitive correlates of bilingualism. *Review of Educational Research* 80.2, 207–245.

American Psychiatric Association (2013). *Diagnostic and statistical manual of mental disorders: DSM-5*. Washington, DC: American Psychiatric Association.

Archibald, L. M. & M. F. Joanisse (2009). On the sensitivity and specificity of nonword repetition and sentence recall to language and memory impairments in children. *Journal of Speech, Language, and Hearing Research* 52.4, 899–914.

Armon-Lotem, S. (2010). Instructive bilingualism: Can bilingual children with specific language impairment rely on one language in learning a second one? *Applied Psycholinguistics* 31.2, 253–260.

Armon-Lotem, S. (2014). Between L2 and SLI: Inflections and prepositions in the Hebrew of bilingual children with TLD and monolingual children with SLI. *Journal of Child Language* 41.1, 3–33.

Armon-Lotem, S., J. de Jong & N. Meir (eds.) (2015). *Assessing multilingual children: Disentangling bilingualism from language impairment*. Bristol: Multilingual Matters.

Bedore, L. M., E. D. Peña, R. B. Gillam & T. H. Ho (2010). Language sample measures and language ability in Spanish-English bilingual kindergarteners. *Journal of Communication Disorders* 43.6, 498–510.

Benasich, A. A. & P. Tallal (2002). Infant discrimination of rapid auditory cues predicts later language impairment. *Behavioural Brain Research* 136.1, 31–49.

Bialystok, E., F. I. M. Craik & G. Luk (2012). Bilingualism: Consequences for mind and brain. *Trends in Cognitive Sciences* 16.4, 240–249.

Bialystok, E., G. Luk, K. F. Peets & S. Yang (2010). Receptive vocabulary differences in monolingual and bilingual children. *Bilingualism: Language and Cognition* 13.4, 525–531.

Bishop, D. V. M. (2014). Ten questions about terminology for children with unexplained language problems. *International Journal of Language and Communication Disorders* 49.4, 381–415.

Blom, E., J. De Jong, A. Orgassa, A. Baker & F. Weerman (2013). Verb inflection in monolingual Dutch and sequential bilingual Turkish-Dutch children with and without SLI. *International Journal of Language and Communication Disorders* 48.4, 382–393.

Bortolini, U., M. C. Caselli & L. B. Leonard (1997). Grammatical deficits in Italian-speaking children with specific language impairment. *Journal of Speech, Language, and Hearing Research* 40.4, 809–820.

Branum-Martin, L., P. D. Mehta, D. J. Francis, B. R. Foorman, P. T. Cirino & J. F. Miller (2009). Pictures and words: Spanish and English vocabulary in classrooms. *Journal of Educational Psychology* 101.4, 897–911.

Catts, H. W., M. S. Bridges, T. D. Little & J. B. Tomblin (2008). Reading achievement growth in children with language impairments. *Journal of Speech, Language, and Hearing Research* 51.6, 1569–1579.

Chondrogianni, V. & T. Marinis (2011). Differential effects of internal and external factors on the development of vocabulary, tense morphology and morpho-syntax in successive bilingual children. *Linguistic Approaches to Bilingualism* 1.3, 318–345.

Chondrogianni, V. & T. Marinis (2012). Production and processing asymmetries in the acquisition of tense morphology by sequential bilingual children. *Bilingualism: Language and Cognition* 15.1, 5–21.

https://doi.org/10.1017/S0261444816000070 Published online by Cambridge University Press

Clahsen, H., M. Rothweiler, F. Sterner & S. Chilla (2014). Linguistic markers of specific language impairment in bilingual children: The case of verb morphology. *Clinical Linguistics & Phonetics* 28.9, 709–721.
Cleave, P. L., L. E. Girolametto, X. Chen & C. J. Johnson (2010). Narrative abilities in monolingual and dual language learning children with specific language impairment. *Journal of Communication Disorders* 43.6, 511–522.
Clegg, J., C. Hollis, L. Mawhood & M. Rutter (2005). Developmental language disorders: A follow-up in later life. *Journal of Child Psychology and Psychiatry* 46.2, 128–149.
Costanza-Smith, A. (2010). The clinical utility of language samples. *Perspectives on Language Learning and Education* 17.1, 9–15.
De Bot, K., W. Lowie & M. Verspoor (2007). A dynamic systems theory approach to second language acquisition. *Bilingualism: Language and Cognition* 10.1, 7–21.
De Lamo White, C. & L. Jin (2011). Evaluation of speech and language assessment approaches with bilingual children. *International Journal of Language & Communication Disorders* 46.6, 613–627.
Dollaghan, C. A. & E. A. Horner (2011). Bilingual language assessment: A meta-analysis of diagnostic accuracy. *Journal of Speech, Language, and Hearing Research* 54.4, 1077–1088.
Ebert, K. D. (2014). The role of auditory nonverbal working memory in sentence repetition for bilingual children with primary language impairment. *International Journal of Language & Communication Disorders* 49.5, 631–636.
Ebert, K. D. & K. Kohnert (2011). Sustained attention in children with primary language impairment: A meta-analysis. *Journal of Speech, Language, and Hearing Research* 54.5, 1372–1384.
Ebert, K. D. & C. M. Scott (2014). Relationships between narrative language samples and norm-referenced test scores in language assessments of school-age children. *Language, Speech, and Hearing Services in Schools* 45.4, 337–350.
Ebert, K. D., J. Rentmeester-Disher & K. Kohnert (2012). Nonlinguistic cognitive intervention for bilingual children with primary language impairment. *Clinical Linguistics & Phonetics* 26.6, 485–501.
Ebert, K. D., G. Pham & K. Kohnert (2014). Lexical profiles of bilingual children with primary language impairment. *Bilingualism: Language and Cognition* 17, 766–783.
Ebert, K. D., K. Kohnert, G. Pham, J. Rentmeester Disher & B. Payesteh (2014). Three treatments for bilingual children with primary language impairment: Examining cross-linguistic and cross-domain effects. *Journal of Speech, Language, and Hearing Research* 57.1, 172–186.
Ellis Weismer, S. & S. B. Robertson (2006). Focused stimulation approach to language intervention. In R. McCauley & M. Fey (eds.), *Treatment in Language Disorders in Children*. Baltimore: Brookes Publishing Co., Inc., 175–202.
Engel de Abreu, P. M., A. Cruz-Santos & M. L. Puglisi (2014). Specific language impairment in language-minority children from low-income families. *International Journal of Language & Communication Disorders* 49.6, 736–747.
Fletcher, P., L. B. Leonard, S. F. Stokes & A. M. Y. Wong (2005). The expression of aspect in Cantonese-speaking children with specific language impairment. *Journal of Speech, Language, and Hearing Research* 48.3, 621–634.
Fujiki, M., B. Brinton & D. Clarke (2002). Emotion regulation in children with specific language impairment. *Language, Speech, and Hearing Services in Schools* 33.2, 102–111.
Gabriel, A., N. Stefaniak, C. Maillart, X. Schmitz & T. Meulemans (2012). Procedural visual learning in children with specific language impairment. *American Journal of Speech-Language Pathology* 21.4, 329–341.
Gibson, T. A., E. D. Peña & L. M. Bedore (2014). The receptive–expressive gap in bilingual children with and without primary language impairment. *American Journal of Speech-Language Pathology* 23.4, 655–667.
Greene, K. J., E. D. Peña & L. M. Bedore (2013). Lexical choice and language selection in bilingual preschoolers. *Child Language Teaching & Therapy* 29.1, 27–39.
Grosjean, F. (2010). *Bilingual: Life and reality*. Cambridge, MA, USA: Harvard University Press.
Guiberson, M. & J. Atkins (2012). Speech-language pathologists' preparation, practices, and perspectives on serving culturally and linguistically diverse children. *Communication Disorders Quarterly* 33.3, 169–180.
Gutiérrez-Clellen, V. F. & G. Simon-Cereijido (2010). Using nonword repetition tasks for the identification of language impairment in Spanish-English-speaking children: Does the language of assessment matter? *Learning Disabilities Research & Practice* 25.1, 48–58.

https://doi.org/10.1017/S0261444816000070 Published online by Cambridge University Press

Gutiérrez-Clellen, V. F., G. Simon-Cereijido & C. Wagner (2008). Bilingual children with language impairment: A comparison with monolinguals and second language learners. *Applied Psycholinguistics* 29.1, 3–19.
Gutiérrez-Clellen, V. F., G. Simon-Cereijido & A. E. Leone (2009). Code-switching in bilingual children with specific language impairment. *International Journal of Bilingualism* 13.1, 91–109.
Gutiérrez-Clellen, V., G. Simon-Cereijido & M. Sweet (2012). Predictors of second language acquisition in Latino children with specific language impairment. *American Journal of Speech-Language Pathology* 21.1, 64–77.
Håkansson, G. (2001). Tense morphology and verb-second in Swedish L1 children, L2 children and children with SLI. *Bilingualism: Language and Cognition* 4.1, 85–99.
Håkansson, G., E. K. Salameh & U. Nettelbladt (2003). Measuring language development in bilingual children: Swedish–Arabic children with and without language impairment. *Linguistics* 41.2, 255–288.
Hart, B. & T. R. Risley (1995). *Meaningful differences in the everyday experience of young American children*. Baltimore: Paul H Brookes Publishing.
Hasson, N., B. Camilleri, C. Jones, J. Smith & B. Dodd (2013). Discriminating disorder from difference using dynamic assessment with bilingual children. *Child Language Teaching & Therapy* 29.1, 57–75.
Iluz-Cohen, P. & J. Walters (2012). Telling stories in two languages: Narratives of bilingual preschool children with typical and impaired language. *Bilingualism* 15.1, 58–74.
Iluz-Cohen, P. & S. Armon-Lotem (2013). Language proficiency and executive control in bilingual children. *Bilingualism: Language and Cognition* 16.4, 884–899.
Jacobson, P. & D. Livert (2010). English past tense use as a clinical marker in older bilingual children with language impairment. *Clinical Linguistics & Phonetics* 24.2, 101–121.
Jacobson, P. F. & P. R. Walden (2013). Lexical diversity and omission errors as predictors of language ability in the narratives of sequential Spanish-English bilinguals: A cross-language comparison. *American Journal of Speech-Language Pathology* 22.3, 554–565.
Jia, G., D. Aaronson & Y. Wu (2002). Long-term language attainment of bilingual immigrants: Predictive variables and language group differences. *Applied Psycholinguistics* 23.4, 599–621.
Johnson, C. J., J. H. Beitchman & E. B. Brownlie (2010). Twenty-year follow-up of children with and without speech-language impairments: Family, educational, occupational, and quality of life outcomes. *American Journal of Speech-Language Pathology* 19.1, 51–65.
Jordaan, H. (2008). Clinical intervention for bilingual children: An international survey. *Folia Phoniatrica et Logopaedica*, 60.2, 97–105.
Kan, P. F. & K. Kohnert (2008). Fast mapping by bilingual preschool children. *Journal of Child Language*, 35.3, 495–514.
Kan, P. F. & K. Kohnert (2012). A growth curve analysis of novel word learning by sequential bilingual preschool children. *Bilingualism: Language & Cognition* 15.3, 452–469.
Kapantzoglou, M., M. A. Restrepo & M. S. Thompson (2012). Dynamic assessment of word learning skills: Identifying language impairment in bilingual children. *Language, Speech, and Hearing Services in Schools* 43.1, 81–96.
Kerr, S. P. & W. R. Kerr (2011). *Economic impacts of immigration: A survey* (No. w16736). National Bureau of Economic Research. www.nber.org/papers/w16736.
Kohnert, K. (2013). *Language disorders in bilingual children and adults* (2nd edn). San Diego: Plural Publishing.
Kohnert, K. J. & E. Bates (2002). Balancing bilinguals II: Lexical comprehension and cognitive processing in children learning Spanish and English. *Journal of Speech, Language, and Hearing Research* 45.2, 347–359.
Kohnert, K. & J. Windsor (2004). The search for common ground part II: Nonlinguistic performance by linguistically diverse learners. *Journal of Speech, Language, and Hearing Research* 47.4, 891–903
Kohnert, K. & A. Medina (2009). Bilingual children and communication disorders: A 30-year research retrospective. *Seminars in Speech and Language* 30.4, 219–233.
Kohnert, K., P. F. Kan & B. T. Conboy (2010). Lexical and grammatical associations in sequential bilingual preschoolers. *Journal of Speech, Language, and Hearing Research*, 53.3, 684–698.
Kohnert, K., J. Windsor & K. D. Ebert (2009). Primary or 'specific' language impairment and children learning a second language. *Brain and Language* 109.2, 101–111.
Kohnert, K., J. Windsor & G. Pham (2009, June). *Separating differences from disorders using processing-dependent measures*. Poster presentation at the Symposium on Research in Child Language Disorders, Madison, WI.

https://doi.org/10.1017/S0261444816000070 Published online by Cambridge University Press

Kohnert, K., D. Yim, K. Nett, P. F. Kan & L. Duran (2005). Intervention with linguistically diverse preschool children: A focus on developing home language(s). *Language, Speech, and Hearing Services in Schools* 36.3, 251–263.
Komeili, M. & C. R. Marshall (2013). Sentence repetition as a measure of morphosyntax in monolingual and bilingual children. *Clinical Linguistics and Phonetics* 27.2, 152–161.
Lantolf, J. P. (2009). Dynamic assessment: The dialectic integration of instruction and assessment. *Language Teaching* 42.3, 355–368.
Law, J., J. Boyle, F. Harris, A. Harkness & C. Nye (2000). Prevalence and natural history of primary speech and language delay: Findings from a systematic review of the literature. *International Journal of Language and Communication Disorders* 35.2, 165–168.
Leonard, L. B. (2014). *Children with specific language impairment* (2nd edn). Cambridge, MA: A Bradford book.
Leonard, L., S. Ellis Weismer, C. A. Miller, D. J. Francis, J. B. Tomblin & R. V. Kail (2007). Speed of processing, working memory, and language impairment in children. *Journal of Speech, Language, and Hearing Research* 50.2, 408–428.
López, L. M. & D. B. Greenfield (2004). The cross-language transfer of phonological skills of Hispanic Head Start children. *Bilingual Research Journal* 28.1, 1–18.
Lum, J. A., G. Conti-Ramsden, D. Page & M. T. Ullman (2012). Working, declarative and procedural memory in specific language impairment. *Cortex* 48.9, 1138–1154.
Marinis, T. & D. Saddy (2013). Parsing the passive: Comparing children with specific impairment to sequential bilingual children. *Language Acquisition* 20.2, 155–179.
Martin, D. (2012). Dynamic assessment of language disabilities. *Language Teaching* 48.1, 51–68.
Miller, C. A., R. Kail, L. B. Leonard & J. B. Tomblin (2001). Speed of processing in children with specific language impairment. *Journal of Speech, Language, and Hearing Research* 44.2, 416–433.
Miller, J. F., J. Heilmann, A. Nockerts, A. Iglesias, L. Fabiano & D. J. Francis (2006). Oral language and reading in bilingual children. *Learning Disabilities Research & Practice* 21.1, 30–43.
Montgomery, J. W., B. M. Magimairaj & M. C. Finney (2010). Working memory and specific language impairment: An update on the relation and perspectives on the relation and perspectives on assessment and treatment. *American Journal of Speech-Language Pathology* 19.1, 78–94.
Morgan, G. P., M. A. Restrepo & A. Auza (2013). Comparison of Spanish morphology in monolingual and Spanish-English bilingual children with and without language impairment. *Bilingualism* 16.3, 578–596.
Motsch, H. & S. Riehemann (2008). Effects of 'context-optimization' on the acquisition of grammatical case in children with specific language impairment: An experimental evaluation in the classroom. *International Journal of Language and Communication Disorders* 43.6, 683–698.
Ooi, C. C. W. & A. M. Y. Wong (2012). Assessing bilingual Chinese-English young children in Malaysia using language sample measures. *International Journal of Speech-Language Pathology* 14.6, 499–508.
Ordóñez, C. L., M. S. Carlo, C. E. Snow & B. McLaughlin (2002). Depth and breadth of vocabulary in two languages: Which vocabulary skills transfer? *Journal of Educational Psychology* 94.4, 719–728.
Orgassa, A. & F. Weerman (2008). Dutch gender in specific language impairment and second language acquisition. *Second Language Research* 24.3, 333–364.
Paradis, J. (2005). Grammatical morphology in children learning English as a second language: Implications of similarities with specific language impairment. *Language, Speech, and Hearing Services in Schools* 36.3, 172–187.
Paradis, J. (2010). The interface between bilingual development and specific language impairment. *Applied Psycholinguistics* 31.2, 227–252.
Paradis, J. & M. Crago (2000). Tense and temporality: A comparison between children learning a second language and children with SLI. *Journal of Speech, Language, and Hearing Research* 43.4, 834–847.
Paradis, J., K. Emmerzael & T. Sorenson Duncan (2010). Assessment of English language learners: Using parent report on first language development. *Journal of Communication Disorders* 43.6, 474–497.
Paradis, J., P. Schneider & T. Sorenson Duncan (2013). Discriminating children with language impairment among English-Language learners from diverse first-language backgrounds. *Journal of Speech, Language, and Hearing Research* 56.3, 971–981.
Paul, R. & C. F. Norbury (2012). *Language disorders from infancy through adolescence: Listening, speaking, reading, writing, and communicating* (4th edn). St. Louis, MO: Elsevier.

https://doi.org/10.1017/S0261444816000070 Published online by Cambridge University Press

Peña, E. D., A. Iglesias & C. S. Lidz (2001). Reducing test bias through dynamic assessment of children's word learning ability. *American Journal of Speech-Language Pathology* 10.2, 138–154.
Peña, E. D., L. M. Bedore & R. Zlatic-Giunta (2002). Category-generation performance of bilingual children: The influence of condition, category, and language. *Journal of Speech, Language, and Hearing Research* 45.5, 938–947.
Peña, E. D., R. B. Gillam & L. M. Bedore (2014). Dynamic assessment of narrative ability in English accurately identifies language impairment in English language learners. *Journal of Speech, Language, and Hearing Research* 57.6, 2208–2220.
Peña, E. D., V. Gutiérrez-Clellen, A. Iglesias, B. Goldstein & L. M. Bedore (2014). *BESA: Bilingual English-Spanish assessment manual*. San Rafael, CA: AR-Clinical publications.
Perozzi, J. A. (1985). A pilot study of bilingual language facilitation: Theoretical and intervention implications. *Journal of Speech and Hearing Disorders* 50.4, 403–406.
Perozzi, J. A. & M. C. Sanchez (1992). The effect of instruction in L1 on receptive acquisition of L2 for bilingual children with language delay. *Language, Speech, and Hearing Services in Schools* 23.4, 348–352.
Pham, G. & K. Kohnert (2014). A longitudinal study of lexical development in children learning Vietnamese and English. *Child Development* 85.2, 767–782.
Pham, G., K. Kohnert & D. Mann (2011). Addressing clinician–client mismatch: A preliminary intervention study with a bilingual Vietnamese–English preschooler. *Language, Speech, and Hearing Services in Schools* 42.4, 408–422.
Pham, G., K. D. Ebert & K. Kohnert (2015). Bilingual children with primary language impairment: 3 months after treatment. *International Journal of Language & Communication Disorders* 50.1, 94–105.
Phinney, J. S., I. Romero, M. Nava & D. Huang (2001). The role of language, parents, and peers in ethnic identity among adolescents in immigrant families. *Journal of Youth and Adolescence* 30.2, 135–153.
Poarch, G. J. & J. G. van Hell (2012). Executive functions and inhibitory control in multilingual children: Evidence from second-language learners, bilinguals, and trilinguals. *Journal of Experimental Child Psychology* 113.4, 535–551.
Reilly, S., B. Tomblin, J. Law, C. McKean, F. Mensah, A. Morgan, S. Goldfeld, J. Nicholson, and M. Wake (2014). SLI: A convenient label for whom? *International Journal of Language and Communication Disorders* 49.4, 415–433.
Rescorla, L. (2011). Late talkers: Do good predictors of outcome exist? *Developmental Disabilities Research Reviews* 17.2, 141–150.
Restrepo, M. A. (1998). Identifiers of predominantly Spanish-speaking children with language impairment. *Journal of Speech, Language, and Hearing Research* 41.6, 1398–1411.
Restrepo, M. A. & K. Kruth (2000). Grammatical characteristics of a Spanish-English bilingual child with specific language impairment. *Communication Disorders Quarterly* 21.2, 66–76.
Restrepo, M. A., G. P. Morgan & M. S. Thompson (2013). The efficacy of a vocabulary intervention for dual language learners with language impairment. *Journal of Speech, Language, and Hearing Research* 56.2, 748–765.
Roberts, M. Y. & A. P. Kaiser (2011). The effectiveness of parent-implemented language interventions: A meta-analysis. *American Journal of Speech-Language Pathology* 20.3, 180–199.
Roeper, T. (2012). Minimalism and bilingualism: How and why bilingualism could benefit children with SLI. *Bilingualism: Language and Cognition* 15.1, 88–101.
Rothweiler, M., S. Chilla & H. Clahsen (2012). Subject–verb agreement in specific language impairment: A study of monolingual and bilingual German-speaking children. *Bilingualism: Language and Cognition* 15.1, 39–57.
Salameh, E. K., G. Håkansson & U. Nettelbladt (2004). Developmental perspectives on bilingual Swedish-Arabic children with and without language impairment: A longitudinal study. *International Journal of Language & Communication Disorders* 39.1, 65–90.
Sanz-Torrent, M., E. Serrat, L. Andreu & M. Serra (2008). Verb morphology in Catalan and Spanish in children with specific language impairment: A developmental study. *Clinical Linguistics & Phonetics* 22.6, 459–474.
Scott, C. M. & J. Windsor (2000). General language performance measures in spoken and written narrative and expository discourse of school-age children with language learning disabilities. *Journal of Speech, Language, and Hearing Research* 43.2, 324–339.
Sheng, L., Y. Lu & P. F. Kan (2011). Lexical development in Mandarin–English bilingual children. *Bilingualism: Language and Cognition* 14.4, 579–587.

https://doi.org/10.1017/S0261444816000070 Published online by Cambridge University Press

Sheng, L., E. D. Peña, L. M. Bedore & C. E. Fiestas (2012). Semantic deficits in Spanish-English bilingual children with language impairment. *Journal of Speech, Language, and Hearing Research* 55.1, 1–15.
Sheng, L., L. M. Bedore, E. D. Penã & C. Taliancich-Klinger (2013). Semantic convergence in Spanish-English bilingual children with primary language impairment. *Journal of Speech, Language, and Hearing Research* 56.2, 766–777.
Simon-Cereijido, G. & V. F. Gutiérrez-Clellen (2009). A cross-linguistic and bilingual evaluation of the interdependence between lexical and grammatical domains. *Applied Psycholinguistics* 30.2, 315–337.
Simon-Cereijido, G. & V. F. Gutiérrez-Clellen (2014). Bilingual education for all: Latino dual language learners with language disabilities. *International Journal of Bilingual Education and Bilingualism* 17.2, 235–254.
Simon-Cereijido, G., V. F. Gutiérrez-Clellen & M. Sweet (2013). Predictors of growth or attrition of the first language in Latino children with specific language impairment. *Applied Psycholinguistics* 34.6, 1219–1243.
Spoelman, M. & G. W. Bol (2012). The use of subject-verb agreement and verb argument structure in monolingual and bilingual children with specific language impairment. *Clinical Linguistics & Phonetics* 26.4, 357–379.
Squires, K. E., M. J. Lugo-Neris, E. D. Peña, L. M. Bedore, T. M. Bohman & R. B. Gillam (2014). Story retelling by bilingual children with language impairments and typically developing controls. *International Journal of Language & Communication Disorders* 49.1, 60–74.
Thordardottir, E. & M. Brandeker (2013). The effect of bilingual exposure versus language impairment on nonword repetition and sentence imitation scores. *Journal of Communication Disorders* 46.1, 1–16.
Thordardottir, E., S. Ellis Weismer & M. E. Smith (1997). Vocabulary learning in bilingual and monolingual clinical intervention. *Child Language Teaching & Therapy* 13.3, 215–227.
Thordardottir, E., G. Cloutier, S. Ménard, E. Pelland-Blais & S. Rvachew (2015). Monolingual or bilingual intervention for primary language impairment? A randomized control trial. *Journal of Speech, Language, and Hearing Research* 58.2, 287–300.
To, C. K., T. Law & X. X. Li (2012). Influence of additional language learning on first language learning in children with language disorders. *International Journal of Language & Communication Disorders* 47.2, 208–216.
Tomblin, J. B., N. L. Records, P. Buckwalter, X. Zhang, E. Smith & M. O'Brien (1997). Prevalence of specific language impairment in kindergarten children. *Journal of Speech, Language, and Hearing Research* 40.6, 1245–1260.
Tsybina, I. & A. Eriks-Brophy (2010). Bilingual dialogic book-reading intervention for preschoolers with slow expressive vocabulary development. *Journal of Communication Disorders* 43.6, 538–556.
Ukrainetz, T. A., S. Harpell, C. Walsh & C. Coyle (2000). A preliminary investigation of dynamic assessment with Native American kindergartners. *Language, Speech, and Hearing Services in Schools* 31.2, 142–154.
Ullman, M. T. & E. I. Pierpont (2005). Specific language impairment is not specific to language: The procedural deficit hypothesis. *Cortex* 41.3, 399–433.
Umbel, V. M., B. Z. Pearson, M. C. Fernández & D. K. Oller (1992). Measuring bilingual children's receptive vocabularies. *Child Development* 63.4, 1012–1020.
van der Lely, H. K., M. Jones & C. R. Marshall (2011). Who did Buzz see someone? Grammaticality judgement of wh-questions in typically developing children and children with Grammatical-SLI. *Lingua* 121.3, 408–422.
Verhoeven, L. (2007). Early bilingualism, language transfer, and phonological awareness. *Applied Psycholinguistics* 28.3, 425–439.
Verhoeven, L., J. Steenge & H. van Balkom (2011). Verb morphology as clinical marker of specific language impairment: Evidence from first and second language learners. *Research in Developmental Disabilities* 32.3, 1186–1193.
Verhoeven, L., J. Steenge & H. van Balkom (2012). Linguistic transfer in bilingual children with specific language impairment. *International Journal of Language & Communication Disorders* 47.2, 176–183.
Verhoeven, L., J. Steenge, M. van Weerdenburg & H. van Balkom (2011). Assessment of second language proficiency in bilingual children with specific language impairment: A clinical perspective. *Research in Developmental Disabilities* 32.5, 1798–1807.
Vugs, B., J. Cuperus, M. Hendriks & L. Verhoeven (2013). Visuospatial working memory in specific language impairment: A meta-analysis. *Research in Developmental Disabilities* 34.9, 2586–2597.

https://doi.org/10.1017/S0261444816000070 Published online by Cambridge University Press

Westman, M., M. Korkman, A. Mickos & R. Byring (2008). Language profiles of monolingual and bilingual Finnish preschool children at risk for language impairment. *International Journal of Language & Communication Disorders* 43.6, 699–711.
Williams, C. J. & S. McLeod (2012). Speech-language pathologists' assessment and intervention practices with multilingual children. *International Journal of Speech-Language Pathology* 14.3, 292–305.
Windsor, J., K. Kohnert, A. L. Loxtercamp & P. F. Kan (2008). Performance on nonlinguistic visual tasks by children with language impairment. *Applied Psycholinguistics* 29.2, 237–268.
Windsor, J., K. Kohnert, K. F. Lobitz & G. T. Pham (2010). Cross-language nonword repetition by bilingual and monolingual children. *American Journal of Speech-Language Pathology* 19.4, 298–310.
Wright, S. C., D. M. Taylor & J. Macarthur (2000). Subtractive bilingualism and the survival of the Inuit language: Heritage- versus second-language education. *Journal of Educational Psychology* 92.1, 63–84.
Zelaznik, H. N. & L. Goffman (2010). Generalized motor abilities and timing behavior in children with specific language impairment. *Journal of Speech, Language, and Hearing Research* 53.2, 383–393.
Ziethe, A., U. Eysholdt & M. Doellinger (2013). Sentence repetition and digit span: Potential markers of bilingual children with suspected SLI? *Logopedics Phoniatrics Vocology* 38.1, 1–10.

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