1 # Chapter 10

2 # Research Methods for L2 Children with Special Needs

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4 ## Abstract

5 This chapter examines methodological approaches for studying children who are

6 exposed to multiple languages and have special needs. Written through the lens of

7 speech-language pathology professionals, the discussion centers on developmental

8 language disorder and autism spectrum disorder. The chapter first summarizes

9 common research questions in the study of these populations. Under each research

10 question, the authors present relevant research methods and review the

11 methodological standards for high-quality translational studies that aim to inform

12 assessment and intervention practice. In the second section, the authors outline

13 challenges and methodological implications in terms of selecting the population of

14 interest, identifying the appropriate comparison group, and reducing potential

15 confounds inherent in a highly heterogeneous population.

16 ## Introduction

17 This chapter examines methodological approaches for studying children between the

18 ages of 4 and 12 who are exposed to multiple languages and have special needs. As

19 speech-language pathology professionals, we focus our discussion of special needs on

developmental disorders (DDs) that negatively impact oral communication, i.e., comprehension and expression of spoken language. Subtypes of DD that have received the most attention in the bilingualism literature are developmental language disorder (DLD) and autism spectrum disorder (ASD). Readers who are interested in the interface between L2 literacy development and specific learning difficulties may peruse works by Kormos (2017a, 2017b). The study of bilingual children[i] with a DD (Bi-DD) utilizes a wide variety of research methods, and we are unable to give close attention to each of them in this chapter. At the same time, the study of Bi-DD attempts to answer a set of research questions that are uniquely motivated by the needs of this population. Different questions necessitate different research designs and methods. Therefore, we adopt a different organizational structure for this chapter. In the first section, we summarize common basic science and clinical research questions in the study of Bi-DD. Under each research question, we highlight relevant research methods used to answer the question or present methodological standards that guide the generation of high-quality translational data to establish the evidence base for clinical practice. In the second part of the chapter, we outline the challenges that come with studying Bi-DD and discuss the methodological implications of these challenges.

Common Research Questions and Research Methods Used in Empirical Studies

Bi-DD and Risk Status

One of the most frequently encountered questions in the study of Bi-DD is: Does exposure to two languages present an additional risk for language acquisition in children with a DD? Even in typically developing children, in spite of mounting evidence that the human language capacity can accommodate two or even more linguistic systems, the decision to raise a child bilingually is not easy and is often met with conflicting advice from professionals and family members. Children with a DD usually have less efficient language learning capacity and lag behind typical age peers on acquiring their native language. Would the demand of acquiring two languages overburden the already hindered system and lead to further delay and extraordinary difficulties with both languages? To answer this question, researchers often pit Bi-DD participants against a comparison group of monolingual children with the same diagnosis. Studies of this nature have included various disorder types (e.g., ASD, DLD, and specific learning disabilities such as dyslexia), a range of geographic locations (e.g., Canada, China, Italy, and the United States), multiple language combinations, and outcome measures across language domains. For example, Petersen et al. (2012) used standardized tests such as the Peabody Picture Vocabulary Test (Dunn, 2007) to measure receptive vocabulary and the Preschool Language Scale (Zimmerman et al., 2011) to measure the language comprehension and production of the Bi-ASD children and the monolingual ASD control group. Paradis et al. (2003) coded the use of grammatical morphemes in spontaneous language samples produced by bilingual and monolingual children with a DLD. Vender et al. (2018) designed a

cloze task that assessed the ability to generate plural noun inflections of nonwords in bilingual and monolingual children with dyslexia.

The main finding is that bilingual children with a DD usually performed comparably to monolinguals with a DD, when the stronger language or both languages of bilinguals were considered. Extensions of this line of work have included testing the bilinguals in both languages and comparing them to two monolingual groups with the same diagnosis (e.g., Paradis et al., 2003), four-way comparisons that fully cross diagnostic status (DD vs. typical) and bilingual status (bilingual vs. monolingual) (e.g., Gonzalez-Barrero & Nadig, 2019), and comparing two DD groups who were sequentially bilingual and sequentially trilingual, respectively (e.g., To et al., 2012). These studies further buttress the conclusion that children with significant language learning impairments are able to become bilingual or even multilingual.

Language and Cognitive Profiles of Bi-DLD

To pave the way for effective assessment and treatment, one must have good descriptive data about the nature and extent of deficits in Bi-DD populations. Within this line of research, the Bi-DLD population has been studied more than the Bi-ASD population. These studies on Bi-DLD aim to delineate the dual language profiles of Bi-DLD in comparison to typically developing bilingual peers (Bi-TD) in all domains of language: phonological memory (repetition of nonsense words), lexical

1   development (using standardized tests of receptive and expressive vocabulary),

2   semantic development (using semantic fluency and word association tasks to examine

3   the relationships among words), morphosyntactic ability (using spontaneous language

4   samples to measure utterance length and complexity), and overall quality of discourse

5   (eliciting story samples to examine narrative macrostructure and microstructure). All

6   of the methods for assessing language outcomes discussed in other chapters of this

7   book should, in principle, be applicable to the study of Bi-DD populations. A method

8   that merits special attention is narrative sampling, one of the most frequently used and

9   arguably the most established method for studying expressive language in Bi-DD

10   because it can be readily adapted across languages, ages, and diagnoses.

11   Narrative sampling involves eliciting speech via wordless picture books or

12   specific prompts. Several standardized protocols exist (see Table 10.1 for a summary

13   of narrative sampling protocols). Among them, the Edmonton Narrative Norms

14   Instrument (ENNI, Schneider et al., 2005) and the Multilingual Assessment

15   Instrument for Narratives (MAIN; Gagarina et al., 2012, 2019) are freely available to

16   researchers. The frog narrative (e.g., *Frog, Where Are You?* Mayer, 1969) elicitation

17   protocols can be purchased at a low price at the Systematic Analysis of Language

18   Transcript (SALT; Miller & Iglesias, 2017) software website; or, alternatively,

19   researchers can create their own protocols using the frog storybooks. The SALT

20   software also provides access to a database that contains normative samples from

21   English monolingual children for the ENNI, the frog stories, and the Test of Narrative

Language (TNL; Gillam & Pearson, 2017) and normative samples from Spanish-English bilingual participants for the frog stories. These are useful reference data when trying to determine if a bilingual child meets the criterion for having a language disorder.

Table 10.1 Here

There are a number of factors that can make one narrative task more appropriate than others when testing bilingual populations. Most of these narrative tasks utilize wordless picture sequences, making them accessible to all populations. Despite this neutral format, some of the images or scenes may be culture specific or not equally familiar to all individuals, causing unintentional bias. The MAIN is an example of a relatively culturally fair task given the careful consideration of cultural factors in the creation of the pictorial materials. Additionally, task materials, including story scripts, comprehension questions, and scoring protocols, may only be available in English or a handful of additional languages and would require additional ad hoc translation before the task becomes viable for other language speakers. The MAIN task materials are available in many languages. According to the test developers, the MAIN empirical database now consists of more than 2,500 narratives, which bodes well for researchers who need norm-referenced scores on this instrument. By comparison, the frog stories' task materials are available in fewer languages but large-scale normative data exist in English and Spanish, making it possible to compare a particular child's performance to others from a similar background. Finally, if testing

is planned for bilinguals' two languages, it is also necessary to select a narrative task with multiple stories that closely parallel each other (i.e., MAIN, the frog stories) to decrease practice effect.

To generate good descriptive data, one could also profile language growth over time given that different rates of L1 and L2 growth across domains of language are well documented for bilingual learners (Ebert & Kohnert, 2016). This research goal requires a longitudinal design that assesses learners over multiple time points. As with any population, conducting longitudinal studies is more challenging than cross-sectional studies.

Although one should strive for assessing Bi-DLD children in both languages, oftentimes this is simply not achievable because of the lack of tools in many languages and the lack of linguistic expertise among researchers and practitioners (Sheng, 2019). A substantial line of research takes this reality into consideration by asking: How do TD sequential bilinguals compare to monolingual peers with and without a DLD in single-language assessment? Because sequential bilinguals have had less exposure to the L2, their performance on L2 language measures is often indistinguishable from that of monolinguals with a DLD. The goal of these studies is to identify potential fault lines that could separate TD bilinguals from monolinguals with a DLD by scrutinizing performance on a range of linguistic and nonlinguistic skills in three groups of children: TD sequential bilinguals, TD monolinguals, and monolinguals with a DLD. Testing is conducted in the monolingual's only language

and the bilinguals' L2. Measures that show clear separation between the two TD groups and the DLD group are ideal because they are minimally affected by differences in language experience while at the same time sensitive to the integrity of the language learning system. Measures that yield an indistinguishable performance between TD sequential bilinguals and monolinguals with a DLD are to be avoided in non-biased assessment. This line of work has pointed to certain nonlinguistic skills (e.g., reaction time in shape detection, Kohnert & Windsor, 2004), clausal embedding (i.e., frequency of producing embedded clauses in spontaneous language samples, Scheidnes & Tuller, 2019), and error types (e.g., TD sequential bilinguals were more likely to make substitution errors whereas monolinguals with a DLD were more likely to make omission errors in the production of inflections and prepositions, Armon-Lotem, 2014) as potential candidates that can be used to rule out DLD in sequential bilinguals.

Diagnostic Accuracy Studies

Studies that delineate dual language profiles are clinically useful because they inform us about weaknesses in Bi-DLD at a group level. Studies with the goal of identifying fault lines between TD sequential bilinguals and monolingual DLD are also useful because they tell us what not to use in diagnostic testing and what measures are good at ruling out DLD. However, neither type of study can tell a clinician whether or not a client with a certain combination of scores is affected or typical. To exert a more

direct practical impact, diagnostic accuracy studies ask these questions: What are the

psychometric properties of the proposed measure? Specifically, what are the

sensitivity, specificity, positive likelihood ratio, and negative likelihood ratio of the

index test (i.e., the measure under scrutiny) when evaluated against a reference

standard (i.e., a widely accepted approach to classify individuals into categories)?

Studies of this nature have evaluated a broad range of potential measures, including

nonlinguistic processing tasks (e.g., processing speed, Ebert & Pham, 2019), clinical

markers of DLD such as morphosyntactic composite, nonword repetition, and

sentence repetition (Girbau & Schwartz, 2008; Gutiérrez-Clellen et al., 2008;

Thordardottir & Brandeker, 2013), dynamic assessment tasks (Orellana et al., 2019),

parent report of bilingual children's first language development (Paradis et al., 2010),

English standardized test scores (Gillam et al., 2013), and scores on a bilingual

screener (Lugo-Neris, Peña et al., 2015). While a number of these measures are

promising, the methodological quality is variable across studies (Dollaghan & Horner,

2011; Orellana et al., 2019).

The ultimate charge for the researcher who studies clinical populations is to

generate a high-quality evidence base to support effective clinical practice. High-

quality translational research is not only governed by its own set of methodological

standards but should also follow all familiar standards of scientific inquiries. There

has been a concerted effort among the scientific community to develop standards and

procedures to increase the quality of clinical research. The EQUATOR network

(Enhancing the Quality and Transparency of Health Research) is a multinational initiative dedicated to promoting the use of comprehensive reporting guidelines that facilitate not only accurate and transparent reporting but also the planning and implementation of health research. The network offers a free online library of reporting guidelines for various study types. For instance, the Standards for Reporting Diagnostic accuracy studies (STARD; Bossuyt et al., 2015) is a 30-item checklist of requirements for the title, abstract, introduction, methods, results, discussion, and other relevant information (e.g., funding source) sections of a paper. Readers of a diagnostic research paper can use this checklist to judge the potential bias, relevance, and validity of study findings, whereas researchers can use the checklist for the design, conduct, and reporting of diagnostic research.

Intervention Studies

An important goal of studying Bi-DD is to design effective intervention to improve the quality of life of affected individuals. All the questions pertaining to intervention for monolinguals apply to bilinguals. Among the questions unique to bilinguals, the most common is: What should be the language of intervention for bilinguals? Under this broad question, more specific questions include: How does bilingual intervention compare to L2-only intervention (Restrepo et al., 2013)? Would time spent providing intervention in the minority language lead to smaller gains in majority language skills compared to an L2-only intervention (Restrepo et al., 2013)? Could intervention

1   delivered in one language lead to gains in the other language (Petersen et al., 2016)?

2   To date, research evidence indicates that bilingual intervention results in as much gain

3   in the majority language as L2-only intervention, with some added benefit of L1

4   gains. Therefore, to the extent possible, intervention provided in both languages of the

5   bilinguals should be encouraged. Under the bilingual intervention condition, the

6   following questions have been raised: Is there an optimal order of initial instructional

7   language (L1 first or L2 first) (Lugo-Neris, Bedore et al., 2015)? Given the frequent

8   mismatch in clinician-client languages, could caregivers be trained to deliver effective

9   intervention in the home language (Pedero et al., 2018)? Could intervention targeting

10   nonlinguistic cognitive processing lead to cross-domain gains in both of the

11   bilinguals' languages (Ebert et al., 2014)? Studies attempting to answer these

12   questions are beginning to emerge, but considerable gaps are present for all of them.

13   Intervention studies require the measurement of participants' language skills before

14   and after intervention. Depending on the goal of the intervention, researchers may use

15   standardized tests, language sampling, and researcher-designed probes to establish

16   baseline performance and to evaluate change in a specific area (e.g., tense

17   morphology) or more broadly (e.g., increase in mean length of utterance or in

18   standardized test scores).

19   For intervention research, the gold standard is randomized controlled trials

20   (RCT), which measure the effectiveness of an intervention by randomly assigning

21   participants to either the intervention or the comparison group. Again, readers can use

1   guidelines on the EQUATOR network (i.e., Consolidated Standards for Reporting

2   Trials, CONSORT; Schulz et al., 2010), a 25-item checklist to appraise the quality of

3   a published RCT, or plan for a new study. Single-case designs are also appropriate in

4   intervention studies targeting bilingual populations with a language learning

5   impairment. These designs sample a few participants' responses to an intervention

6   multiple times over a period of time. The single-case reporting guidelines in

7   behavioral interventions (SCRIBE; Tate et al., 2016), a 26-item checklist, can be used

8   for the planning, conduct, and evaluation of single-case research.

9   In the realm of educational research, the What Works Clearinghouse (WWC),

10   an initiative of the US Department of Education's Institute of Education Sciences, has

11   published handbooks of standards and procedures used by the WWC to review and

12   appraise the quality of education intervention studies. Now in its fourth version, the

13   Standards Handbook (What Works Clearinghouse, 2020) describes in detail the

14   standards for four types of intervention research designs: RCT, quasi-experimental

15   design, regression discontinuity design, and single-case design. Researchers

16   developing interventions for Bi-DD populations should be cognizant of these

17   guidelines and standards and ensure adherence to the standards in their respective

18   field.

19   In summary, research questions posed by the study of Bi-DD are of interest to

20   both basic and clinical sciences. They offer insights into the process of language

21   acquisition and can inform the interrelations between language, cognition, and

experience. Well-designed treatment studies are particularly suitable to test

hypotheses about the nature of underlying learning and processing deficits because

they are better equipped for drawing causal relationships.

Challenges and Methodological Implications

Answering any of the questions outlined in the previous section presupposes that one

has a method for selecting the population of interest, for identifying the appropriate

matching comparisons, for measuring the linguistic construct of interest, and for

removing or controlling confounds that could threaten the validity of the method.

When studying young L2 learners, these methodological requirements present a

number of challenges due to the scarcity of participants and the increased number of

potential confounds that are inherent in a highly heterogeneous population.

Participant Selection

Readers of the Bi-DD literature would quickly notice that the participant section is

quite elaborate because thorough descriptions of the bilingual status and the disorder

status of the participants are in order. Every researcher who studies the Bi-DD

population should already have a detailed background questionnaire in their

methodological toolkit (see Table 10.2 for a summary of questionnaires). These tools

rely on a report by the primary caregiver, typically administered in a face-to-face

interview to increase reliability of reporting. They allow the researcher to quantify the

current level of use and lifetime cumulative use of each language and document the

daily function of each language across various settings and interlocutors. Researchers

may choose to set a certain threshold of language use and/or language proficiency to

include or exclude individuals. For instance, Gonzalez-Barrero and Nadig (2019) used

a combination of four indices to determine the bilingual status of their ASD

participants: (1) > 20% of lifetime exposure to each language according to parent

report; (2) the ability to complete the testing protocol in both languages; (3) a score of

> 3 on a 4-point proficiency scale in each language as rated by parents; and (4) mean

ratings of > 2 on a 4-point proficiency scale from three external raters' assessment of

language use based on videos of the testing sessions. Others may choose to use > 20%

current language use rather than lifetime exposure and still others may use a different

cut-off criterion (e.g., < 65% English; Ebert et al., 2019). There is no consensus on the

definition of bilingual. Thus, the main guidance is to choose a logically sound

criterion that helps one fulfil the aim of the project.

Table 10.2 Here

      Procedures for determining or verifying disorder status is specific to each

disorder. ASD is diagnosed based on the distinct behavioral profile demonstrated by

affected individuals. Participant recruitment is typically through community referrals

and research registries. Researchers then either request health/educational records

from participants or administer additional tests in the laboratory to document the

severity of the disorder.

Diagnosing DLD, even in monolinguals, is not a cut-and-dry process. For bilinguals, the problem becomes more complex due to the overlap in linguistic performance between typical sequential bilinguals and monolinguals with DLD, the shortage of psychometrically sound tools, and the lack of bilingual expertise in the professional workforce. To ensure accurate participant selection, researchers administer confirmatory testing to verify the diagnostic status of the children recruited through community referrals. In Sheng et al. (2012), to be included in the DLD group, not only were the Spanish-English bilinguals enrolled in therapy at school, but they also demonstrated 1) low proficiency ratings (more than 1 SD below the group mean in a pool of 280 children) in both languages reported by parents and teachers; 2) valid concerns expressed by teachers and parents about their language ability; 3) clinician concern on the basis of difficulties at the time of testing; and 4) low grammaticality in narrative production in both languages. The convergent sources of information guard against errors of over-, under, and mis-diagnosis of DLD frequently reported in bilingual populations. Convergent information from both subjective ratings and object performance measures is a viable solution to diagnosing DLD when norm-referenced tests are unavailable (see Table 10.3 for a list of standardized language tests in languages other than English). When such tests are available, it is customary to use 1 to 1.5 standard deviations below the mean on omnibus L1 and L2 proficiency tests to select individuals with DLD (e.g., Russian-Hebrew: Fichman & Altman, 2019; Spanish-English: Grasso et al., 2018). The use of 1–1.5 standard deviations below the

mean, however, is not universal. Further discussions on language test score criteria can be found in Plante (1998). The ideal norm should consist of bilingual children with similar demographic characteristics and comparable language experience, but this is rarely the case given the challenges in recruiting large bilingual samples.

Table 10.3 Here

IQ testing is almost always required in studies of special populations. IQ test scores are used to document the cognitive functioning of the participants and to select appropriately matched controls (e.g., monolinguals with the same diagnosis and similar IQ scores or younger typically developing children with comparable raw IQ scores). In the case of DLD, a cut-off score of 70 on nonverbal intelligence tests is commonly used to exclude individuals whose language deficits are caused by deficits in intellectual ability.

Determination of bilingual status and DD status is not trivial. Both involve a combination of subjective judgment from stakeholders (i.e., parents, teachers, trained professionals) and objective performance measures. Such painstaking details are critical to ensuring confidence in the participants' status and finding the right matching group to answer key research questions.

Comparison Group

As illustrated in the research question section, the appropriate comparison group is dictated by the question. At a minimum, the comparison group should be of a similar age, socioeconomic status, gender, and geographic region to the group of interest. In

studies of monolingual children with a DLD, researchers often utilize another type of comparison—namely, language-matched peers—to examine attainment in one aspect of language relative to another. For instance, English-speaking children with a DLD are repeatedly found to score significantly worse on grammatical morphology than younger peers matched on mean length of utterance, hence the conclusion that extraordinary difficulties with grammatical morphology is a core characteristic of English DLD (Leonard, 2014). Language matching is unattested in Bi-DLD for obvious reasons: Most bilinguals do not have balanced skills in both languages. Language matching could result in large differences in chronological age between the L1 and L2 language-matched peers, making the comparisons unfair and invalid for this population.

Heterogeneity

Much of child language research emphasizes the need for homogeneous groups of participants for the purpose of experimental control. When homogeneity proves difficult to attain in special populations, researchers turn to grouping techniques (e.g., grouping by disorder subtype or severity) or statistical techniques to analyze the effect of individual variation or factor out undesirable differences.

Anyone who has conducted research on either bilinguals or individuals with a DD already knows that participants are in short supply. When the target population has to meet both criteria, the number of eligible participants decreases exponentially.

Further complicating the matter, both bilinguals and individuals with a DD are known for their heterogeneity. When striving for homogeneous participant pools, Bi-DD researchers may control for participants' language type and exposure level and limit participants' age range. However, these constraints further limit participant availability. Depending on the research question, more inclusive approaches of participant selection can be used to expand the participant pool without jeopardizing study validity.

One approach is to broaden the language requirement by accepting participants exposed to any pairing or grouping of languages into the "bilingual" group of a study. This should be done when differences between languages or language pairs are irrelevant to the goals of the study or when researchers want language-specific differences to average out, allowing results to generalize across multiple language populations. Questions of this nature often focus on the general cognitive effects of bilingual exposure or examine if assessing only one language (i.e., the majority language) or assessing nonlinguistic cognitive skills can adequately separate individuals with a DLD from TD individuals.

When a research question requires specific language pairs, the amount of language exposure per participant is another variable that can be expanded. Including participants with a wide range of bilingual exposure is well suited for answering questions regarding the effect of exposure on attainment. Examples of this type of question can be found in Bohman et al.'s (2010) large-scale investigation of the

language input effect on TD Spanish-English bilingual children's language performance and in Gonzalez-Barrero and Nadig (2018)'s study on the effect of current language exposure on vocabulary and morphological skills in bilingual school-age children with ASD.

Conclusion

Studying bilingual children with a developmental disability affords many opportunities for high-stakes research questions. We have tried to illustrate some of the research questions uniquely motivated by this population. At the same time, this line of work poses many challenges because of the complexity and heterogeneity of the population, and we have described some of the innovative solutions to overcome these challenges. As this field of study advances, the research questions will become more nuanced and sophisticated and so must our research methods. Equally importantly, future studies need to meet the highest methodological standards to translate research evidence into practice.

Key Terms

Autism spectrum disorder is a neurodevelopmental disorder manifested on a spectrum of severity in the areas of social interaction, communication, restricted and repetitive behaviors, and sensory interests or responses.

1   **Basic science** addresses questions about the core of how and why things work

2   the way they do, which often requires translation in order to be

3   applicable.

4   **Clinical science** tests the efficacy, benefits, and accuracy of treatments,

5   medication, and diagnostic techniques.

6   **Developmental language disorder** is a disorder that negatively affects a

7   person's ability to acquire their native (and subsequent) language(s) in

8   the absence of sensory, neurological, intellectual, and social-emotional

9   impairment.

10   **Dynamic assessment** is a flexible method of evaluating a child's capacity for

11   learning through skills such as attention, memory, and cognitive

12   flexibility. Dynamic assessment procedures include testing, teaching,

13   and retesting phases, which are analyzed by either establishing how

14   much a child has improved, how much support and modification the

15   child needs, or some combination thereof. Dynamic assessment is

16   believed to help separate children whose language lags behind peers

17   due to general skills versus those who lag behind due to lower

18   exposure.

19   **Index test** is the test whose scoring or diagnostic accuracy is being examined.

20   **Negative likelihood ratio** is the odds of an individual having a given

21   diagnosis after receiving a negative test result.

Positive likelihood ratio is the odds of an individual having a given diagnosis after receiving a positive test result.

Reference standard refers to the accepted clinical diagnosis. This is used to compare with the accuracy of the index test, and, if the index test is accurate, they align.

Screener is a brief measure of language ability used to detect individuals who may be at risk of having a language disorder. Individuals who fail a screening do not necessarily have a disorder but should undergo comprehensive testing or close monitoring.

Sensitivity refers to a test's ability to positively diagnose an individual, as calculated by the number of true positives divided by the combined value of true positives and false negatives.

Specificity refers to a test's ability to correctly identify individuals who do not have a given diagnosis, as calculated by the number of true negatives divided by the combined value of true negatives and false positives.

Further Readings

Abbeduto, L., Kover, S. T., & McDuffie, A. (2012). Studying the language development of children with intellectual disabilities. In E. Hoff (Ed.), *Research methods in child language: A practical guide* (pp. 330–346).

Hoboken: Blackwell Publishing Ltd.

https://doi.org/10.1002/9781444344035.ch22

This chapter describes challenges in assessing language in individuals with intellectual disabilities and some of the methods that can be used to deal with these challenges.

Ebert, K. D., & Kohnert, K. (2016). Language learning impairment in sequential bilingual children. In *Language Teaching* (Vol. 49).

https://doi.org/10.1017/s0261444816000070

This review focuses on the evidence regarding theoretical and pedagogical issues for children who have been both diagnosed with language impairments and are sequential bilinguals.

Kay-Raining Bird, E., Genesee, F., & Verhoeven, L. (2016). Bilingualism in children with developmental disorders: A narrative review. *Journal of Communication Disorders, 63*, 1–14. https://doi.org/10.1016/j.jcomdis.2016.07.003

This article reviews the published evidence regarding developmental differences between simultaneous and sequential bilinguals with a DD, and how language intervention influences bilingual children with a DD.

McGregor, K. K. (2012). Studying children with language impairment. In E. Hoff (Ed.), *Research methods in child language: A practical guide* (pp. 317–329). Hoboken: Blackwell Publishing Ltd.

This chapter describes methods of studying children with LI, including the selection of participants, comparison groups, and tasks. In addition, it provides guidance on how to make such research high quality and translational to serve evidence-based intervention practices.

Discussion Questions

1. Consider how the language evaluation of a child with a DD should be altered when that child is also bilingual. How should those alterations change depending on the specific DD diagnosis?

2. What types of measures are available for Bi-DD ages 4–12 and what is lacking? How does this affect their chances of an accurate diagnosis?

3. Provide some examples of how various DDs can affect bilingual language acquisition. Are there differences between the impact of DDs on bilingual versus monolingual language acquisition?

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1 What Works Clearinghouse. (2020). *Standards Handbook* (4.1). Washington DC:

2   Institute of Education Sciences.

3 Zimmerman, I. L., Steiner, V. G., & Pond, R. E. (2011). *Preschool Language Scale,*

4   *Fifth Edition* (PLS-5). APA PsycTests.

5 Table 10.1 Narrative tasks

	Task type	Additional details	Available languages	Citation
Edmonton Narrative Norms Instrument (ENNI)	Tell (story generation) task	Standardized, normed measure, for ages 4–9 years	Materials in English and French, can be conducted in any language	Schneider, P., Dubé, R. V., & Hayward, D. (2005). *The Edmonton Narrative Norms Instrument*. Retrieved from University of Alberta Faculty of Rehabilitation Medicine website: www.rehabresearch.ualberta.ca/enni. Govindarajan, K. & Paradis, J. (2019). Narrative abilities of bilingual children with and without Developmental Language Disorder (SLI): Differentiation and the role of age and input factors. *Journal of Communication Disorders*, 77, 1–16.
Frog narratives	Tell, retell, and comprehension tasks	Standardized measure, retell normed for monolingu	Can be conducted in any language	Mayer, M. (1969). *Frog, where are you?* New York: Dial Press. Scripts can be found at https://www.saltsoftware.com/resources/databases

		al Spanish (5:10–10:7) and bilingual Spanish-English (5:0–9:9), tell normed for bilingual Spanish-English (5:0–9:7)		Gutiérrez-Clellen, V. F., Simon-Cereijido, G., & Wagner, C. (2008). Bilingual children with language impairment: A comparison with monolinguals and second language learners. *Applied Psycholinguistics*, *29*(1), 3–19.
Multilingual Assessment Instrument for Narratives (MAIN)	Tell, retell, and comprehension	Standardized measure	Materials available in more than 27 languages, including Estonian, Lithuanian, Vietnamese, and Welsh	Gagarina, N., Klop, D., Kunnari, S., Tantele, K., Välimaa, T., Balčiūnienė, I., Bohnacker, U. & Walters, J. (2012). MAIN: Multilingual Assessment Instrument for Narratives. *ZAS Papers in Linguistics*, *56*. Gagarina, N., Klop, D., Kunnari, S., Tantele, K., Välimaa, T., Bohnacker, U. & Walters, J. (2019). MAIN: Multilingual Assessment Instrument for Narratives – Revised. *ZAS Papers in Linguistics*, *63*. Tsimpli, I. M., Peristeri, E., & Andreou, M. (2016). Narrative production in monolingual and bilingual children with specific language impairment. *Applied Psycholinguistics*, *37*, 195–216.

Renfrew Bus Story	Retell task	Standardized measure, for ages 3–6:11	English	Renfrew, C. E. (1969). *The bus story: A test of continuous speech*. North Place, Old Headington: Oxford. Rezzonico, S., Chen, X., Cleave, P. L., Greenberg, J., Hipfner-Boucher, K., … Girolametto, L. (2015). Oral narratives in monolingual and bilingual preschoolers with SLI. *International Journal of Language & Communication Disorders*, *50*(6), 830–841.
Test of Narrative Language (TNL)	Narrative tell, retell, and comprehension	Standardized, normed measure, for ages 4:0–15:11	English, Brazilian Portuguese, experimental Spanish version	Gillam, R., & Pearson, N. (2017). *TNL-2: Test of Narrative Language* (2nd ed.). Austin, Texas: Pro-Ed. Rossi, N. F., Lindau, T. A., Gillam, R. B., & Giacheti, C. M. (2016). Cultural adaptation of the Test of Narrative Language (TNL) into Brazilian Portuguese. *CoDAS*, *28*(5), 507–516. Perme, A. L. (2014). *Measures of narrative performance in Spanish-speaking children on the Test of Narrative Language-Spanish* [Unpublished master's thesis]. University of Texas at Austin, Austin, TX. Squires, K. E., Lugo-Neris, M. J., Peña, E. D., Bedore, L. M., Bohman, T. M., & Gillam, R. B. (2014). Story retelling by

				bilingual children with language impairments and typically developing controls. *International Journal of Language & Communication Disorders*, *49*(1), 60–74.

Table 10.2 Language use and experience questionnaires

Name	Focus	Additional details	Languages	Citations
The Alberta Language Environment Questionnaire (ALEQ)	Language history and present use, behavior, and family history	Standardized measure, normed using children ages 5–7 years with a DLD	Materials in English but content not language specific	Paradis, J. (2011). Individual differences in child English second language acquisition: Comparing child-internal and child-external factors. *Linguistic Approaches to Bilingualism*, Volume 1(3). Reetzke, R., Zou, X., Sheng, L. & Katsos, N. (2015). Communicative development in bilingually exposed Chinese children with autism spectrum disorders. *Journal of Speech, Language, and Hearing Research*, *58*, 813–825.
Bilingual Input-Output Survey, part of Bilingual English-	Parent/teacher assessment of language use and exposure	Standardized questionnaire, for ages 4–6 years	Available in English and Spanish	Peña, E., Gutierrez-Clellen, V., Iglesias, A., Goldstein, B., & Bedore, L. (2018). *BESA: Bilingual English-Spanish Assessment*. Baltimore, MD: Brookes Publishing.

Spanish Assessment (BESA)				Grasso, S. M., Peña, E. D., Bedore, L. M., Hixon, J. G., & Griffin, Z. M. (2018). Cross-linguistic cognate production in Spanish-English bilingual children with and without specific language impairment. *Journal of Speech, Language, and Hearing Research, 61*, 619–633.
Bilingual Language Experience Calculator (BiLEC)	Current year's input and output, lifetime input and output	Standardized measure	Intended for bilinguals of English and any other language	Unsworth, S. (2013). Assessing the role of current and cumulative exposure in simultaneous bilingual acquisition: The case of Dutch gender. *Bilingualism* 16, 86–110. https://doi.org/ 10.1017/S1366728912000284 Vender, M., Hu, S., Mantione, F., Savazzi, S., Delfitto, D., & Melloni, C. (2018). Inflectional morphology: Evidence for an advantage of bilingualism in dyslexia. *International Journal of Bilingual Education and Bilingualism, 24*(2), 155–172. https://doi.org/10.1080/13670050.2018.1 450355
Language Experience and Proficiency Questionnaire (LEAP-Q)	Current & history use and exposure	Standardized measure	Available in 24 languages, including Arabic, Russian, Spanish, and Thai	Marian, V., Blumenfeld, H. K., & Kaushanskaya, M. (2007). The Language Experience and Proficiency Questionnaire (LEAP-Q): Assessing language profiles in bilinguals and multilinguals. *Journal of Speech, Language, and Hearing Research, 50*(4), 940–967.

				https://bilingualism.northwestern.edu/leapq/ Mor, B., Yitzhaki-Amsalem, S., & Prior, A. (2014). The joint effect of bilingualism and ADHD on executive function. *Journal of Attention Disorders*, *19*(6), 1–15.

1 Note: In the citation column, the first citation listed is the task itself and the second citation is an
2 example article that uses the tool.

3 Table 10.3 Language measures for groups other than English-speaking
4 monolinguals

Name	Focus	Additional details	Available languages	Citations
Batteria per la Valutazione della Dislessia e della Disortografia Evolutiva – 2 [Battery for the assessment of developmental dyslexia and dysorthographia-2] (DDE-2)	Word and nonword reading and writing tasks, homophones	Standardized, normed measure	Italian	Sartori, G., Job, R., & Tressoldi, P. E. (2007). *DDE-2. Batteria per la valutazione della dislessia e della disortografia evolutiva* [Battery for the assessment of developmental dyslexia and dysorthographia]. Firenze: Giunti OS. Vender, M., Hu, S., Mantione, F., Savazzi, S., Delfitto, D., & Melloni, C. (2018). Inflectional morphology: Evidence for an

				advantage of bilingualism in dyslexia. *International Journal of Bilingual Education and Bilingualism*, *24*(2), 155–172. https://doi.org/10.1080/136700 50.2018.1450355
Bilans Informatisés du Langage Oral [Computerized schedule for oral language] (BILO-3C)	Expressive and receptive, morphosyntax, sentence completion, phonology	Standardized measure, for infants through adolescents	French	Khomsi, A., Khomsi, J., Parabeau-Guéno, A., & Pasquet, F. (2007). *Bilans Informatisés du Langage Oral (BILO-3C)* [Computerized schedule for oral language]. Paris, France: Editions du CPA. Scheidnes, M. & Tuller, L. (2019). Using clausal embedding to identify language impairment in sequential bilinguals. *Bilingualism: Language and Cognition*, *22*(5), 949–967.
Bilingual English Spanish Assessment (BESA)	Morpho/syntax, semantics, phonology, pragmatics, questionnaires	Standardized and normed measure, for ages 4–6 years	English and Spanish	Peña, E., Gutierrez-Clellen, V., Iglesias, A., Goldstein, B., & Bedore, L. (2014). *BESA: Bilingual English-Spanish Assessment Manual*. San Rafael, CA: AR-Clinical Publications. Squires, K. E., Lugo-Neris, M. J., Peña, E. D., Bedore, L. M., Bohman, T. M., & Gillam, R.

				B. (2014). Story retelling by bilingual children with language impairments and typically developing controls. *International Journal of Language & Communication Disorders*, *49*(1), 60–74.
Clinical Evaluation of Language Fundamentals (CELF), -S, -NL	Receptive and expressive language, written language, social skills	Standardized, normed measure, for ages 5–21 years	English, Spanish, Dutch	Semel, E., Wiig, E., & Secord, W. A. (2013). *Clinical Evaluation of Language Fundamentals* (5th ed.). San Antonio, TX: Pearson. Semel, E., Wiig, E. H., & Secord, W. A. (2003). *Clinical Evaluation of Language Fundamentals* (4th ed.) [CELF-4 Spanish]. San Antonio, TX: PsychCorp. Altman, C., Armon-Lotem, S., Fichman, S., & Walters, J. (2016). Macrostructure, microstructure, and mental state terms in the narratives of English-Hebrew bilingual preschool children with and without specific language impairment. *Applied Psycholinguistics*, *37*, 165–193.
Évaluation du Langage Oral de	Language production	Standardized measure,	French	De Agostini, M., Metz-Lutz, M.-N., Van Hout, A.,

l'enfant Aphasique [Oral language evaluation of aphasic children] (ELOLA)	(originally intended for children with aphasia)	for ages 4–12 years		Chavance, M., Deloche, G., Pavao-Martins, I., & Dellatolas, G. (1998). Batterie d'évaluation du langage oral de l'enfant aphasique (ELOLA): standardisation française (4–12 ans) [Oral language evaluation battery of aphasic children: A French standardization]. *Revue de Neuropsychologie*, *8*(3), 319–367. Scheidnes, M. & Tuller, L. (2019). Using clausal embedding to identify language impairment in sequential bilinguals. *Bilingualism: Language and Cognition*, *22*(5) 949–967.
Goralnik Screening Test for Hebrew	Sentence repetition, comprehension, expression, pronunciation, vocabulary, and storytelling	Standardized, normed measure	Hebrew	Goralnik, E. (1995). *Goralnik Screening Test for Hebrew*. Even Yehuda: Matan. Fichman, S., Altman, C., Voloskovich, A., Armon-Lotem, S., & Walters, J. (2017). Story grammar elements and causal relations in the narratives of Russian-Hebrew bilingual children with SLI and typical language development. *Journal*

				of Communication Disorders, *69*, 72–93.
Inventory to Assess Language Knowledge (iTALK), part of Bilingual English-Spanish Assessment (BESA)	Five areas of language development (vocabulary, grammar, sentence production, comprehension, and phonology)	Standardized measure, for ages 4–6 years	English, Spanish	Peña, E., Gutierrez-Clellen, V., Iglesias, A., Goldstein, B., & Bedore, L. (2014). *BESA: Bilingual English-Spanish Assessment Manual*. San Rafael, CA: AR-Clinical Publications. Grasso, S. M., Peña, E. D., Bedore, L. M., Hixon, J. G., & Griffin, Z. M. (2018). Cross-linguistic cognate production in Spanish-English bilingual children with and without specific language impairment. *Journal of Speech, Language, and Hearing Research*, *61*(3), 619–633.
MacArthur-Bates Communicative Development Inventories (MB-CDIs); CDI; Preschool CDI (PCDI); Chinese CDI (CCDI)	Early language including vocabulary comprehension and production, gestures, and grammar	Standardized, normed measure, for ages 8–30 months	Used across 29 languages, including Norwegian, Danish, Portuguese, and Turkish	Fenson, L. (2007). *MacArthur-Bates communicative development inventories*. Baltimore, MD: Paul H. Brookes Publishing Company. http://wordbank.stanford.edu/ Petersen, J. M., Marinova-Todd, S. H., & Mirenda, P. (2012). Brief report: An exploratory study of lexical

				skills in bilingual children with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, *42*, 1499–1503.
Preschool Boehm Test of Basic Concepts	Basic language and cognitive development	Standardized, normed measure, for ages 3:0–5:11	English, Spanish	Boehm, A. E. (1971) *Boehm Test of Basic Concepts*. New York: The Psychological Corporation. Thordardottir, E. T., Weismer, S. E., & Smoth, M. E. (1997). Vocabulary learning in bilingual and monolingual clinical intervention. *Child Language Teaching and Therapy*, *13*(3), 215–227.
Preschool Language Scales (PLS) -3, -4, -5, -Spanish	Receptive and expressive language from pre-verbal to early literacy	Standardized, normed measure, for ages birth–7:11	English, Spanish	Zimmerman, I. L., Steiner, V. G., & Pond, R. E. (2011). *Preschool language scales* (5th ed.). San Antonio, TX: Pearson. Ohashi, J. K., Mirenda, P., Marinova-Todd, S., Hambly, C., Fombonne, E., … the Pathways in ASD Study Team (2012). Comparing early language development in monolingual- and bilingual-exposed young children with autism spectrum disorder.

				Research in Autism Spectrum Disorders, *6*(2), 890–897.
Receptive and Expressive One-Word Picture Vocabulary Test (ROW/ROWPVT & EOW/EOWPVT); Spanish-Bilingual Edition (EOWPVT-3: SBE)	Vocabulary	Standardized, normed measure, for ages 4–70+ years	English, Spanish, bilingual edition	Brownell, R. (Ed.). (2000). *Expressive one-word picture vocabulary test: Manual*. Academic Therapy Publications. Grasso, S. M., Peña, E. D., Bedore, L. M., Hixon, J. G., & Griffin, Z. M. (2018). Cross-linguistic cognate production in Spanish-English bilingual children with and without specific language impairment. *Journal of Speech, Language, and Hearing Research*, *61*(3), 619–633.
Russian Language Proficiency Test for Multilingual Children	Production and receptive language	Standardized and preliminarily normed measure, for ages 3–6:11	Russian, preliminary bilingual norms for Russian-Hebrew bilinguals	Gagarina N., Klassert A., & Topaj, N. (2010). Russian language proficiency test for multilingual children. *ZAS Papers in Linguistics*, *54*. Fichman, S., & Altman, C. (2019). Referential cohesion in the narratives of bilingual and monolingual children with typically developing language and with specific language impairment. *Journal of Speech,*

				Language, and Hearing Research, *62*(1), 123–142.
Schlichting test voor taalproductie [Schlichting test for language production]; -2	Productive semantics, syntax, and pragmatics	Standardized, normed measure, for ages 1:2–6:3, version 2 for ages 3:9–7:0	Dutch	Schlichting, J., van Eldik, M., lutje Spelberg. H., van der Meulen, S., & van der Meulen, B. (2003). *Schlichting test voor taalproductie* [Schlichting test for language production]. Lisse, The Netherlands: Swets & Zeitlinger.
Taaltoets Alle Kinderen [The language proficiency test for all children] (TAK-R)*	Receptive and productive language, semantics, morphosyntax	Standardized, normed measure	Dutch	Verhoeven, L., & Vermeer, A. (2001). *Taaltoets alle kinderen* [Dutch language test for children]. Arnhem: The Netherlands Cito Group. Verhoeven, L., Steenge, J., & van Balkom, H. (2012). Linguistic transfer in bilingual children with specific language impairment. *International Journal of Language & Communication Disorders*, *42*(2), 176–183.

1 Note: In the citation column, the first citation listed is the task itself and the second citation is an
2 example article that uses the tool.

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[i] Because this literature typically labels participants as "bilingual," here we use the

term "bilingual" interchangeably with "L2 children."