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Code-Switching by Spanish–English Bilingual Children in a Code-Switching Conversation Sample: Roles of Language Proficiency, Interlocutor Behavior, and Parent-Reported Code-Switching Experience

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Abstract: Code-switching is a complex bilingual behavior that can be affected by a variety of factors related to characteristics of the speaker, the interlocutor, and the broader sociolinguistic context. A better understanding of these factors is important for interpreting children's use of code-switching in different elicitation contexts across research studies and in applied settings, such as language sample analysis for clinical assessment. In the current study, we used a conversation sample protocol with a code-switching adult interlocutor to examine the use of English, Spanish, intra-sentential and inter-sentential code-switching, and alignment with the interlocutor by Spanish/English bilingual children with a wide range of language abilities. In a single-language comparison condition, the same examiner engaged the child in conversation using only English or only Spanish. Key findings include that children exhibited limited use of code-switching in the English condition and similar frequency of code-switching in the Spanish, compared to the code-switching, conditions. Children exhibited a tendency to align with the examiner in their use of English vs. Spanish and their use of intra-sentential code-switching during the code-switching context, although they generally code-switched less than the examiner. There was also considerable variability across children. Predictors of this variability included children's age and language proficiency. However, language proficiency was not associated with the frequency of children's intra-sentential code-switching in a code-switching context. Parent-report measures of code-switching experience exhibited limited associations with the children's observed code-switching behavior; inter-sentential switches into English showed the most direct associations. Based on the findings from this exploratory study, we highlight the importance of including a code-switching context when analyzing language samples from bilingual children, considering both the target child and the interlocutor's behavior, and continuing to refine indirect report measures of code-switching experience.

Keywords: code-switching; typology; bilingual; children; conversation; interlocutor; language proficiency; parent report

1. Introduction

Code-switching, the intermixing of languages over the course of a conversation or within a sentence, is a frequent bilingual behavior that is still often misunderstood, especially in children. Families and professionals often wonder about the use of code-switching by caregivers or children themselves and implications for language development, especially for children who have language difficulties. A variety of studies (e.g., [Bail et al. 2015](#); [Byers-Heinlein 2013](#); [Kapantzoglou et al. 2021](#); [Kaushanskaya and Crespo 2019](#); [Place and Hoff 2011, 2016](#); [Yow et al. 2018](#)) have examined relationships between children's exposure to and/or use of code-switching and their language skills in an effort to understand what the use of code-switching may say about children's proficiency and how code-switching experience may influence language learning and proficiency. However, it is important to

acknowledge that the frequency and structure of children's code-switching can be influenced by a variety of factors, including the context in which it is measured (e.g., type of task, perceived expected language(s), and characteristics of the interlocutor). We suggest that it is critical to interpret children's code-switching and its relationship to proficiency in context, both the immediate context of the interaction and the broader context of language use patterns in the child's daily life.

Some researchers prefer the term *code-mixing* to describe the language-switching behavior of young children (e.g., Meisel 1994) or when describing the intermingling of words and grammatical structures from both languages within a sentence (e.g., Muysken 2000). In the current paper, we use *code-switching* as a broad term encompassing a variety of ways children and adults use two languages over the course of a conversation, including both between speakers or utterances (i.e., *inter-sentential* code-switching) and within utterances (i.e., *intra-sentential* code-switching).

1.1. Methods of Studying Code-Switching in Children

A variety of methods have been used to quantify children's use of and exposure to code-switching in past work. These include parent report measures, in which parents report on their own behavior or that of their child; observation/diary studies, in which the researcher observes or has parents document a child's natural interactions with others; structured narrative or conversation samples with an examiner who follows a specific protocol; and scripted confederate tasks, in which the participant interacts with someone who is not a researcher but who is following guidelines provided by the researcher. These methods each have their advantages and disadvantages and fall along a continuum in terms of indirect vs. direct measures and prioritizing ecological validity vs. control over contextual factors. In addition, the age of the child may play a role in the method selected. For example, detailed observation/diary studies are especially well-suited to very young children in the early stages of development when their inventory of words and word combinations can still be captured. Structured tasks that require the child to describe a picture or tell a narrative are more appropriate for preschool and school-age children. Other key factors to consider include whether intra-sentential switches are distinguished from inter-sentential switching and whether the interactional context is one that encourages code-switching or implies an expectation to use a particular language.

1.1.1. Parent Report Measures

Parent report measures have been used both to measure parents' own code-switching behavior (e.g., Bail et al. 2015; Byers-Heinlein 2013; Kaushanskaya and Crespo 2019; Place and Hoff 2011, 2016) and to measure children's use of code-switching (e.g., Quirk 2021; Ribot and Hoff 2014). The language mixing scale (Byers-Heinlein 2013) focuses mostly on intra-sentential switching (e.g., "I often start a sentence in [Other language] and then switch to speaking English"; "I often borrow a word in English when speaking [Other language]"; and "In general, I often mix English and [Other language]" Byers-Heinlein 2013, Table 1). Place and Hoff (2011, 2016) had parents report on the times of day when children heard both Spanish and English during the same 30 min block, but they did not specify whether the child heard both languages from the same person (implying code-switching) or whether the child may have been addressed by different people, each speaking one language. Kaushanskaya and Crespo (2019) asked parents to rate the frequency on a 0–10 scale that children were exposed to code-switching (either intra-sentential or inter-sentential) by different people in their environment. Thus, the level of information provided in parent self-ratings has varied across studies. Furthermore, there is some question as to the accuracy of parental report. Bail et al. (2015) also directly measured parents' use of code-switching during a short play session and found that instances of observed inter-sentential code-switching were correlated with self-report, while instances of observed intra-sentential code-switching were not. In addition, parents who code-switched more during the play sample were more accurate in their self-report rating than parents who

code-switched occasionally. Findings from these studies relating exposure to parental code-switching and child language outcomes have been mixed, with some studies yielding negative relationships to language-specific skills (Byers-Heinlein 2013; Place and Hoff 2016), others yielding a positive relationship to overall language skills measured across languages (Bail et al. 2015), some yielding no relationship (Place and Hoff 2011, 2016), and others yielding both positive and negative relationships with language-specific skills depending on the working memory skills of the child (Kaushanskaya and Crespo 2019). Given the variability in how parental code-switching was measured and the variability of the findings, it is difficult to draw any specific conclusions as to how exposure to code-switching may influence children's language skills.

When parents have been asked to report on their child's use of code-switching, the focus has usually been on cross-speaker switching: responding in language A after being addressed in language B (e.g., Quirk 2021; Ribot and Hoff 2014). Parent-reported cross-speaker switches in both studies were associated with lower expressive language skills in the target language such that the child may understand what is said but is not able to formulate a response in the same language. In terms of directionality, it is unclear whether limited expressive skills in the target language may result in cross-speaker switching or whether cross-speaker switching may limit growth in the target language, or some combination of the two. These parent-report measures of children's cross-speaker switching have not yet been validated against children's observed code-switching behavior.

1.1.2. Observation/Diary Studies

A variety of observational studies have provided an in-depth analysis of the code-switching patterns of individual children or siblings (e.g., Brice and Anderson 1999; Gaskins et al. 2019; Lanza 1992; Namba 2012; Nicoladis and Secco 2000; Quick et al. 2021; Vihman 2018). These studies have provided detailed information about the structure of children's code-switching, the role of lexical gaps in contributing to code-switching, and how children's use of code-switching is related to input and to responses from their parents. These studies have documented that young bilingual children exhibit code-switching, even when it is not present in the input from their parents, reflecting the child's productivity and developing competence in manipulating their languages (e.g., Gaskins et al. 2019). An advantage of this approach is that researchers have a rich amount of information about the child's developing vocabulary and skills in each language, as well as the input they receive from family members. However, generalization is limited.

Other observational studies have included multiple children interacting with their own caregivers, generally in their own home, as they normally would (e.g., Genesee et al. 1995; Mishina-Mori 2011; Nicoladis and Genesee 1996; Paradis and Nicoladis 2007; Quick and Hartmann 2021) or with a stranger (e.g., Comeau et al. 2003; Genesee et al. 1996). However, the samples were still small (2–8 children), which makes it difficult to interpret variability. Many of these studies have focused on the pragmatic differentiation of language use, or the extent to which children adjust their language choice depending on their conversation partner. Thus, there is usually an expected language to use with a given adult. Although the adults in their study generally used a single language, Paradis and Nicoladis (2007) also examined the children's use of intra-sentential code-switching and reported, similar to the findings of the pragmatic differentiation of language use, that the frequency was associated with both children's language dominance and sociolinguistic factors. Comeau et al. (2003) specifically examined the children's use of code-switching by having them interact with a trained bilingual assistant who generally used the child's less dominant language and varied their own level of code-switching (both within and between utterances) across sessions from approximately 15% in the first and third sessions up to 40% in the second session. The authors reported that all six children increased their rates of code-switching from the first to the second session; two children continued to code-switch at a higher rate in the third session, while the remaining children followed the adult in reducing their level of code-switching. Furthermore, the children showed a tendency to

match their interlocutor's language choice on a turn-by-turn basis. In general, these studies suggest that children tend to align their language choice with their conversation partner, although some code-switching can be observed even with partners who are speaking a single language. The level of code-switching can be expected to increase if the partner is also code-switching.

In addition to these observational studies conducted in the home environment, other researchers have observed children's use of code-switching in bilingual school environments (e.g., [Yow et al. 2018](#); [Zentella 1981](#)). Zentella observed language use by Puerto Rican teachers and students in third-grade and sixth-grade bilingual classrooms in New York City. Children most often responded to the teacher in the language in which they were addressed, especially the third graders. Some older children exhibited strong language preferences or insecurities about their abilities in one language that dictated their language choices. Both teachers and students engaged in code-switching, although the third-grade teacher code-switched more frequently than the sixth-grade teacher. The author attributed this difference to a variety of factors (e.g., language background, linguistic skills of the class, personality, and teaching style) and in general argued that it is difficult to explain code-switching behavior, given the multitude of factors involved. [Yow et al. \(2018\)](#) observed 5–6-year-old children at childcare centers in Singapore that conducted classroom activities in both Mandarin and English. They observed that teachers did not code-switch when addressing the children, but they also did not show explicit approval or disapproval of children's code-switching. In this bilingual environment, frequency of code-switching was positively associated with children's language proficiency.

A key limitation of naturalistic observation studies is that factors, such as the topic of conversation or the type of activity, vary widely and could influence code-switching behavior. In addition, when children interact with a familiar caregiver, their past experiences with that person (not directly observed during the study) could influence behavior.

1.1.3. Language Sample Tasks

Studies based on play, narrative, or conversation samples elicited using a specific protocol allow for larger samples and more specific manipulation of variables of interest (e.g., target language, and interlocutor) while controlling for other factors (topic, activity, materials) that could affect code-switching behavior. In addition, some studies using this approach (e.g., [Gutierrez-Clellen et al. 2009](#); [Iluz-Cohen and Walters 2012](#); [Kapantzoglou et al. 2021](#)) have included children with language impairment, providing information about code-switching in children with a broader range of abilities. Such samples have generally been conducted in single-language contexts, where there is a specific expected language (e.g., [Gutierrez-Clellen et al. 2009](#); [Iluz-Cohen and Walters 2012](#); [Kapantzoglou et al. 2021](#); [Kuzyk et al. 2020](#); [Montanari et al. 2019](#); [Peynircioglu and Durgunoglu 2002](#); [Raichlin et al. 2018](#); [Smolak et al. 2019](#)). A few of these studies have included a mixed-language condition where children were asked to describe a picture or retell a story in a mixed-language setting ([Iluz-Cohen and Walters 2012](#); [Peynircioglu and Durgunoglu 2002](#); [Raichlin et al. 2018](#)) or where children engaged in conversation with an examiner who was code-switching for part of the conversation ([Raichlin et al. 2018](#)). However, these studies did not always include intra-sentential switching in the input from the adult. The mixed-language stories used by Iluz-Cohen, Raichlin, and colleagues were described as alternating between languages at sentence boundaries. For the mixed-language stories used by Peynircioglu and colleagues and the conversation task used by Raichlin and colleagues, it is unclear whether the code-switching by the experimenter included intra-sentential code-switching. Thus, a key limitation of these studies is that children's use of intra-sentential code-switching and inter-sentential code-switching was being examined in a context where the adult model generally did not include intra-sentential code-switching.

1.1.4. Scripted Confederate Tasks

In scripted confederate tasks, the participant takes turns describing pictures with a partner who appears to also be a participant but has actually been instructed by the experimenters to use language in specific ways in order to then measure how the participant responds. This approach has mostly been used with adults, particularly to examine syntactic priming. In the context of code-switching, [Kootstra et al. \(2010\)](#) reported that bilingual adults tended to code-switch at the same syntactic juncture and use the same word order as the confederate. The confederate was given specific sentences to use so that the experimenters had control over the model being presented. In a more open-ended task, [Valdés Kroff and Fernandez-Duque \(2017\)](#) had bilingual confederates join participants in a map task where they had to describe to each other where to find items in a display. The confederates were instructed to code-switch as naturally and frequently as possible and to use roughly an equal amount of English and Spanish, but their specific utterances were not scripted. Valdés Kroff and Fernandez-Duque reported that the confederates were able to follow these parameters and that this approach did elicit spontaneous code-switching from the participants. While the participants tended to use similar amounts of Spanish vs. English as the confederate, they varied widely in their use of code-switching and did not necessarily match the confederate's language choices and use of code-switching on a turn-by-turn basis.

Bilingual scripted confederate tasks have not frequently been used with children. [Gross and Kaushanskaya \(2020, 2022\)](#) used a scripted confederate picture description task in which children took turns describing pictures with a video partner. Although the partner appeared to the child to be interacting in real time, the video partner was pre-recorded, and thus their picture descriptions were carefully scripted so that all children received the same input. The goal was to examine the extent to which children would use English to describe pictures to the English-speaking partner and Spanish to describe pictures to the Spanish-speaking partner, including in a dual-language context where an English-speaking partner and a Spanish-speaking partner both participated. The task was successful in capturing a variety of behavior in children, including addressing each partner in the expected language, addressing a partner (especially the Spanish-speaking partner) in the unexpected language, and engaging in intra-sentential code-switching. However, the partners in this task only used a single language. Such a task may be ideal to measure language control, but not necessarily to capture children's naturalistic code-switching patterns in a bilingual, code-switching setting.

The conversation sample protocol in the current study combines aspects of language sampling and scripted confederate approaches to introduce a conversation sample task in which the adult conversation partner engages in both intra-sentential and inter-sentential code-switching. Similar to the work of [Valdés Kroff and Fernandez-Duque \(2017\)](#), the task was designed to be structured around specific content (to address some of the limitations of naturalistic observation), but unscripted. The goal was to create an environment that would encourage code-switching from the child participants so that their code-switching behavior could be described in an under-studied code-switching context.

1.2. Describing Children's Code-Switching

Descriptions of children's code-switching patterns can include three key facets: the direction of the switch, the linguistic structure of the switch, and the motivation for the switch. For example, [Raichlin et al. \(2018\)](#) described children's code-switching in terms of the direction, syntactic location, and psycholinguistic vs. socio-pragmatic motivation. Motivation can also be described relative to the behavior of the examiner (e.g., [Ponce-Lawler 2017](#)).

1.2.1. Directionality

The direction of a switch can be determined based on the immediate context (i.e., the immediately preceding words) or based on the broader context (i.e., the expected language

of an interaction, if there is one). For example, if a child is asked to retell a narrative in Spanish, any words produced in English might be considered a switch into the non-target language. Studies that established an expected language (e.g., Gross and Kaushanskaya 2022; Gutierrez-Clellen et al. 2009; Kapantzoglou et al. 2021; Kuzyk et al. 2020; Montanari et al. 2019; Smolak et al. 2019) have generally examined the directionality of code-switching by comparing, for example, switches into English during a Spanish sample and switches into Spanish during an English sample. A few other studies have determined the direction of the switch in a relative manner. For example, Raichlin et al. (2018) coded switches each time there was a switch in language, regardless of the expected language of the context. Thus, a Russian–Hebrew bilingual child asked to retell a story to a Hebrew-speaking puppet might exhibit both switches into Russian and also switches into Hebrew within this sample that has Hebrew as the expected language. Studies using both methods for measuring directionality have demonstrated that it is more common for children to switch into a more socially prestigious language. Although the child’s relative proficiency in each language can also influence directionality, children still show a greater tendency to switch into the language of prestige, even if it is not their stronger language (e.g., Gross and Kaushanskaya 2022; Gutierrez-Clellen et al. 2009; Montanari et al. 2019; Paradis and Nicoladis 2007; Smolak et al. 2019).

1.2.2. Structure

At a broad level, two main categories have been used to describe code-switching, and these are inter-sentential (between utterances) and intra-sentential (within utterance) switches. Developmentally, some longitudinal studies have demonstrated an increase in the rate of intra-sentential code-switching relative to inter-sentential code-switching as children get older (e.g., Hoffmann and Stavans 2007; Montanari et al. 2019; Smolak et al. 2019). However, contrasting findings in other studies complicate the interpretation of developmental changes in code-switching structure, perhaps related to the age range under consideration or the context of the sample (e.g., Halpin and Melzi 2021; Kuzyk et al. 2020; Treffers-Daller 2022; Zentella 1981). When it comes to proficiency, intra-sentential code-switching has been associated with higher bilingual proficiency (e.g., Peynircioglu and Durgunoglu 2002; Yow et al. 2018). On the other hand, inter-sentential, and especially cross-speaker, switching has been associated with more limited proficiency in the target language of the conversation (e.g., Genesee et al. 1995; Gross and Kaushanskaya 2022; Kuzyk et al. 2020; Quirk 2021; Ribot and Hoff 2014).

To further describe intra-sentential code-switching in children, Treffers-Daller (2022) applied Muysken’s typology (Deuchar et al. 2007; Muysken 2013) of four patterns: insertion, alternation, congruent lexicalization, and backflagging. *Insertion* occurs when a lexical item from language B is incorporated into a sentence in language A, where language A provides the syntactic frame of the sentence. An example of insertion would be “el perro está comiendo un *bone*” [The dog is eating a bone]. In this case, “bone” is a content word from English integrated into the host language (Spanish), likely to fill a lexical gap. Secondly, *alternation* occurs when the speaker alternates between Language A and Language B, generally at a natural syntactic boundary such that the speaker uses the grammar of the two languages independently (e.g., “the dog is walking *en el patio de la casa*” [The dog is walking in the backyard]). *Congruent lexicalization* refers to a shared sentence structure with words from different languages (Deuchar et al. 2007). In this type of code-switching, the speaker uses the structure of either language, or the structure reflects a combination of both languages. Furthermore, function and content words are used interchangeably in both languages (e.g., “*mi picture es una niña limpiando* the window” [My picture is a girl cleaning the window]). Lastly, *backflagging* is a type of alternation that occurs when the speaker uses a discourse marker from their heritage language within the societal language, which may now be their more dominant language (e.g., “*pero*, I would like to go [but, I would like to go]”).

This typology can be used to categorize and understand the extent to which grammars interact during code-switching. However, there can be ambiguity and overlap between categories. It has not often been applied to children but may be helpful in better understanding the development of code-switching skills. Insertions, alternations, and backflagging have been observed in children's speech, but evidence regarding congruent lexicalization is less clear (e.g., [Namba 2012](#); [Treffers-Daller 2022](#); [Wu et al. 2021](#)). Treffers-Daller suggests that the creative ways that children use grammatical elements from both languages (also known as bilingual bootstrapping, Gawlitzek-Maiwald and Tracy 1996) and their tendency to mix in function words from their other language, not commonly seen in adults, could be examples of congruent lexicalization.

1.2.3. Motivation

[Iluz-Cohen and Walters \(2012\)](#) and [Raichlin et al. \(2018\)](#) categorized motivation for code-switching during narratives as psycholinguistic (e.g., due to lexical gaps) or socio-pragmatic (e.g., to demonstrate a change in characters). In conversational samples, the motivation for a child's code-switching can sometimes be attributed to the behavior of the conversation partner. For example, [Ponce-Lawler \(2017\)](#) examined code-switching by two bilingual autistic children during speech-language therapy sessions with a clinician who was also code-switching. They developed a coding scheme based on the elicitation or spontaneity of the child's intra-sentential and inter-sentential switches. Overall, the main findings of this study revealed a greater production of elicited rather than spontaneous code-switches. In other words, children tended to code-switch in response to the language behavior of the clinician rather than initiating their own code-switches spontaneously.

1.3. Factors Influencing Code-Switching Behavior

A variety of factors have been suggested to influence children's code-switching behavior. These can include child-internal factors, such as their developmental level and proficiency in each language. These can also include the immediate context of the interaction, such as the conversation partner and the language context. Finally, the broader context around the child can play a role, including their experience using and hearing code-switching in their daily life, attitudes toward code-switching within their family, and their awareness of broader sociolinguistic norms.

1.3.1. Child Factors: Proficiency and Age

Many studies of code-switching in young children have assumed that limitations in linguistic or grammatical knowledge in the target language of the interaction drive children's tendency to code-switch, especially when interacting with a conversation partner who prefers one language (e.g., bilingual bootstrapping, [Gawlitzek-Maiwald and Tracy 1996](#); lexical gap hypothesis, [Nicoladis and Secco 2000](#)). A variety of studies have linked children's use of code-switching in single-language contexts with proficiency and suggested that children are more likely to switch from their weaker language to their stronger language ([Gross and Kaushanskaya 2020](#); [Gutierrez-Clellen et al. 2009](#); [Paradis and Nicoladis 2007](#)). Children's code-switching patterns have been suggested to change over time with maturation, including increases in intra-sentential code-switching and shifts in the use of content vs. function words when code-switching (e.g., [Montanari et al. 2019](#); [Smolak et al. 2019](#)). It can be difficult to disentangle the effects of age and proficiency, as proficiency also tends to increase and shift with age. However, Montanari and colleagues found that proficiency was less associated with children's use of code-switching as they aged.

Proficiency can also interact with factors at other levels. While code-switching in single-language contexts may be expected to decrease with increasing proficiency in the target language, code-switching in bilingual contexts where others are also code-switching has been associated with *higher* proficiency (e.g., [Yow et al. 2018](#)). Even in single-language contexts, the type of code-switching under consideration may play a role. Inter-sentential or cross-speaker code-switching has been associated with lower proficiency in the target

language (e.g., [Genesee et al. 1995](#); [Kuzyk et al. 2020](#); [Quirk 2021](#)), while intra-sentential code-switching has sometimes yielded non-significant associations with proficiency (e.g., [Genesee et al. 1995](#); [Kuzyk et al. 2020](#)), suggesting that it may be driven by other factors.

1.3.2. Immediate Context: Interlocutor Behavior

Characteristics of the child's conversation partner can influence their code-switching behavior. Awareness of their conversation partner's language knowledge or language preferences can in turn influence children's language choices. For example, Genesee and colleagues (e.g., [Genesee et al. 1995, 1996](#); [Nicoladis and Genesee 1996](#)) observed that children tend to use more English with English-speaking partners and more French with French-speaking partners, described as "pragmatic differentiation of language use". Interactive alignment (e.g., [Kootstra et al. 2009, 2010](#)), a broader phenomenon also observed in adults, encompasses aligning with the conversation partner not only in selecting a particular language, but also in how and when a speaker code-switches. With the modeling hypothesis, [Comeau et al. \(2003\)](#) suggested that children may adapt their level of code-switching to match the frequency of code-switching by their conversation partner. However, the findings linking children's use of code-switching with that of their caregivers have been mixed, as children have also been observed to code-switch, even when their parents switch rarely ([Gaskins et al. 2019](#); e.g., [Genesee et al. 1995](#); [Quick and Backus 2022](#)), with no correlation between parent and child code-switching (e.g., [Smolak et al. 2019](#); [Vihman 2018](#)). Using a traceback approach that involves identifying patterns that occur previously in parental input and in children's own productions, Quick and colleagues (e.g., [Quick et al. 2021](#); [Quick and Backus 2022](#)) identified multi-word units present in unilingual parental input that children in turn combined creatively and productively in code-switched utterances.

The way the conversation partner responds to the child's code-switching, even if they do not use code-switching themselves, may also influence behavior. [Lanza \(1992\)](#) and [Mishina-Mori \(2011\)](#) introduced a scale to classify a parent's level of acceptance of code-switching based on how they respond to their child's use of code-switching. Parents who pretend not to understand when their child code-switches or explicitly ask the child to repeat what they said using one language display a lack of acceptance of code-switching. Parents who continue the conversation, even if they do not use code-switching themselves, demonstrate acceptance of the child's code-switching. Parents who model what the child said using one language, without requesting the child to repeat, demonstrate a more neutral attitude. Lanza described how one bilingual child exhibited differential use of code-switching with her two parents, who demonstrated different levels of code-switching acceptance. Thus, children's awareness of whether their conversation partner approves of code-switching may influence their use of code-switching.

1.3.3. Broader Context: Sociolinguistic Patterns and Child's Experiences

As noted above, children tend to be highly sensitive to sociolinguistic patterns and are more likely to code-switch into the language with higher prestige and to engage in code-switching when speaking a minoritized language (e.g., [Gross and Kaushanskaya 2022](#); [Gutierrez-Clellen et al. 2009](#); [Iluz-Cohen and Walters 2012](#); [Montanari et al. 2019](#); [Paradis and Nicoladis 2007](#); [Raichlin et al. 2018](#); [Smolak et al. 2019](#)). There has been limited work on the impact of children's accumulated experience with code-switching on their observed code-switching behavior in the context of a study, in part because many studies have been based on naturalistic observations rather than experimental manipulations. However, in adults, code-switching experience in daily life has often been a key predictor of code-switching behavior in an experimental context. For example, [Valdés Kroff and Fernandez-Duque \(2017\)](#) observed that adult participants' use of code-switching during a collaborative map task was positively correlated with their self-reported *use* of code-switching in daily life, but not with their self-reported *exposure* to code-switching in daily life. Such relationships between code-switching experience and observed code-

switching behavior are complicated by measurement challenges. It is still unclear how accurate self-report (or parent report) of code-switching behavior may be due to stigma associated with code-switching, shared understanding of what code-switching is, and level of awareness. When directly observing code-switching in a study, it is similarly unclear how representative the participant's behavior may be, given the wide variety of factors that can influence code-switching.

The current exploratory study sought to examine relationships between observed code-switching and parent-reported code-switching behavior in children and to document child factors (e.g., proficiency) and contextual factors (e.g., interlocutor behavior, child's broader language environment) that may influence children's code-switching in a conversational context that is both naturalistic and includes some control.

1.4. Current Study

In the current study, we examined code-switching and language choice in a sample of 24 4–6-year-old Spanish–English bilingual children with a range of abilities in each language. Our goal was to inform interpretations of children's use of code-switching and how it relates to language proficiency in applied settings, such as clinical assessment, by examining different factors that influence children's code-switching behavior. The critical condition was a conversation sample task in which a bilingual examiner code-switched both intra- and inter-sententially with the child, as most previous language sample studies of children's code-switching have had an expected target language with the examiner using only that language. As a comparison, the current study also included single-language conditions in which the same bilingual examiner engaged the child in conversation using only English and using only Spanish. The conversations followed a loosely structured protocol around the same three themes (home, school, hobbies) to provide consistency in the topics across contexts and across children. We examined the extent to which children adjusted their own code-switching and language choices based on the immediate context of their conversation partner's behavior, the child's own language skills, and parent report of the child's language environment in daily life. In this exploratory study, we sought to address the following research questions:

1. How does the frequency and structure of children's code-switching differ in a code-switching context compared to a single-language context?
2. To what extent do children follow the lead of their conversation partner in their language choices and code-switching structure in a code-switching context?
3. How do factors such as children's language proficiency and parent-reported experiences with code-switching in daily life relate to children's use of code-switching in a code-switching context?

2. Materials and Methods

2.1. Participants

The participants in this study included 24 Spanish–English bilingual children (7 males, 17 females), ages 4;0–6;11 ($M = 5.64$, $SD = 0.91$). Participants were recruited through schools, preschool programs, and community centers in a Midwestern city in the United States as part of a larger project (Gross and Kaushanskaya 2020) focused on language control in bilingual children with a range of language abilities, including those with developmental language disorder (DLD). Inclusion criteria included exposure to Spanish within the first year of life, the ability to produce simple phrases in both Spanish and English, and normal hearing based on a pure-tone hearing screening at 1000, 2000, and 4000 Hz. Children were classified as at risk for DLD based on meeting at least two of the following criteria: (1) morphosyntax score on the Bilingual English Spanish Assessment in their stronger language at or below the cut-off listed in the manual for the child's age; (2) current or past language therapy services; and (3) current parent concerns about language skills. Exclusionary criteria included hearing impairment, neurological impairment, genetic syndromes, other developmental disabilities, current exposure to a language other than English or Spanish

(exposure >5% of waking hours in a typical week) or significant past exposure to a third language from a care provider. ADHD and speech sound disorders were not exclusionary criteria, as these often co-occur with language impairment.

The 24 participants in the current study represent a convenience sample of those children who were able to complete the conversational language sample task while participating in the larger project. These children tended to have slightly higher language scores (mean Language Index of 106) than the original full sample of 62 (mean Language Index of 102) and were more likely to be female (17/24 compared to 37/62) and attend dual-language schools (16/24 compared to 28/62); otherwise, the demographics are largely representative of the original sample. The proportion of children identified as at risk for DLD in this subsample (5 out of 24 children) was comparable to that of the full sample (15 out of 62 children). Children with DLD were included in the current study to examine code-switching in children across a spectrum of abilities, as the findings from this exploratory study may have implications for clinical language assessment. The sub-group of children with DLD in the current study was too small to conduct formal group comparisons, but a continuous measure of overall language ability was included as a potential predictor to account for the wide range of language skills. Excluding children with DLD did not change the major patterns of findings, with a few exceptions that are noted in the Results.

Table 1 summarizes key participant characteristics. The timing of English exposure varied within the sample: 17 children were exposed to English within the first year of life, and the remaining seven children were exposed to English at or after age 2. Nineteen children were born in the continental United States, two in Puerto Rico, one in Honduras, and the birthplace for two children was not reported. Although Mexican Spanish is the most common variety among Spanish-speaking communities in this Midwestern city, there was some heterogeneity in the regional background of children’s caregivers, which included Mexico, Canada, Colombia, Guatemala, Honduras, Puerto Rico, Peru, Spain, Uruguay, and the United States. On average, caregivers reported using Spanish with their child 70% of the time, but this varied widely across families. A majority of children attended dual-language preschool, daycare, or school programs, but six children received instruction only in English. On average, caregivers reported limited use of code-switching with their children (average composite of 12 on a 30-point scale) and a general preference for children to use one language at a time. However, as discussed in the Introduction, it can be difficult to obtain accurate self-report of code-switching behavior and attitudes.

Table 1. Participant characteristics.

Characteristic	Descriptive Statistics Mean (SD); Range
Age of first English exposure (months)	11.96 (15.62); Range: 0–48
Current Spanish input/output (% waking hrs) ¹	55% (14); Range: 26–84%
Parent self-reported Spanish use with child	70% (29); Range: 5–100%
Language of instruction at school/daycare	Both: 16; English: 6; Spanish: 2
Maternal education (1–6) ²	3.17 (1.79); Range: 1–6
Nonverbal intelligence std. score (Leiter-3)	105.67 (6.47); Range: 90–117
BESA Language Index ³	105.54 (10.62); Range: 83–118
BESA Spanish Morphosyntax std. score	88.96 (17.85); Range: 55–113
BESA English Morphosyntax std. score	95.88 (17.26); Range: 68–115
BESA Spanish Semantics std. score	107.92 (10.18); Range: 90–128
BESA English Semantics std. score	105.08 (12.01); Range: 75–123
BESA Morphosyntax Difference Score (Sp-En)	−6.92 (20.75); Range: −48–35
BSQ Switch to English Composite ⁴	−0.06 (1.04); Range: −2.05–1.74
BSQ Switch to Spanish Composite ⁴	−0.06 (0.93); Range: −1.60–1.92
Parent Language Mixing Scale ⁵	11.83 (8.68); Range: 0–28 (out of 30)

Table 1. Cont.

Characteristic	Descriptive Statistics Mean (SD); Range
Parental Response to Child Code-switching (CS):	
Ask child to repeat in target language	12
Repeat in target language and move on	6
Continue conversation but no CS by parent	2
Continue conversation and parent uses CS	2
Not available	2

¹ Current Spanish exposure was determined by completing the Bilingual Input Output Survey from the Bilingual English Spanish Assessment (BESA; Peña et al. 2014). The value represents the proportion of the child's waking hours spent interacting in Spanish, averaging the values for hearing and speaking. Times when the child hears or speaks both languages are counted as 50% Spanish in the calculations, as per the instructions in the manual.

² Scale: 1 = less than high school, 2 = high school/General Educational Development (GED) diploma, 3 = some college/2-year degree, 4 = bachelor's degree, 5 = master's degree, 6 = doctorate. ³ The Language Index from the BESA provides a composite measure of overall language ability that combines children's best morphosyntax score (whether Spanish or English) with their best semantics score (whether Spanish or English). For children with mixed dominance, the Language Index could incorporate, for example, their English morphosyntax score and their Spanish semantics score. ⁴ Using an adapted version of the Bilingual Switching Questionnaire (BSQ, Rodríguez-Fornells et al. 2012), parents rated the frequency of different types of switching behavior by their child (described in more detail in Section 2.4). These values represent composite factor scores generated from three items for switches from Spanish to English (i.e., My child does not remember or cannot recall some Spanish words when speaking in this language; When my child cannot remember a word in Spanish, my child tends to immediately produce it in English; Without intending to, my child sometimes produces the English word faster when speaking Spanish) and three parallel items for switches from English to Spanish. ⁵ Overall rating comprised of 5 items from the Language Mixing Scale for parents (Byers-Heinlein 2013, described in more detail in Section 2.4), with 30 as the highest possible score. A score of 30 would indicate that the parent responded "very true" to the following items: I often start a sentence in English and then switch to speaking Spanish; I often start a sentence in Spanish and then switch to speaking English; I often borrow a Spanish word when speaking English; I often borrow an English word when speaking Spanish; In general, I often mix English and Spanish. A score of 0 would indicate that the parent responded "not at all true" to all items.

As shown in the wide ranges for the language scores in Table 1, children varied in their language levels from limited skills in both languages (i.e., children at risk for DLD) to high proficiency in both languages, with other children exhibiting high English and low Spanish skills or high Spanish and low English skills. Below are sample utterances from a child with limited skills in both languages and a child with high proficiency in both languages.

1. Child at risk for DLD with limited skills in both languages
 - a. Code-switching sample:
and gusta play mis amigos con [child's name]
like-PRES_3rd_sing my-pl friend-pl with [child name]
'And like to play my friends with [child's name]' (missing subject, unusual word order)
 - b. English sample:
Play outside and go park.
 - c. Spanish sample:
Muchas ropas mi muñeca.
Many-PL clothing-PL my doll
My doll many clothings (missing verb, plural ending on mass noun)
2. Child with high proficiency in both languages:
 - a. English sample:
And then the bad guy wants to steal the puppies so he can make a big sweater out of their fur.
 - b. Spanish sample:
Practiqué todo el año en invierno hasta que el hielo se derritió.
practice-PAST_1st_sing all the year in winter until the ice melt-PAST_3rd_sing.
'I practiced all year in the winter until the ice melted'

As a group, children tended to have higher scores in English than in Spanish, especially for morphosyntax. All children received nonverbal intelligence scores within normal limits (i.e., standard score of at least 85) on the Leiter International Performance Scale-Third Edition (Leiter-3; [Roid et al. 2013](#)).

2.2. Procedure

Data were collected between December 2016 and July 2018 in a laboratory space in a U.S. Midwestern city. All procedures were approved by the Institutional Review Board. Parents provided written consent and children provided verbal assent in their preferred language. Children participated in three or four 1–1.5 h sessions, during which they completed a language control task (reported elsewhere: [Gross and Kaushanskaya 2020, 2022](#)), language and cognitive assessments, the focal conversation sample task for the current study, and parent interviews/questionnaires. Children generally completed one session in their preferred language, one session in their other language, and one session that contained activities involving both languages. The order of sessions was counterbalanced such that some participants ($n = 13$) started with their preferred language and others started with the dual-language tasks ($n = 11$). As described below, the conversation sample task was conducted in three conditions, which aligned with the overall language of the session: in English, in Spanish, and with frequent code-switching by the examiner.

2.3. Standardized Measures

Children completed the Spanish and English morphosyntax and semantics subtests of the Bilingual English Spanish Assessment (BESA, [Peña et al. 2014](#)), and their scores are summarized in Table 1. This assessment was designed for and normed on Spanish/English bilingual children. Scores on the morphosyntax subtests served to identify children at risk for DLD and to determine relative proficiency by calculating a difference score. The semantics subtests provided additional information about children's language skills, including an overall Language Index score that combined their best semantics score with their best morphosyntax score. However, because children can respond in either language regardless of the language of administration, the semantics subtests provide less specific information about relative proficiency.

In addition, children completed the Leiter International Performance Scale (Leiter-3, [Roid et al. 2013](#)) as a measure of nonverbal intelligence. This measure is administered in a pantomimed fashion (i.e., the examiner uses gestures and demonstrations as specified in the manual to show the child how to complete tasks) and thus is ideal for children with language disorders and/or those who are not native speakers of English. The children in the current study exhibited performance within the average range on this measure.

2.4. Caregiver Report Measures

Caregivers completed a variety of questionnaires in their preferred language in an interview format to provide information about their child's development, language history, and current language use and exposure. The Bilingual Input Output Survey from the BESA (BIOS; [Peña et al. 2014](#)) provided information about conversation partners and the language(s) (i.e., Spanish, English, or Both) that the child hears and speaks during each waking hour of a typical weekday and weekend, yielding an overall proportion of input/output in Spanish vs. English. Times when the child hears or speaks both languages were counted as 50% Spanish in the calculation procedure, as indicated in the manual.

Caregivers also completed two measures specific to code-switching. The language mixing scale ([Byers-Heinlein 2013](#)) provided an overall language mixing score that encapsulates how often caregivers codeswitch, particularly intra-sententially (e.g., start a sentence in Spanish and finish in English, and borrow words from English when speaking Spanish) when interacting with their child. Similar to the validation study by Byers-Heinlein, the ratings for the five items by parents in our full sample ([Gross and Kaushanskaya 2019](#)) all loaded on a single factor, accounting for 62% of the variance, with high factor loadings

(0.73–0.83). The average mixing score of 11.83 in the current sample is slightly lower than the mean of 13.3 reported in the validation study by [Byers-Heinlein \(2013\)](#).

In an attempt to measure children's own codeswitching in daily life, caregivers were administered a modified version of the Bilingual Switching Questionnaire (BSQ, [Rodríguez-Fornells et al. 2012](#)) in which they reported on their child's behavior. A factor analysis based on our original full sample ([Gross and Kaushanskaya 2019](#)) revealed that the caregiver report data did not follow the same factor structure as that of adult self-report in the original measure (i.e., switch to Language A, switch to Language B, contextual switching, and unintentional switching). Items such as those intended to capture contextual vs. unintentional switching may be difficult to rate on behalf of a child. However, the three items for the "switch to English" factor (loadings 0.6–0.88) and the three items for the "switch to Spanish" factor (loadings 0.5–0.89) demonstrated higher factor loadings, indicating that these items can be considered to cluster together to reflect a particular construct. These two factor scores were used in the current study to describe children's code-switching behavior in daily life.

As discussed in the Introduction, it is important to keep in mind that there is some question as to the accuracy of self-report of language behavior, especially when it comes to code-switching (e.g., [Bail et al. 2015](#)).

2.5. Conversation Sample Elicitation

The conversation sample was elicited following a loosely structured protocol with questions centered around three topics: home, school, hobbies. The full protocol is provided in Appendix A. Three different samples (Spanish, English, and code-switching) were administered in separate sessions with different questions within these same three topics. In the vast majority of cases (with two exceptions, one code-switching sample and one English sample, due to scheduling conflicts), the samples were elicited by the first author, a white, female, non-native but proficient speaker of Spanish.¹ From other interactions throughout the larger project, the children knew the examiner spoke both Spanish and English. However, the examiner spoke exclusively English during the English sample, exclusively Spanish during the Spanish sample, and code-switched intra-sententially and inter-sententially during the code-switching sample. The examiner did not aim for a specific frequency of code-switching, but rather sought to code-switch in naturalistic ways to create an environment for the child that would indicate code-switching was clearly welcome. Therefore, similar to [Valdés Kroff and Fernandez-Duque \(2017\)](#), code-switching was not specifically scripted. However, the examiner often phrased questions in similar ways across children, usually with a switch in languages between clauses (e.g., "Cuando yo era niña fuimos a visitar a mi abuela y mi tío y mi tía, and we had a great big dinner" [When I was little, we went to visit my grandma and my uncle and my aunt, and we had a great big dinner]) or an alternational switch within a clause (e.g., "when I was little, I used to visit mi abuela y mi tío y mi tía"). The examiner also occasionally used insertional switches (e.g., "Necesitamos quedarnos inside" [We need to stay inside]).

To maintain children's engagement, the sample was frequently collected while playing on the floor with toy cars on a rug depicting a town. The examiner would ask the home-related questions while playing near the houses, the school-related questions when pretending to go to the school, and the hobby-related questions when they fit naturally within the course of play. Conversation samples occurred either at the end of a session within the larger project or when children needed a break between other more structured activities. Twenty-four children completed the code-switching sample, the main focus of the current study. Due to time constraints, only 13 children completed all three conditions. An additional 6 children completed the code-switching sample and either the Spanish ($n = 3$) or English ($n = 3$) samples, still allowing for a comparison between a single-language and code-switching context. Of the 19 children who completed both the code-switching sample and a single-language sample, 11 children completed the single-language conditions first and the remaining 8 children participated in the code-switching condition first.

Samples varied in length with an average of 5.89 min ($SD = 1.99$, Range = 2.53–11.47) and 54.89 intelligible child utterances ($SD = 27.01$, Range = 15–129). Length was similar across sampling contexts: Code-switching ($M = 5.86$ min, $SD = 1.99$, Range = 2.53–11.47; $M = 52.83$ utterances, $SD = 31.13$, Range = 15–129); English ($M = 6.05$ min, $SD = 1.66$, Range = 2.70–9.80; $M = 60.56$ utterances, $SD = 22.39$, Range = 22–98); Spanish ($M = 5.78$ min, $SD = 2.21$, Range = 3.30–12.57; $M = 52.31$ utterances, $SD = 25.30$, Range = 20–126). In total, 3074 intelligible child utterances were analyzed across the three sampling contexts, including 1268 utterances in the code-switching condition.

2.6. Transcription and Coding

2.6.1. Transcribers and Coders

One native speaker of Spanish and six highly proficient non-native speakers studying speech-language pathology participated in transcribing and coding the audio-recorded conversation samples using the Systematic Analysis of Language Transcripts Software (SALT, [Miller and Iglesias 2017](#)). In addition, a bilingual speech-language pathologist who is a native speaker of Spanish and code-switches regularly (the second author) coded the typology of intra-sentential code-switches in collaboration with the first author, a bilingual speech-language pathologist who is a proficient non-native speaker of Spanish.

2.6.2. Transcription and Coding Procedure

The transcription and coding protocol followed a 4-step process. First, transcriber 1 listened to the audio recording and transcribed according to the standard SALT transcription protocol, including appropriate punctuation and marking unintelligible words and phrases. The utterances were broken up into communication units (C-units) which include an independent clause and any subordinate clauses or modifiers (e.g., “And then the bad guy wants to steal all the puppies so he can make a big sweater out of their fur” = 1 C-unit). Independent clauses joined by coordinating conjunctions were broken up into two C-units (e.g., “I know one is thirteen/And I don’t know what the other is”). The speaker was denoted at the beginning of the utterance by “E” for examiner and “C” for child. After completing the transcription, transcriber 1 listened to the recording one more time to check for any errors or to see if any previously unintelligible words or phrases could be deciphered. Second, transcriber 2 listened to the audio recording, checked for transcription errors/disagreements, and marked bound morphemes and grammatical errors. Third, transcriber 2 or an additional coder added codes to each utterance to denote the language, type of code-switching produced, and whether the speaker followed their partner’s language choices (as described further below). Fourth, coder 2 read the transcript and checked the codes for errors, only listening to the audio if necessary to resolve ambiguity.

The coding of the typology for intra-sentential code-switches was completed after this 4-step process. Using the search functions of the Research Version of SALT, the second author identified all utterances (both child and examiner) coded as intra-sentential switches and further classified these according to Muysken’s typology (as described below). Next, the first author generated a list of all utterances coded under each category of the typology and reviewed for consistency. Any disagreements were resolved by consensus between the first and second authors.

2.6.3. Codes Used in Spanish and English Single-Language Samples

Codes used in the current study are provided in Table 2 along with definitions and examples. The specifics of the coding system depended on the sample context. For the single-language samples in which the examiner was speaking only Spanish or only English, child utterances were coded for the presence of inter-sentential code-switching (i.e., producing an entire C-unit in English during the Spanish sample, coded as [CS:inter] or [CS:interW, i.e., CS inter within] depending on whether the switch occurred between or within speakers) and for the presence of intra-sentential code-switching (i.e., producing

both English and Spanish words within a single C-unit, coded as [CS:intra]). Proper nouns (e.g., Spiderman, names of TV shows) were not counted as code-switches.

Table 2. Code-switching codes with definitions and examples.

Code	Definition	Switch into Spanish	Switch into English
Codes for all utterances (examiner and child, English, Spanish, or code-switching sample)			
CS:interW / CS:inter (inter-sentential CS within or between speakers)	The speaker code-switches between utterances within a conversational turn (CS:interW) or at a turn boundary (CS:inter). In the English or Spanish samples, all utterances in the non-target language were coded as CS:inter.	E: Can you tell me more about Frozen [E]? E: <i>Hay una parte que te gusta más</i> [SCS:interW]? C: Turkey and bread [E]. E: <i>Algo más</i> [SCS:inter].	E: Y mi tío y mi tía también estaban allá [S]. E: <i>And we had a big dinner</i> [ECS:interW] C: Y después David dijo “no” [S]. E: <i>David said no</i> [ECS:inter]?
CS:intra	The speaker code-switches within the utterance. Utterances have both Spanish and English words. Types of intra-sentential code-switching:		
CS:ins (insertion)	A lexical item from one language is incorporated into an utterance that has a different matrix language.	E: Was it your <i>cumpleaños</i> [CS:intra][CS:ins]? C: I started it in <i>sábado</i> [CS:intra][CS:ins].	E: Tus manos estaban <i>dirty</i> [CS:intra][CS:ins]? C: Es un perro que se comió <i>alphabet soup</i> [CS:intra][CS:ins].
CS:alt (alternation)	Switching between longer segments of Language A and Language B. A segment in one language can be a single word if it is a discourse marker or if the switch occurs at a natural constituent boundary at the beginning of the utterance.	E: Which one of the colors <i>es tu favorito</i> [CS:intra] [CS:alt]. C: <i>Pero</i> , only one people, they are not good to me [CS:intra] [CS:alt].	E: De verdad en la escuela <i>they have Xbox</i> [CS:intra] [CS:alt]? C: En tiempo libre <i>we mostly play dolls</i> [CS:intra] [CS:alt].
Codes for child’s English and Spanish utterances at turn boundaries in the code-switching sample			
CMXM (Child Match, Examiner Match)	The child produces an utterance in the same language as their previous utterance and that of the examiner.	C: Y a la tienda, yo voy [S]. E: Qué van a comprar [S]? C: Yo quiero comprar pizza [SCMXM].	C: The both of them at the same time [E]. E: That must have been delicious [E]. C: That’s too many sweets [ECMXM].
CSXM (Child Switch, Examiner Match)	The child produces an utterance in a different language from the language of their previous utterance; however, the language of the child’s utterance matches that of the examiner.	C: I don’t know [ECSXM]. E: Tus amigos [SCS:inter]? E: Tus primos, si tienes primos? E: Quién vinieron [S]? C: Toda la gente [SCSXM]	C: Las dos [SCMXM]. E: Las dos [S]? E: Dime más sobre ellas [S]. E: What are they like [ECS:interW]? C: Pretty [ECSXM].
CMXS (Child Match, Examiner Switch)	The child produces an utterance in the same language as their previous utterance, but not that of the examiner.	C Y mira esto [S]! E Mhm [X]. E Where are they gonna go [ECS:inter]? C <i>Es como así</i> [SCMXS].	C: It was chocolate [ECMXM]. E: Oh que rico [SCS:inter]. C: <i>And know what</i> [ECMXS]?
CSXS (Child Switch, Examiner Switch)	The child produces an utterance in a different language from the language of their previous utterance and that of the examiner.	C Because he is golden [ECSXM]! E He’s golden [E]? E Pero te gusta verde, sí [SCS:interW]? E Are there any green characters [ECS:interW]? C <i>Fue un poquitos verdes</i> [SCSXS].	C: Pastel [SCSXM]. E: <pastel> [S]! C: <el> [S]. E: Quién hizo el pastel [S]? C: <i>[Name] buyed it</i> [ECSXS].

Note: In the examples, italics show a switch in language at/during the focal utterance. Per standard SALT protocols, “E” at the beginning of an utterance denotes that the speaker is the examiner and “C” at the beginning of an utterance means that the child is speaking. <> reflects overlapping speech. Codes to identify morphemes and verb roots were employed in the transcripts but removed here for readability.

Utterances with intra-sentential code-switching were further categorized according to Muysken’s typology by a native speaker of Spanish who code-switches regularly. Guidelines for coding were drawn from a few sources that have described this typology (Deuchar et al. 2007; Treffers-Daller 2022). In the current study, there was only one instance that could

be considered congruent lexicalization; the vast majority of switches could be described as insertions or alternations, and thus we focused on these two categories. Backflagging was considered a type of alternation in our coding system. An insertion [CS:ins] was defined as a code-switch when a lexical item from English was incorporated into a sentence with a Spanish frame (or vice versa). Insertions were often observed in the middle or at the end of the sentences as a content word. Alternations were coded as [CS:alt] and were defined as code-switches where the speaker alternated between languages at a natural syntactic boundary. Alternations generally involved longer segments than insertions. However, alternations could include a single word in a given language if the switch still occurred at a natural boundary between constituents. Such single-word alternations were observed with discourse markers and other constituents (e.g., conjunction, adverb, verb) at the beginning of an utterance followed by use of the opposite language. These would be considered instances of backflagging when the discourse marker was in Spanish and the rest of the utterance was in English. However, we also observed this phenomenon in the opposite direction (e.g., “*Or, tu papá te ayudó?*” [Or, your dad helped you?]). Table 2 provides examples of each code.

2.6.4. Additional Codes Used in the Code-Switching Sample

Within the code-switching conversation sample, which did not have a specific target language, each utterance by the child and the examiner was coded for language. The language codes, [S] and [E], at the end of an utterance denoted Spanish and English, respectively. Following the approach of Ponce-Lawler (2017), [X] denoted that the language of the utterance was ambiguous (e.g., no, ok, ah, oh). Utterances by both the child and the examiner that included intra-sentential switches were coded as [CS:intra] and then further categorized based on Muysken’s typology as described above. Also as above, inter-sentential code-switches within a speaker’s conversational turn were coded as [CS:interW], but it was necessary to specify the direction of the switch: [ECS:interW] for switches into English and [SCS:interW] for switches into Spanish.

Cross-speaker inter-sentential code-switches were difficult to define in this context, as there was no specific target language, and the examiner frequently switched between languages. Therefore, single-language utterances by the child at a turn boundary were coded to denote whether the child followed the examiner’s language choices and whether they switched from the language they were previously speaking in their last utterance. For example, the code [CSXM, i.e., Child Switch, Examiner Match] was used to denote a language switch from the child’s most recent utterance to match the language of the examiner’s preceding utterance. The code [CSXS, i.e., Child Switch, Examiner Switch] was used when the child switched away from both their own previous language and that of the examiner. The code [CMXM, i.e., Child Match, Examiner Match] indicated that the child’s language choice matched their own previous utterance, as well as that of the examiner. Finally, [CMXS, i.e., Child Match, Examiner Switch] indicated that the child switched away from the language just used by the examiner to continue their own previous language choice. Table 2 provides more detailed explanation and examples. An ‘S’ or ‘E’ was added before each code to indicate the language of the utterance. For example, [ECMXS] reflects that the child produced an utterance in English that matched the child’s previous language (English) and switched away from the examiner’s previous language (Spanish). In cases where the child’s previous utterance was coded as [X], the determination of language match or language switch was based on the last time the child used [E] or [S]. In cases where the child or examiner’s previous utterance was mixed (i.e., coded as [CS:intra]), the current utterance was then coded as a language match because both languages were activated in the previous utterance.

This coding system represents a combination of the relative coding system for language switches used by Raichlin et al. (2018) and Ponce-Lawler’s (2017) system for coding the child’s switches as spontaneous vs. elicited by the examiner’s language behavior. The goal was to characterize how the use of English, Spanish and mixed-language utterances by the

child related to what they were hearing from the examiner and to what extent the child followed the examiner's lead.

2.7. Analyses

All analyses were conducted using R version 4.2.0 (R Core Team 2022). To address the first research question, we conducted paired sample *t*-tests to compare the children's code-switching patterns and use of English and Spanish during the code-switching conversation sample to their patterns during a single-language sample. As not all children were able to complete all three conditions, we conducted separate analyses comparing the code-switching and Spanish conditions for one subset of 16 children and comparing the code-switching and English conditions for a slightly different subset of 16 children. In addition to the paired samples *t*-tests reported below, we also conducted non-parametric Wilcoxon signed rank tests, given that not all variables of interest were normally distributed. However, the patterns of significance were the same.

To address the second research question about how the child's behavior during the code-switching sample aligned with that of their adult conversation partner (the examiner), we conducted paired-sample *t*-tests to examine whether child-examiner dyads differed in their use of code-switching, English, Spanish, and neutral utterances. When variables were not normally distributed, we confirmed with a non-parametric Wilcoxon test. In addition, we produced descriptive plots to examine the distribution of utterance types between child-examiner dyads and also across samples as the examiner interacted with different children. Next, we produced descriptive plots by participant to examine the patterns children exhibited at turn boundaries in terms of whether they continued the language of the examiner or switched to a different language, and whether this choice represented maintenance or a switch of their own previous language.

To address the third research question, we examined the extent to which children's code-switching and language choices during the code-switching samples were associated with the language behavior of the examiner, the child's age and proficiency, as well as characteristics of the child's language environment in daily life. We first examined a correlation matrix of variables of interest. Next, we conducted linear regressions for each child outcome variable of interest: use of intra-sentential code-switching, inter-sentential switches in each direction, overall use of English and Spanish, and the child's tendency to adapt to the examiner's language choice. Predictors of interest included child age, language ability, and relative proficiency; examiner behavior (reflecting immediate context); and parent report of child switching behavior in daily life, parental mixing, and parental responses to the child's code-switching (reflecting broader context). Given the small sample size of 24, we included 1–3 predictors (including interactions) in each regression based on the correlation matrix.

3. Results

3.1. RQ1: Children's Frequency and Type of Code-Switching in a Code-Switching Context vs. a Single-Language Context

3.1.1. Code-Switching vs. Spanish Contexts

As shown in Table 3, children did not differ in their overall use of intra-sentential code-switching during the code-switching sample compared to the Spanish sample. Children tended to use more alternations during the code-switching sample than the Spanish sample and more insertions during the Spanish sample than during the code-switching sample, but these small differences did not reach statistical significance. In both conditions, the vast majority of insertions were English nouns (e.g., Hay un *troll* que tiene *glitter* [code-switch condition]) and sometimes included signs of lexical retrieval difficulties (e.g., un poquito de la de la um *roof* [Spanish condition]). There were a few adjectives (es muy *short* [Spanish condition], es muy *funny* [both conditions]) and verbs (también *talk* [code-switch condition, could also be an alternation]; necesitamos *share* [Spanish condition]). Insertions of conjunctions were rare (Quiero comer salchichas *and* sánwich [Spanish condition]).

Children did not differ in their use of inter-sentential switches into English during the Spanish sample (defined as any full utterances in English) compared to the code-switching sample (defined as instances when children switched into English for a full utterance after a preceding utterance in Spanish, whether it was their own or the examiner's). However, overall, children did produce significantly more utterances in English during the code-switching sample compared to the Spanish sample. The combination of these last two findings would suggest that children's use of English during the code-switching sample was at least partially driven by the examiner's use of English, rather than reflecting a greater tendency to respond in English when addressed in Spanish.

Table 3. Paired *t*-tests comparing behaviors of interest as a proportion of total utterances during Spanish and code-switching samples ($n = 16$).

Outcome	Code-Switching Sample M (SD); Range, Mdn	Spanish Sample M (SD); Range, Mdn	Mean Difference [95% CI]	<i>t</i>
Intra-sentential CS overall	0.06 (0.06); 0–0.20, 0.04	0.05 (0.05); 0–0.14, 0.05	0.003 [−0.029, 0.036]	0.22
Alternations ^a	0.03 (0.04); 0–0.13, 0	0 (0.01); 0–0.05, 0	0.023 [0.001, 0.044]	2.28
Insertions	0.03 (0.04); 0–0.15, 0	0.05 (0.04); 0–0.13, 0.05	−0.020 [−0.053, 0.013]	−1.30
Inter-utterance switches into English ^a	0.05 (0.06); 0–0.19, 0.04	0.09 (0.15); 0–0.55, 0.03	−0.032 [−0.092, 0.027]	−1.17
Total utterances in English ^a	0.35 (0.31); 0–0.91, 0.28	0.09 (0.15); 0–0.55, 0.03	0.262 [0.118, 0.404]	3.90 *

* $p < 0.01$ (criterion for statistical significance with Bonferroni correction for 5 tests). ^a These variables were not normally distributed. However, non-parametric Wilcoxon signed rank tests showed the same pattern of significance as the paired *t*-tests presented here.

3.1.2. Code-Switching vs. English Contexts

As shown in Table 4, children's code-switching and language choices during the code-switching sample diverged more from the English sample than was observed with the Spanish sample. Children produced significantly more intra-sentential code-switching, inter-sentential switches into Spanish, and total utterances in Spanish during the code-switching sample compared to the English sample. The only comparisons that did not reach significance were between subtypes of intra-sentential switches (alternations and insertions), although the differences were in the same direction of more code-switching during the code-switching sample. In general, use of Spanish during the English sample was rare. The median for all measures listed in Table 4 is zero, reflecting that it was only a few children who exhibited any of these behaviors.

Table 4. Paired *t*-tests comparing behavior as a proportion of total utterances during English and code-switching samples ($n = 16$).

Outcome	Code-Switching Sample M (SD); Range, Mdn	English Sample M (SD); Range, Mdn	Mean Difference [95% CI]	<i>t</i>
Intra-sentential CS overall	0.05 (0.06); 0–0.20, 0.02	0.01 (0.02); 0–0.06, 0	0.043 [0.014, 0.071]	3.15 *
Alternations	0.02 (0.04); 0–0.13, 0	0 (0.01); 0–0.02, 0	0.018 [−0.002, 0.038]	1.90
Insertions ^a	0.03 (0.04); 0–0.15, 0.01	0.01 (0.01); 0–0.06, 0	0.023 [−0.001, 0.048]	2.04
Inter-utterance switches into Spanish ^a	0.07 (0.07); 0–0.26, 0.07	0.01 (0.04); 0–0.14, 0	0.057 [0.016, 0.099]	2.96 *
Total utterances in Spanish ^a	0.35 (0.25); 0.04–0.77, 0.33	0.01 (0.04); 0–0.14, 0	0.337 [0.205, 0.470]	5.42 *

* $p < 0.01$ (criterion for statistical significance with Bonferroni correction for 5 tests). ^a These variables were not normally distributed. However, non-parametric Wilcoxon signed rank tests showed the same pattern of significance as the paired *t*-tests presented here.

3.2. RQ2: Aligning with Conversation Partner in Language Choice and Code-Switching Structure

As shown in Table 5, the rate of intrasentential code-switching was significantly higher for the examiner compared to the child during the code-switching sample. This was especially the case for alternational switches, which formed the majority of the examiner's intra-sentential code-switching behavior. Children showed a more even split between their use of insertions and alternations, resulting in a non-significant tendency for children to exhibit more insertions than examiner. There were no significant differences in the overall amount of English, Spanish, or language-neutral utterances produced by the child compared to the examiner. However, there was a tendency for children to use more English than Spanish and for the examiner to use slightly more Spanish than English. Children differed from the examiner in their use of English by 10%, on average (42% vs. 32%), but there was enough variability, especially among children, that this did not reach significance. Given this high level of variability, we also examined patterns at an individual level.

Table 5. Paired *t*-tests comparing child and examiner behaviors (as a proportion of total utterances) during the code-switching conversation sample ($n = 24$).

Outcome	Child M (SD); Range, Mdn	Examiner M (SD); Range, Mdn	Mean Difference [95% CI]	<i>t</i>
Intra-sentential CS overall	0.04 (0.05); 0–0.20, 0.03	0.10 (0.06); 0.02–0.28, 0.09	−0.053 [−0.081, −0.026]	−4.03 *
Alternations ^a	0.02 (0.04); 0–0.13, 0	0.09 (0.06); 0.01–0.28, 0.08	−0.067 [−0.091, −0.044]	−5.89 *
Insertions	0.02 (0.04); 0–0.15, 0	0.01 (0.01); 0–0.04, 0.01	0.013 [−0.001, 0.028]	1.86
Spanish Utterances	0.32 (0.23); 0–0.77, 0.33	0.37 (0.09); 0.22–0.58, 0.36	−0.055 [−0.137, 0.028]	−1.37
English Utterances	0.42 (0.30); 0–0.91, 0.36	0.32 (0.11); 0.12–0.64, 0.30	0.100 [−0.006, 0.207]	1.95
Language-Neutral Utterances	0.22 (0.13); 0.06–0.60, 0.21	0.21 (0.08); 0.07–0.37, 0.19	0.007 [−0.063, 0.077]	0.22

* $p < 0.00167$ (criterion for statistical significance with Bonferroni correction for 6 tests). ^a This variable was not normally distributed. However, a non-parametric Wilcoxon signed rank tests showed the same pattern of significance as the paired *t*-test presented here.

Figure 1 shows the proportion of utterance types used by each child and the examiner. Based on the hypothesis that children's use of Spanish vs. English may relate to their language dominance, individual children are ordered in Figure 1 based on the children's relative language dominance. Language dominance is a complex construct that can be operationalized in a variety of ways (e.g., [Bedore et al. 2012](#); [Treffers-Daller 2019](#)). Given our interest in the structure of children's code-switched utterances, we indexed relative dominance by the difference between children's Spanish and English morphosyntax standard scores on the BESA. These subtests were normed on the same sample of bilingual children, and determining relative dominance by comparing scores within a given domain is described as one of the uses of the BESA in the manual ([Peña et al. 2014](#)). In their study of code-switching patterns by Spanish–English bilingual children, [Gutierrez-Clellen et al. \(2009\)](#) also used the difference between Spanish and English morphosyntax scores as part of their determination of relative dominance, along with parent/teacher ratings. In the current study, values for this difference score ranged from −48 for child 1 (i.e., highly English-dominant, with an English score 48 points [>3 SD] higher than their Spanish score) to 35 for child 24 (i.e., Spanish-dominant, with a Spanish score 35 points [>2 SD] higher than their English score). Children 17 and 18 were the only ones who obtained identical scores in both languages, although children 13–16 and child 19 obtained scores within 5 points. Of the six children who obtained higher BESA scores in Spanish than English, all six used as much or more Spanish than English during the code-switching sample. Among the 16 children who obtained higher BESA scores in English, 11 exhibited more use of English

than Spanish. However, there were 5 English-dominant children (most notably child 10 and child 12) who used more Spanish than English during the task. Along the continuum of English dominance, child 3, who was highly English dominant, used more Spanish than some peers who were more balanced and more closely matched the proportion of Spanish used by the examiner. In contrast, children 12, 15, and 18 had relatively balanced skills, yet they used mostly English in the task. Thus, there is a visual trend for children to use more of their dominant language than their less-dominant language during the code-switching task, but there are exceptions to this pattern.

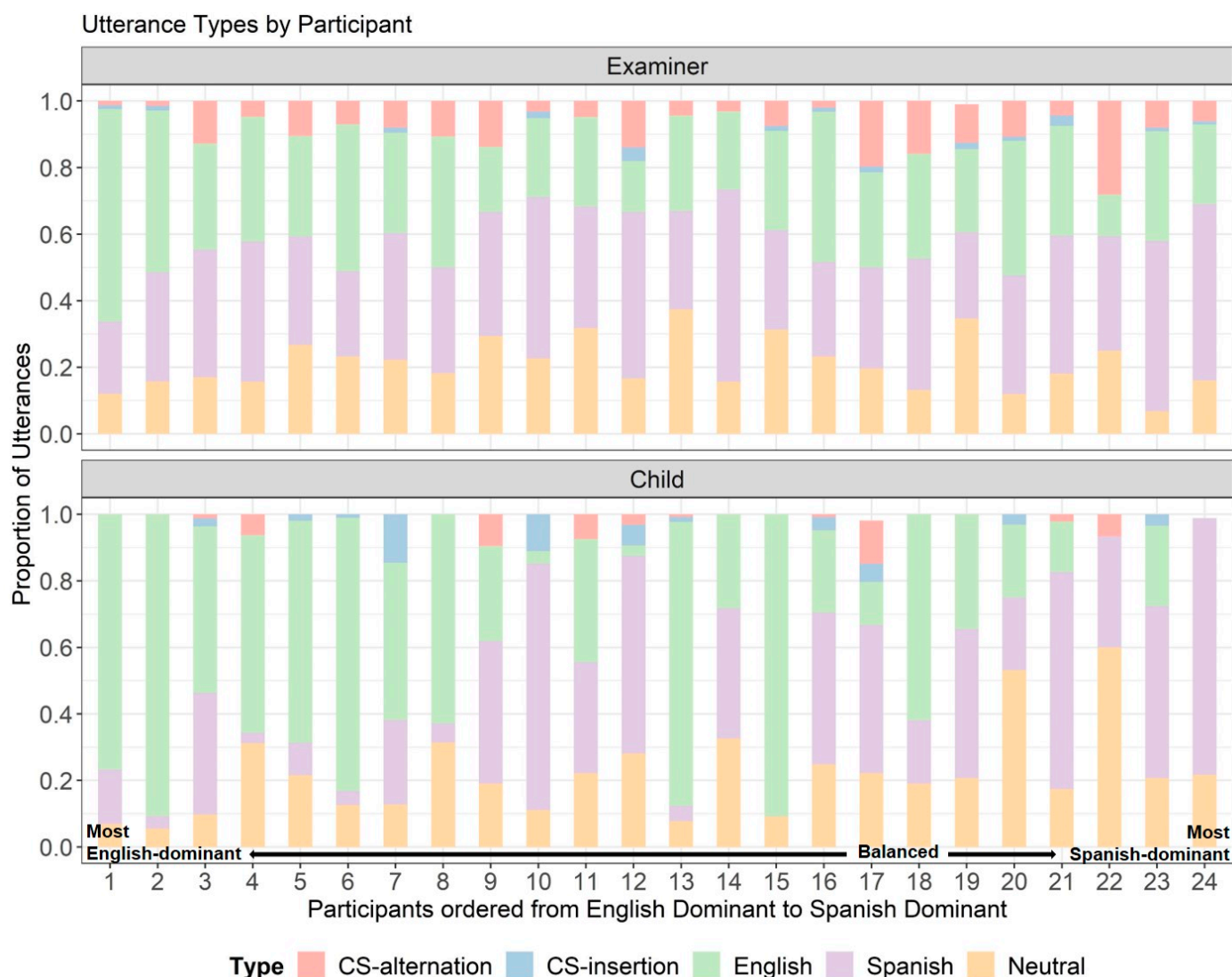


Figure 1. Utterance types for each child–examiner pair during the code-switching conversation sample, ordered by child language dominance based on a difference score on the BESA morphosyntax test (Spanish–English).

The top panel of Figure 1 shows some influence of the child’s language dominance on the behavior of the examiner. When the children were more English-dominant, the examiner tended to use more English, and when the children were more Spanish-dominant, the examiner tended to use more Spanish. The examiner used at least some intra-sentential code-switching with all children, but the frequency varied. More than half of the children in the sample used intra-sentential code-switching during the conversational task. The type of code-switching that children used consistently were insertions, whereas the examiner used more alternations. The children who demonstrated the highest English and Spanish dominance (children 1 and 24) did not code-switch at all. Overall, Figure 1 shows some syn-

chrony between child–examiner dyads as well as substantial variability. These descriptive patterns are further explored through regression analyses to address Research Question 3 below.

In addition to examining overall proportions of each utterance type used by the child and the examiner, we also examined relationships within each dyad on a turn-by-turn basis. Each utterance that the child produced in English or Spanish at the start of a new conversation turn was coded for whether it matched the language of the examiner’s previous utterance as well as the child’s most recent utterance. As shown in Table 6, the language choice pattern “Child Match, Examiner Match” was most prominent at turn boundaries. In other words, children were most likely to continue in the language just used by the examiner, especially when it also matched the child’s own previous language. In contrast, the language choice pattern “Child Switch, Examiner Switch” was the least prevalent at turn boundaries. It was less likely for the child to initiate an inter-sentential switch into a different language from their own previous utterance and that of the examiner. This type of language pattern sometimes occurred when the examiner exhibited an inter-sentential switch right before the child’s turn (see SCSXS example in Table 2). The child may have already started formulating a response as the examiner was speaking Spanish before the examiner then finished her turn in English. Overall, both the “Child Switch, Examiner Match” and “Child Match, Examiner Switch” language patterns had similar proportions of instances between these two extremes. The “Child Switch, Examiner Match” pattern reflects following the examiner’s lead, as the child switches away from their own previous language choice to match the examiner. The “Child Match, Examiner Switch” pattern reflects the opposite tendency of the child to maintain their own previous language choice even though the examiner has initiated a switch. The standard deviations also reflect wide variability across children. Thus, we also examined children’s use of these different patterns at an individual level.

Table 6. Descriptive statistics for child language choice patterns at turn boundaries (as a proportion of total utterances).

Pattern	Child Chooses English at Turn Boundary M (SD); Range, Mdn	Child Chooses Spanish at Turn Boundary M (SD); Range, Mdn
Child Match, Examiner Match	0.13 (0.11); 0–0.35, 0.10	0.11 (0.11); 0–0.33, 0.11
Child Switch, Examiner Match	0.05 (0.04); 0–0.19, 0.04	0.05 (0.04); 0–0.17, 0.04
Child Match, Examiner Switch	0.05 (0.07); 0–0.24, 0.02	0.04 (0.05); 0–0.22, 0.03
Child Switch, Examiner Switch	0.01 (0.02); 0–0.05, 0	0.01 (0.02); 0–0.10, 0

In Figure 2 (as in Figure 1), the participants were ordered from English-dominant to Spanish-dominant along the x-axis based on the difference between Spanish and English BESA morphosyntax scores. Figure 2 demonstrates that the participants who were identified as balanced and Spanish-dominant had a higher proportion of instances during which they switched languages at a turn boundary to follow the examiner’s lead (shown in light green), compared to the participants who were English dominant. The results are also highly variable across participants, which may mean that there are more factors at play that influence the way a bilingual child adapts their language choices relative to those of their conversation partner. These additional factors are further examined in Research Question 3.

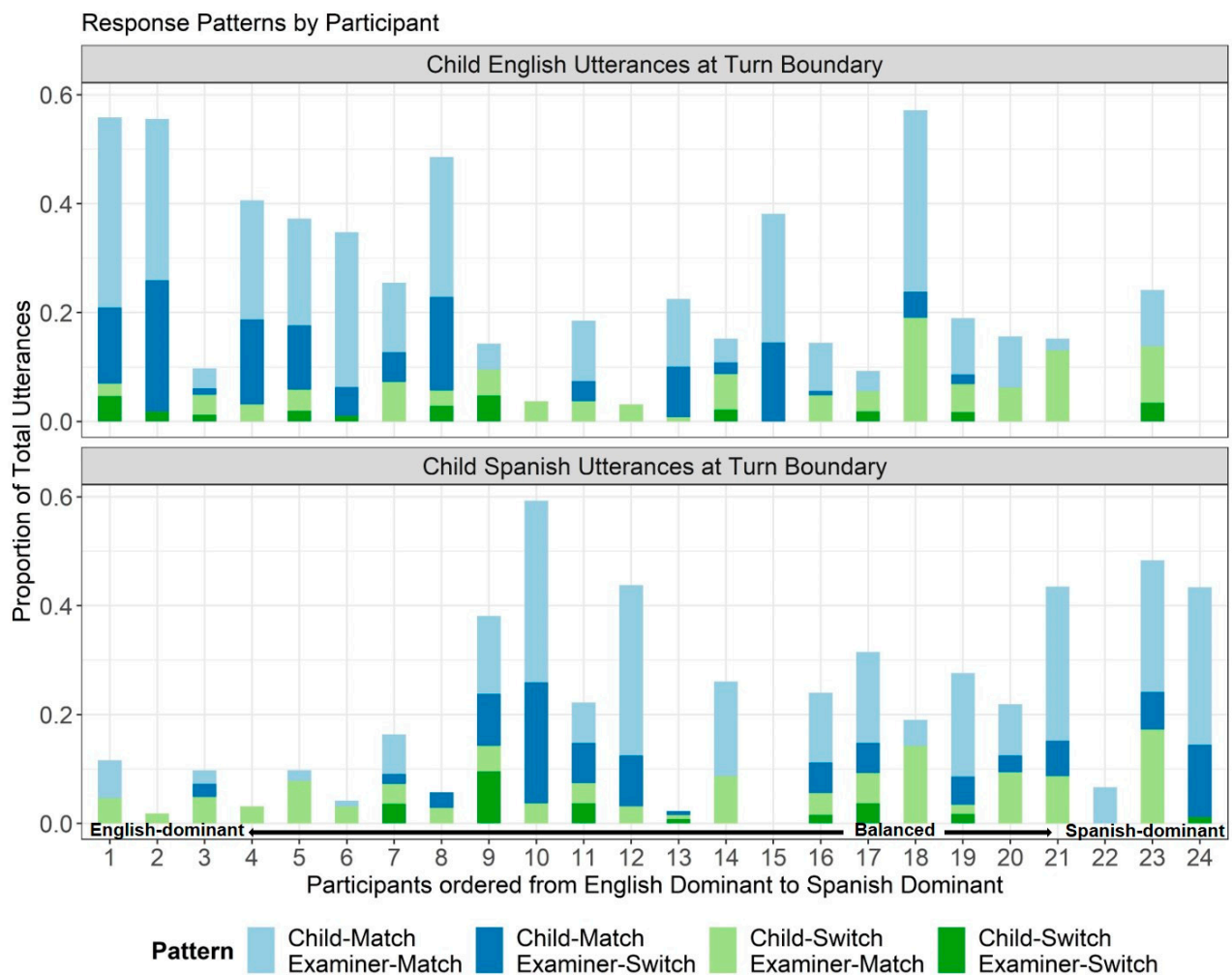


Figure 2. Single-language utterances by children at turn-boundaries categorized by whether they match the language of the examiner’s previous utterance, as well as the child’s own previous language choice. Blue bars reflect a continuation of the child’s previous language choice and green bars reflect a switch from the child’s previous language choice. Light bars reflect a match with the examiner’s language choice and dark bars reflect a switch away from the examiner’s language choice. In particular, light green bars reflect adaptability in that the child is switching their own previous language choice to match the examiner.

3.3. RQ3: Predictors of Children’s Code-Switching and Language Choice during the Code-Switching Sample

3.3.1. Predictors of Intra-Sentential Code-Switching

Linear regression analyses revealed that the frequency of children’s use of intra-sentential code-switching during the code-switching conversation sample tended to be associated with the rate of intra-sentential code-switching of the examiner ($b = 0.33$, $SE = 0.16$, $p = 0.056$). However, this relationship was moderated by age ($b = -0.46$, $SE = 0.17$, $p = 0.014$), such that the examiner’s code-switching had a stronger association with use of code-switching by younger children (see Figure 3). The relationship between child and examiner intra-sentential code-switching was also moderated by parental mixing as measured by parent report ($b = -0.07$, $SE = 0.03$, $p = 0.015$). As shown in Figure 4, children whose parents reported a low level of language mixing showed a stronger association with the examiner’s rate of mixing. In contrast, children whose parents reported the highest level of language mixing showed less of an association with the examiner; these children mixed at higher rates, even if the examiner was not mixing as much with them. It should be noted that the overall model including the interaction between examiner mixing and parental mixing

(adjusted $R^2 = 0.28$) did not explain as much variance as the model including the interaction between examiner mixing and child age (adjusted $R^2 = 0.32$). When both interactions were included in the same model, none of the effects were significant, although the adjusted R^2 was 0.30. The small sample size may limit our ability to detect significant effects in a model with five predictors. In addition, these findings should be interpreted with caution, as follow-up analyses removing the 5 children with risk for DLD revealed that the effect of examiner switching and its interaction with age and with parent mixing were no longer significant, though still in the same direction. The strength of these effects appears to have been disproportionately enhanced by one particular child with DLD who exhibited the highest rates of intra-sentential code-switching (and also happened to be the youngest and have low parent mixing).

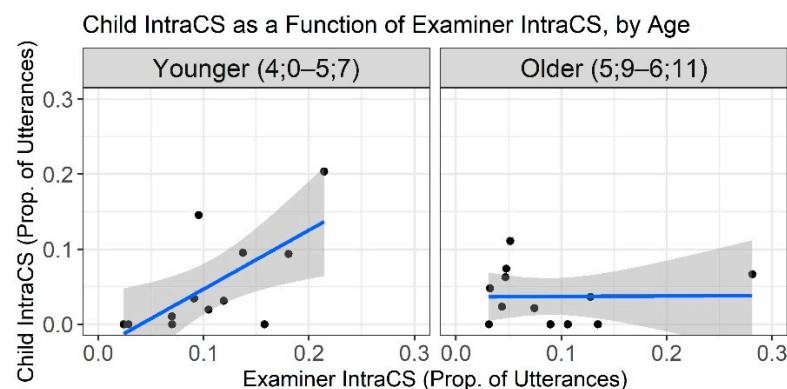


Figure 3. Use of intra-sentential code-switching by children during the code-switching conversation sample as a function of the examiner’s rate of intra-sentential code-switching, separated by age. Note that age was included as a continuous variable in the regression model but was separated using a median split in this figure to visualize the interaction.

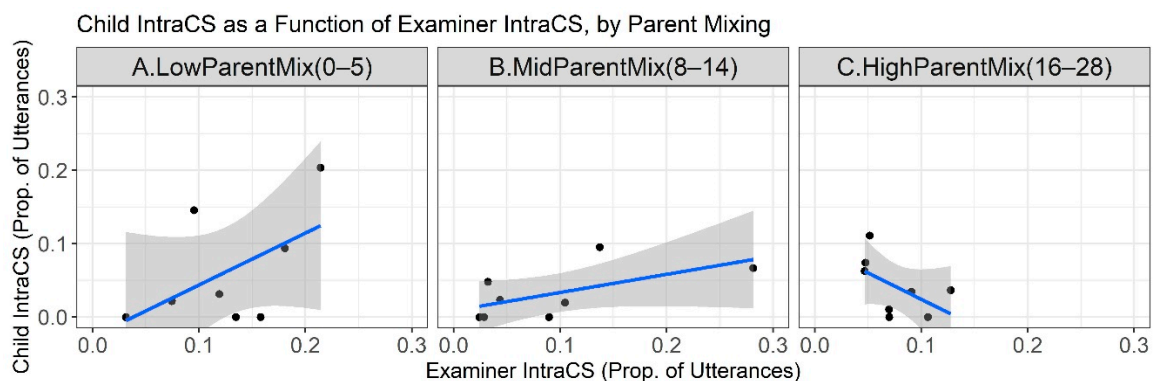


Figure 4. Use of intra-sentential code-switching by children during the code-switching conversation sample as a function of the examiner’s rate of intra-sentential code-switching, separated by levels of parental mixing. Note that parental mixing was included as a continuous variable in the regression model but was separated into thirds in this figure to visualize the interaction.

Other predictors, such as relative proficiency, Spanish and English proficiency, and parent acceptance of their child’s code-switching, did not significantly predict children’s intra-sentential code-switching or moderate the relationship between child and examiner code-switching. Thus, predictors of children’s intra-sentential code-switching in a code-switching context remain difficult to identify. One other consideration is the regional background of the child and variation in the code-switching patterns of different speech communities. Descriptively, the three children whose parents were born in the U.S. exhibited the highest rates of intra-sentential code-switching ($M = 7\%$ of utterances, $SD = 7\%$, Range 0–15%), and the three children from South American families exhibited the lowest

rates ($M = 3\%$ of utterances, $SD = 3\%$, Range = 0–6%). Mexican and Central American families were the largest group, with a mean code-switching rate in the middle (4% of utterances, $SD = 6\%$, range = 0–20%). Among the two children from Puerto Rican families, one never code-switched and one code-switched 10% of the time (all alternations). Children whose parents were born in the continental U.S. exhibited the most insertions. Larger samples would be needed to more thoroughly investigate these potential regional differences.

3.3.2. Predictors of Inter-Sentential Code-Switching

A linear regression examined predictors of children's tendency to switch into English during the code-switching conversation sample (either following their own previous utterance in Spanish or following an examiner utterance in Spanish). Children who were more English dominant, as indexed by a difference score between their BESA morphosyntax scores in Spanish and English, switched into English significantly more often ($b = -0.002$, $SE = 0.0005$, $p < 0.001$). Over and above the effects of relative proficiency, children with lower overall language skills, as indexed by the BESA Language Index, also switched more often into English ($b = -0.003$, $SE = 0.0009$, $p = 0.007$). Finally, parent report of children's tendency to switch from Spanish into English on the Bilingual Switching Questionnaire was also significantly associated with more frequent switches into English during this task ($b = 0.030$, $SE = 0.010$, $p = 0.007$), reflecting a relationship between observed behavior and parent report. These three predictors, which together accounted for 61% of the variance, are shown in Figure 5. It should be noted that the child's Spanish morphosyntax score was also a significant predictor, but the model including Spanish proficiency and parent-reported switching accounted for significantly less variance (adjusted $R^2 = 0.545$), $p = 0.047$. Thus, it appears to be a combination of overall language ability and relative dominance, rather than limited Spanish proficiency alone, that may drive the tendency to switch into English.

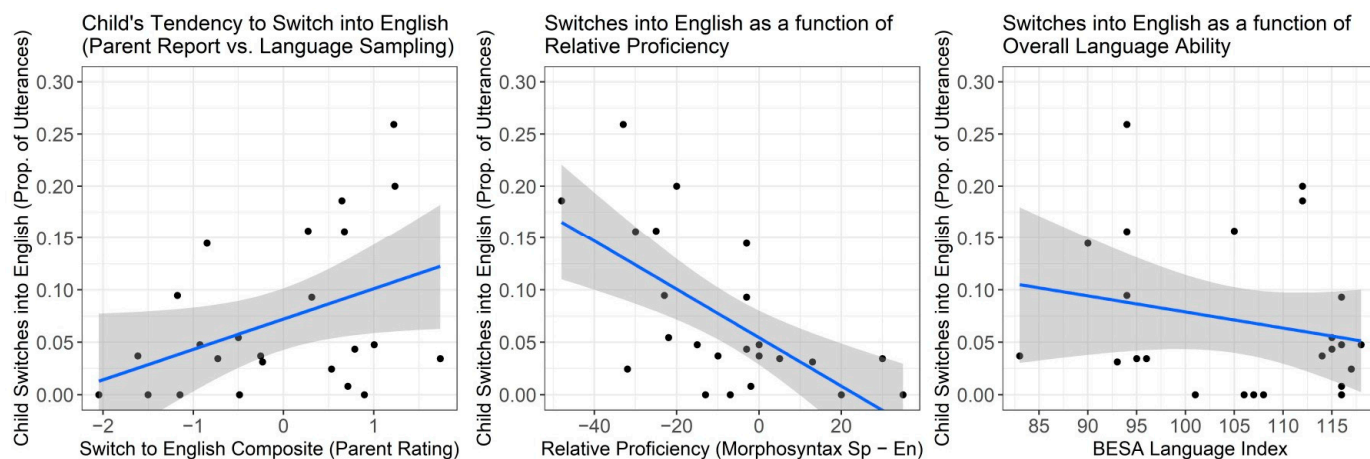


Figure 5. Inter-sentential switches from Spanish into English by children during the code-switching conversation sample as a function of parent-reported switching behavior, relative proficiency, and overall language ability. In a linear regression, each of these were significant predictors.

There were no significant predictors of inter-sentential switches from English into Spanish during the code-switching conversation sample among the predictors of interest we examined: age, overall language ability, Spanish proficiency, English proficiency, relative proficiency, Spanish exposure, parent-reported tendency to switch into Spanish, parent acceptance of code-switching, parental mixing.

3.3.3. Predictors of Language Choice

A linear regression revealed that children's overall use of English during the code-switching conversation sample was predicted by the child's relative proficiency ($b = -0.007$, $SE = 0.003$, $p = 0.021$); children who were more English-dominant used more English

throughout the task. The examiner's own use of English also tended to be associated with the child's use of English ($b = 0.95$, $SE = 0.48$, $p = 0.063$), although this relationship did not reach statistical significance. Furthermore, as shown in Figure 6, there was also a correlation ($r(22) = -0.50$, $p = 0.014$, 95% CI $[-0.75, -0.12]$) between the examiner's use of English and the child's relative proficiency. Although the examiner's use of English fell within a more restricted range than the child's, the examiner did exhibit a tendency to use more English with children who were more English-dominant. As shown in the bottom portion of Figure 6, similar patterns were observed for the children's overall use of Spanish, although in this case, the association with the examiner's language use was stronger ($b = 1.07$, $SE = 0.44$, $p = 0.024$) than was observed for English. Relative proficiency played a similar role, where children who were more Spanish-dominant used significantly more Spanish ($b = 0.004$, $SE = 0.002$, $p = 0.044$). The examiner's use of Spanish was also correlated with the child's relative dominance ($r(22) = 0.42$, $p = 0.043$, 95% CI $[0.02, 0.70]$), although the relationship was less robust than for English. When children at risk for DLD were removed from the analysis, the role of relative proficiency was no longer significant, though with a trend in the same direction; there was still an effect of examiner behavior.

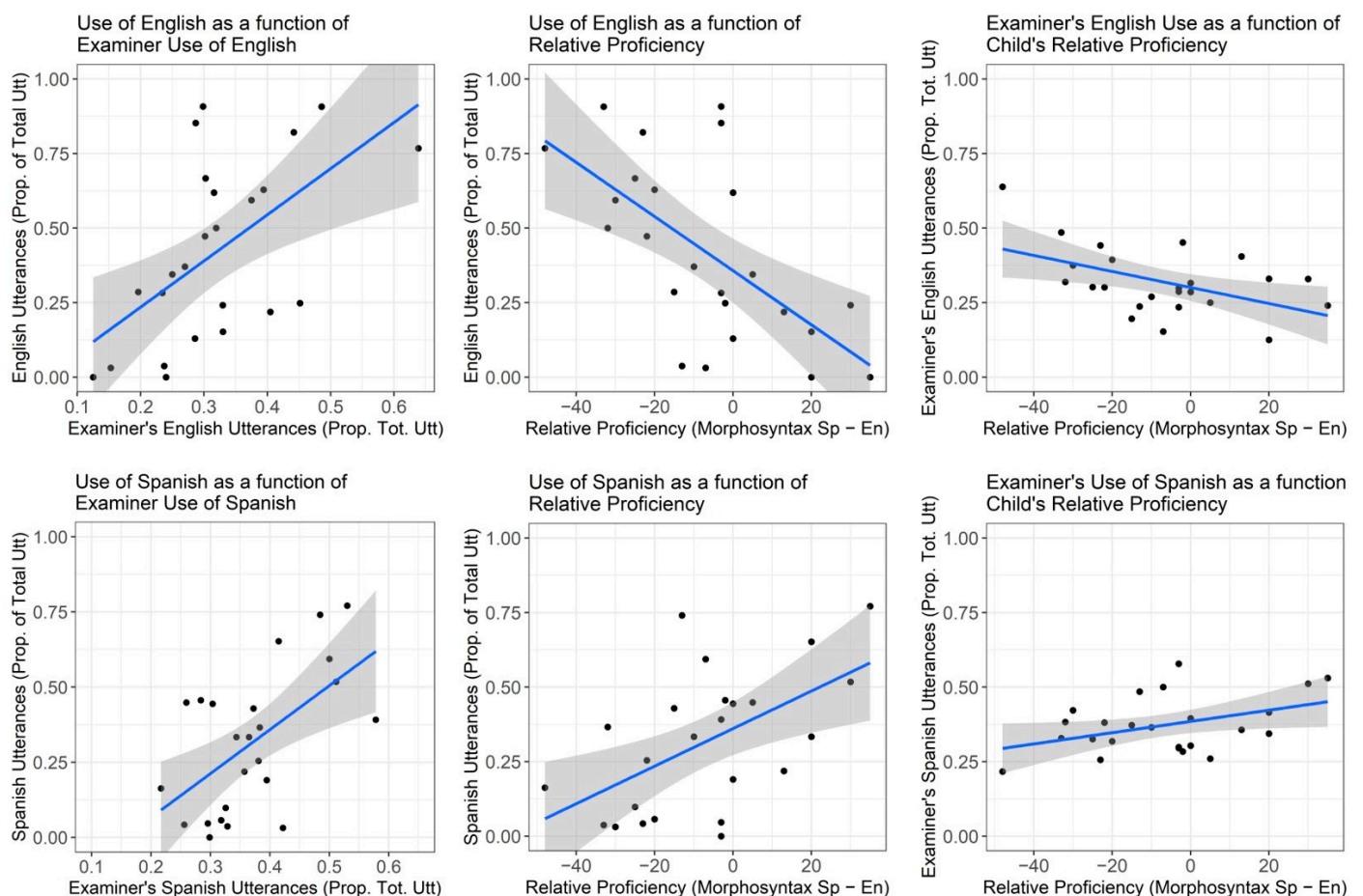


Figure 6. Children's overall use of English (**top**) and Spanish (**bottom**) as a function of the examiner's use of each language (**left**) and the child's relative proficiency (**middle**). The right-hand column shows the relationship between the examiner's language use and the child's relative proficiency.

3.3.4. Predictors of Alignment with Examiner's Language Switches

A linear regression revealed that the tendency to adapt to the examiner's language choice was significantly associated with both child age and Spanish proficiency. As shown in Figure 7, younger children ($b = -0.35$, $SE = 0.02$, $p = 0.045$) were significantly more likely to switch to match the language choices of the examiner than older children. Children with higher Spanish proficiency ($b = 0.002$, $SE = 0.001$, $p = 0.041$) also were more likely

to follow the lead of the examiner's language choices compared to children with lower Spanish proficiency. When children at risk for DLD were removed from the analysis, these patterns were still present but no longer reached significance.

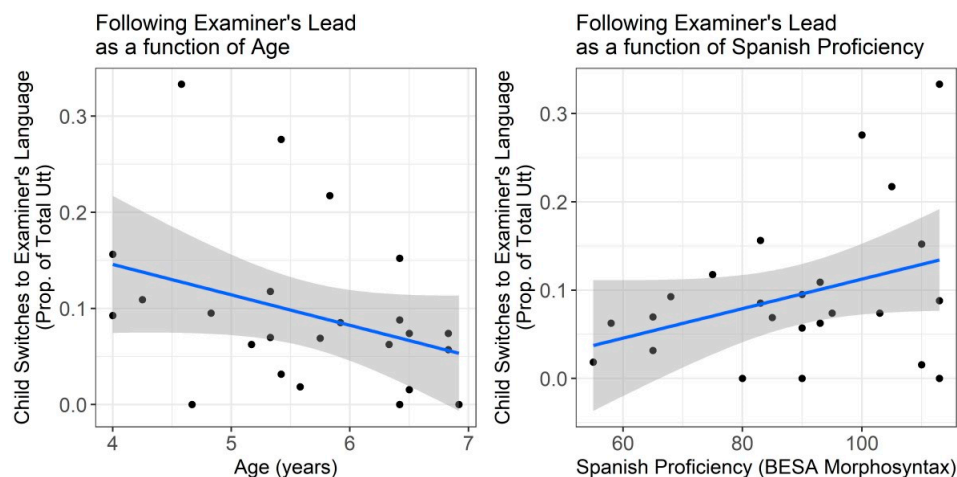


Figure 7. Children's tendency to follow the examiner's lead, as indexed by the proportion of trials in which the child switched away from their own previous language choice to match the examiner's. This behavior was associated with both child age and Spanish proficiency.

4. Discussion

The goal of the current study was to examine children's code-switching behavior and associated factors using a naturalistic, but structured, task that manipulated the language behavior of the child's conversation partner. In particular, we wanted to include a code-switching context, as other language sample studies of children's code-switching have usually had an expected target language. For RQ1 comparing children's language choices and use of code-switching in a single-language vs. a code-switching context, the English context diverged from the code-switching context, while children exhibited more similar patterns in the Spanish and code-switching contexts. For RQ2 comparing child-examiner dyads in the code-switching context, children did not engage in intra-sentential code-switching as frequently as the examiner, and not all children code-switched. In particular, children used less alternational code-switching than the examiner. However, in RQ3, the children's rate of intra-sentential switching and use of English and Spanish were correlated with the examiner's, reflecting some degree of alignment, especially for younger children. In addition to the impact of the examiner's behavior, the children's language choices during the code-switching context were associated with language proficiency. Importantly, proficiency was not associated with the use of intra-sentential code-switching in the code-switching context. Of the parent report measures, parent ratings of children's tendency to switch from Spanish to English or from English to Spanish were most associated with observed code-switching behavior. Parent self-report of their own level of language mixing and their responses to their child's code-switching had limited associations with children's observed behavior. The findings from this exploratory study contribute new insights and raise additional questions about approaches for studying code-switching in children and the factors that may influence code-switching behavior.

4.1. RQ1: Children's Frequency and Type of Code-Switching in a Code-Switching Context vs. a Single-Language Context

Comparisons between the code-switching context and English and Spanish single-language contexts revealed an asymmetry. Children code-switched rarely in the English single-language context, while their use of code-switching during the Spanish single-language context did not differ from the code-switching context. This finding is consistent with past work across a variety of language pairs documenting that intra-sentential code-

switching in a heritage language context tends to be more common than in a context where the societal language is spoken (e.g., Gross and Kaushanskaya 2022; Gutierrez-Clellen et al. 2009; Iluz-Cohen and Walters 2012; Kapantzoglou et al. 2021; Montanari et al. 2019; Paradis and Nicoladis 2007; Raichlin et al. 2018; Smolak et al. 2019; Tare and Gelman 2010). Thus, children's limited use of code-switching in the English sample, even with a bilingual conversation partner, may reflect their awareness of sociolinguistic norms.

Compared to other studies that have also included both mixed-language and single-language elicitation contexts, our findings were similar in that children did not exhibit the most switching in the mixed-language context (e.g., Iluz-Cohen and Walters 2012; Peynircioglu and Durgunoglu 2002; Raichlin et al. 2018). However, Raichlin, Iluz-Cohen, and colleagues reported *more* code-switching in the heritage language context than in the mixed-language context, while we observed similar levels. Two key distinctions may be that the mixed-language context in these prior studies included only inter-sentential switching and the task was a narrative retell rather than a conversation. In this case, children may have code-switched in the heritage language condition due to weaker skills in that language and used more of their stronger language, rather than code-switching, in the mixed-language context. In the current study, the active use of both inter-sentential and intra-sentential code-switching by the child's conversation partner may have encouraged more code-switching than would be observed in a narrative in a mixed-language context. Thus, a conversational task with a partner who is also code-switching may be ideal for eliciting code-switching from children.

In terms of typology, there were no significant differences between the code-switching context and the Spanish single-language context, although there was a tendency for children to produce more alternational code-switches in the code-switching context than in the Spanish context, where most switches were insertions. This pattern may reflect that most switches in the Spanish context were motivated by difficulty coming up with the appropriate word in Spanish. As has been observed in previous studies (e.g., Brice and Anderson 1999; Gutierrez-Clellen 1999; Zentella 1981), the vast majority of insertions were English nouns. In contrast, children's alternational switches during the code-switching context may reflect more sophisticated code-switching behavior, as the child needs to have sufficient command of both languages to switch at an appropriate syntactic juncture. While a single-language context may be more likely to elicit insertional code-switches necessary to relieve lexical access difficulties, the code-switching context may elicit more flexible use of the grammars from both languages in an effort to participate in the code-switched discourse. In addition to the language context, the preference of the examiner for alternational switches may also have influenced children's increased use of this type in the code-switching context. However, given the lack of statistically significant differences and the limited use of alternational switches by children overall, the effect of context on typology requires further study.

4.2. RQ2 following the Lead of the Conversation Partner

Overall, the examiner code-switched more frequently than the children in the code-switching context. The examiner code-switched at least some of the time with all children, but not all children engaged in code-switching. There may be a variety of reasons for this. First, the examiner's use of code-switching provided an invitation, but not an obligation, to code-switch. In this bilingual setting, the children would be understood regardless of the language they used, and thus some children used their preferred language throughout instead of engaging in code-switching. Second, the examiner was a non-native speaker of Spanish. Although the examiner attempted to code-switch as naturally as possible, some children may have been less willing to code-switch with a non-native speaker. Along these same lines, some children may have felt uncomfortable code-switching with a relatively unfamiliar conversation partner in a formal laboratory setting. Whatever the explanation, these findings are similar to those of Valdés Kroff and Fernandez-Duque (2017), who observed that some of their bilingual adult participants did not code-switch as often as the

bilingual confederates. In turn, the confederates then reduced their level of code-switching with these participants as the task continued. Similarly, we found that the examiner, while attempting to provide similar input to all children, tended to use more English with English-dominant children and more Spanish with Spanish-dominant children. This finding highlights the challenge of engaging a live conversation partner, if the goal is experimental control across participants, as conversation partners tend to influence each other's behavior.

Although the overall levels of code-switching differed between children and the examiner, child-examiner dyads did show a general tendency toward synchrony. Use of intra-sentential code-switching, English, and Spanish utterances by examiner and child were correlated with each other. The analysis of children's language choices at turn boundaries revealed an overall tendency to continue the current language used by both the child and the examiner. When both speakers had just used the same language, children were far more likely to continue in that language than to initiate a switch to a new language. This finding is similar to that of [Ponce-Lawler \(2017\)](#), who found that children were less likely to spontaneously initiate a language switch than they were to switch in response to the behavior of their partner. When the examiner switched into a new language relative to the previous language used by the child, children showed similar tendencies to either continue in the language of the examiner (switching away from their own previous language choice) or to return to their previous language choice.

In addition to these overall patterns, the by-participant plots generated as part of this research question revealed extensive variability across participants. Thus, it was important to examine individual differences that may influence children's language choices and how they responded to the examiner.

4.3. RQ3: Predictors of Children's Code-Switching and Language Choice during the Code-Switching Sample

The analysis of potential predictors of children's code-switching and language choices yielded a variety of interesting findings. First, age moderated the extent to which children's use of intra-sentential code-switching was associated with that of the examiner. Younger children were more likely to match the examiner's use of intra-sentential code-switching. Although this finding is tempered by the possibility of disproportionate influence from one younger participant, this role for age is consistent with other findings, both in the current study and in other work. At turn boundaries, younger children were more likely to exhibit the pattern of switching away from their previous language choice to match the examiner's most recent utterance. It may be that younger children are more eager to please an adult conversation partner and/or more likely to be influenced by adult input, while older children are more likely to exert their own language preferences. Findings from other studies provide some support for these possibilities. [Zentella \(1981\)](#) reported that the younger children in her study (in this case, third graders) were more likely than the older children (6th graders) to respond in the language in which they were addressed, even when the investigator introduced a sudden language switch during the conversation. [Comeau et al. \(2003\)](#) observed that the 2-year-old children in their study tended to match their conversation partner on a turn-by-turn basis. Quick and colleagues observed that younger children produced multi-word units previously identified in parental input more so than older children (e.g., [Quick and Backus 2022](#)). In addition, with developing theory of mind and perspective taking skills, older children may be more aware that a bilingual partner will understand them, regardless of their language choice. Theory of mind and metalinguistic awareness have been associated with language choices in bilingual children in single-language contexts (e.g., [Tare and Gelman 2010](#)), and children do undergo rapid developments in theory of mind during the preschool years (e.g., [Wellman and Liu 2004](#)). However, these skills were not measured in the current study.

Language proficiency may also play a role. In [Zentella \(1981\)](#), the older children who were less likely to follow the lead of an adult conversation partner also tended to be

more English-dominant. However, in our sample, age was not correlated with Spanish proficiency. Spanish proficiency had an independent effect, even after controlling for age, on children's tendency to adapt their language choice to that of the examiner. This finding suggests that sufficient Spanish proficiency may be necessary for children to be able to follow an examiner's switch to Spanish. Children's tendency to switch inter-sententially into English was also associated with language skills: in this case, relative proficiency and overall language ability. Children who were more English-dominant and who had lower overall language skills were more likely to switch out of Spanish into English for a whole utterance. As the only analysis for which overall language ability (as opposed to proficiency in a specific language) was a significant predictor, this finding is consistent with past work in a single-language context in which children at risk for developmental language disorder were more likely to respond in English when addressed in Spanish, even after controlling for Spanish proficiency (Gross and Kaushanskaya 2022).

However, it is important to note that use of intra-sentential code-switching in the code-switching context was *not* associated with proficiency in either language. This is distinct from findings in a single-language context, where intra-sentential code-switching has been associated with more limited proficiency in the target language (e.g., Gross and Kaushanskaya 2022; Kapantzoglou et al. 2021). Thus, when interpreting relationships between use of code-switching and proficiency, it is critical to consider both the type of code-switching (inter-sentential vs. intra-sentential) and the context of the interaction. Use of intra-sentential code-switching in a context where code-switching is modeled and encouraged may reflect an ability to align with the conversation partner.

A final point to consider is how children's use of code-switching during the conversation sample related to parent report measures of children's exposure to and use of code-switching in daily life. Exposure to parental code-switching, as measured by the Language Mixing Scale (Byers-Heinlein 2013), exhibited only a moderating role in the extent to which children's use of intra-sentential code-switching was associated with the examiner's, and the strength of this effect may have been influenced by one particular participant who exhibited high rates of code-switching and low parent mixing. Previous studies have also noted code-switching by children, even when parents exhibit little or no code-switching (e.g., Gaskins et al. 2019; Quick et al. 2021; Smolak et al. 2019). It is also possible that parents may under-report code-switching (e.g., Bail et al. 2015). In addition, as noted by Valdés Kroff and Fernandez-Duque (2017), code-switching behavior elicited in a research context may show a stronger relationship with self-reported code-switching use (but not necessarily exposure) in daily life. In the current study, there was a significant relationship between children's inter-sentential switches into English during the conversation sample and parent report of children's tendency to switch from Spanish to English in daily life on the Bilingual Switching Questionnaire. This finding may relate to the observation of Bail et al. (2015) that parents' rating of their own code-switching was associated with observed inter-sentential, but not intra-sentential, code-switching. Thus, inter-sentential code-switching (by themselves or by their child) may be more salient to parents than intra-sentential code-switching and may be more accurately captured through parent report measures.

4.4. Limitations and Future Directions

The current study was a preliminary exploration of children's code-switching behavior and associated factors when elicited in a conversation sample context that encouraged code-switching. The use of a convenience sample within a larger project resulted in limitations to be addressed in future research. First, not all children were able to complete all three conditions of the conversation sample due to time constraints. Thus, it was not possible to conduct a full three-way comparison among English, Spanish, and code-switching contexts. Second, the sample was relatively small, so it was not possible to conduct larger regression models examining more complex relationships among predictors or to consider factors such as regional variety of Spanish where there were only a few participants in a given category.

Third, the identity of the examiner as a non-native speaker of Spanish may have influenced the children's behavior. Future examinations of children's code-switching behavior in a code-switching context with a native Spanish speaker and habitual code-switcher may yield different findings. Fourth, moving beyond the distinction between insertion and alternation, analyses of the syntactic position of switches may yield additional insights about children's developing code-switching skills. Finally, it is still unclear how accurate parent report of code-switching behavior may be. In future work, it may be beneficial to also collect a parent–child interaction sample to increase opportunities for triangulation across naturalistic observation, parent report, and experimentally elicited code-switching that manipulates variables of interest (e.g., the language context).

The observation that the examiner's behavior varied across participants is important to note as a limitation and to consider as a methodological decision in future studies. If the goal is to manipulate the input children receive in different contexts in a systematic and controlled manner, more specific scripting or monitoring of code-switching frequency may be necessary to reduce the natural tendency of the conversation partner to adapt their behavior to the child. However, such scripting would be less natural. If the goal is to examine dyadic use of code-switching, then it will be important in future studies to measure not only the child's behavior, but also that of the conversation partner and how they relate to each other.

5. Conclusions and Implications

The current study makes a preliminary contribution to the broader literature on children's code-switching by highlighting several key considerations when examining and interpreting code-switching by children, such as during assessment by a speech-language pathologist. First, investigations of the relationship between code-switching and language proficiency should look beyond single-language contexts to consider code-switching behavior in contexts where code-switching is clearly welcomed. Second, the bidirectional influence of one conversation partner on another should be considered when examining code-switching in a conversational context. Third, examining the specific typology of children's intra-sentential code-switching may yield beneficial insights about code-switching development and the influence of context. Fourth, when collecting parent report measures of code-switching, inter-sentential switches may be more salient than intra-sentential code-switching. Overall, the findings from this study suggest that children's code-switching behavior and language choices in a code-switching conversational context appear to be related to child age, proficiency, and the behavior of their conversation partner. Relationships to parent-reported code-switching experience were less clear. However, these findings will need to be confirmed by future work with larger samples and continued efforts to refine measures of code-switching experience.

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Appendix A

Conversation Sample Spanish Protocol

Family Questions:

1. Cuando era niña, me gustaba cuando mi mama cocinaba fideos con queso. ¿Qué tipo de comida hace tu mamá?
2. ¿Qué te gusta comer para el desayuno? ¿el almuerzo? ¿la cena?
3. ¿Cuál es tu postre favorito?
4. ¿Cómo ayudas a tu mamá en la casa?

School Questions:

1. ¿Adónde vas cuando tus padres van a trabajar?
2. Cuando era niña, caminaba a mi escuela. ¿Cómo llegas a tu escuela?
3. ¿Qué tienes que hacer cuando llegues a la escuela?
4. Dime sobre los otros niños en tu clase.

Hobby Questions:

1. Cuando era niña, me gustaba patinar. ¿Te gustan los deportes?
2. ¿Qué deportes miras en la tele? ¿Cuál es tu equipo favorito? ¿Tus jugadores favoritos?
3. ¿Juegas a algún deporte? No sé las reglas—¿Cómo juegas a este deporte? ¿Con quién juegas? ¿Juegas bien? ¿Hay algo difícil en jugar [deporte]?
4. ¿Te gustan los video juegos? ¿Cuáles juegos te gustan? Oh, dime más sobre [juego]. ¿Cómo lo juegas?
5. ¿Te gusta hacer proyectos de arte? ¿Qué te gusta hacer? ¿Cómo haces esto? ¿Qué puedes dibujar? Etc.
6. Dime sobre tu juguete/juego/muñeca favorito(a) ¿Cómo es? ¿Qué puede hacer [juguete]? ¿Cómo lo juegas [juego]?

Conversation Sample English Protocol:

Family Questions:

1. In my family there is my mom, my dad, my sister and me. Tell me about the people in your family. How old are your brothers/sisters?
2. My sister and I liked to play outside. Tell me about what you like to do with your brothers/sisters.
3. Have you ever gotten in a fight with your brother/sister? What happened?

School Questions:

1. I still remember some of my teachers from when I went to school/daycare. I liked singing songs with them and playing math games with numbers. Tell me about your teacher.
2. What are some fun things that you do with your teacher?
3. When I was in school I wasn't very good at sports. Is there anything you don't like to do at school?

Hobby Questions:

1. I really like the move Shrek. What is your favorite movie?
2. Tell me about your favorite character.
3. Tell me about what happens in the movie.

Conversation Sample Code-switching Protocol:

Code-switching was not specifically scripted. The examiner switched between and within utterances throughout.

Family Questions:

1. When I was little, we used to visit my grandma and my aunt and uncle and have a big dinner. Have you ever had a party in your house?
2. What was it like? Who came?
3. What did you and your mom make?
4. What did you play?

School Questions:

1. I used to like to play dress up with my friends at school. Most of my friends were girls, but some were boys. Tell me about your friends at school/daycare.
2. What do you and your friends do when you go outside?
3. What do you play with your friends when you have to stay inside?
4. Oh, I don't know that game! How do you play?

Hobby Questions:

1. I really like Winnie the Pooh. What is your favorite TV show?
2. Tell me about your favorite character.
3. Tell me about a funny episode.

Note

- ¹ There were two exceptions due to scheduling conflicts (one code-switching sample for one child and one English sample for a different child) when the samples were elicited by a fellow bilingual doctoral student who is a native Spanish speaker. However, the distribution of intra-sentential code-switching, English, Spanish, and language-neutral utterances produced by the alternate examiner in the code-switching sample was similar to the remaining samples conducted by the first author.

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