

**Critical Review:**  
**What is the impact of a bilingual environment on the language development of children with SLI?\***  
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This critical review investigates the impact of bilingualism on the language development of children with SLI. Six articles that examined the relationship between bilingualism and SLI were reviewed and evaluated. Study designs included RCT, non-randomized controls, and case-controls. Overall, the majority of the studies reviewed suggested that bilingual environment had no negative impact on the language development of bilingual children with SLI.

### ***Introduction***

North-American society is becoming increasingly multilingual; English is no longer the only language children learn at infancy, with French and Spanish, among other languages, being spoken at homes of many Americans and Canadians. As noted by Paradis (2010), “research at the interface of bilingual development and child language disorders has increased greatly in the past decade”. However, it is still not clear whether bilingualism has any effect on language development of children with Specific Language Impairment (SLI) and whether the exposure to two languages can negatively affect the child’s overall developing language skills. Furthermore, if bilingual environment indeed has a negative effect on the language development of children with SLI, the critical question becomes whether such environment should be modified, that is, if parents should raise the child in a monolingual environment.

This is a question of great interest and relevance to the field of Speech-Language Pathology, since in both Canadian and American societies multilingualism has become more prevalent, and “the number of bilingual children on speech-language pathology caseloads has increased due to international mobility and immigration” (Girolametto & Cleave, 2010). As such, SLPs often need to make clinical decisions in the areas of assessment and intervention of bilingual children with a suspected SLI. Understanding the impact of a bilingual environment on a child with SLI could greatly influence the assessment

procedures and the design of intervention by the SLP; namely, which language(s) will be used in assessment and intervention, the dosage of/input from each language, the context(s) in which the languages are being used by the child, etc.

### ***Objectives***

The primary objective of this paper is to analyze and critically evaluate the evidence that examines the impact of bilingualism on language development of children with SLI in order to better understand whether such impact exists and how it should direct speech and language assessment and intervention.

### ***Methods***

#### Search Strategy

Electronic databases (Scopus, PubMed, ProQuest) were searched using the following terms: “bilingualism”, “language impairment”, “language disorder”, “multilingualism”, “specific language impairment (SLI)”,

#### Selection Criteria

Articles were selected based on their relevance in addressing the question in this critical review. The selection reflected a variety of geographical backgrounds such as Canadian, American, European, and Asian. Articles that were theoretical in nature were not selected.

#### Data Collection

Papers included in this review are mixed RCT (1), non-randomized between-groups (3), mixed non-

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randomized (1), and a retrospective case-control study (1).

### **Results**

#### Retrospective case-control

**Cheuk, Wong, & Leung (2005)** conducted a retrospective case-control study in which they examined the association between multilingual home environment and SLI in Hong-Kong Chinese children in a local hospital over a 4-year period. They compared children with SLI to children with other developmental and behavioural problem but with normal language development. A total of 326 cases and 304 controls were used; exclusion criteria were enforced. All children in the local hospital were assessed by developmental pediatricians using the Griffiths Mental Developmental Scale (GMDS, developed in the UK) which assessed 6 domains of development, one of them being language. The authors defined SLI as children who were 1 SD below the mean for language quotient.

Chi-square tests were used to examine association between diagnosis of SLI and the various independent variables such as age. ANOVA measures as well as binary logistic regression were used, too. Results indicated a significant dose-response relationship and a “linear trend that exposure to an increasing number of languages was associated with higher odds of SLI” (Cheuk et al. 2005). In their discussion, however, the authors compared their results with previous other studies and arrived to the conclusion that multilingual exposure was not a sufficient cause of SLI.

It is important to mention a few key points. The authors did control for confounding factors, but since the assessment tool used (GMDS) was not formally validated for use with Chinese children, this became a serious flaw in determining the cut-off for SLI as it was done by the authors. Moreover, the authors admitted that this assessment tool was very simple and could not give detailed analysis of the children’s language abilities; it did not consider the children’s ability in each language. In addition, language was assessed by SLPs for only some of the cases, as those were referred by the developmental pediatricians. Despite the fact that this study had a large number of participants, the authors

recognized that the sample of children was very young and that they could not distinguish ‘late talkers’ from other true cases of SLI. Finally, the authors did not know if the children were exposed to languages simultaneously or sequentially. Due to the validity issue, the weak level of evidence by the type of design, the methods used, and the several limitations mentioned, the study’s evidence was determined to be equivocal.

#### Non-randomized studies

**Korkman, Stenroos, Mickos, Westman, Ekholm, & Byring (2012)** conducted a non-randomized between-groups study with controls using 116 Finnish pre-schoolers ages 5-7 years and sorted them into 4 groups: Bilingual children (Swedish-Finnish) with SLI, monolinguals (Swedish) with SLI, bilingual control, and monolingual control. Participants were recruited from clinics, from screenings done by a previous study, and by parental questionnaires. A short version of the WPPSI-R was used to assess participants’ cognitive ability. The Swedish version of the NEPSY (language and memory assessment tool) was used to assess verbal capacities. The language background of each child was assessed using parental questionnaires. T-tests were used to compare groups, and repeated-measures MANOVA to compare the groups’ test profiles. Partial Eta Square was used to indicate effect size.

Results from the WPPSI-R indicated that the verbal and non-verbal mean scores of SLI groups were significantly lower than those of the control groups. However, mono- versus bilingual comparison did not yield a significant difference in scores. It was found that bilingual groups scored significantly lower only on body parts naming task than the monolingual groups.

It should be noted that the formation of the control group was based on parental reports of ‘no concern’ regarding their development; this is a subjective and not so reliable way of determining whether a child has (or doesn’t have) normal, typical language development. Moreover, the authors admitted that no comprehensive language tests were used to verify SLI “as no such test had been translated into Swedish and standardized” (Korkman et al. 2012); this presents with a serious

validity issue. Despite specifying the criteria for SLI, the authors used a standardized test of cognitive ability and another one for verbal capacity to determine if child was in SLI group or in control. That is, the tools might have been appropriately selected but definitely not sufficient and/or comprehensive. In fact, the authors acknowledged that the use of NEPSY as a diagnostic tool was not sufficient! Finally, proficiency in both Swedish and Finnish was assessed using questionnaires/parental reports; there is a lack of use of more objective tests or ways to obtain such crucial information.

Overall, the evidence from this study showed that there were significant differences between SLI and control groups but not between mono/bilingual groups. Given the limitations mentioned above, and some of the validity issues observed, this study's evidence was concluded to be suggestive that bilingualism did not aggravate specific language problems.

**Verhoeven, Steenge, van Weerdenburg, & van Balkom (2011)** conducted a non-randomized between-groups study with 3 control groups where they examined a total of 1108 children ages 6-8 years and divided them according to age (6,7, or 8 years) and into 4 groups: monolingual (Dutch) children with typical development (Mono-TD); Mono-SLI; Bilingual (Dutch + another language) typically developing children (Bili-TD); these 3 groups served as controls for the 4<sup>th</sup> group - Bilinguals with SLI (Bili-SLI). The goal was to examine to what extent “the conditions of restricted input of L2 and SLI have an additive impact on language acquisition” (Verhoeven et al. 2011).

All children with SLI were diagnosed by psychologists and SLPs. The Dutch standardized language test was used to assess the children's Dutch language skills; the test consisted of 9 different subtests. All children were tested in 6-8 sessions of 20-40 minutes each. Statistical procedures included a 3x4 MANOVA (age x group), and a one-way ANOVA for each age-group and for each language task (i.e. subtest). Significance was found if  $p < 0.125$ .

The results revealed that 6-year-old children did not show any significant difference in any task in the standardized test that was due to both bilingualism and SLI. Children age 7 in the Bili-SLI group had a significant disadvantage due to both SLI and bilingualism in 3 out of 9 tasks. Eight-year-old children in the Bili-SLI group had a significant disadvantage due to both SLI and bilingualism in 5 out of 9 tasks of the standardized test.

In conducting this study, the authors provided clear criteria including normal hearing and intelligence that were verified. There was no description of recruitment methods but the authors mentioned that all of the participants were in the Dutch school system. The use of standardized tests was appropriate; the test chosen was comprehensive and examined different linguistic domains. Statistical procedures were selected and carried out well. The authors did admit that they did not consider the bilingual participants' L1 skills and proficiency, which could have given us more valuable information regarding their true bilingual skills. Finally, the authors did not consider effect sizes in their analyses.

Overall this study had a very large number of participants which seems to be representative enough, and included three control groups. The study design and its validity were compelling in showing that bilingual children with SLI had lower scores on language tests than monolinguals with SLI. In other words, bilingualism had a negative impact on the language development of bilingual children with SLI.

**Paradis, Crago, Genesee, & Rice (2003)** conducted a non-randomized between-groups study to determine if bilingual children with SLI were similar to or different from monolingual children with SLI in terms of their use of tense-bearing and non-tense-bearing morphemes in obligatory contexts in spontaneous speech. Participants were 8 English-French bilingual children with SLI (mean age = 83 months), 21 English monolingual children with SLI (mean age = 85 months), and 10 French monolingual children with SLI (mean age = 91 months). All participants were referred to the study by SLPs. At the time of data collection, 7 out of the 8 bilingual children

were receiving treatment by an SLP, and some (unknown) number of English monolinguals received therapy as well.

Bilingualism was assessed using a questionnaire given to primary caregivers, and standardized tests were used (TOLD, CELFP, and TLDD) in case a child was not tested within the last year to ensure criteria for inclusion in the study were met. In addition, assessment was carried out through naturalistic 30-45-minute play sessions with the children, one in French and one in English; language samples were taken and transcribed in both languages. Assessment of English monolingual children was done in multiple sessions over a 2-year-period with sessions that included naturalistic language production to elicit certain morphemes. French monolingual children were assessed in 45-minute play sessions. Both monolingual samples were checked for reliability. Mann-Whitney U comparisons were used to analyze the samples in both groups.

Results showed that, when comparing tense-bound versus non-tense-bound morphemes, both bilinguals and monolinguals had greater variation and lower mean scores for tense-bound morphemes. There was no significant difference between monolinguals and bilinguals for tense scores in each language, “indicating that bilingual children displayed difficulties with tense marking to the same extent as monolinguals in both languages” (Paradis et al. 2003).

It should be noted that no control group was used in the current study, but the authors examined three distinct groups and their morphosyntactic marking (which is an important linguistic skill in language development). The samples were fairly representative and participants’ ages were roughly close to each other (i.e., no big age gaps between groups). Moreover, the authors chose to use spontaneous speech samples as those were the most natural utterances that would represent the children’s true language abilities. It is worth noting that the data collection from the English monolinguals lasted longer than the time used to collect samples from the French monolinguals.

Given the type of design in this study and the validity of it, the authors provided some compelling evidence regarding the impact of

bilingual environment on language development of children with LI; the authors concluded that bilingualism was not the cause of different patterns of difficulty in the domain of morphosyntax shown by monolinguals and bilinguals.

**To, Law, & Li (2012)** conducted a mixed non-randomized study examining the effects of multilingual learning on L1 acquisition of children with SLI. Participants were 37 Cantonese native speakers from primary schools in Hong-Kong who were recruited and assessed by SLPs; all had a mild to mild-moderate SLI. One group (n=19) received greater exposure to Mandarin Chinese (L2) lessons (about 25% of curriculum), while the other group (n=18) received significantly lower exposure (close to 3% of curriculum time) to Mandarin Chinese (L2) lessons.

The Hong-Kong Cantonese Oral Language Assessment Scale (HKCOLAS) was the standardized test used to assess the participants’ Cantonese language skills; it included 5 subtests. Pre-treatment measures were taken and compared to normative data for both groups, followed by 9 months of speech-language treatment in the schools, and then the same assessment procedures were carried out in re-assessment. Two-way ANOVA measures were used with time (as repeated measure) and group (as between measures) variables; this was conducted for each subtest of the HKCOLAS.

Results indicated improvements in all language subtests for both groups between assessment and re-assessment. Main effect on group was not significant, however time effect was found to be significant. Interaction effects were not significant. The authors concluded that there was no detrimental effect on children’s L1 acquisition when an additional language was added. Moreover, they indicated that the two groups showed similar pattern of development in various language domains.

It is worth noting that the SLPs in this study were blinded to the study details and so could not have had any bias in their assessment process. In addition, the authors took baseline measures and confounding factors such as SES “were matched

to minimize extraneous variability” (To et al. 2012).

The overall design and methods used were appropriate with compelling validity. The results generated by this study provide compelling evidence for the impact of bilingual environment on language development, that is, that additional language learning is not detrimental on L1 acquisition for bilingual children with SLI.

#### Mixed RCT

**Ebert, Kohnert, Pham, Disher, & Payesteh (2014)** conducted a mixed RCT study where they examined the effects of 3 treatment programs for 59 school-aged bilingual English-Spanish children with SLI. Children were recruited by school district personnel. Treatment options were 1) non-linguistic cognitive processing (e.g., working memory), 2) English, 3) Bilingual, or 4) deferred treatment (i.e. control group who received therapy after the study). Pre- and post-treatment measures were taken by a team of SLP and Hearing-Science university students; a certified SLP was on-site to supervise. Participants were exposed to both languages, but Spanish is believed to be their L1.

Three cognitive tasks that examined cognitive processing skills included Choice Visual Detection, Sustained Selective Attention, and Auditory Serial Memory tasks. Three standardized language tests were administered in both English and Spanish: the Expressive One-Word Picture Vocabulary Test, the Receptive One-Word Picture Vocabulary Test, and the Core Language score from the CELF-4E (and in Spanish using the CELF-4S). T-tests were used for within-group changes and ANCOVA for between-group changes.

Results looked at absolute and relative effectiveness of treatments. For the non-linguistic cognitive treatment, the results suggested small improvements in English expressive vocabulary and overall English language skills, medium improvements in Spanish NWR, and large improvements in processing speed. For the English language treatment, results showed large improvements in English vocabulary and medium improvement in overall English language skills in addition to all non-linguistic cognitive processing

skills. For the bilingual treatment group, results showed “medium gains in English NWR and overall English language skills, small-to-medium gains in English and Spanish expressive vocabulary, and small gains in overall Spanish skills” (Ebert et al. 2014). Overall, results indicated some improvements found in all treatment groups, with only modest gains shown in Spanish versus English.

This study had several strengths. Randomization was used, and post-treatment assessment was conducted by individuals who were not involved in treatment. Cohen’s *d* was used to account for effect size. Treatment intensity and duration were described, and treatment fidelity was conducted via video recording.

Despite compelling validity, this study found only modest gains in all treatment groups and lack of follow up with these children did not allow for better understanding of the treatment effects in the long-term. Therefore, the evidence was judged to be only suggestive regarding the impact of bilingualism on language development of children with SLI.

### *Discussion*

Several of the above studies suggest that a bilingual environment does not negatively affect the language development of children with SLI (Korkman et al., 2012; Ebert et al., 2014; Paradis et al., 2003 & To et al., 2012). A common finding in all of these studies was that, low scores on standardized language tests were not specific to the bilingual group only. That is, lower scores were shown in groups that had a SLI, regardless of the mono- versus bilingual factor. This suggests that bilingualism in and of itself was not a factor that led to low scores on administered tests. Only Verhoeven et al.’s (2011) study suggested that bilingualism had a negative impact on the language development of children with SLI. However, this study did not consider the participants’ L1 whereas To et al.’s (2012) study did look at the effects of multilingual learning on L1 - which is the main question of this review. Ultimately, both Paradis et al. (2003) and To et al. (2012) provided compelling counter evidence to the findings of Verhoeven et al. (2011) that a

bilingual environment did not impact the language development of children with SLI. Future studies can look at the effects of bilingual exposure on language development from a longitudinal perspective, considering both typically-developing children and those with a SLI.

### ***Clinical Implications***

The evidence examined in this review suggests that bilingual environment has no negative impact on language development of children with SLI. This means that SLPs need to be aware of clinical decisions regarding assessment and intervention with bilingual children with SLI; moreover, SLPs should be careful in making clinical judgments and suggestions to parents when deciding about the linguistic environment for a child with SLI. Some clinical relevance in Canada would include French Immersion programs for children with SLI, as well as providing multilingual stimulation for children from a diverse linguistic background.

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