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Code-Switching During Narratives by Bilingual Children With and Without Developmental Language Disorder

Megan C. Gross[a] and **Anny Castilla-Earls**[b]

[a]Department of Speech, Language, and Hearing Sciences, University of Massachusetts Amherst [b]Department of Communication Disorders and Sciences, University of Houston, TX

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ABSTRACT

Purpose: This study examined the frequency, direction, and structural characteristics of code-switching (CS) during narratives by Spanish–English bilingual children with and without developmental language disorder (DLD) to determine whether children with DLD exhibit unique features in their CS that may inform clinical decision-making.
Method: Spanish–English bilingual children, aged 4;0–6;11 (years;months), with DLD (n = 33) and with typical language development (TLD; n = 33) participated in narrative retell and story generation tasks in Spanish and English. Instances of CS were classified as between utterance or within utterance; within-utterance CS was coded for type of grammatical structure. Children completed the morphosyntax subtests of the Bilingual English-Spanish Assessment to assist in identifying DLD and to index Spanish and English morphosyntactic proficiency.
Results: In analyses examining the contributions of both DLD status and Spanish and English proficiency, the only significant effect of DLD was on the tendency to engage in between-utterance CS; children with DLD were more likely than TLD peers to produce whole utterances in English during the Spanish narrative task. Within-utterance CS was related to lower morphosyntax scores in the target language, but there was no effect of DLD. Both groups exhibited noun insertions as the most frequent type of within-utterance CS. However, children with DLD tended to exhibit more determiner and verb insertions than TLD peers and increased use of "congruent lexicalization," that is, CS utterances that integrate content and function words from both languages.
Conclusions: These findings reinforce that use of CS, particularly within-utterance CS, is a typical bilingual behavior even during narrative samples collected in a single-language context. However, language difficulties associated with DLD may emerge in how children code-switch, including use of between-utterance CS and unique patterns during within-utterance CS. Therefore, analyzing CS patterns may contribute to a more complete profile of children's dual-language skills during assessment.
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Code-switching (CS), or the alternation between languages within a sentence or stretch of discourse, is a common feature of bilingual language use. Children may engage in CS for a variety of reasons, such as to compensate when they do not know a word or grammatical construction in the current language of the conversation, to more precisely express their desired meaning, to repair a communication breakdown, to clarify, to provide emphasis, to shift roles or topics, or to quote something said in the other language (e.g., Halpin & Melzi, 2021; Namba, 2012; Raichlin et al., 2018; Yu, 2016). Children may be particularly likely to code-switch when interacting with other bilinguals who also understand both languages. However, typically developing bilingual children have

Correspondence to Megan C. Gross: megangross@umass.edu. ***Disclosure:*** *Megan C. Gross is an advisory board member for the project Children and Language Mixing (CALM) at Utrecht University (since March 2022, continuing). Anny Castilla-Earls has declared that no competing financial or nonfinancial interests existed at the time of publication.*

been observed to code-switch even in monolingual settings, especially when using their less dominant language and/or a minoritized language (e.g., Gross & Kaushanskaya, 2022; Gutiérrez-Clellen et al., 2009; Kapantzoglou et al., 2021; Montanari et al., 2019; Raichlin et al., 2018). Thus, CS is a typical part of bilingual development that reflects linguistic resourcefulness and should not be seen as a sign of disorder when observed during a language assessment. However, it is possible that a deeper look at how children code-switch could reveal differences in the CS patterns of children with developmental language disorder (DLD) that may be clinically informative.

Despite the important role of CS in bilingual language use, utterances containing CS are generally excluded from language sample analysis, which forms a core component of the evaluation process to identify DLD in bilingual children (e.g., Castilla-Earls, Bedore, et al., 2020). Given their grammatical difficulties, children with DLD might be expected to have more difficulty integrating the grammatical systems of their two languages during CS and following the distributional patterns of their language community. However, past works (e.g., Greene et al., 2013, 2014; Gross & Kaushanskaya, 2022; Gutiérrez-Clellen et al., 2009; Iluz-Cohen & Walters, 2012; Kapantzoglou et al., 2021) have yielded mixed results as to whether children with DLD exhibit differences in the frequency, direction, or grammatical structure of their CS compared to peers with typical language development (TLD). The goal of this study was to analyze the frequency, direction, and structural characteristics of CS during narratives by Spanish–English bilingual children with and without DLD. In particular, we examined whether Muysken's typology (e.g., Deuchar et al., 2007; Muysken, 2013; Treffers-Daller, 2022) could uncover unique patterns in the CS of children with DLD that have not been detected in past work.

Factors Influencing the Frequency and Direction of CS by Bilingual Children

In the sections that follow, we review factors that influence the frequency and direction of CS by bilingual children with typical development. For frequency, we consider whether children code-switch at all and (if they do) how often they code-switch. For direction, we consider whether children are more likely to switch into one language than the other. Furthermore, we distinguish "between-utterance CS" (also known as "intersentential CS," where a switch in languages occurs at an utterance or sentence boundary) from "within-utterance CS" (also known as "intrasentential CS," where elements of both languages are intermixed within a single utterance or sentence). These two major types of CS are often examined separately. We focus on studies employing direct measures of children's CS (as opposed to parent report) from narrative, conversation, and free-play tasks among children aged 2–7 years (toddlers, preschool, early school age) from various countries (United States, Canada, Israel, Singapore, England, and Japan) who speak a variety of language pairs (Spanish–English, French–English, Marathi–English, Russian–Hebrew, Chinese–English, Mirpuri–English, and Japanese–English).

Sociolinguistic Context

The frequency of CS can be affected by the sociolinguistic norms of a region or community. For example, in picture descriptions by Mirpuri–English bilingual preschoolers (ages 3–4 years) in the United Kingdom (Pert & Letts, 2006) and peer interactions among Mandarin–English bilingual preschoolers (ages 5–6 years) in Singapore (Yow et al., 2018), all participants exhibited at least some CS. In contrast, only a subset of children code-switched during narrative samples by Spanish–English bilingual preschoolers (ages 3–6 years) in the United States (e.g., Gutiérrez-Clellen et al., 2009; Halpin & Melzi, 2021). This behavior may reflect their experience growing up in a multilingual community with frequent CS.

Perceptions of language prestige can affect the direction of CS. Although children are generally more likely to switch from their weaker language to their stronger language, French-dominant and Spanish-dominant toddlers and preschoolers (ages 2–4 years) across multiple studies in the United States and Canada were more likely to switch into English (their weaker language) than English-dominant children were to switch into their weaker language, which was not the language of prestige (e.g., Montanari et al., 2019; Paradis & Nicoladis, 2007; Smolak et al., 2019). Assumptions about the language knowledge of others can also play a role in this phenomenon (e.g., Paradis & Nicoladis, 2007; Tare & Gelman, 2010). In North America, speakers of a minoritized language can often be expected to know at least some English, such that a code-switch into English would still be understood. However, English speakers are not necessarily expected to be familiar with other languages.

Immediate Conversational Context

In addition to the broader sociolinguistic context, the immediate context of an interaction can affect the use of CS through different control processes that regulate language selection. In their adaptive control hypothesis, Green and Abutalebi (2013) described three interactional contexts: "single-language contexts," where there is one expected language for interactions (e.g., Spanish at home, English at school); "dual-language contexts," where both languages are present but used with different

speakers (e.g., Spanish with grandparents, English with siblings); and "dense CS contexts," where bilingual individuals engage in frequent CS. The two languages are proposed to be in a competitive relationship in the first two contexts, such that one language is activated whereas the other is inhibited. When CS occurs, it may involve a shift in the activation levels of each language. In contrast, a dense CS context is posited to involve cooperative control where opportunistic planning can be used to select either language depending on what is most accessible to the speaker and best fits the desired meaning (e.g., Beatty-Martínez et al., 2020; Green, 2018; Green & Wei, 2014).

Thus, in a single-language context, which is often the case during language assessment, use of CS may be less frequent and may be governed by different processes than would be apparent in a dense CS context where CS is expected. For example, studies in both toddlers (Comeau et al., 2003) and adults (Valdés Kroff & Fernandez-Duque, 2017) reported that frequency of CS can be affected by whether their conversation partner also engages in CS. Toddlers have also shown sensitivity to whether their conversation partner appears to approve of CS (e.g., Lanza, 1992; Mishina-Mori, 2011). Toddlers in these studies used more CS with parents who accepted a code-switched utterance and continued the conversation (even without using CS themselves) than with parents who made explicit requests to use a specific language.

Age

Age has been suggested to affect the frequency and characteristics of children's CS. Researchers continue to debate whether language mixing in young children is qualitatively different from the CS exhibited by proficient bilingual adults and how the nature of CS may change with development (e.g., Muller & Cantone, 2009; Treffers-Daller, 2022). Longitudinal studies of Spanish–English and French–English bilingual toddlers and preschoolers (ages 2–4 years; Montanari et al., 2019; Smolak et al., 2019) observed that younger children tended to exhibit more between-utterance than within-utterance switching and that use of within-utterance CS increased relative to between-utterance CS with age. However, other longitudinal studies with Spanish–English bilingual preschoolers (ages 3–5 years) documented no systematic patterns over time (Kuzyk et al., 2020) or consistently infrequent between-utterance CS over time (Halpin & Melzi, 2021). These mixed findings may reflect the complex interactions among other factors in addition to age. Similarly, multiple studies of Spanish–English bilingual toddlers and preschoolers (e.g., Halpin & Melzi, 2021; Montanari et al., 2019; Smolak et al., 2019) have reported a reduced tendency to switch from English to Spanish with age, but it is difficult to tease apart the role of age versus shifting dominance.

Pragmatic functions of CS have also been suggested to change with age, such that CS in young children is described as mostly compensatory (e.g., Nicoladis & Secco, 2000), whereas early school-age children use CS to achieve different pragmatic functions (e.g., Raichlin et al., 2018). However, other studies have suggested that children exhibit diverse pragmatic functions of CS as young as the age of 3 years (e.g., Halpin & Melzi, 2021; Namba, 2012) and are able to adjust their language choice for different conversation partners as young as the age of 2 years (e.g., Genesee et al., 1995; Lanza, 1992; Nicoladis & Genesee, 1996).

Dominance/Relative Proficiency

Related to the assumption that CS serves a mostly compensatory role in young children, child CS has generally been attributed to limited proficiency in the target language of the conversation. According to the lexical gap hypothesis (Nicoladis & Secco, 2000), children may code-switch when they do not know the word for the concept they are trying to express in the target language. In terms of syntax, the phenomenon of bilingual bootstrapping (Gawlitzek-Maiwald & Tracy, 1996) describes how children may incorporate syntactic structures from the nontarget language to help them express a structure they have not yet fully developed in the target language. Indeed, studies of Spanish–English and French–English bilingual children aged 2–6 years have documented a tendency to switch out of a language in which they have lower proficiency toward a language in which they have higher proficiency (e.g., Greene et al., 2013; Gutiérrez-Clellen et al., 2009; Nicoladis & Genesee, 1996; Paradis & Nicoladis, 2007; Peynircioglu & Durgunoglu, 2002; Smolak et al., 2019). However, at least in preschoolers, the role of dominance can interact with sociolinguistic prestige, such that the tendency to switch into the child's dominant language is weaker if that language has less prestige (e.g., Gutiérrez-Clellen et al., 2009; Paradis & Nicoladis, 2007). In addition, Montanari et al. (2019) reported that English proficiency had a weaker relationship with CS to/from English as children aged. Thus, the role of proficiency in CS may change with age.

The negative relationship between proficiency and CS may also be restricted to single-language contexts in the child's less dominant language. When narratives were elicited in the child's dominant language by a bilingual examiner who followed the child's language choices, Halpin and Melzi (2021) observed no significant difference in proficiency between children who did and did not code-switch. Furthermore, Yow et al. (2018) observed a positive relationship between Mandarin proficiency and preschoolers'

use of CS in a setting with peers who were engaged in CS. The cooperative, rather than competitive, relationship between languages in a dense CS context may shift the relationship between proficiency and CS.

Finally, different types of CS may show different relationships to proficiency. Between-utterance CS has especially been associated with limited proficiency in the target language (e.g., Genesee et al., 1995; Gross & Kaushanskaya, 2022; Kuzyk et al., 2020). Within-utterance CS has been variably associated with more balanced proficiency (e.g., Peynircioglu & Durgunoglu, 2002), lower proficiency in the target language of the sample (e.g., Gross & Kaushanskaya, 2022; Kapantzoglou et al., 2021), or no relationship to proficiency (e.g., Genesee et al., 1995; Halpin & Melzi, 2021; Kuzyk et al., 2020). These mixed findings may relate to the context of the interaction. As showcased throughout this discussion of CS and proficiency, factors influencing the frequency and direction of CS can interact in complex ways within any given situation.

Structural Characteristics of CS by Bilingual Children

Looking beyond the frequency and direction of CS, studies have also characterized the grammatical structure of children's within-utterance CS. A variety of studies have identified single-word switches as more common than longer switches in preschoolers and early school-age children (e.g., Brice & Anderson, 1999; Halpin & Melzi, 2021; Paradis & Nicoladis, 2007). Other studies have distinguished content words from function words, identifying more switches on content words than function words among both Spanish–English and French–English toddlers (e.g., Smolak et al., 2019). However, switches on function words are still relatively more common in children compared to adults (Treffers-Daller, 2022). As their grammatical skills are still developing in their weaker language, children tend to use function words from their more dominant language when engaged in CS. For example, Mirpuri-dominant bilingual preschoolers were reported to switch into English to express subjects and objects, while Mirpuri continued to be used for function words (Pert & Letts, 2006). In contrast, Smolak et al. (2019) reported increased switches into English for function words as Spanish–English bilinguals aged and became more English-dominant.

In terms of specific grammatical categories, nouns have been documented across studies as the most commonly code-switched element (e.g., Brice & Anderson, 1999; Gutiérrez-Clellen et al., 2009; Halpin & Melzi, 2021; Iluz-Cohen & Walters, 2012; Pert & Letts, 2006). Beyond that, the next most commonly switched category has varied across studies, including verbs (e.g., Brice & Anderson, 1999; Pert & Letts, 2006) or other words such as conjunctions, prepositions, adverbs, adjectives, and determiners (e.g., Gutiérrez-Clellen et al., 2009; Halpin & Melzi, 2021). Brice and Anderson (1999) suggested that switches on verbs may be specific to the CS of young children, compared to more mature bilinguals. An understanding of the grammatical structure of CS by bilingual children is important when considering how CS may be impacted by DLD.

CS by Bilingual Children With DLD

Due to their overall challenges with learning language, bilingual children with DLD tend to have lower proficiency in both languages when compared to TLD peers. If proficiency is one of the factors in children's CS, children with DLD might be expected to show different CS patterns from their TLD peers. Similarly, if within-utterance CS requires a sophisticated command of the grammars of both languages to integrate the two languages appropriately, children with DLD, who tend to have difficulty learning grammatical rules, might be expected to exhibit atypical CS structure. Past studies comparing CS in children with and without DLD have yielded mixed findings, which may relate to task differences and whether proficiency was taken into consideration.

Multiple studies reported no significant differences between Spanish–English preschoolers with and without DLD (ages 4–7 years) in the frequency or direction of their CS (e.g., Greene et al., 2014; Gutiérrez-Clellen et al., 2009; Kapantzoglou et al., 2021). All three studies examined narrative and/or conversation tasks with an expected target language. In contrast, Iluz-Cohen and Walters (2012) found Hebrew–English bilingual children (ages 5–7 years) with DLD to exhibit more CS than TLD peers. Furthermore, differences were observed in the direction of CS; the TLD group was more likely to switch into Hebrew (the community language) when retelling a story in English, whereas the DLD group was more likely to switch into English (their home language) when retelling a story in Hebrew. This difference could reflect reduced sensitivity to sociolinguistic norms among children with DLD. However, the groups in this study were not explicitly matched for dominance, and the DLD group may also have been more English-dominant. Similarly, Greene et al. (2013) observed a greater tendency for children at risk for DLD to switch from English to Spanish, the less expected direction for their TLD peers. They also attributed this finding to reduced sociolinguistic awareness, but it could reflect differences in relative proficiency. Kapantzoglou et al. (2021) directly examined the role of proficiency. They reported that Spanish proficiency was negatively correlated with Spanish-to-English CS for children with DLD but not for

children with TLD. Thus, relative proficiency may play a greater role in influencing CS behavior for children with DLD compared to their TLD peers.

In addition to examining the frequency and direction of CS, it is important to consider the structure, which could reflect qualitative differences associated with DLD. In a recent study (Gross & Kaushanskaya, 2022), differences between Spanish–English preschoolers with and without DLD varied by type of CS. Even after accounting for proficiency in each language, children with DLD showed a greater tendency than their TLD peers to engage in between-utterance CS (particularly from Spanish to English) but no differences in the frequency or direction of within-utterance CS. Iluz-Cohen and Walters (2012) reported that children with DLD produced more switches on extended segments (i.e., not single-word insertions) than their TLD peers. Gutiérrez-Clellen et al. (2009) did not find differences between children with and without DLD in the grammatical category of code-switched words or the tendency to produce atypical switches (e.g., adjective–noun, switches between a pronoun and an inflected verb). Children with and without DLD showed a similar tendency to switch from a Spanish article to an English noun, consistent with other CS literature (e.g., Liceras et al., 2008; Valdés Kroff, 2016). However, children with DLD were more likely to omit determiners and copula "is/es" in code-switched utterances. These nuanced findings suggest that there may still be something different about the CS patterns of children with DLD, although systematic differences have been difficult to identify in past work.

In this study, we adopt Muysken's typology (e.g., Deuchar et al., 2007; Muysken, 2013; Treffers-Daller, 2022) to examine whether the distinction among insertions, alternations, and congruent lexicalization may reveal new insights into the effects of DLD on children's CS patterns. *Insertions* are defined as the insertion of a single lexical item from Language B into a sentence that is primarily in Language A, the matrix language that sets the sentence structure. *Alternations* are defined as utterances that alternate between stretches in Language A and stretches in Language B, usually at a grammatical boundary. In *congruent lexicalization*, also known as *dense CS*, both languages contribute to a shared structure expressed by lexical items from both languages. Congruent lexicalization reflects the greatest level of integration of the two languages, with function words produced in both languages and switches potentially occurring within grammatical units.

Muysken's typology has not often been applied to child CS and, especially, not among children with DLD. However, Treffers-Daller (2022) suggested that code-switches on function words, more frequently observed in young children than adults, may reflect use of congruent lexicalization. Congruent lexicalization in bilingual adults has generally been associated with typologically similar languages, high levels of bilingual proficiency, and frequent language contact within the community (Muysken, 2013). However, even children who speak languages that are quite different (e.g., Japanese and English) and are still developing their grammatical skills have been suggested to exhibit congruent lexicalization (e.g., Namba, 2012; Treffers-Daller, 2022). Thus, the concept of congruent lexicalization from Muysken's typology may be relevant to understanding how children are creatively integrating grammatical features of their two languages and how this process may be impacted by DLD.

This Study

Language sample analysis in both languages is a critical component of a bilingual language assessment (Castilla-Earls, Bedore, et al., 2020). Recent work suggests that combining data from samples in both languages may yield good diagnostic accuracy when examining metrics such as percent grammatical utterances (Hernandez & Castilla-Earls, 2022). However, even when looking at both English and Spanish samples, utterances containing CS are usually excluded from analysis, and clinicians and researchers are often unsure how to evaluate such utterances. Yet, especially for children from communities that engage in frequent CS, CS utterances have been shown to have a higher mean length of utterance than single-language utterances (e.g., Pert & Letts, 2006). Thus, analyzing single-language utterances alone may not fully represent their best linguistic skills. The goal of this study was to focus precisely on those utterances that are often thrown out from language sample analysis to determine whether systematic differences could be observed in the CS utterances of children with versus without DLD. Although past studies have conducted similar comparisons using narrative tasks (Gutiérrez-Clellen et al., 2009; Iluz-Cohen & Walters, 2012; Kapantzoglou et al., 2021), the findings have not yet revealed consistent patterns to provide clear guidance to analyze CS by children with DLD.

This study sought to answer the following research questions.

1. How does DLD status relate to the tendency to engage in within-utterance or between-utterance CS during English and/or Spanish narrative samples?
2. What are the roles of English and Spanish proficiency and DLD status in predicting the presence and/or frequency of CS?

3. Do bilingual children with DLD exhibit qualitative differences from TLD peers in the structure of their CS?

Method

Participants

The participants were 33 Spanish–English bilingual children with TLD and 33 Spanish–English bilingual children with DLD. These children are the same children reported in the work of Castilla-Earls et al. (2021) and were recruited in Western New York (n = 36) and South Texas (n = 30). Inclusion in this study required parent report that Spanish was spoken at home. All children obtained a score equal or higher than 70 on the Nonverbal Scale of the Kaufman Brief Intelligence Test–Second Edition (Kaufman & Kaufman, 2004) and passed a hearing screening using an otoacoustic emission test. Children with DLD had a score equal or below the age-specific cutoff score of the Bilingual English-Spanish Assessment (BESA; Peña et al., 2014), accompanied by the critical appraisal of a certified bilingual speech-language pathologist when the confidence interval of the score included the cutoff score, and a percentage of grammatical utterances below 80% in both Spanish and English (Restrepo, 1998; Simon-Cereijido & Gutiérrez-Clellen 2007). Children with typical language skills had a score above the age-specific cutoff score on the BESA, accompanied by critical appraisal of language skills by a bilingual speech-language pathologist when the confidence interval of the child's score included the cutoff score.

Participant characteristics and statistical comparisons between TLD and DLD groups using independent samples t tests and tests of independence (Fisher's exact test or chi-square test with p values calculated through Monte Carlo simulation) are provided in Table 1, with key patterns summarized here. Children were between the ages of 4;0 (years;months) and 6;11. Children in the DLD group were significantly younger than those in the TLD group, and the DLD group had a larger proportion of boys. Groups did not differ significantly in age of English acquisition, level of maternal education, proportion of children receiving free/reduced lunch, nonverbal IQ, school language, or fathers' language use with the child. Children in the DLD group showed a greater tendency than their TLD peers to receive input in both Spanish and English from their mothers, but this trend did not reach significance. As would be expected given their diagnosis, the DLD group differed from TLD peers in the proportion of children currently receiving speech/language therapy and scores received on the BESA. Children in this study tended to be Spanish-dominant; on average, they heard more Spanish than English at home and received higher BESA scores in Spanish than English. However, in terms of the difference between English and Spanish BESA morphosyntax scores, the TLD group was significantly more Spanish-dominant than the DLD group. The majority of children were identified as Hispanic (n = 61), with only one child identified as not Hispanic (and four null responses). Participant characteristics comparing samples from Western New York versus South Texas can be found in Supplemental Material S1.

General Procedure

The institutional review board at both the State University of New York at Fredonia and the University of Houston approved this study. All data were collected between 2014 and 2016. Parents provided consent for their own and their children's participation in the study and completed a written questionnaire. Children provided assent to participate and completed three testing sessions of approximately 50 min each. Sessions took place on different days within a period of 3 weeks maximum, and each session was administered by a different Spanish–English bilingual research assistant. The first session was conducted in Spanish and included the hearing screening, nonverbal IQ measure, and Spanish language assessments. The second and third sessions included the narrative tasks that were the focus of this study. One session was conducted in Spanish (narrative tasks), and the other session was conducted in English (both narrative tasks and language assessments). The order of these sessions was counterbalanced such that some children completed the second session in English and the third session in Spanish, whereas other children did the reverse. Within a given session, the sequence of tasks was random. Research assistants used the target language consistently to complete all tasks during the session, and children were not explicitly told that the research assistant was bilingual. Research assistants used strategies such as pretending that they did not speak the nontarget language and/or reminding the children to use the target language when children used the nontarget language.

Language Proficiency

To account for the role of proficiency in each language when examining the relationship between DLD and CS, we used the BESA standard scores for the morphosyntax subtests in English and Spanish as estimates of language-specific proficiency, taking age into account. Descriptive statistics for children's scores on this measure are reported in Table 1. The absolute level of proficiency in each language may play a role in children's CS

Table 1. Participant characteristics.

Characteristic	DLD (n = 33)	TLD (n = 33)	p[a]
Gender	9 girls, 24 boys	18 girls, 15 boys	.044*
Age (months)	57.48 (7.02) Range: 48–82	65.09 (10.26) Range: 48–83	.001***
Maternal education level:			.119
Elementary	12	8	
High school	12	6	
Some college	1	3	
Associate's degree	3	3	
Bachelor's degree	2	5	
Graduate degree	1	6	
Not reported	(2)	(2)	
Free/reduced lunch	28/31 reported	22/30 reported	.106
Country of origin			< .001***
Mexico	23	7	
Puerto Rico	1	14	
(Mainland) United States	1	1	
Other	6	8	
Not reported	(2)	(3)	
Parent's best language			.551
Spanish	20	23	
English	2	1	
Both	4	2	
Not reported	(6)	(7)	
Child's age of English acquisition (years)	2.70 (1.30) Range: 1–6	3.04 (1.66) Range: 1–5	.416
Language with child (mother)			.068
Only English	0	1	
Mainly English	0	1	
Spanish and English	7	1	
Mainly Spanish	10	11	
Only Spanish	13	18	
Not reported	(3)	(1)	
Language with child (father)			.560
Only English	0	0	
Mainly English	0	0	
Spanish and English	8	6	
Mainly Spanish	6	10	
Only Spanish	14	16	
Other	1	0	
Not reported	(4)	(1)	
School language			.588
Bilingual	8	11	
English	22	21	
Not reported	(3)	(1)	
Current speech/language therapy (parent report)[b]	18/28 reported	3/31 reported	< .001***
Nonverbal intelligence (KBIT)	97.27 (11.16) Range: 73–118	101.52 (16.53) Range: 74–139	.226
BESA Spanish morphosyntax	70.06 (9.18) Range: 52–85	98.61 (8.33) Range: 83–118	< .001***

(*table continues*)

Table 1. *(Continued).*

Characteristic	DLD (n = 33)	TLD (n = 33)	p[a]
BESA English morphosyntax	64.7 (9.84) Range: 52–83	83.36 (20.95) Range: 52–115	< .001***
BESA best score	72.15 (8.45) Range: 52–85	100.7 (9.14) Range: 83–118	< .001***
BESA difference score English Morphosyntax–Spanish Morphosyntax	–5.36 (11.30) Range: –27 to 13	–15.24 (20.49) Range: –51 to 18	.019*

Note. DLD = developmental language disorder; TLD = typical language development; KBIT = Kaufman Brief Intelligence Test; BESA = Bilingual English-Spanish Assessment.

[a]p values reflect independent samples t tests for continuous variables and tests of independence for categorical variables (using Fisher's exact test for 2 × 2 contingency tables and Monte Carlo simulation with 10,000 replicates to calculate p values when there were more than two categories, given that expected counts were often < 5). [b]Information about current speech/language therapy was collected from the parent questionnaire. Three children classified as TLD based on our assessments were reported to be receiving current speech/language therapy. It may be that they were receiving services for needs other than language (e.g., articulation). It is also possible that English language learner services were confused with speech-language pathology services or that they were misdiagnosed, as these children had low English scores. Detailed information about the focus of therapy was not available to confirm these conjectures.

*p < .05. ***p < .001.

behavior that would not be captured by looking for only a relative proficiency, where a child who is "balanced" could have equally low scores in both languages or equally high scores. We recognize that morphosyntax subtest scores are not an ideal indicator of overall proficiency, as they do not encompass all domains of language, and relative proficiency can vary by domain (e.g., Bedore et al., 2012). However, given our interest in the structure of children's CS, their grammatical skills in each language were particularly relevant and allowed us to examine whether DLD had an impact on children's CS behavior over and above the effects of having limited grammatical skills in the target language of the sample.

Narrative Samples

Children completed two narrative tasks in each language. First, children completed a story-retell task using one of two Frog books from Mercer Mayer (Spanish: Frog Goes to Dinner and Frog on His Own; English: A Boy, a Dog and a Frog and One Frog Too Many) with story scripts from the Systematic Analysis of Language Transcripts (SALT) website (www.saltsoftware.com). Children were told (in the target language), "I am going to tell you a story while we look at the pictures in this book. When I am finished, it will be your turn to tell me the story." After children completed the story retell, they were then shown the second Frog book and told (in the target language), "Now we are going to use this book and you are going to tell me another story using these pictures." Examiners used the target language throughout; any use of the nontarget language by examiners was rare and occurred primarily when glossing the child's utterances. Children were explicitly encouraged to stay in the target language when code-switches were evident in their stories. For example, research assistants would say, "Tell me in English what happened," "Acuerdate que me tienes que hablar en español" ["Remember that you need to speak to me in Spanish"], or "Acuerdate que yo no entiendo inglés" ["Remember that I don't understand English"]. Therefore, the expectation to stay in the target language was set both implicitly and explicitly.

All narratives were audio recorded and then transcribed using SALT (Miller & Iglesias, 2017). Language sample transcription took place under the supervision of the second author of this study in two different laboratories and by different research assistants. For the data in Western New York, interrater reliability for Spanish transcription was 94%. The interrater reliability for the transcription of English samples was initially considered unacceptable (below 90%) and was therefore completed as consensus agreement between two research assistants. For the data from Texas, interrater reliability was 94% for the Spanish transcripts and 95% for the English transcripts.

Coding

Complete and intelligible utterances containing CS (i.e., at least one word not in the target language of the sample) were marked as "[CS]." A bilingual research assistant reviewed all utterances marked as [CS] and coded them for type according to Muysken's typology (e.g., Deuchar et al., 2007) as between-utterance, alternational, insertional, or congruent lexicalization (see Table 2 for code definitions and examples). An additional phenomenon emerged during coding: insertional code-switches where the main language of the utterance was not the

Table 2. Codes for code-switching (CS) types with definitions and examples.

Type [Code]	Definition	Example from Spanish narrative	Example from English narrative
Between-utterance CS			
CS:inter	Child's whole utterance is in the nontarget language	*There was something in there*.	*Y la niño pensó agarró el rana.*
Within-utterance CS			
Alternation [CS:alt]	Utterance starts in one language and switches to the other; switch is more than just one word; occurs at a natural grammatical boundary	Rana salta *into the basket.*	The boy is *feliz porque ya encontró a una rana.*
Congruent lexicalization [CS:dense]	Several (at least 3) back-and-forth switches between languages, such that it is difficult to define one language as the "matrix"; may include function words in both languages; may cross grammatical boundaries; may include calque translations and morphological integration of switched words	Entonces dijo sal de *my* comida *heard the frog*.	*La* frog down *y la* boy and the frog.
Insertion [CS:ins]	Inserts single lexical item from nontarget language; clear matrix language	Después la rana se metió a la *basket* del picnic.	And frog is *triste*.
Reverse insertion [CS:insrev]	Inserts single lexical item from target language into an utterance otherwise in nontarget language	Frog on the *cabeza*.	Y después el *frog* estaba en un *rock*.

Note. There was originally an "other" category for instances the research assistant did not know how to code. Review by the first author determined that these instances would fall under "congruent lexicalization."

target language of the sample. These were coded as "reverse insertions." In addition, for the purpose of the first two research questions, we combined alternations, congruent lexicalization, insertions, and reverse insertions into a broader "within-utterance CS" category.

The second author reviewed the research assistant's coding during the initial stages. After all transcripts had been coded, the first author reviewed all CS codes and made adjustments as needed; any uncertainties were discussed with the second author. Within insertions, the first author further coded these for part of speech (e.g., insertion of a noun, determiner, etc.). In addition, to make sure that all code-switches had been identified during initial transcription, the first author extracted a word list from all utterances not marked as [CS] in the English narratives to look for Spanish words that may have been missed. Similarly, a word list from all utterances not marked as [CS] in the Spanish narratives was reviewed for English words that may have been missed. Following conventions used by Gutiérrez-Clellen et al. (2009), proper nouns (e.g., Halloween, Spider-Man) and English words commonly used even in monolingual Spanish speech (e.g., tablet, sticker, bye-bye) were not considered code-switches. To identify such words, the first author reviewed a set of 57 transcripts from children in Mexico that had been collected by the second author for a study with monolingual children (Castilla-Earls, Auza, et al., 2020). During this study, there were few instances of English words during Spanish samples that were not considered code-switches (i.e., bye_bye, sticker). Once all codes had been reviewed and finalized, the first author generated a list of all utterances that had been assigned each code. These lists were reviewed by the second author for consistency, and all disagreements between the first and second author were discussed and resolved by consensus.

Analyses

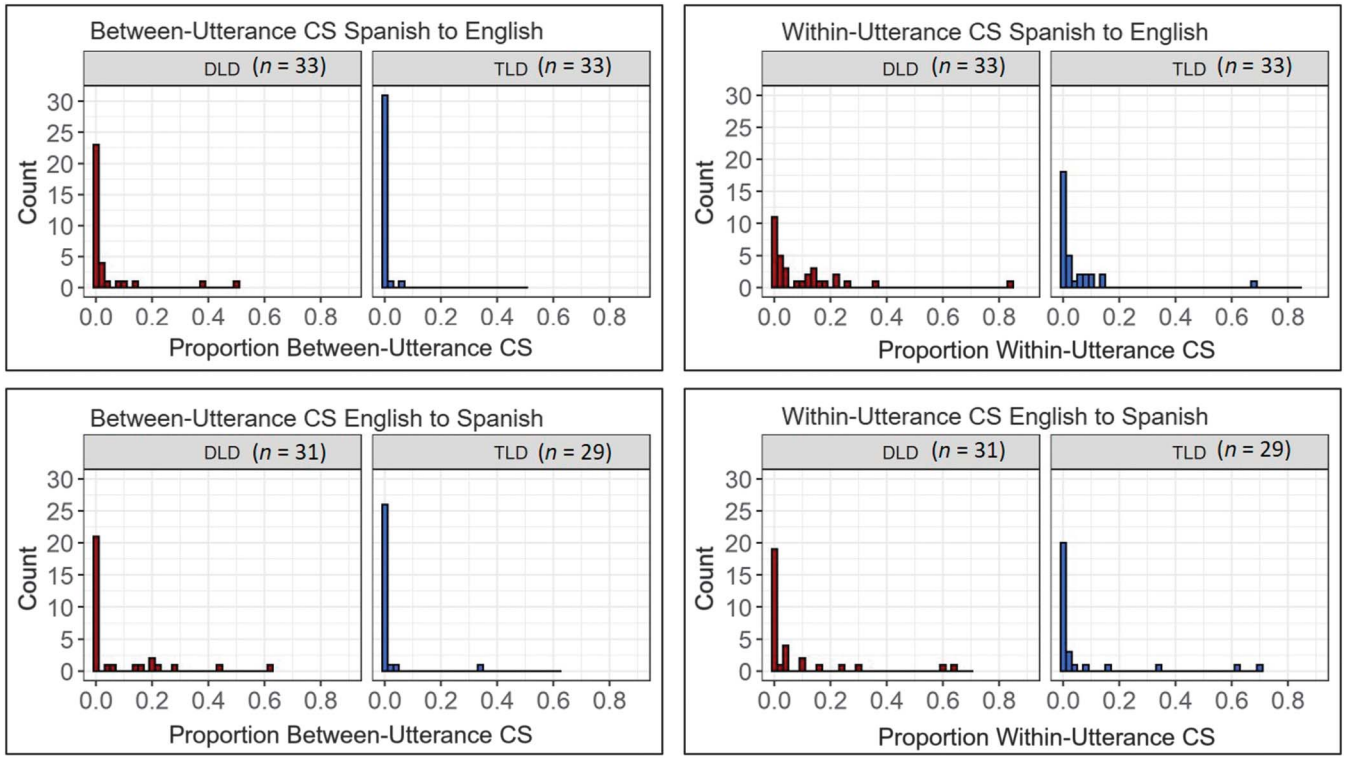
Four children with TLD and one child with DLD had no English narrative samples; an additional child with DLD produced 0 complete and intelligible utterances during the English sample. Therefore, 60 English samples (31 DLD and 29 TLD) and 66 Spanish samples (33 DLD and 33 TLD) were included in the analyses. To have a more robust sample of utterances, both the retell and story generation tasks were analyzed together for each language. However, four samples (one English and three Spanish) included the story retell task only. All samples included at least five complete and intelligible utterances (M = 48.15, SD = 20.88, range: 6–107). There were four transcripts (three English, one Spanish) with only 6–8 complete and intelligible utterances. These transcripts were produced by children with DLD (best BESA standard scores: 60–78). We were concerned that excluding them would reduce the representation of children with more severe impairment in the data set. Repeating the analyses without these four transcripts yielded the same pattern of results.

All analyses were conducted in R version 4.1.1 (R Core Team, 2021). To address the first research question about DLD status and overall switching patterns, we characterized each child as switching only during the Spanish sample (i.e., from Spanish to English), only during the English sample (i.e., from English to Spanish), during both samples (i.e., in both directions), or during neither sample (i.e., no instances of CS in either direction). These characterizations were done separately for between-utterance CS and within-utterance CS. Only the 60 children (31 DLD and 29 TLD) who produced samples in both languages were included in this analysis. For each type of CS, chi-square analyses compared the distribution of switching patterns among children with TLD versus DLD. Given the small expected counts in some cells, p values computed from the asymptotic chi-squared distribution of the test statistic may not be accurate. Instead, p values were computed using Monte Carlo simulations with 10,000 replicates, using the following, R code: chisq.test(tbl,simulate.p.value = T, B = 10000).

To address the second research question about the presence and frequency of CS in each direction (i.e., into English during the Spanish narrative sample, into Spanish during the English narrative sample), we calculated the proportion of CS utterances out of total utterances, separately for between- and within-utterance CS in the Spanish and English samples. As shown in the histograms in Figure 1, we observed a large number of zero scores (i.e., children who never engaged in CS). For within-utterance CS, where there were both a large number of zero scores and variation in the frequency of CS among children who did switch, we conducted hurdle models (Zeileis et al., 2008). The hurdle model estimates two models: (a) a logistic regression model for the odds of engaging in any CS and (b) a count model for the number of utterances containing CS (per total utterances), given that there is at least one. Hurdle models were conducted using the hurdle() function of the pscl package (Version 1.5.5). For between-utterance CS, too few children (< 15) engaged in CS to run the count portion of the hurdle model, so we used logistic regression.

Prior to finalizing the predictors for the models, we conducted nonparametric spearman rho correlations among the proportion of utterances containing within-utterance and between-utterance CS in each sample, children's age, English BESA morphosyntax scores, Spanish

Figure 1. Histograms of the proportion of utterances containing between-utterance (left) and within-utterance (right) code-switching (CS) in the Spanish samples (top) and English samples (bottom) for children with developmental language disorder (DLD; red) and children with typical language development (TLD; blue). Plots were generated using the ggplot2 package (Version 3.3.6; Wickham, 2016).



BESA morphosyntax scores, and best BESA morphosyntax scores. Correlation tables can be viewed in Supplemental Material S2. Age, centered around the overall mean age for all children, was included as a covariate, given both the significant difference between groups in age (see Table 1) and the potential relationship between age and CS behavior exhibited by the correlations. English and Spanish morphosyntax scores were group mean centered and standardized (i.e., z scored within groups), yielding a measure of English and Spanish proficiency within each group that accounted for the overall tendency for children with DLD to receive lower scores than their TLD peers. For the dichotomous predictor of group, DLD was the reference category for all analyses. In the event of an interaction with group, the analysis was repeated with TLD as the reference category to further explore the interaction. The significance of individual predictors was established through likelihood ratio tests comparing a full model containing the target predictor to a reduced model without that predictor, as this approach has been recommended over Wald tests (Bolker, 2014, 2018; Social Science Computing Cooperative, 2016). Full model details (unstandardized coefficient estimates, standard errors, and chi-square and p values from likelihood ratio tests) are provided in tables. To assist in interpretation in the text, estimates for significant predictors are expressed as odds ratios (for logistic regression models) or rate of increase/decrease in CS (for the count portion of hurdle models), with their 95% confidence interval (CI). Note that for odds ratios reflecting a decrease in odds, the smaller the number, the stronger the effect. For example, an odds ratio of 0.25 reflects a steeper decline in odds compared to an odds ratio of 0.75.

To address our third research question about structural differences in the types of within-utterance CS exhibited by children with and without DLD, we characterized each child based on Muysken's typology, separately for the Spanish and English samples: no within-utterance CS, insertions only, alternations only, both insertions and alternations, or congruent lexicalization (which only occurred in combination with other types). Chi-square analyses compared the distribution of CS types among children with TLD versus DLD. As with Research Question 1, we used Monte Carlo simulations with 10,000 replicates to compute the p values for these tests of association/independence due to cells with small expected counts. Given that insertions were the most common, we generated a table to examine

the grammatical categories of insertions in each group. Examples can be found in the Supplemental Material S3.

Results

Research Question 1: DLD Status and Overall CS Patterns

Chi-square analyses revealed a significant difference in the CS patterns of children with and without DLD for between-utterance CS (χ^2 = 11.33, simulated p = .006 based on Monte Carlo simulation with 10,000 replicates), but not for within-utterance CS (χ^2 = 1.93, simulated p = .63). As shown in Figure 2, the majority of children with TLD (25 out of 29 with samples in both languages) did not engage in between-utterance CS in either direction, whereas over half of the children with DLD (17 out of 31 with samples in both directions) engaged in between-utterance CS in at least one direction.

Research Question 2: Proficiency, DLD Status, and Presence/Frequency of CS

Spanish Sample (Spanish-to-English CS)

For between-utterance CS into English during the Spanish sample, there were too few children exhibiting this behavior to run the count portion of the hurdle model. Thus, we report only the logistic regression portion examining predictors of the odds of engaging in between-utterance CS at least once. There was a significant effect of age, where a 1-month increase in age decreased the odds of engaging in between-utterance CS by a factor of 0.80 (95% CI [0.64, 0.93]). There was also a significant effect of Spanish proficiency, moderated by an interaction with group. Among children with DLD, a 1-*SD* increase in Spanish BESA morphosyntax scores above the DLD group mean score decreased the odds of engaging in between-utterance CS by a factor of 0.29 (95% CI [0.07, 0.83]). Among children with TLD, a 1-*SD* increase above the TLD group mean score increased the odds of engaging in between-utterance CS by a factor of 7.64 (95% CI [1.28, 92.06]). These results are visualized in Figure 3 (top left). However, it should be noted that only two children with TLD (who happened to have Spanish morphosyntax scores at or above the TLD group mean) exhibited between-utterance CS, so this pattern should be interpreted with caution.

For within-utterance CS, there were no significant predictors of the odds of engaging in CS at least once, although there was a tendency for CS to be associated with lower Spanish proficiency (as can be seen in the top middle graph in Figure 3). However, the count model examining the rate of CS among those who do switch revealed significant effects of age and Spanish proficiency (see Figure 3, top right). A 1-month increase in age decreased the rate of code-switched utterances per sample by a factor of 0.95 (95% CI [0.91, 0.99]). A 1-*SD* increase in Spanish BESA morphosyntax score above the group mean (calculated separately for the DLD and TLD groups) decreased the rate of code-switched utterances per sample by a factor of 0.47 (95% CI [0.28, 0.78]). Crucially, there was no significant effect of group or interaction with group. Full results of the statistical models are shown in Table 3, and model plots are shown in the top portion of Figure 3.

Figure 2. Distribution of overall code-switching (CS) patterns by children with developmental language disorder (DLD; red) versus typical language development (TLD; blue) for between-utterance CS (left) and within-utterance CS (right). Children were characterized as exhibiting no CS in either direction, CS in both directions (i.e., during both the English and Spanish narrative samples), CS only from English to Spanish (EtoS; i.e., during the English sample only), and CS only from Spanish to English (StoE; i.e., during the Spanish sample only). Plots were generated using the ggplot2 package (Version 3.3.6; Wickham, 2016).

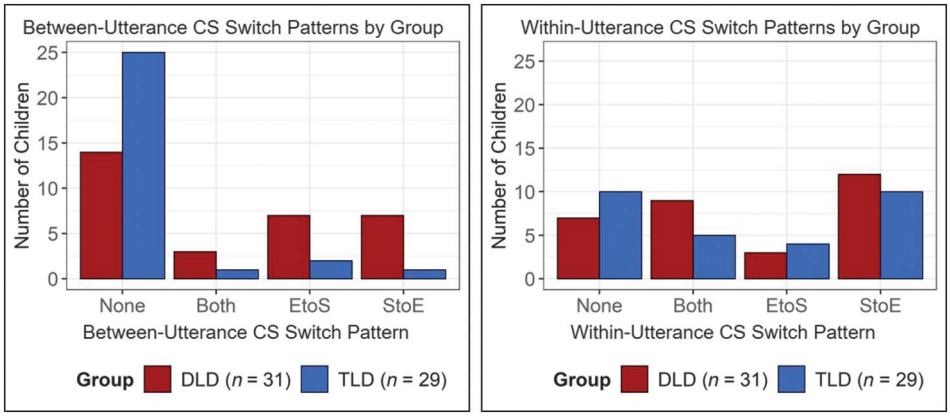
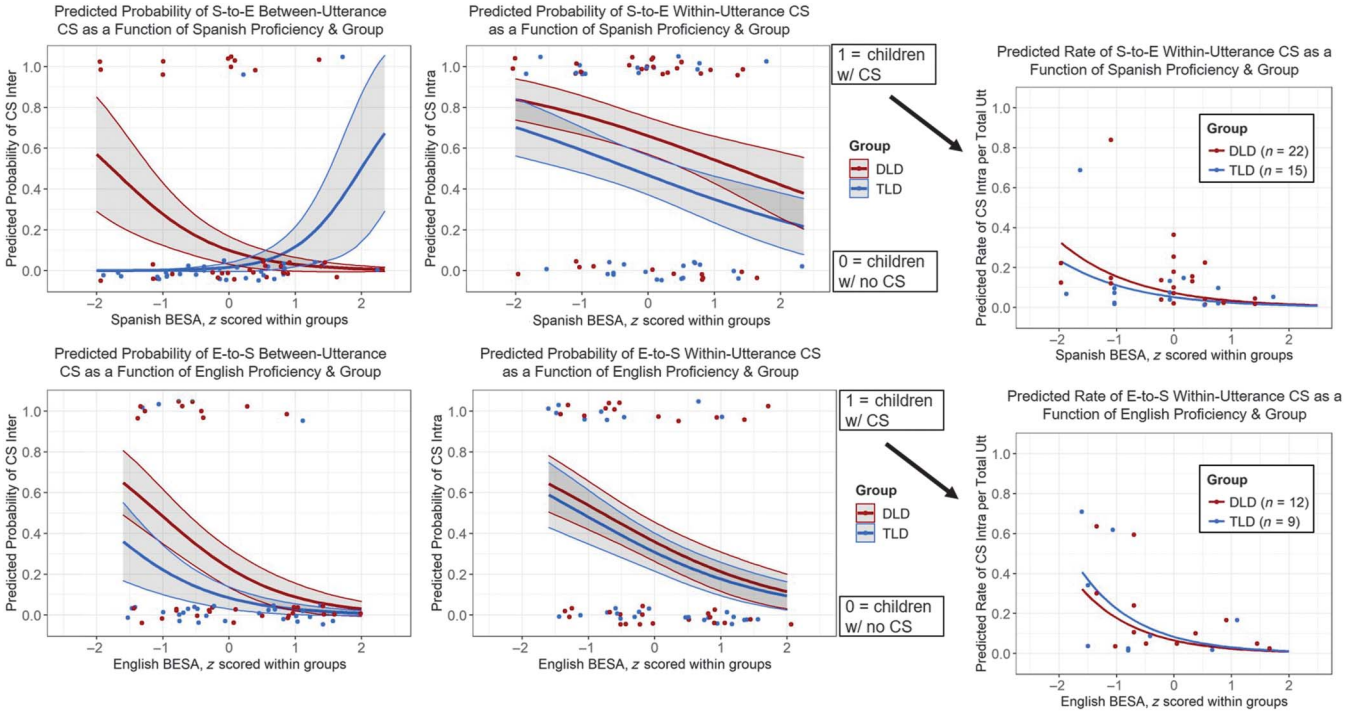


Figure 3. Model plots showing the relationship between proficiency in the target language and the predicted probability of engaging in between-utterance (left) and within-utterance (middle) code-switching (CS) during Spanish samples (top) and English samples (bottom) for children with DLD (red) versus children with TLD (blue), as well as the predicted rate of within-utterance CS among children who do switch (right). Plots were generated using the ggplot2 package (Version 3.3.6; Wickham, 2016). *Left and middle:* These model plots are based on predicted values from the logistic regression models estimated using target-language Bilingual English-Spanish Assessment (BESA) scores from the original sample and fixing covariates (age, BESA scores in the nontarget language) at their mean. The gray ribbons show one standard error within the model predictions. The dots show raw participant data indicating children who do (value of 1, along the top) and do not (value of 0, along the bottom) engage in CS as a function of their BESA scores. *Right*: The model plots in the right-hand column show the predicted rate of utterances containing within-utterance CS (per 50 utterances—a standard target for language samples) among those who do code-switch. The predicted values were generated from the count portion of the hurdle models using target-language BESA scores from the original sample, fixing covariates (age, BESA scores in the nontarget language) at their mean, and using 50 utterances as the total sample length. The predict() function for hurdle models did not generate standard errors along with the predicted values, and thus, there is no ribbon. The dots show raw participant data for the rate of utterances containing within-utterance CS per total utterances produced by the child as a function of BESA scores. S-to-E = Spanish to English; E-to-S = English to Spanish.



To summarize, both between-utterance CS and within-utterance CS into English were more likely among younger children and those with lower Spanish proficiency. However, only between-utterance CS showed a significant effect of DLD; children with DLD were more likely than TLD peers to engage in this kind of CS, particularly when their Spanish proficiency was low.

English Samples (English-to-Spanish CS)

For between-utterance CS into Spanish during the English sample, there were again too few children exhibiting this behavior to run the count portion of the hurdle model. Thus, we report only the logistic regression portion examining predictors of the odds of engaging in between-utterance CS at least once (visualized in Figure 3, bottom left). The only significant predictor was English proficiency. A 1-*SD* increase in English BESA morphosyntax score above the group mean (calculated separately for the DLD and TLD groups) decreased the odds of engaging in between-utterance CS by a factor of 0.32 (95% CI [0.12, 0.72]). There was also a tendency for the odds of engaging in between-utterance CS to be associated with higher Spanish proficiency, but this effect did not reach significance. There was no main effect or interaction for group.

For within-utterance CS, English proficiency was a significant predictor of both the odds of engaging in any CS and the rate of CS among those who exhibited it (see Figure 3, bottom middle and right). A 1-*SD* increase in English BESA morphosyntax score above the group mean (calculated separately for the DLD and TLD groups) decreased the odds of engaging in within-utterance CS by a factor of 0.48 (95% CI [0.26, 0.91]) and decreased the rate of code-switched utterances per sample by a factor of 0.37 (95% CI [0.15, 0.90]). Full results of the statistical models are shown in Table 4,

Table 3. Hurdle models for the Spanish samples examining predictors of the odds of engaging in any between-utterance and within-utterance code-switching (CS; top) and the frequency of such CS among those children who switch at least once (bottom).

	Between-utterance CS to English				Within-utterance CS to English			
	Estimate	***SE***	χ^2	***p***	**Estimate**	***SE***	χ^2	***p***
Variable	**Logistic model of odds of engaging in CS**							
Observations	*n* = 66 (33 DLD, 33 TLD)				*n* = 66 (33 DLD, 33 TLD)			
Intercept	**–2.20**	**0.76**			0.67	0.40		
Age in months (centered)	**–0.23**	**0.09**	**10.22**	**.001**	–0.02	0.03	0.35	.555
Spanish BESA (group *z* score)	**–1.24**	**0.60**	**5.49**	**.019**	–0.49	0.29	3.06	.080
Group (DLD vs. TLD)	–1.85	1.20	3.26	.071	–0.80	0.59	1.89	.170
English BESA (group *z* score)	0.36	0.48	0.58	.447	0.40	0.29	2.08	.149
Spanish BESA x Group	**3.28**	**1.27**	**9.49**	**.002**	Adding an interaction term does not improve the model (χ^2 = 0.79, *p* = .37)			
Negative binomial count model of CS utterances (out of total utterances) given at least one CS utterance								
Observations	*n* = 12 (10 DLD, two TLD)				*n* = 37 (22 DLD, 15 TLD)			
Intercept	n/a (too few observations)				–2.61	0.32		
Age in months (centered)					**–0.05**	**0.02**	**4.46**	**.035**
Spanish BESA (group *z* score)					**–0.76**	**0.26**	**7.81**	**.005**
Group (DLD vs. TLD)					–0.34	0.43	0.59	.441
English BESA (group *z* score)					0.05	0.27	0.03	.859
Spanish BESA x Group					Adding an interaction term does not improve the model (χ^2 = 0.44, *p* = .51)			

Note. Bold values indicate significant effects based on a likelihood ratio test. To measure proficiency while reducing the confound with diagnostic status, Spanish and English Bilingual English-Spanish Assessment (BESA) morphosyntax standard scores were *z* scored within each group separately. Coefficients indicate the effect of a 1 *SD* increase above the mean score within the child's group. DLD = developmental language disorder; TLD = typical language development; n/a = not applicable.

and model plots are shown in the bottom portion of Figure 3.

To summarize, both between-utterance and within-utterance CS into Spanish were more likely among children with lower English proficiency. Between-utterance CS also tended to be associated with higher Spanish proficiency, but this did not reach significance.

Research Question 3: Structural Characteristics of Within-Utterance CS by Children With and Without DLD

Chi-square analyses revealed no significant difference in the typology of within-utterance CS by children with and without DLD for Spanish-to-English switches during the Spanish sample (χ^2 = 6.62, simulated *p* = .13 based on Monte Carlo simulation with 10,000 replicates) or for English-to-Spanish switches during the English sample (χ^2 = 3.10, simulated *p* = .60). As shown in Table 5, the majority of children in both groups engaged in either no within-utterance CS or insertions of English words during the Spanish sample. During the English sample, most children in both groups did not engage in any within-utterance CS, but those who did tended to exhibit insertions of Spanish words or a combination of alternations and insertions.

Looking specifically at the congruent lexicalization category, children with DLD tended to be more likely than their TLD peers to exhibit congruent lexicalization during the Spanish sample, although it did not reach significance (Fisher's exact test, *p* = .105). Only two children with TLD exhibited instances of congruent lexicalization: one child during the English sample and one child during the Spanish sample. Seven children with DLD exhibited instances of congruent lexicalization: one child only during the English sample, one child during both English and Spanish samples, and five only in the Spanish sample. The following are examples of congruent lexicalization, characterized by multiple back-and-forth switches, including within constituents and use of function words in both languages:

1. Child with TLD during the English sample:
   La frog down *y la* boy and the frog.
   "The(*fem,sing*) frog down and the(*fem,sing*) boy and the frog."
2. Child with DLD during English sample:
   Aunque no him dog *dice* "No" because *porque* him want to eat it.
   "Although no him dog says 'No' because because him want to eat it."

Table 4. Hurdle models for the English samples examining predictors of the odds of engaging in any between-utterance and within-utterance code-switching (CS; top) and the frequency of such CS among those children who switch at least once (bottom).

	Between-utterance CS to Spanish				Within-utterance CS to Spanish			
	Estimate	***SE***	**χ^2**	***p***	**Estimate**	***SE***	**χ^2**	***p***
Variable	**Logistic model of odds of engaging in CS**							
Observations	*n* = 60 (31 DLD, 29 TLD)				*n* = 60 (31 DLD, 29 TLD)			
Intercept	–1.20	0.54			–0.58	0.42		
Age in months (centered)	–0.06	0.06	1.29	.256	–0.02	0.03	0.22	.638
English BESA (group *z* score)	**–1.13**	**0.45**	**8.20**	**.004**	**–0.73**	**0.32**	**5.68**	**.017**
Group (DLD vs. TLD)	–1.19	0.85	2.15	.143	–0.23	0.63	0.13	.715
Spanish BESA (group *z* score)	0.66	0.38	3.30	.069	0.29	0.30	0.96	.328
Negative binomial count model of CS utterances (out of total utterances) given at least one CS utterance								
Observations	*n* = 13 (10 DLD, three TLD)				*n* = 21 (12 DLD, nine TLD)			
Intercept	n/a (too few observations)				–2.72	0.58		
Age in months (centered)					–0.03	0.05	0.33	.566
English BESA (group *z* score)					**–0.99**	**0.45**	**4.61**	**.032**
Group (DLD vs. TLD)					0.24	0.62	0.15	.702
Spanish BESA (group *z* score)					0.61	0.36	2.66	.103

Note. Bold values indicate significant effects based on a likelihood ratio test. To measure proficiency while reducing the confound with diagnostic status, Spanish and English Bilingual English-Spanish Assessment (BESA) morphosyntax standard scores were *z* scored within each group separately. Coefficients indicate the effect of a 1 *SD* increase above the mean score within the child's group. DLD = developmental language disorder; TLD = typical language development; n/a = not applicable.

3. Child with TLD during Spanish sample:
   And la [missing subject] quiere *dog* {barking noise}.
   "And the(*fem,sing)* [missing subject] wants dog {barking noise}."

4. Child with DLD during Spanish sample:
   Entonces dijo, sal de *my* comida *heard the frog*
   "Then he[ambiguous subject] said, Get out of my food heard the frog."

It is difficult to note systematic differences in the quality of congruent lexicalization by children with and without DLD, as only two children with TLD exhibited this type of CS.

Given that insertions were the most common type of within-utterance CS, Table 6 shows the grammatical category of insertions produced by children in each group. Descriptive patterns were examined, rather than conducting formal statistical analyses, given the large number of categories and the exploratory nature of this analysis. It should also be kept in mind that the TLD group tended to be more Spanish dominant in the area of morphosyntax than the DLD group. Thus, group differences specific to one language could reflect the effects of dominance. Group differences observed in both languages are more likely to reflect the influence of DLD, although other group differences could also be playing a role, such as age, gender, or the family's country of origin. Differences between languages observed for both groups may reflect

Table 5. Typology of within-utterance code-switching shown by children in the typical language development (TLD) and developmental language disorder (DLD) groups during Spanish samples (i.e., from Spanish to English) and during English samples (i.e., from English to Spanish).

Group	Insertion	Alternation	Alternation and insertion	Congruent lexicalization plus others	None
Spanish to English					
TLD	12	0	2	1	18
DLD	10	1	4	6	12
English to Spanish					
TLD	6	1	1	1	20
DLD	6	0	4	2	19

Note. Separately for the Spanish and English samples, children were characterized as exhibiting no within-utterance code-switching, insertions only, alternations only, both insertions and alternations, or congruent lexicalization (which only occurred in combination with other types). See Table 2 for an example of each type of code-switching.

Table 6. Types of insertions produced by children with developmental language disorder (DLD) and children with typical language development (TLD).

Type of insertion	English insertions in Spanish narratives				Spanish insertions in English narratives			
	DLD (n = 33)		TLD (n = 33)		DLD (n = 31)		TLD (n = 29)	
	Instances	Children	Instances	Children	Instances	Children	Instances	Children
Nouns	0.70 (80)	13	0.62 (44)	14	0.08 (5)	3	0.18 (10)	2
Noun phrase	0.01 (1)	1	0	0	0	0	0	0
Pronoun	0.02 (2)	2	0	0	0.06 (4)	3	0.11 (6)	2
Conjunction	0.01 (1)	1	0.23 (16)	3	0.71 (44)	6	0.41 (23)	4
Determiner	0.15 (17)	5	0.04 (3)	3	0.06 (4)	3	0.29 (16)	2
Verb	0.08 (9)	6	0.03 (2)	2	0.08 (5)	5	0.02 (1)	1
Progressive verb	0.02 (2)	2	0.01 (1)	1	0	0	0	0
Adjective	0.01 (1)	1	0.04 (3)	3	0	0	0	0
Adverb	0	0	0.03 (2)	1	0	0	0	0
Other	0.02 (2)	2	0	0	0	0	0	0
Total	115	19[a]	71	15[a]	62	12[a]	56	8[a]

Note. This table shows both the proportion (out of total insertions) and count of instances of insertions of each grammatical category per group, as well as the number of children per group who exhibited each type of insertion. Examples of each type of insertion can be found in Supplemental Material S3.

[a]These totals reflect the number of children in each group who engaged in any type of insertion. It is not equivalent to the sum of the column above, as some children may exhibit insertions of multiple types.

broader sociolinguistic phenomena, regardless of dominance or DLD status.

Overall, there were more insertions of English words during Spanish samples than vice versa. However, this difference was driven by children with DLD, who produced almost twice as many insertions during Spanish samples as they did during English samples; children with TLD produced a more similar number of insertions in both samples. Nouns were the most common insertions, followed by conjunctions and determiners. Insertions of English nouns during Spanish samples were more common than the reverse, for both groups, suggesting that this may reflect broader patterns for CS, regardless of dominance. Insertions of Spanish conjunctions during English samples were more common than the reverse for both groups but especially for children with DLD. Though the count of instances was high, these instances were produced by a relatively small number of children with several instances each. For both children with TLD and DLD, conjunctions in the nontarget language most often appeared at the beginning of an utterance rather than in the middle of an utterance.

For determiners, group differences were observed in direction and frequency. Children with TLD exhibited more insertions of Spanish determiners during English samples, whereas children with DLD exhibited more insertions of English determiners during Spanish samples. However, only a few children with TLD exhibited insertions of determiners (two during the English sample, three during the Spanish sample), whereas slightly more children with DLD did so (three during the English sample, five during the Spanish sample). In addition, the children with TLD exhibited only one instance each of inserting an English determiner in a Spanish sample, whereas children with DLD exhibited more instances (1–7 each).

An additional potential difference between groups was the insertion of verbs, which was more common among children with DLD in both directions (five to six children) than among children with TLD in either direction (one to two children). Children with DLD were observed to switch between subjects and bare stem verbs, avoiding inflection in either language (e.g., "Una rana *kiss*" ["A frog kiss"]; "Y gato *sail*" ["And cat sail"]). Some insertions of inflected verbs resulted in unusual sentence construction (e.g., "No quiere *are*" ["He/she/it doesn't want are"]; "Is a cat, a ribbit, a *es*" ["Is a cat, a ribbit, a he/she/it is"]). In contrast, insertions of adjectives and adverbs were exhibited mostly by children with TLD and only during the Spanish samples.

Reverse insertions included English words inserted into mostly Spanish utterances within the English sample and Spanish words inserted into mostly English utterances within the Spanish sample. These instances were relatively rare. As shown in Table 7, they occurred most frequently for nouns during the English sample (in keeping with the tendency for insertions to be English nouns within Spanish utterances). A few other types were produced by one or two children in each sample. Children with DLD exhibited more reverse insertions than children with TLD, with

Table 7. Types of reverse insertions produced by children with developmental language disorder (DLD) and children with typical language development (TLD).

Type of reverse insertion	Spanish insertions in mostly English utterances during Spanish narratives				English insertions in mostly Spanish utterances during English narratives			
	DLD (n = 33)		TLD (n = 33)		DLD (n = 31)		TLD (n = 29)	
	Instances	Children	Instances	Children	Instances	Children	Instances	Children
Nouns	0.14 (1)	1	0	0	0.62 (8)	4	0.80 (4)	2
Pronoun	0.29 (2)	2	0	0	0.08 (1)	1	0	0
Conjunction	0.14 (1)	1	0	0	0	0	0	0
Determiner	0.14 (1)	1	0	0	0	0	0	0
Preposition	0	0	0	0	0.08 (1)	1	0	0
Verb	0.14 (1)	1	0	0	0.08 (1)	1	0	0
Progressive verb	0	0	0	0	0.08 (1)	1	0	0
Adjective	0.14 (1)	1	0	0	0.08 (1)	1	0.20 (1)	1
Total	7	5[a]	0	0[a]	13	6[a]	5	3[a]

Note. This table shows both the proportion (out of total reverse insertions) and count of instances of reverse insertions of each grammatical category per group, as well as the number of children per group who exhibited each type of insertion. Examples of each type of reverse insertion can be found in the Supplemental Material S3.

[a]These totals reflect the number of children in each group who engaged in any type of reverse insertion. It is not equivalent to the sum of the column above, as some children may exhibit reverse insertions of multiple types.

the group difference in the proportion of children engaging in reverse insertions approaching significance during the Spanish sample (Fisher's exact test, p = .053).

Discussion

This study compared CS behavior of children with and without DLD during narrative samples collected in Spanish and in English. Overall, children with DLD were more likely than their peers with TLD to engage in between-utterance CS in one or both directions (i.e., producing entire utterances in Spanish during the English sample and/or in English during the Spanish sample); this CS behavior was rare among children with TLD. The groups did not differ, however, in their use of within-utterance CS. Analyses examining the contributions of both DLD status, and Spanish and English morphosyntactic proficiency revealed a significant effect of proficiency in the target language of the sample on the use of between-utterance CS and on the use and/or frequency of within-utterance CS. The only significant effect of DLD status was seen in the tendency to engage in between-utterance CS during the Spanish sample; Spanish proficiency also had a larger negative association with between-utterance CS for children with DLD. Taken together, these findings suggest a potential impact of DLD status on the use of between-utterance CS, but not for within-utterance CS. However, there is still the possibility of qualitative differences in the structure of within-utterance CS. Although both the DLD and TLD groups exhibited insertions as the most frequent type of within-utterance CS, there were some potential differences in determiner and verb insertions, reverse insertions, and congruent lexicalization that may reflect characteristics of DLD.

DLD Status and Overall CS Patterns

For within-utterance CS, both children with DLD and children with TLD were more likely to switch during the Spanish sample or during both samples; children who only switched during the English sample were rare in both groups. These patterns are consistent with previous studies of Spanish–English bilinguals with and without DLD (e.g., Gross & Kaushanskaya, 2022; Gutiérrez-Clellen et al., 2009; Kapantzoglou et al., 2021; Smolak et al., 2019) and with observations of the switching patterns of Spanish–English bilinguals in the United States in general (e.g., Blokzijl et al., 2017; Valdés Kroff, 2016).

The finding in this study that children with DLD were more likely to engage in between-utterance CS than their TLD peers is consistent with the work of Gross and Kaushanskaya (2022), where differences between children with and without DLD for between-utterance (but not within-utterance) CS were also identified. In studies of typically developing children, between-utterance CS has more often been associated with lower proficiency in the target language (e.g., Genesee et al., 1995; Kuzyk et al., 2020; Quirk, 2021) or earlier stages of development (e.g., Montanari et al., 2019; Smolak et al., 2019). Thus, the increased use of between-utterance CS by children with DLD may reflect their linguistic limitations, particularly with morphology and syntax. Children with TLD, even

with limited morphosyntactic proficiency in the target language, may have had the skills to maintain the target language as the sentence frame and to insert lexical items from the other language when unsure on how to express a concept, resulting in within-utterance rather than between-utterance CS. To further explore this finding, it was important to examine whether DLD had an impact on children's CS patterns over and above the effects of target-language proficiency.

Proficiency, DLD Status, and Presence/Frequency of CS

In analyses that accounted for Spanish and English morphosyntactic proficiency, the only significant effect of DLD was on the presence of between-utterance CS into English during the Spanish sample. This finding is consistent with the work of Gross and Kaushanskaya (2022). Although Kapantzoglou et al. (2021) did not find any significant effect of DLD status on between-utterance CS, their correlation analyses did reveal a significant correlation between Spanish proficiency and Spanish-to-English CS for children with DLD, but not for children with TLD. The interaction between Spanish proficiency and DLD status obtained in this study may reflect a similar phenomenon and would be consistent with other studies suggesting that dominance may play a greater role in the CS behavior of children with DLD (e.g., Greene et al., 2013; Iluz-Cohen & Walters, 2012), while sociolinguistic factors may supersede the effects of dominance for children with TLD. In this study, the two children with TLD who used between-utterance CS during the Spanish sample exhibited Spanish morphosyntax scores above the mean for their group. Thus, something other than limited proficiency likely motivated these switches, such as awareness that switches from Spanish to English are more common. Between-utterance switches to Spanish during the English sample were predicted by limited English morphosyntactic proficiency, regardless of group. Switches in this direction are less common in broader language use and were likely driven by linguistic necessity among children who were more Spanish dominant.

Within-utterance CS in both directions was significantly predicted by lower morphosyntactic proficiency in the target language, with no effects of DLD. This relationship to proficiency is consistent with some past work in children with and without DLD (e.g., Gross & Kaushanskaya, 2022; Kapantzoglou et al., 2021). However, other studies did not find a significant relationship between proficiency and within-utterance CS (e.g., Genesee et al., 1995; Halpin & Melzi, 2021; Kuzyk et al., 2020). This discrepancy may relate to the context of the interaction. Studies that found a significant effect of proficiency, including this study, had an explicit expected language with a highly structured task (picture description or narrative). In this context, children may have only switched into the non-target language when they could not access the desired concept in the target language, which would more likely occur for children with limited proficiency in that language. In contrast, Halpin and Melzi (2021) elicited a narrative in the child's dominant language, and the bilingual examiner followed the child's lead if they switched languages. Thus, CS was likely less associated with proficiency because children were not forced to use their less proficient language. In support of this hypothesis, Halpin and Melzi reported that only 41% of switches appeared to fill lexical gaps, whereas the remaining served pragmatic functions such as emphasis or clarification. Genesee et al. (1995) and Kuzyk et al. (2020) used free-play tasks with the child's parent, who was asked to speak predominately one language, but children were not given explicit expectations. Thus, associations between frequency of within-utterance CS and limited proficiency may be specific to contexts where the child is expected to use one language, especially the language in which they are less comfortable.

Structural Characteristics of Within-Utterance CS by Children With and Without DLD

Although children with DLD did not differ from their TLD peers in the presence or frequency of within-utterance CS, there may still be qualitative differences in the structure of their CS. When examining Muysken's typology of insertions, alternations, and congruent lexicalization, both children with and without DLD exhibited insertions (and specifically insertions of nouns) as the most common type of within-utterance CS. Beyond nouns, the most common insertions included conjunctions and determiners. Frequent switches on conjunctions were also documented by Gutiérrez-Clellen et al. (2009) by both TLD and DLD groups. When these switches occur at the beginning of the utterance, as shown in the examples shared by Gutiérrez-Clellen and in our current study, these might also be considered alternations rather than insertion, with the use of "*and*...," "*and then*...," and "*y*..." at the beginning of an utterance as a peripheral element. This phenomenon likely reflects the tendency, also observed in English single-language narratives, for preschoolers to start most utterances with "*And*..." and/or "*Then*" as they add more to a story, while they are still developing use of temporal and causal ties (e.g., Petersen et al., 2016; Roth, 2009).

The insertion of determiners has been less frequently documented in previous work. Mixed noun phrases with switches between a determiner and a noun have been

frequently observed among both children and adults, but at least in the United States, it is more common to see an English noun inserted following a Spanish determiner in a mostly Spanish utterance (e.g., Blokzijl et al., 2017; Liceras et al., 2008; Valdés Kroff, 2016). The insertion of Spanish determiners into a mostly English utterance may reflect language dominance in morphosyntax, as only children with at least a 10-point gap between Spanish and English BESA morphosyntax scores exhibited this behavior. The insertion of English determiners during a Spanish sample is unusual compared to past work and was observed mostly by children with DLD, including those who obtained higher Spanish morphosyntax scores than in English. Thus, this pattern is not likely fully explained by English dominance. Difficulty with determiners has been identified as a potential marker of DLD among Spanish speakers (Castilla-Earls, Auza, et al., 2020; Castilla-Earls et al., 2016, 2021). Thus, the insertion of English determiners could reflect difficulties in the DLD group with Spanish determiners and the requirement to agree in number and gender with the following noun.

Verbs were another category of insertions with potential differences between children with and without DLD. Only one or two children with TLD inserted verbs in either direction, whereas five to six children with DLD did so. It is difficult to draw conclusions, as these numbers are still small. However, a greater tendency among children with DLD to insert verbs would be consistent with observations of particular difficulty with verbs (in both English and Spanish) among children with DLD (e.g., Bedore & Leonard, 2001; Castilla-Earls et al., 2021; Peña et al., 2014). Furthermore, in their longitudinal case study, Brice and Anderson (1999) suggested that switches on verbs may be more common when children are at an earlier stage of language development. Even in another language pair, Iluz-Cohen and Walters (2012) observed in a study of English–Hebrew bilinguals with and without DLD that all code-switches on verbs were produced by children with DLD.

In addition to patterns involving specific grammatical categories, children with DLD also tended to exhibit more instances of what we coined "reverse insertions," where the child produced an utterance mostly in the nontarget language of the sample with one or two words in the target language (e.g., "Y rana y su hijo tiene *toy* de palos" ["'And frog and his/her son has toy of sticks"] during an English narrative). This tendency may be related to the increased use of between-utterance CS by children with DLD. A reverse insertion could be viewed as an inserted English lexical item within a between-utterance switch into Spanish during an English narrative.

Moving beyond insertions to other categories of Muysken's typology, children with DLD tended to be more likely to engage in congruent lexicalization. Previous studies of children with DLD have not examined congruent lexicalization, but there are related findings in previous work. Iluz-Cohen and Walters (2012) also reported that children with DLD were more likely than their TLD peers to exhibit longer switches (as opposed to noun insertions). Gutiérrez-Clellen et al. (2009) provided examples of switches by children with DLD that reflect characteristics of congruent lexicalization, such as morphological blends of the two languages, switches within constituents, and utterances that include determiners in both languages. While they did not find differences in the production of "atypical switches" by children with versus without DLD, there have been critiques of the constraints used to define switches as "atypical," and there were few instances of such switches overall. It is possible that examining congruent lexicalization as a type of CS behavior may have been useful in their data set as well.

Adult studies employing Muysken's typology have generally viewed congruent lexicalization, or dense CS, as a sophisticated integration of the two grammars requiring a high level of proficiency in both languages (e.g., Muysken, 2013). However, Treffers-Daller (2022) suggested that instances of congruent lexicalization may be more common in the CS of young children than has been previously recognized. Our data present additional examples of child CS with characteristics of congruent lexicalization (J. Treffers-Daller, personal communication, June 24, 2022). Further work is necessary to determine whether children with DLD are more likely to use congruent lexicalization than their TLD peers overall or whether children with TLD may also use this type of CS, but in ways that are likely to be perceived as more acceptable or grammatical by other bilingual speakers. In a context with a clearly defined expected language, children with TLD may be unlikely to use congruent lexicalization, as observed in this study. In contrast, regardless of the expectation to use a single target language, children with DLD may need to draw on both content and function words from both languages (resulting in congruent lexicalization) to express their message. Thus, for children with DLD, similar to very young bilingual children, congruent lexicalization may be a resource employed across contexts rather than a stylistic choice constrained to certain environments.

Taken together, some of these patterns observed among children with DLD may be interrelated, potentially yielding a more cohesive picture. Both reverse insertions and between-utterance CS may reflect that the child is relying on the nontarget language to form the grammatical frame of the utterance. Similarly, switches involving determiners may be associated with congruent lexicalization

(e.g., Treffers-Daller, 2022), as the child is drawing function words either entirely from the nontarget language or using a combination of function words from both languages. Each of these patterns may be reflective of morphosyntactic limitations associated with DLD, which the child creatively addresses by drawing on morphosyntactic resources from their relatively stronger language or pooling resources across both languages.

Preliminary Clinical Implications

The findings from this study suggest the following preliminary clinical implications for clinicians working with Spanish–English bilingual children.

1. *The presence of within-utterance CS during a narrative language sample is a typical bilingual behavior and should not be a cause for concern.* Children with and without DLD did not differ in their tendency to switch languages within an utterance or in how frequently they exhibited this behavior during narrative language samples. Even though there was a clear expected language, children with TLD still relied on within-utterance CS as a resource to express themselves. However, as noted below, there may be differences in how children with DLD code-switch that could be clinically informative.
2. *Children's utterances containing CS should be analyzed for structural patterns, not excluded from language sample analysis.* Although further work with more instances of CS are needed to confirm these patterns, our initial findings suggest a possible profile of within-utterance CS among children with DLD, which includes increased use of insertional CS involving verbs and determiners and increased use of congruent lexicalization, which may in turn be associated with insertions of determiners. Such patterns are also in line with grammatical characteristics of DLD in Spanish, which include difficulties with verb forms and determiners (e.g., Bedore & Leonard, 2001; Castilla-Earls, Auza, et al., 2020; Castilla-Earls et al., 2016, 2021; Peña et al., 2014). In addition, difficulties with sentence formulation can be observed within code-switched sentences at points other than where the code-switches occur. Thus, there may be continuities in the grammatical patterns observed in Spanish-only utterances and code-switched utterances that would missed by excluding code-switched utterances. CS patterns are not recommended to be used as diagnostic markers in isolation, but rather as additional information to be considered together with grammaticality in single-language utterances and other information. Furthermore, grammatical patterns observed across single-language and CS utterances may reveal beneficial treatment targets.
3. *Producing entire utterances in the nontarget language of the sample (i.e., between-utterance CS) or utterances with a grammatical frame in the nontarget language (i.e., reverse insertions as termed in this study) may be a cause for concern in single-language elicitation contexts.* Children with DLD showed a greater tendency than their TLD peers to produce entire utterances in the nontarget language of the sample or to produce utterances that were mostly in the nontarget language with insertions of lexical items from the target language. Such behavior could reflect limited proficiency in the target language, difficulties with pragmatic awareness, and/or difficulties with cognitive control skills that underlie language control. Each of these could be associated with DLD (e.g., Andrés-Roqueta & Katsos, 2020; Marton et al., 2019). Furthermore, analyses that accounted for proficiency in each language still yielded an effect of DLD on children's tendency to respond fully in English during the Spanish sample. This behavior should not be definitively viewed as indicative of DLD but should be considered together with other information about the child's language background and use.

Although we put forth these initial recommendations based on our findings, there are several areas that require further study, as the patterns observed in this study may be limited to the particular sample, elicitation context, and language pairs examined here.

Limitations and Future Directions

This study adds to the sparse literature about both the frequency and structural characteristics of CS by bilingual children with DLD. There are a variety of limitations to keep in mind, which also suggest directions for future work. First, the TLD and DLD groups differed on variables other than DLD and language skills, including gender, age, relative dominance, and the family's country of origin. This complicates the interpretation of group comparisons. Age and proficiency in each language were included in regression analyses, but gender and country of origin were not specifically examined. Given past work on CS in Puerto Rican communities (e.g., Poplack, 1988; Zentella, 1981), one might expect CS to be more prevalent in the TLD group, which had a higher proportion of children from Puerto Rican families, but this was not the case. In future work, more similar TLD and DLD groups or a larger sample would be needed to account for these multiple factors. In addition, parent report or direct observation of the language patterns in the child's community and their experience with CS would help to inform interpretations.

In the analyses for Research Question 2, it was difficult to measure proficiency in each language independently from DLD. This challenge has been noted by other researchers (e.g., Kapantzoglou et al., 2021). Furthermore, our use of morphosyntax scores to index skills in each language only captured grammatical aspects of proficiency, and children's relative strengths/weaknesses across languages can vary by domain (e.g., Bedore et al., 2012). In future work, an independent measure of proficiency, separate from the BESA and encompassing multiple facets of language, would be beneficial to distinguish language learning difficulties associated with DLD from limited proficiency in a specific language.

When classifying code-switched utterances according to Muysken's typology, the boundaries between categories are not absolute. In this study, some utterances exhibited features consistent with more than one category, especially in shorter utterances. Other studies (e.g., Deuchar et al., 2007) have used highly detailed rubrics to rate each code-switch on a variety of parameters to identify whether a given switch exhibits more features of insertion, alternation, or congruent lexicalization. Such a detailed analysis is beyond the scope of clinical language sample analysis. Our goal of using Muysken's typology was to identify whether it may reveal nuanced differences between CS patterns of children with and without DLD that have not been identified through other metrics. Based on our findings here, the most useful aspects of Muysken's typology may be for identifying characteristics of congruent lexicalization. In terms of insertions or alternations, the specific grammatical category of the switched element may be more informative. A future step may be to evaluate the grammaticality or well-formedness of utterances containing congruent lexicalization by children with and without DLD, which would require ratings by adult speakers from the same community.

The findings with regard to children's CS patterns in this study must be interpreted in light of the elicitation context, where there was a clear target language and children were explicitly reminded to use this language. A critical next step would be to create a context where others are also engaged in CS, and it is clear to the child that CS is welcome. In line with the translanguaging literature in bilingual education (e.g., García & Wei, 2014) and emerging work on translanguaging at the intersection of disability and multilingualism (e.g., Cioè-Peña, 2021), such a context allows children to freely use all their linguistic resources and views CS from a strengths-based perspective rather than as a deviation from an expected language. It is possible that children with DLD may thrive in such a context, more so than when they are expected to use one language. Such a finding would have important implications for both assessment and intervention.

A bilingual context may elicit more instances and a greater variety of CS patterns, providing a richer data set for the analysis and comparison of patterns produced by children with and without DLD. Furthermore, a bilingual context may elicit a greater range of pragmatic functions of CS (e.g., topic shifts, role shifts, quoting, emphasis, clarification, and directing behavior; Halpin & Melzi, 2021), which were not explicitly examined in this study. In addition, examining a bilingual context may refine the observed relationship between proficiency and use of CS. In this study, within-utterance CS was negatively associated with morphosyntactic proficiency in the target language, suggesting a compensatory function of CS. However, if there is no target language, the relationship between CS and proficiency and the underlying mechanisms driving CS may look quite different.

Finally, this study, which focused on Spanish–English CS, may suggest an approach for examining the structure of CS for other language pairings. However, the specific patterns of interest identified in this study would not necessarily generalize to other language pairings, as CS is highly dependent on the practices of each language community, as well as the grammatical characteristics of each language. Thus, additional studies of CS by children with DLD who speak other languages are needed, and structural patterns should be analyzed in reference to grammatical characteristics associated with DLD in those languages.

Conclusions

Although there are many promising directions for future research, the findings from this study can provide some initial insights for interpreting CS during the assessment of dual-language learners using narrative tasks. Overall, the descriptive patterns observed in this study, alongside quantitative analyses, reinforce that the use of within-utterance CS, in and of itself, is a typical bilingual behavior independent of DLD status. However, language difficulties associated with DLD may be observed in subtle nuances in the overall structure and specific grammatical categories involved in CS. While further work is needed to examine specific CS patterns in more detail, our overarching recommendation is that code-switched utterances be examined as important data, rather than excluded, during language sample analysis.

Data Availability Statement

All data obtained and/or analyzed during this study are available from the authors upon reasonable request.

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