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The Effects of Community Linguistic Diversity and Multilingualism on Children's Development of Language Awareness

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The Effects of Community Linguistic Diversity and Multilingualism on Children's Development of Language Awareness

A dissertation submitted in partial satisfaction of the

requirements for the degree Doctor of Philosophy

in Psychology

by

Natsuki Atagi

2017

ABSTRACT OF THE DISSERTATION

The Effects of Community Linguistic Diversity and Multilingualism
on Children's Development of Language Awareness

by

Natsuki Atagi
Doctor of Philosophy in Psychology
University of California, Los Angeles, 2017
Professor Catherine M. Sandhofer, Chair

Growing up in a linguistically diverse language environment and/or a multilingual family shapes language and communicative development. This dissertation focused on how growing up in a linguistically diverse environment versus a multilingual family affects development of language awareness—the understanding of the communicative functions and conventions of language. Specifically, the present dissertation examined the effects of two kinds of foreign language experience on language awareness development: (1) exposure to many languages in your community (i.e., community linguistic diversity) and (2) exposure to one foreign language for a brief period of time. Moreover, this dissertation examined how these two kinds of foreign language experience impact children's development of four aspects of language awareness: children's (1) ability to name language(s); (2) awareness of their language environment; (3) understanding of the communicative consequences of speaking different languages; and (4)

understanding of labeling conventions across languages—that objects have different names in different languages.

Experiment 1 examined whether exposure to community linguistic diversity affects monolingual children's development of language awareness and whether those effects differ from the effects of multilingualism on children's development of language awareness. Participants were three- to five-year-old children who were (1) monolingual and from a linguistically homogeneous community, (2) monolingual and from a linguistically diverse community, or (3) multilingual and from a linguistically diverse community. Results from Experiment 1 suggest that community linguistic diversity and multilingualism affect only some aspects of language awareness—specifically language labeling abilities and ability to talk about communicative consequences—but not other aspects of language awareness.

Experiment 2 sought to examine whether brief exposure to one foreign language affects language awareness development—specifically, the aspects of language awareness found to differ by exposure to community linguistic diversity in Experiment 1. Participants were four- and five-year-old children who were monolingual and from a linguistically homogeneous community. Half of these children participated in a brief foreign language exposure intervention, and their language awareness was measured before and after the intervention. Findings from Experiment 2 revealed that brief exposure to a foreign language did not affect any aspect of language awareness development examined in this dissertation and suggest that other aspects of foreign language exposure should be examined in future research.

By examining different types of foreign language experience and different aspects of language awareness, this dissertation begins to elucidate how different language environments and foreign language experiences may have differing effects on specific aspects of language

awareness. This dissertation expands on the literature on the effects of diverse language environments on children's language awareness development, and critically, provides a first step to understanding what aspect of foreign language exposure may be underlying language awareness development.

The dissertation of Natsuki Atagi is approved.

Erica Cartmill

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University of California, Los Angeles

2017

DEDICATION

This dissertation is dedicated to my parents and my sister. Thank you for fostering every interest and curiosity that I have ever had and for never letting me grow out of my “Why?” stage.

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SELECTED PUBLICATIONS

Atagi, N., DeWolf, M., Stigler, J. W., & Johnson, S. P. (2016). The role of visual representations in college students' understanding of mathematical notation. *Journal of Experimental Psychology: Applied, 22*(3), 295-304. doi:10.1037/xap0000090

Sandhofer, C. M., **Atagi, N.**, Schonberg, C., & Slone, L. K. (2016). Developmental Psychology (Cognitive). In D. S. Dunn (Ed.), *Oxford Bibliographies in Psychology*. New York, NY: Oxford University Press. doi:10.1093/OBO/9780199828340-0180

Atagi, N., Goldenberg, E. R., & Sandhofer, C. M. (2016). Children's use of linguistic information when learning in a bilingual context. *Journal of Experimental Child Psychology, 144*, 199-208. doi:10.1016/j.jecp.2015.11.005

Atagi, N., & Sandhofer, C. M. (2015). Characterizing Japanese parents' numeral classifier input and its effects on children's classifier and number learning. *Psychology of Language and Communication, 19*(2), 101-127. doi:10.1515/plc-2015-0007

Atagi, N., Sethuraman, N., & Smith, L. B. (2009). Conceptualizations of Gender in Language. In N.A. Taatgen & H. van Rijn (Eds.), *Proceedings of the 31st Annual Conference of the Cognitive Science Society* (pp.1804-1809). Austin, TX: Cognitive Science Society.

SELECTED PRESENTATIONS

Atagi, N., & Sandhofer, C. M. (2017, April). *Bilingualism, community linguistic diversity, and children's development of language awareness*. Poster presented at the 2017 Biennial Meeting of the Society for Research in Child Development, Austin, Texas.

Atagi, N., Tsang, T., & Johnson, S. P. (2017, April). *What do early language experiences tell us about visual social attention and communicative development?* Poster presented at the 2017 Biennial Meeting of the Society for Research in Child Development, Austin, Texas.

Atagi, N., Tsang, T., & Johnson, S. P. (2016, May). *The roles of early language environment and language skills on infants' visual attention to faces*. Poster presented at the 2016 International Conference on Infant Studies, New Orleans, Louisiana.

Atagi, N., & Sandhofer, C. M. (2015, October). *Arithmetic Problem-Solving in Bilingual Children.* Poster presented at the 9th Biennial Meeting of the Cognitive Development Society, Columbus, Ohio.

Atagi, N., & Sandhofer, C. M. (2013, April). Learning Numbers and Number Words: The Role of Parent Input in Number Learning and Japanese Numeral Classifier Acquisition. In **N. Atagi** (Symposium Chair), *Bridging the Gap Between Number Representation and Language Learning*. Symposium conducted at the 2013 Biennial Meeting of the Society for Research in Child Development, Seattle, Washington.

Atagi, N., Goldenberg, E. R., & Sandhofer, C. M. (2013, April). *Learning from Others in a Bilingual Context: Does Tutor and Learner Language Background Matter?* Poster presented at the 2013 Biennial Meeting of the Society for Research in Child Development, Seattle, Washington.

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General Introduction

Early language environments shape many aspects of young children's language and cognitive development. For example, the language input children receive affects not only the language(s) that they acquire (e.g., Hoff, 2003; de Houwer, 2009), but also the rate at which they learn words (e.g., Cartmill, Armstrong, Gleitman, Goldin-Meadow, Medina, & Trueswell, 2013; Goodman, Dale, & Li, 2008; Huttenlocher, Haight, Bryk, Seltzer, & Lyons, 1991; Moerk, 1980). Moreover, exposure to multiple languages affects various aspects of infant cognitive development, including attention (e.g., Ayneto & Sebastian-Galles, 2016; Tsang, Atagi, & Johnson, under review; Pons, Bosch, & Lewkowicz, 2015), perception (e.g., Byers-Heinlein & Fennell, 2014; Sebastián-Gallés, Albareda-Castellot, Weikum, & Werker, 2012; Weikum, Vouloumanos, Navarra, Soto-Faraco, Sebastián-Gallés, & Werker, 2007), executive functioning (e.g., Kovács & Mehler, 2009a), rule learning (e.g., Kovács & Mehler, 2009b), and memory (e.g., Brito & Barr, 2012, 2014; Brito, Grenell, & Barr, 2014; Singh et al., 2015). And acquiring multiple languages during childhood has lifelong consequences for cognition (e.g., Bialystok, 2009). Although early language environments have vast effects on children's development, comparatively little is known about the effects of early language environments on children's development of language awareness—the broad understanding of the functions and conventions of language that are foundational to further linguistic and communicative development. The present dissertation thus examines the effects of different kinds of early language environments on children's language awareness development.

Development of Language Awareness

During the preschool years, children begin to learn to use appropriate language and develop language awareness. Studies have shown that young children can judge and use

language that is appropriate for the person with whom they are speaking (e.g., Clark, 1978; Edelsky, 1977; Gleason, 1977; Sachs & Devin, 1976; Shatz & Gelman, 1973). For instance, by five years of age, children can judge the politeness of words and make word choice decisions based on who their interlocutor is (Clark, 1978). Additionally, four-year-old children use shorter, simpler sentences when talking to their two-year-old peers versus four-year-old peers or adults (Shatz & Gelman, 1973). Moreover, language awareness skills are also associated with other language and communicative skills: various aspects of language awareness—such as phonological awareness, awareness of grammatical structures and syntax, and word concept—are related to literacy skills and vocabulary development (e.g., Bowey, 1986; Smith & Tager-Flusberg, 1982; Wood & Terrell, 1998). Altogether, such studies suggest that preschool-age children begin to develop an understanding of the communicative functions of language and that early language awareness skills have consequences for language and communicative development. Moreover, these studies demonstrate that young children begin to develop various aspects of language awareness of during the preschool years and young children can use their language awareness to help modulate their language use according to social and linguistic cues.

Effects of Exposure to Linguistic Diversity on Language Awareness Development

Children's development of language awareness may be facilitated by different kinds of experiences with language. Studies using a wide variety of methods indicate that two kinds of linguistic experiences that involve exposure to linguistic diversity may particularly affect language awareness: foreign language experience (e.g., Akhtar, Menjivar, Hoicka, & Sabbagh, 2012; Slobin, 1978) and multilingualism (e.g., Akhtar et al., 2012; Bailey & Osipova, 2016; Byers-Heinlein, Chen, & Xu, 2014; Comeau, Genessee, & Mendelson, 2007; Diesendruck, 2005; Genessee, Boivin, & Nicoladis, 1996; Montanari, 2009; Nicoladis, 1998; Petitto et al., 2001).

However, because studies have examined different aspects of children's language awareness, it is possible that different aspects of language awareness may be differentially affected by different kinds of linguistic experiences. The present dissertation thus examines whether and how exposure to foreign languages and multilingualism affect children's language awareness development.

One way children may come to develop language awareness is through exposure to foreign languages—that is, exposure to language(s) a child does not speak. Indeed, some evidence suggests that foreign language experience helps monolingual children develop an understanding for the conventional—as opposed to functional—aspects of language awareness. Foreign language experience may allow monolingual children to compare and contrast features of their native language with foreign languages and subsequently develop an understanding that different language conventions exist across languages (e.g., Dąbrowska & Street, 2006; Levelt, Sinclair, & Jarvella, 1978). The most comprehensive study of the effects of foreign language experience on monolingual children's development of metalinguistic awareness is a case study of a monolingual English-speaking child who had extensive foreign language experience for approximately one year between age 33 and 47 months (Slobin, 1978). This case study revealed that with foreign language experience, this monolingual child developed a keen understanding of labeling conventions—that idea that object labels are distinct from the object concept. This child not only accepted foreign words to refer to a concept for which she already knew the English word, but also invented her own words for concepts for which she already knew the English word (e.g., calling milk "bap"). A more recent, experimental study also showed that monolingual English-speaking children who have exposure to a foreign language were more able to learn foreign words from a foreign language speaker than their monolingual and bilingual peers

(Akhtar et al., 2012). Such studies demonstrate that foreign language exposure facilitates the development of metalinguistic awareness, by providing an experience that helps children compare and contrast features of different languages and become more flexible in their understanding of language.

Another type of experience that helps children develop the conventional aspects of language awareness is multilingualism (including bilingualism). Multilingual language experiences—like foreign language experience—allows children to compare and contrast features of their different languages. For instance, Galambos and Goldin-Meadow (1990) found that Spanish-English bilingual four- to six-year-olds could identify more grammatical errors in Spanish sentences than their monolingual Spanish-speaking peers. Moreover, when these bilingual and monolingual children were asked to explain these grammatical errors, bilingual children were found to provide form- or grammar-oriented explanations at younger ages than their monolingual counterparts, who were found to provide more content- or meaning-oriented explanations at younger ages. These bilingual children's ability to provide form-oriented explanations points to a precocious understanding of the structure of language. Such findings thus suggest that bilingual children develop an understanding of the features of language at a younger age than monolinguals.

Multilingualism also allows children to compare and contrast speakers of their two or more languages. Indeed, multilingualism helps children develop a precocious understanding and awareness of others' language backgrounds and what consequences others' language backgrounds have for communication. Young bilingual children demonstrate a basic understanding of the communicative consequences of language—the idea that speakers who speak different languages may not understand each other. Bilingual children as young as one

year of age are able to identify and use the language appropriate for different interlocutors (e.g., Comeau et al., 2007; Nicoladis, 1998; Petitto et al., 2001; for a discussion on trilingual children, see also Montanari, 2009), and by two years of age, are also able to judge an interlocutor's proficiency in a(nother) shared language (Genessee et al., 1996). Furthermore, two-year-old bilingual children demonstrate an understanding of labeling conventions across languages: bilingual children—but not monolingual children—are able to understand that speakers have knowledge of words particular to that speaker's native language but not a different language (Byers-Heinlein et al., 2014). Similarly, three-year-old bilingual children are able to understand that bilingual speakers speak two languages whereas monolingual speakers speak one language (Diesendruck, 2005). Additionally, preschool-age bilingual children can identify other bilingual speakers as also having the experience of speaking two languages, even when the bilingual preschoolers do not speak the same two languages as the bilingual speakers (Atagi et al., 2016). Such studies demonstrate that multilingual language experiences facilitate children's development of various conventional aspects of language awareness by allowing children to develop an understanding and awareness of others' language knowledge as well as develop an understanding of the communicative consequences of language.

Recent research also suggests that experience with more than one language—whether foreign language exposure or bilingualism—affect children's communication abilities. Compared to monolingual children, both multilingual children and monolingual children with exposure to another language have been found to be better able to use perspective-taking to understand what a speaker is referring to (Fan, Liberman, Keysar, & Kinzler, 2015). Experience with more than one language thus appear to not only affect children's understanding of the

communicative functions of language, but may also affect the kinds of skills children develop to communicate effectively.

There is also evidence to suggest that both exposure to foreign languages as well as bilingualism also help children develop a metacognitive understanding of their own language background as well. For instance, parents of young multilingual children have reported multilingual children to express an understanding of their own multilingualism and even express a desire to learn other languages (Bailey & Osipova, 2016). Moreover, Akhtar and colleagues (2012) asked, "What language do you speak?" to English-speaking preschool-aged children who were monolingual, bilingual, or bilingually-exposed (i.e., children who had weekly exposure to but did not fluently speak two languages). Whereas only 19% of monolingual children were able to correctly answer the question, approximately half of the bilingual and bilingually-exposed children were able to correctly identify and label at least one of the languages that they spoke. Nonetheless, when children were shown videos of two individuals—one speaking English and one speaking "Nordish," a language invented by the experimenters—and asked to identify who spoke "their language," approximately 70% of monolingual, bilingual, and bilingually-exposed children could identify the English-speaker as the individual who spoke "their language." Altogether, these findings suggest that children—regardless of previous language experience—are able to identify an individual as speaking the same language as them; however, experience with two or more languages allows children to develop an understanding of their own language background and label their language. What remains unclear from these studies, however, is whether the effects of such experience with multiple languages are limited to children's understanding of their own language background or if such experience allows children to

understand others' language backgrounds as well and/or develop a broader understanding and awareness of their language environment.

Though extant research suggests that foreign language experience, multilingualism, and exposure to linguistic diversity facilitate children's language awareness development, it remains unclear whether specific kinds of experiences with languages are more beneficial than others for children's language awareness development. Moreover, little attention has been paid to whether different kinds of experiences with languages affect all aspects of language awareness development equally or if different kinds of linguistic experiences differentially affect specific aspects of language awareness development. The present two experiments thus examine whether and how exposure to foreign languages as well as multilingualism affect children's language awareness development. In particular, the present experiments aimed to examine the effects of two different kinds of foreign language experience on the conventional aspects of language awareness development: (1) exposure to many languages in your community (i.e., community linguistic diversity) and (2) exposure to one foreign language for a brief period of time.

Although neither of these two kinds of foreign language experience have been examined in relation to language awareness development, one study (Howard, Carramazza, & Woodward, 2014) has examined the effects of exposure to neighborhood linguistic diversity on social cognitive development. Exposure to neighborhood linguistic diversity has been found to predict 19-month-old monolingual infants' social learning via imitation, such that monolingual infants from more linguistically diverse neighborhoods have been found to demonstrate greater openness to imitating speakers of foreign languages than infants from less linguistically diverse neighborhoods. These findings suggest that even incidental exposure to linguistic diversity in the community can affect development in young infants. The present study will expand upon this

previous work by examining whether linguistic diversity in the community may also affect young monolingual children's language awareness development.

The Present Experiments

The goals of the present two experiments were to understand whether and how exposure to foreign languages as well as multilingualism affect children's development of the conventional aspects of language awareness. Specifically, Experiment 1 examines the effects of community linguistic diversity and multilingualism on language awareness development, and Experiment 2 examines whether brief exposure to one foreign language affects language awareness development.

Experiment 1 examines the effects of community linguistic diversity and multilingualism on language awareness development. Specifically, Experiment 1 seeks to understand whether exposure to community linguistic diversity affects monolingual children's development of the conventional aspects of language awareness and whether those effects differ from the effects of multilingualism on children's development of the conventional aspects of language awareness. Different conventional aspects of language awareness were examined in monolingual children from linguistically diverse versus linguistically homogenous communities in the United States, as well as multilingual children. If exposure to community linguistic diversity indeed affects the development of the conventional aspects of language awareness, then monolingual children from a linguistically diverse community should have better language awareness than monolingual children from a linguistically homogenous community. Additionally, if multilingualism affects the development of language awareness differently from community linguistic diversity, then multilingual children's language awareness should differ from that of both groups of monolinguals.

Experiment 2 examines the effects of brief exposure to one foreign language on the development of the conventional aspects of language awareness in monolingual children. Monolingual children from a linguistically homogenous community in the United States were briefly exposed to a foreign language speaker for four days and different conventional aspects of language awareness were examined before and after the four-day exposure to the foreign language speaker. If even brief exposure to a foreign language can affect children's development of the conventional aspects of language awareness, monolingual children in this experiment should show gains in their language awareness after exposure to the foreign language speaker.

Experiment 1

Experiment 1 examined whether exposure to community linguistic diversity affects monolingual children's development of the conventional aspects of language awareness and whether those effects differ from the effects of multilingualism on multilingual children's development of the conventional aspects of language awareness. Studies suggest that exposure to foreign languages may help monolingual children develop a better understanding of language (e.g., Akhtar et al., 2012; Dąbrowska & Street, 2006; Levelt, Sinclair, & Jarvella, 1978; Slobin, 1978) and enhance their understanding of their own language background (Akhtar et al., 2012). Similarly, multilingualism has been found to help children develop a better understanding of the communicative functions and consequences of language (e.g., Comeau et al., 2007; Montanari, 2009; Nicoladis, 1998; Petitto et al., 2001), as well as a better understanding of their own (Akhtar et al., 2012; Bailey & Osipova, 2016) and others' language backgrounds (e.g., Byers-Heinlein et al., 2014; Diesendruck, 2005). However, it remains unclear whether exposure to foreign languages facilitates monolingual children's language awareness development in all aspects of language awareness or only specific aspects of language awareness. Moreover, whether the effects of foreign language exposure on language awareness development differ from the effects of multilingualism also remains unknown. Experiment 1 thus aimed to understand whether exposure to different languages in the community can facilitate monolingual children's development of the conventional aspects of language awareness and whether the effects of exposure to community linguistic diversity on language awareness development differs from the effects of multilingualism.

Different conventional aspects of language awareness were examined in monolingual children from linguistically diverse versus linguistically homogenous communities in the United

States, as well as multilingual children. The conventional aspects of language awareness examined were children's awareness of their own and others' language backgrounds, ability to name languages, understanding of the communicative consequences of language, and understanding of labeling conventions.

A few possible outcomes were predicted. If exposure to community linguistic diversity indeed affects the development of the conventional aspects of language awareness in general, then monolingual children from a linguistically diverse community should have better language awareness than monolingual children from a linguistically homogenous community. Additionally, if multilingualism affects the development of the conventional aspects of language awareness differently from community linguistic diversity, then multilingual children's language awareness should differ from that of monolinguals from a linguistically diverse community and from that of monolinguals from a linguistically homogenous community. Moreover, if community linguistic diversity and multilingualism affect different aspects of language awareness development, then children from different language backgrounds should differ in performance on tasks measuring different aspects of language awareness.

Method

Participants

Three- to five-year-old children (N=73) from linguistically homogeneous and linguistically diverse communities in the United States participated in this experiment.

Data collection sites. Two counties in the United States were selected as data collection sites based on U.S. Census data. Children from the linguistically homogenous community were from Walworth County, Wisconsin, a linguistically homogenous county in southeast Wisconsin where 89.4% of the population speaks only English and only 10.6% of the population speaks a

language other than English at home (U.S. Census Bureau, 2015). Children from the linguistically diverse community were from Los Angeles County, California, a linguistically diverse county in southern California where only 43.2% of the population speaks only English and 56.8% of the population speaks a language other than English at home (U.S. Census Bureau, 2015).

Participant characteristics. Three groups of children were recruited from preschools in Walworth County, WI (a linguistically homogenous community) and Los Angeles County, CA (a linguistically diverse community): (1) monolingual English-speaking children residing in Walworth County (i.e., linguistically homogeneous monolinguals; n=26; M_{age}=3.92 years, SD_{age}=0.72 years), (2) monolingual English-speaking children residing in Los Angeles County (i.e., linguistically diverse monolinguals; n=20; M_{age}=4.10 years, SD_{age}=0.65 years), and (3) multilingual children—who speak English and one or two other languages—residing in Los Angeles County (i.e., multilinguals; n=27; M_{age}=4.17 years, SD_{age}=0.54 years).

The three groups of children did not differ in age, $F(2,70)=1.099$, $p=.339$. However, the multilingual children did have significantly less exposure to English at home (M=85.75%, SD=18.71%) than did the linguistically homogenous monolinguals (M=100.00%, SD=0.00%) and linguistically diverse monolinguals (M=100.00%, SD=0.00%), $F(2,68)=12.413$, $p<.001$. Multilingual children's non-English languages were Arabic (n=1), Assamese (n=1), Chinese (n=8), German (n=1), Greek (n=1), Hebrew (n=1), Hindi (n=1), Japanese (n=3), Korean (n=2), Malayalam (n=1), Norwegian (n=1), Tagalog (n=3), Tamil (n=1), and Thai (n=1). Monolingual children spoke only English and were exposed only to English at home.

Overall, the three groups of children were comparable in socioeconomic background, relative to the demographics of the community in which they resided. The majority of children in

the three groups were from households with annual incomes that were greater than the median income for their ZIP code (U.S. Census Bureau, 2015; linguistically homogenous monolinguals: $X^2(2, n=20)=9.70$, $p=.008$; linguistically diverse monolinguals: $X^2(2, n=17)=23.06$, $p<.001$; multilinguals: $X^2(2, n=18)=10.33$, $p=.006$). Although multilingual children's parents had significantly higher educational attainment ($M=10.42$, $SD=0.70$; i.e., a Bachelor's degree or higher) than did the linguistically homogenous monolingual children's parents ($M=9.24$, $SD=1.59$; Mann-Whitney $U=154.50$, $Z=-3.406$, $p=.001$), multilingual children's parents did not differ in educational attainment from the linguistically diverse monolingual children's parents ($M=9.75$, $SD=1.59$; Mann-Whitney $U=206.00$, $Z=-1.299$, $p=.19$). More importantly, parents of the two groups of monolingual children did not differ in educational attainment, with the average parent of a monolingual child having an Associate's or Bachelor's degree (Mann-Whitney $U=180.50$, $Z=-1.667$, $p=.10$).

Materials

Children completed three tasks that measured different aspects of language awareness: (1) an interview that measured children's language naming abilities (Language Naming interview), (2) a video task that measured children's understanding of the communicative consequences of language (Communicative Consequences task), and (3) another video task that measured children's understanding of labeling conventions (Labeling Conventions task). Parents of participating children were also asked to complete a questionnaire about their child's language experiences and family environment, and preschool teachers or directors were asked to answer questions regarding the preschool's linguistic environment.

Language Naming Interview. The language naming interview was composed of two parts: (1) Language Label Elicitation (Questions 1-4) and (2) Awareness of Classroom Language

Environment (Questions 5-7). The purpose of the interview was to assess children's (1) ability to name and talk about languages and (2) awareness of their language environment outside of their home context. Children were asked four questions regarding their own and parents' language backgrounds; children were then asked three questions regarding their awareness of their classroom language environment. These seven questions were inspired by and intended to build upon the questions asked by Akhtar et al. (2012). All children were asked the seven questions in the same order as they appear below.

Questions 1-4: Language Label Elicitation. The purpose of the first three questions was to elicit language labels (e.g., "English", "Spanish") from children. Children were first asked, (1) "What language do you speak?" followed by, (2) "What language does your [Caregiver 1] speak?" and (3) "What language does your [Caregiver 2] speak?" (typically, "What language does your mom speak?" and "What language does your dad speak?" respectively). The first question assesses children's ability to identify, name, and talk about their own language(s), whereas the next two questions assess children's ability to identify, name, and talk about their others'—specifically, their parents'—language(s). The first question about the child's language(s) has been used in previous research (Akhtar et al., 2012) with monolingual, bilingual, and bilingually-exposed three- and four-year-old children, and the two questions about the parents' language(s) built upon the first question to extend to examining children's understanding of others' language.

The fourth question was intended to elicit further information about children's responses to the first question, particularly when children's responses to the first question were nonsensical. Children were asked, (4) "Does everyone else in your class speak [child's response to first question] like you?" Thus, if the child's response to the first question ("What language do

you speak?") was "English," then this fourth question was "Does everyone else in your class speak English like you?" If a child responded "dog" to the first question, then this question was "Does everyone else in your class speak dog like you?" Regardless of the child's answer, this question was followed-up, "How can you tell?"

Questions 5-7: Awareness of Classroom Language Environment. The purpose of these three questions was to assess children's awareness of their classroom language environment—specifically, awareness of their classmates' language backgrounds. Children were asked, (5) "Does anyone in your class speak English?" and (6) "Does everyone in your class speak English?" followed by (7) "Does anyone in your class speak a language other than English?" Regardless of children's answers, each of these questions were followed-up with, "How can you tell?" The fifth and sixth questions examined children's awareness of their classmates' language backgrounds, as well as their understanding of the word and concept "English." The seventh question examined children's awareness of the languages being spoken around them by their peers in the classroom.

Communicative Consequences task. The purpose of this task was to assess children's understanding of the communicative consequences of speaking different languages. Children were shown six videos and asked the same three questions about each video. Two of the videos featured a woman speaking in English—a language that all participating children spoke; another two videos featured a different woman speaking in Spanish—a language that was the second most common language in each of the communities that the participating children resided in (U.S. Census Bureau, 2015); and the other two videos featured yet another different woman speaking in French—a language that was less common than both English and Spanish in each of the communities that the participating children resided in (U.S. Census Bureau, 2015). In each

video, the speaker said three sentences about one of six topics (e.g., books at the library, eating snacks) in English, Spanish, or French (see Appendix A for example trials of the task and Appendix B for the English, Spanish, and French scripts). All speakers were portrayed in the videos as monolingual speakers of English, Spanish, or French; however, all speakers were fluent in English and Spanish or English and French.

After viewing each video, children were asked three questions. First, to elicit children's comprehension of the video, children were asked, "What was she talking about?" Next, children were told about the speaker's language background: "Well, she only speaks English." or "Well, she only speaks [Spanish/French] and doesn't speak English." Then, to elicit children's understanding of the communicative consequences of speaking different languages, children were asked, "If you talk to her, will she know what you said?" Regardless of children's answer, this question was followed by a third question, "How can you tell?" Children's responses to each question were audio-recorded and written down verbatim by the experimenter, and the experimenter moved onto the next trial.

Randomization. Four random orders of the six videos in the Communicative Consequences task were created. Because the speakers in the videos were actually fluent in English and Spanish or English and French, the four orders randomized for what language the speaker was speaking (i.e., English, Spanish, or French). In each random order, the order in which speakers/languages appeared was pseudorandomized such that the three speakers/languages appeared once each in the first three videos and once each in the last three videos (e.g., English, Spanish, French, Spanish, English, French). Additionally, the four orders also randomized for what topic the speaker was talking about (e.g., books at the library, eating snacks). No topic was repeated within each random order.

Labeling Conventions task. The purpose of this task was to assess children's understanding of labeling conventions. This task had two parts: (1) training trials, in which children learned how to respond on this task, and (2) test trials, in which children's understanding of labeling conventions was measured.

Training trials. Before watching the videos, children were first given training trials to learn how to respond on this task (see Appendix C). Children received three training trials to learn how to respond in a nonverbal, forced-choice manner on this task (Gordon & McGregor, 2014). During training trials, children were shown a picture of a common object (e.g., a cup) on a computer screen and asked about what the object is called (e.g., "Do you call this a cup or something else?"). Children were trained to respond to this question by pointing to one of two large dots on a piece of paper; one dot represented one answer (e.g., "a cup"), and the other dot represented the other answer (e.g., "something else"). When asking children about what the object is called, experimenters pointed to the corresponding dot at the same time as saying the object label (e.g., "a cup") and "something else." This forced-choice manner of response has been found to help elicit responses from children (e.g., Gordon & McGregor, 2014) and reduce memory demands in the task by adding visual-spatial supports. Whether the left or right dot corresponded to the object label versus "something else" was counterbalanced across trials and across children.

Of the three training trials, the first two trials had questions in which the object label will be in the question (e.g., a cup was shown and the question was, "Do you call this a cup or something else?"), such that the correct response would be the object label; the third trial had a question in which the name of the object was not be in the question (e.g., a cookie was shown and the question was, "Do you call this a shoe or another word?"), such that the correct response

would be “something else”. If children responded incorrectly on any of the training trials, they were provided with corrective feedback and be given another opportunity to respond; children were given as many opportunities to respond as it took to get the correct response.

Videos and post-video test trials. After the training trials, children were shown six videos of a speaker labeling different objects (e.g., a fish, a spoon) in English, Spanish, or French, and then asked questions about what that speaker might call the object. Two of the videos featured a woman speaking in English—a language that all participating children spoke; another two videos featured a different woman speaking in Spanish—a language that was the second most common language in each of the communities that the participating children resided in (U.S. Census Bureau, 2015); and the other two videos featured yet another different woman speaking in French—a language that was less common than both English and Spanish in each of the communities that the participating children resided in (U.S. Census Bureau, 2015). In each video, the speaker first established her language background by saying a sentence in her language (e.g., “We’re going to have so much fun playing this game!”); the speaker then labeled the object three times, five seconds apart (see Appendix D for example trials of the task and Table 1 for the object labels in English, Spanish, and French). Though all speakers were portrayed in the videos as monolingual speakers of English, Spanish, or French, in actuality, all speakers were fluent in English and Spanish or English and French. Additionally, all objects presented in the videos were those with labels that are early-learned and commonly-known by 30-month-old monolingual English-speaking children (Fenson et al., 1994).

Table 1

Object labels presented in the Labeling Conventions task.

English	Spanish	French
Dog	El perro	Le chien
Fish	El pescado	Le poisson
Hat	El sombrero	Le chapeau
Spoon	La cuchara	La chausette
Sock	El calcetín	La cullière
Tree	El árbol	Le arbre

After viewing each video, children were asked three questions. First, to ensure that children knew the English label for the object, children were asked, "What do you call that?" Next, to examine children's understanding of labeling conventions, children were asked, "Do you think she calls that a [English label] or something else?" When asking children about what the object is called, experimenters pointed to the corresponding dot at the same time as saying the English label (e.g., "a cup") and "something else." Children were asked to respond using the two dots by pointing to the dot that corresponded with their answer. Whether the left or right dot corresponded to the English label versus "something else" was counterbalanced across trials and across children. Regardless of children's answer, this question was followed by a third question, "How can you tell?" Children's responses were audio-recorded and written down verbatim by the experimenter, and the experimenter moved onto the next trial.

Randomization. Four random orders of videos in the Labeling Conventions task were created to randomize (a) what language the speaker was speaking (i.e., English, Spanish, or French) and (b) what object the speaker was presenting (e.g., a fish, a spoon). In each random order, the order in which speakers/languages appeared was pseudorandomized such that the three speakers/languages appeared once each in the first three videos and once each in last three videos

(e.g., English, Spanish, French, Spanish, English, French). No object was repeated within each random order.

Parent questionnaire. Parents were asked to complete a questionnaire regarding children's language experiences and family environment (Appendix E). Regarding children's language experiences, the questionnaire asked about children's demographic information; in what countries and for how long the child has lived for more than three months; what language(s) are spoken at home; whether the child is exposed to languages other than English outside of the home; whether and how much the child engages with media in languages other than English; what language(s) are spoken by the child; the percentage of the day the child speaks each of his/her language(s); and how often the child mixes languages. Regarding children's family environment, the questionnaire asked about what ZIP Code the child's family resides in; what language(s) are spoken by parents and/or caregivers living with the child; the percentage of the day each parent/caregiver speaks each of his/her language(s); whether the parent talks to the child about how people speak different languages; parents' highest level of education completed; approximate net annual household income; and number of people in the household.

The information provided by parents on the questionnaire were used in three ways. First, information about the child's language experiences were used to categorize children as monolingual or multilingual and assess children's exposure to non-English languages. Second, language and SES information provided on the questionnaire were used to ensure that the groups of children only differed on relevant language features and were otherwise similar on other social characteristics, such as parent education and income. Third, language information provided by

parents on the questionnaire were used to code children's responses to questions in the Language Naming Interview.

Preschool interview. Preschool teachers or directors were asked to answer questions regarding the linguistic environment of the preschool (Appendix F). An experimenter asked preschool teachers or directors how many children are enrolled at the preschool; what proportion of the children speak a language other than English; if there are any children who do not speak English; how many teachers are employed at the preschool; and what proportion of the teachers speak a language other than English.

Procedure

Children were randomly assigned to one of four random orders of the videos in the Communicative Consequences task and Labeling Conventions task. To control for the possibility that the Language Naming Interview may prime children's responses during the Communicative Consequences task and Labeling Conventions task, children were also randomly assigned to complete the interview or two video tasks first. Thus, half the children completed the Language Naming Interview before the Communicative Consequences task and Labeling Conventions task, and the other half completed the Communicative Consequences task and Labeling Conventions tasks before the Language Naming Interview. In other words, half the children completed tasks in the following order: (1) Language Naming Interview, (2) Communicative Consequences task, and (3) Labeling Conventions tasks; and the other half of participating children completed tasks in the following order: (1) Communicative Consequences task, (2) Labeling Conventions tasks, and (3) Language Naming Interview. Because the Labeling Conventions task demonstrated to children that speakers of different languages communicate differently—information that was expected to affect performance on the Communicative Consequences task—the Communicative

Consequences task always preceded the Labeling Conventions task. Children's responses on all three tasks were written down verbatim by experimenters, as well as audio-recorded.

Parents were asked to complete the questionnaire when they provided consent for their child to participate in the study. Preschool teachers or directors were asked to answer the preschool interview questions on the day that experimenters visited the preschool for data collection.

Results

The goal of Experiment 1 was to understand whether exposure to linguistic diversity may facilitate monolingual children's development of different aspects of language awareness. Language awareness of monolingual children from linguistically homogeneous and linguistically diverse communities were compared to each other, as well as to that of multilingual children.

Language Labeling

Children's ability to identify, name, and talk about their own language(s) and their parents' language(s) was measured with the questions, "What language do you speak?" and "What language does your [caregiver 1/caregiver 2] speak?". Children's responses were scored in terms of accuracy and relevance.

Scoring. Responses were scored for accuracy according to information provided by parents on the parent questionnaire about the child's and parents' language backgrounds. Additionally, regardless of the accuracy of children's responses, responses were also scored for relevance; relevant responses were ones that named a language(s) and/or used speech-related words (e.g., hear, say, talk, voice). Accuracy scores provided a measure of children's language labeling abilities, whereas relevance scores provided a measure of children's ability to talk about language more generally.

Responses to the question, "Does everyone in your class speak [response to the first question] like you?"—as well as the follow-up, "How can you tell?"—were only used to assist in understanding children's responses to the first question, particularly when children provided nonsensical responses (e.g., responding "dog" for "What language do you speak?"); thus, responses to this question were not assessed for accuracy or relevance.

Accuracy. An ANOVA comparing linguistically homogeneous monolinguals', linguistically diverse monolinguals', and multilinguals' accuracy in naming their own language(s) revealed an effect of language background, $F(2,70)=3.77$, $p=.028$, partial $\eta^2=.097$ (Figure 1). Although there were no differences between linguistically homogeneous monolinguals' ($M=15.38\%$, $SD=36.80\%$) and linguistically diverse monolinguals' accuracy ($M=25.00\%$, $SD=44.43\%$; $t[44]=-0.803$, $p=.43$, *n.s.*), multilinguals ($M=48.15\%$, $SD=50.92\%$) were significantly more able to accurately name their own language than linguistically homogeneous monolinguals, $t(51)=-2.676$, $p=.01$. There were no differences between multilinguals and linguistically diverse monolinguals, $t(45)=-1.625$, $p=.11$, *n.s*.

Similarly, an effect of language background was found for children's accuracy in naming their parents' language(s), $F(2,70)=5.603$, $p=.006$, partial $\eta^2=.138$ (Figure 2). There were no differences between linguistically homogeneous monolinguals' ($M=17.31\%$, $SD=37.26\%$) and linguistically diverse monolinguals' accuracy ($M=35.00\%$, $SD=48.94\%$; $t[44]=-1.393$, $p=.17$, *n.s.*), but multilinguals ($M=57.41\%$, $SD=45.37\%$) were significantly more able to accurately name their own language than linguistically homogeneous monolinguals, $t(51)=-3.509$, $p=.001$. There were no differences between multilinguals and linguistically diverse monolinguals, $t(45)=-1.619$, $p=.11$, *n.s*. Thus, regardless of whether children were naming their own or their parents'

language(s), multilingualism—rather than community linguistic diversity—seems to affect children's ability to name languages.

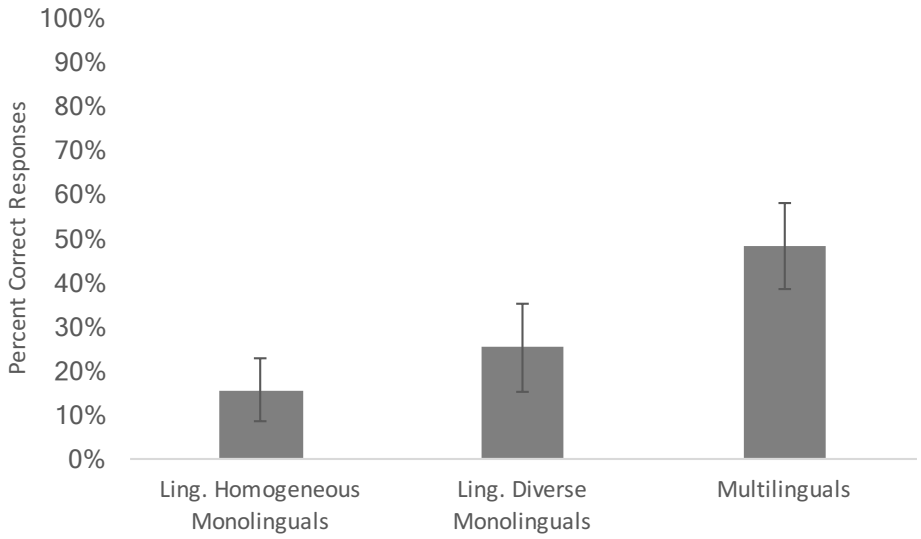


Figure 1. Language naming accuracy: self. Children's accuracy in naming their own language(s).

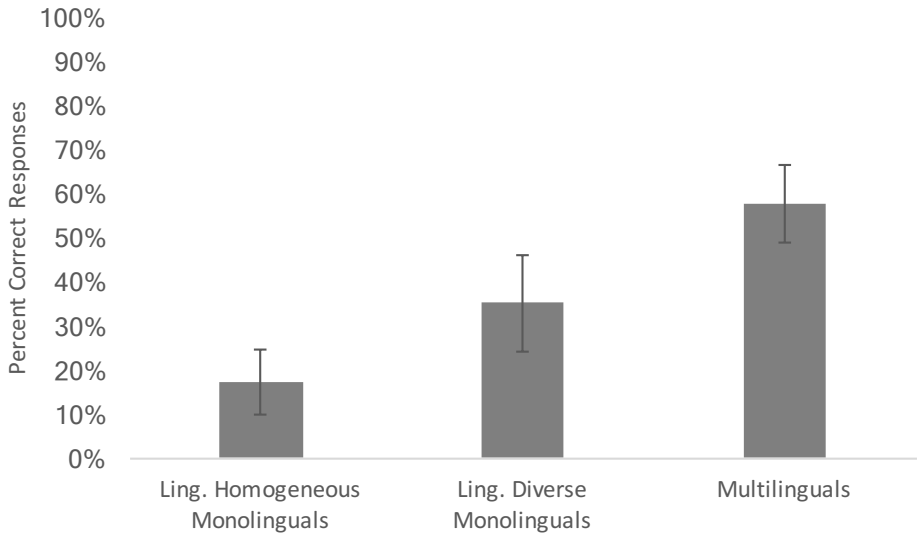


Figure 2. Language naming accuracy: parents. Children's accuracy in naming their parents' language(s).

Relevance. The relevance of children's responses to the questions "What language do you speak?" and "What language does your [caregiver 1/caregiver 2] speak?" were also examined. An effect of language background was also found for the relevance of responses children provided in regards to their own language(s), $F(2,70)=4.382$, $p=.016$, partial $\eta^2=.111$ (Figure 3). Interestingly, multilinguals ($M=55.56\%$, $SD=50.64\%$) and linguistically diverse monolinguals ($M=50.00\%$, $SD=51.30\%$) were significantly more able to provide relevant responses about what language they spoke than could linguistically homogeneous monolinguals ($M=19.23\%$, $SD=40.19\%$; multilinguals vs. linguistically homogeneous monolinguals: $t(51)=-2.886$, $p=.006$; linguistically diverse monolinguals vs. linguistically homogeneous monolinguals: $t(44)=-2.283$, $p=.027$). There were no differences between linguistically diverse monolinguals and multilinguals, $t(45)=-0.370$, $p=.71$, *n.s*.

In comparison, an effect of language background was also found for the relevance of responses children provided in regards to their parents' language(s), $F(2,70)=4.307$, $p=.017$, partial $\eta^2=.110$ (Figure 4). However, in this case, multilinguals ($M=66.67\%$, $SD=45.99\%$)—but not linguistically diverse monolinguals ($M=45.00\%$, $SD=51.04\%$)—were significantly more able to provide relevant responses about what language their parents spoke than could linguistically homogeneous monolinguals ($M=26.92\%$, $SD=45.23\%$), $t(51)=-3.170$, $p=.003$. There were no differences between linguistically diverse monolinguals and linguistically homogeneous monolinguals ($t[44]=-1.271$, $p=.21$, *n.s*.), nor were there differences between linguistically diverse monolinguals and multilinguals ($t[45]=-1.524$, $p=.14$, *n.s*.). Thus, multilingualism seems

to affect children's ability to talk about language. In contrast, community linguistic diversity may only affect children's ability to talk about language when it pertains to their own language background.

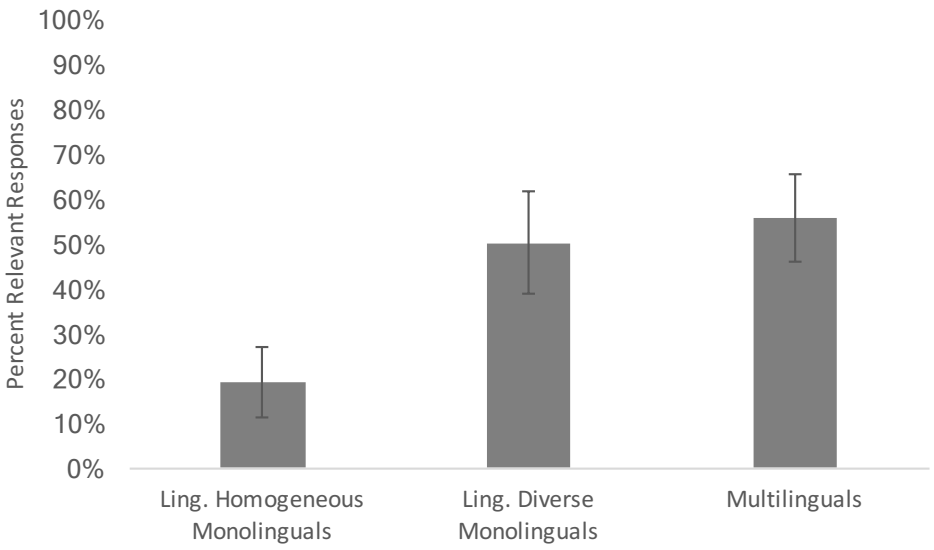


Figure 3. Language naming relevance: self. The relevance of responses children provided in regards to their own language(s).

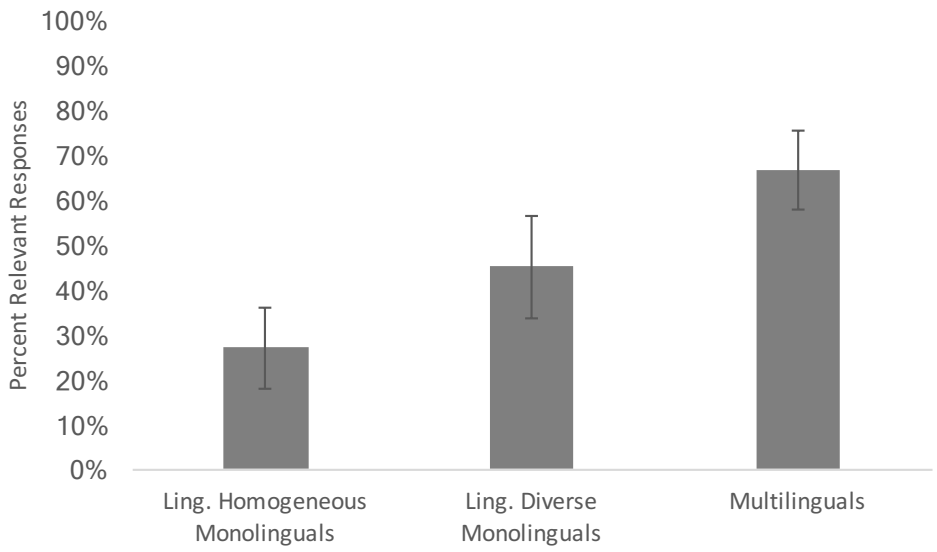


Figure 4. Language naming relevance: parents. The relevance of responses children provided in regards to their parents' languages.

Awareness of Classroom Language Environment

Children's awareness of their classmates' language backgrounds was measured with the three questions: "Does anyone in your class speak English?", "Does everyone in your class speak English?", and "Does anyone in your class speak a language other than English?". The three questions were also followed-up with "How can you tell?", which allowed children an opportunity to talk about their classroom language environment.

Scoring. Awareness of Classroom Language Environment questions (i.e., "Does anyone in your class speak English?", "Does everyone in your class speak English?", "Does anyone in your class speak a language other than English?") were scored for accuracy according to information provided by preschool teachers or directors on the preschool interview. Answers to these three questions were averaged and turned into a percentage to create a composite classroom language environment awareness accuracy score. Because data were collected at preschools in

which English was the dominant language, all children had classmates who spoke English. However, information from the preschool interview was critical for scoring responses from children attending preschools in a linguistically diverse part of the country, where not everyone in their preschool class necessarily spoke English and some classmates were multilingual or monolingual in a non-English language. Additionally, regardless of the accuracy of children's responses, responses to "How can you tell?" after each question were scored for relevance; relevant responses were ones that named a language(s) and/or used speech-related words (e.g., hear, say, talk, voice). Answers to "How can you tell?" after each of the three questions were averaged and turned into a percentage to create a composite classroom language environment awareness relevance score. Accuracy scores provided a measure of children's awareness of their classroom language environment, whereas relevance scores provided a measure of children's ability to talk about their classroom language environment.

Accuracy. An ANOVA comparing linguistically homogeneous monolinguals', linguistically diverse monolinguals', and multilinguals' class language environment awareness accuracy scores revealed no difference among the three language background groups, $F(2,70)=1.085$, $p=.344$, partial $\eta^2=.030$ (Figure 5). Linguistically homogeneous monolinguals ($M=52.56\%$, $SD=31.51\%$), linguistically diverse monolinguals ($M=65.00\%$, $SD=38.20\%$), and multilinguals ($M=65.43\%$, $SD=36.38\%$) did not differ in their awareness of their classroom language environment. Thus, neither community linguistic diversity nor multilingualism seem to affect children's awareness of their classroom language environment.

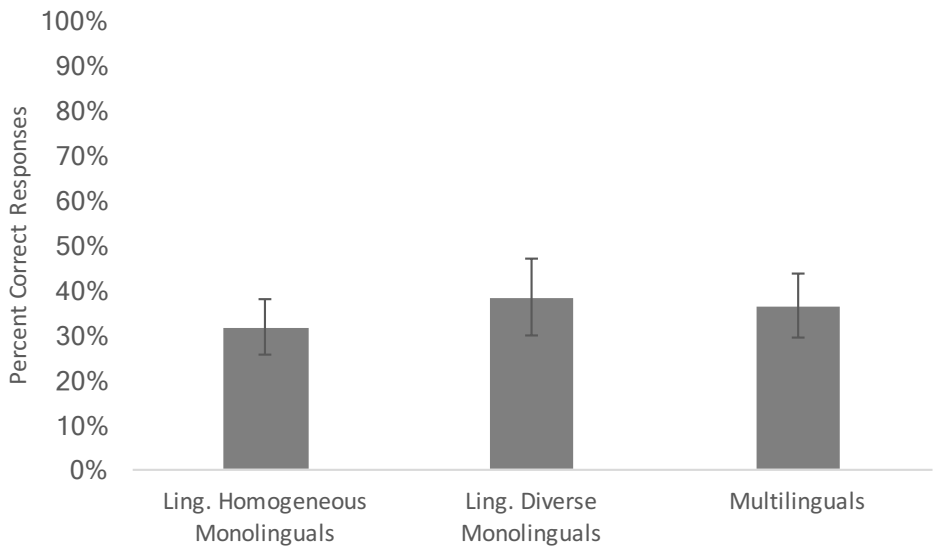


Figure 5. Classroom language environment awareness: accuracy. Children's classroom language environment awareness accuracy scores, reflecting their awareness of their classroom language environment.

Relevance. An ANOVA comparing linguistically homogeneous monolinguals', linguistically diverse monolinguals', and multilinguals' class language environment awareness relevance scores revealed no difference among the three language background groups, $F(2,70)=2.068$, $p=.134$, partial $\eta^2=.056$ (Figure 6). Linguistically homogeneous monolinguals ($M=16.67\%$, $SD=28.67\%$), linguistically diverse monolinguals ($M=6.67\%$, $SD=17.44\%$), and multilinguals ($M=24.69\%$, $SD=37.66\%$) did not differ in their ability to talk about their classroom language environment. Thus, in line with the findings on children's awareness of their classroom language environment, neither community linguistic diversity nor multilingualism seem to affect children's ability to talk about their classroom language environment.

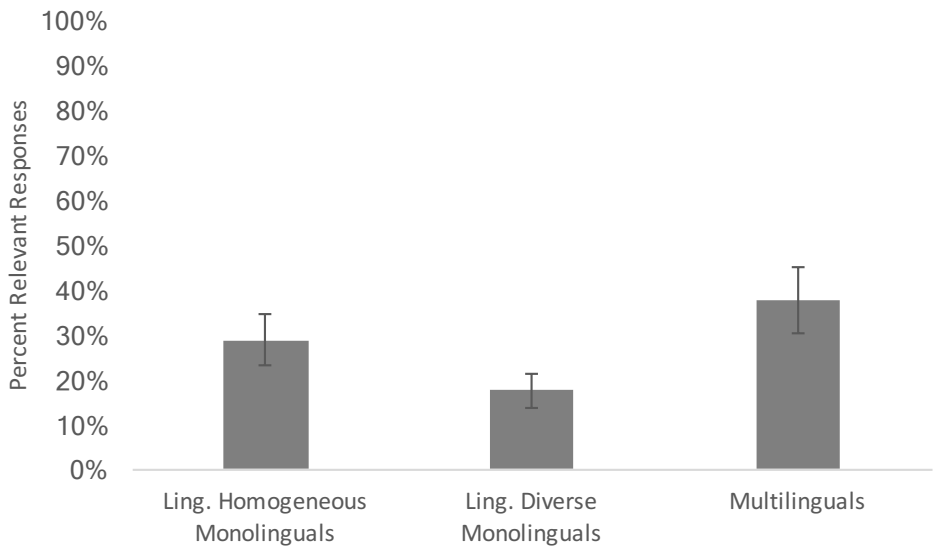


Figure 6. Classroom language environment awareness: relevance. Children's classroom language environment awareness relevance scores, reflecting their ability to talk about their classroom language environment.

Communicative Consequences

Scoring. Children's responses on the Communicative Consequences task were scored according to whether the speaker in the video was an English speaker or a Spanish or French speaker. Because all children spoke English and none spoke Spanish or French, English was a familiar language to all children and Spanish and French were unfamiliar languages to all children.

Familiar language (English) videos. The question, "What was she talking about?", was scored for accuracy only. Responses that reflected any part of what the speaker said was an accurate response for all children. For example, if the speaker was talking about books at the

library, the response “books” and the response “the library” would both be accurate. Accuracy scores provided a measure of children’s comprehension of familiar language speakers.

The question, “If you talk to her, will she know what you said?”, was scored for accuracy only, and an affirmative “yes” response was the only accurate response. The follow-up question, “How can you tell?”, was scored for relevance only, and relevant responses were ones that named a language(s), used speech-related words (e.g., hear, say, talk, voice), stated understanding the speaker, and/or stated something about talking to others. Accuracy scores provided a measure of children’s understanding of the communicative consequences of speaking to familiar language speakers, whereas relevance scores provided a measure of children’s ability to talk about the communicative consequences of speaking to familiar language speakers.

Unfamiliar language (Spanish and French) videos. The question, “What was she talking about?”, was scored for accuracy only. Responses that reflected not understanding what the speaker said was an accurate response for all children. Thus, the response, “I don’t know” or “I don’t know what she said”, would be accurate. Accuracy scores provided a measure of children’s comprehension of unfamiliar language speakers.

The question, “If you talk to her, will she know what you said?”, was scored for accuracy only, and a “no” response was the only accurate response. “I don’t know” was scored as an inaccurate response because children were informed these Spanish and French speakers did *not* speak English. The follow-up question, “How can you tell?”, was scored for relevance only, and relevant responses were ones that named a language(s), used speech-related words (e.g., hear, say, talk, voice), stated not understanding the speaker, and/or stated something about talking to others. Accuracy scores provided a measure of children’s understanding of the communicative consequences of speaking to unfamiliar language speakers, whereas relevance scores provided a

measure of children's ability to talk about the communicative consequences of speaking to unfamiliar language speakers.

Initial analyses examined whether children's responses to questions about Spanish versus French speakers differed. However, all analyses revealed children's responses to questions about Spanish and French speakers to not differ (all *p*s>.05, *n.s.*). Thus, children's responses to questions about Spanish and French speakers were collapsed to reflect children's responses to questions about unfamiliar language speakers.

Comprehension of Different Language Speakers: Accuracy. Children's comprehension of different language speakers was assessed with the question, "What was she talking about?" after viewing videos of speakers talking in English, Spanish, or French. A 3 (children's language background) by 2 (speaker language familiarity) ANOVA examining children's comprehension of different language speakers revealed a main effect of language familiarity (F[1,69]=8.232, p=.005, partial η^2=.107; Figure 7), such that the accuracy of children's responses was higher when children were asked about familiar language (English) speakers (M=79.17%, SD=45.77%) than when asked about unfamiliar language (Spanish and French) speakers (M=62.50%, SD=41.54%). However, no main effect of children's language background (F[2,69]=1.098, p=.34, partial η^2=.031, *n.s.*) or significant interaction were found (F[2,69]=0.425, p=.66, partial η^2=.012, *n.s.*). These results suggest that children's familiarity with the language being spoken—but not community linguistic diversity or multilingualism—affect children's ability to talk about whether they understood different language speakers.

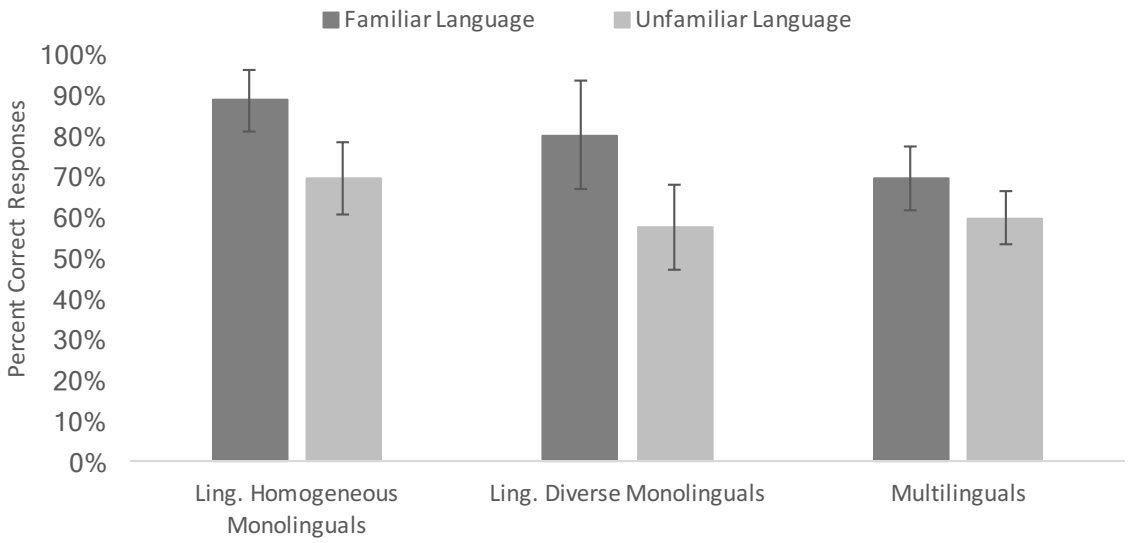


Figure 7. Comprehension of different language speakers: accuracy. Children's comprehension of familiar and unfamiliar language speakers.

Understanding of Communicative Consequences: Accuracy. To measure children's understanding of the communicative consequences of speaking different languages, children were explicitly told about a speaker's language background (e.g., "She only speaks French and doesn't speak English") and then asked, "If you talk to her, will she know what you said?". A 3 (children's language background) by 2 (speaker language familiarity) ANOVA examining children's understanding of the communicative consequences revealed a main effect of language familiarity (F[1,69]=22.511, p<.001, partial η^2=.246; Figure 8), such that the accuracy of responses were higher when children were asked about familiar language (English) speakers (M=75.00%, SD=43.61%) than when asked about unfamiliar language (Spanish and French) speakers (M=38.89%, SD=40.44%). However, no main effect of children's language background (F[2,69]=0.076, p=.93, partial η^2=.002, *n.s.*) or significant interaction were found (F[2,69]=0.056, p=.95, partial η^2=.002, *n.s.*). These results suggest that children at this age have

a better understanding of the communicative consequences of language when speakers are speaking a familiar rather than unfamiliar language.

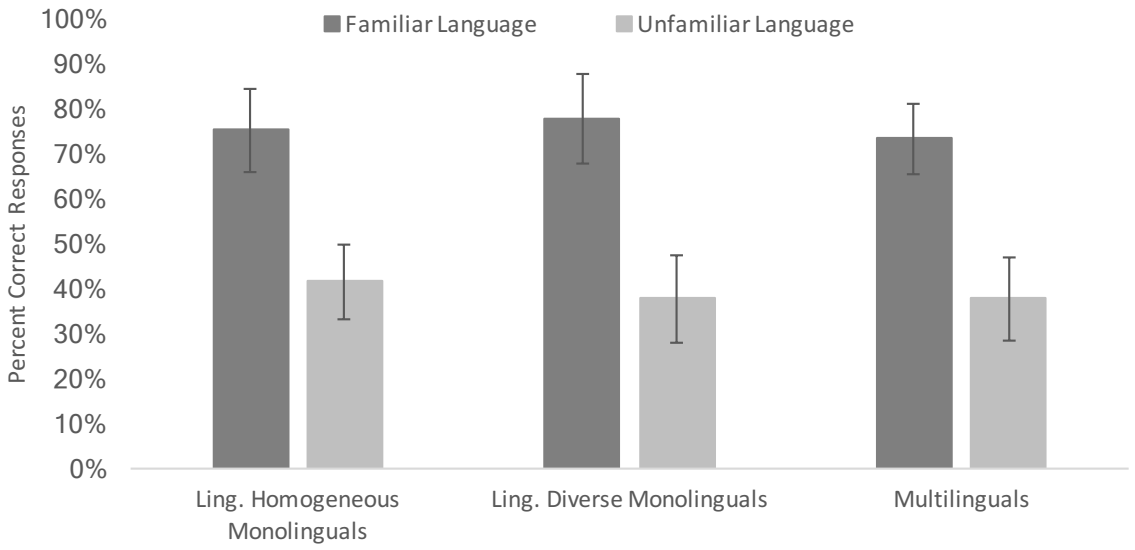


Figure 8. Understanding of communicative consequences: accuracy. Children's understanding of the communicative consequences of speaking different languages.

Understanding of Communicative Consequences: Relevance. A follow-up question, "How can you tell?", allowed children to elaborate on their understanding of the communicative consequences of speaking different languages. Tables 2 and 3 shows the different types of responses children in each language background group provided and the percentages for each type. Regardless of whether children were asked about familiar or unfamiliar language speakers (Tables 2 and 3, respectively), the most common type of response from all children was "I don't know" (31-63% of all responses), which was considered an irrelevant response. The second most common types of responses were relevant responses: naming a language (e.g., "Because she speaks English"; 12%-28% of all responses) and stating something about talking to people (e.g.,

"Because I talk to a lot of kids"; 1-13% of all responses). When asked about familiar language speakers, the third most common type of response was stating that the child could understand the speaker (e.g., "I don't know what she said"; 2-10% of all responses), whereas when asked about unfamiliar language speakers, the third most common type of response was stating that the child could not talk to the speaker (e.g., "I can't talk to her"; 0-5% of all responses). These results demonstrate that children may have difficulty explaining why they can or cannot communicate with speakers of familiar and unfamiliar languages, but when they can provide a relevant explanation, they tend to provide explanations that—though not necessarily accurate—involve naming languages and/or referring to talking to others.

Table 2

Understanding of communicative consequences: Types of responses when asked about familiar language speakers.

	Irrelevant Responses			Relevant Responses		
	I don't know	Answer with a random word/phrase	Perceptual or functional explanation	Name a language	State talking to people	State understanding the speaker
Linguistically Homogenous Monolinguals	63%	9%	0%	16%	5%	5%
Linguistically Diverse Monolinguals	43%	13%	3%	3%	13%	10%
Multilinguals	33%	33%	2%	28%	0%	2%

Table 3

Understanding of communicative consequences: Types of responses when asked about unfamiliar language speakers.

	Irrelevant Responses			Relevant Responses		
	I don't know	Answer with a random word/phrase	Perceptual or functional explanation	Name a language	State talking to people	State *not* being able to talk to the speaker
Linguistically Homogenous Monolinguals	54%	12%	0%	12%	3%	5%
Linguistically Diverse Monolinguals	35%	16%	1%	16%	10%	1%
Multilinguals	31%	25%	0%	28%	1%	0%

To further examine the relevance of children's responses regarding communicative consequences, a 3 (children's language background) by 2 (speaker language familiarity) ANOVA examining the relevance of children's responses regarding communicative consequences was conducted and revealed a significant language background by language familiarity interaction, $F(2,69)=9.653$, $p<.001$, partial $\eta^2=.219$ (Figure 9). Post-hoc analyses revealed no difference in responses among the three groups of children when asked about familiar language speakers, $F(2,70)=0.756$, $p=.47$, partial $\eta^2=.021$, *n.s.* However, when asked about unfamiliar language speakers, the three groups of children differed in relevance of responses ($F[2,69]=6.550$, $p=.002$, partial $\eta^2=.160$), such that linguistically homogenous monolinguals ($M=63.46\%$, $SD=43.15\%$) provided significantly more relevant responses than linguistically diverse monolinguals ($M=21.25\%$, $SD=33.71\%$) and multilinguals ($M=34.62\%$, $SD=43.63\%$; linguistically homogenous monolinguals vs. linguistically diverse monolinguals: $t[44]=3.607$, $p<.05$; linguistically homogenous monolinguals vs. multilinguals: $t[50]=2.397$,

p<.05). However the linguistically diverse monolinguals and multilinguals did not differ, t(44)=0.263, p>.05, *n.s*. Additionally, a main effect of language familiarity was also found (F[1,69]=19.985, p<.001, partial η^2=.225), such that children provided significantly more relevant responses when asked about unfamiliar language (Spanish and French) speakers (M=39.93%, SD=43.74%) than when asked about familiar language (English) speakers (M=20.14%, SD=37.21%). However, there was no main effect of children's language background, F(2,69)=2.868, p=.06, partial η^2=.077, *n.s.* Altogether, these results suggest that linguistically homogenous monolinguals may be better able than linguistically diverse monolinguals and multilinguals to use language- and communication-related words (e.g., naming languages, referring to talking to others) to explain why they would not be able to communicate with an unfamiliar language speaker.

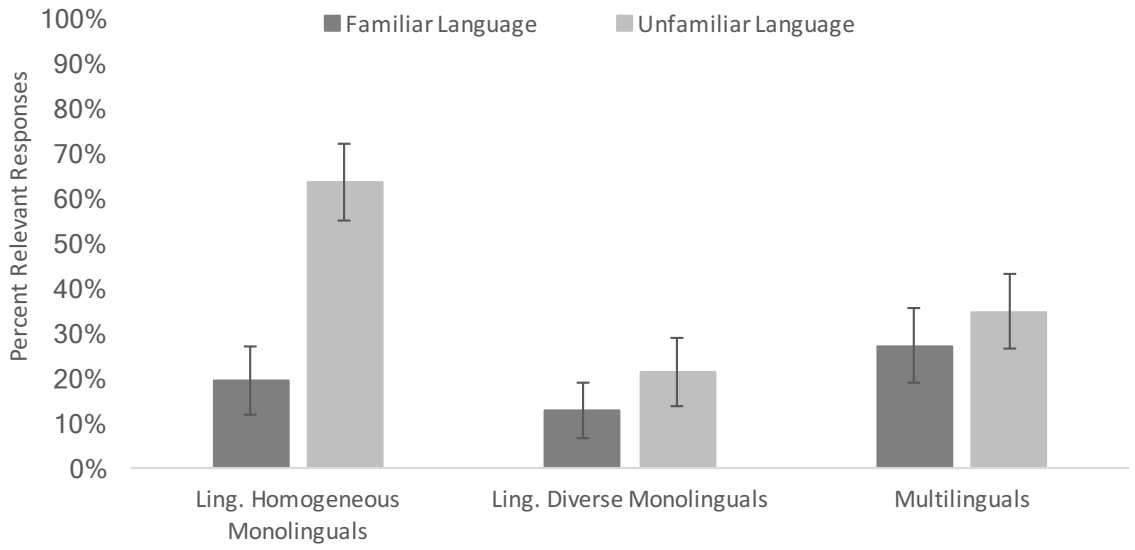


Figure 9. Understanding of communicative consequences: relevance. The relevance of responses children provided in regards to communicative consequences.

Labeling Conventions

Scoring. Children's responses on the Labeling Conventions task were scored according to whether the speaker in the video was an English speaker or a Spanish or French speaker. Because all children spoke English and none spoke Spanish or French, English was a familiar language to all children and Spanish and French were unfamiliar languages to all children.

Familiar language (English) videos. The question, "Do you think she calls that a [English label] or something else?", was scored for accuracy only. Accurate responses were those in which children chose the English label. The follow-up question, "How can you tell?", was scored for relevance only, and relevant responses were ones that named a language(s), used speech-related words (e.g., hear, say, talk, voice), stated understanding the speaker, and/or stated that the speaker labeled the object with that word. Accuracy scores provided a measure of children's understanding of labeling conventions as they pertain to familiar languages, whereas relevance scores provided a measure of children's ability to talk about labeling conventions.

Unfamiliar language (Spanish and French) videos. The question, "Do you think she calls that a [English label] or something else?", was scored for accuracy only. Accurate responses were those in which children chose "something else." The follow-up question, "How can you tell?", was scored for relevance only, and relevant responses were ones that named a language(s), used speech-related words (e.g., hear, say, talk, voice), stated not understanding the speaker, and/or stated that the speaker labeled the object with a different word. Accuracy scores provided a measure of children's understanding of labeling conventions as they pertain to unfamiliar languages, whereas relevance scores provided a measure of children's ability to talk about labeling conventions.

Initial analyses examined whether children's responses to questions about Spanish versus French speakers differed. However, all analyses revealed children's responses to questions about Spanish and French speakers to not differ (all *p*s>.05, *n.s.*). Thus, children's responses to questions about Spanish and French speakers were collapsed to reflect children's responses to questions about unfamiliar language speakers.

Accuracy. Children's understanding of labeling conventions was assessed with the question, "Do you think she calls that a [English label] or something else?" after viewing videos of speakers labeling objects in English, Spanish, or French. A 3 (children's language background) by 2 (speaker language familiarity) ANOVA examining children's understanding of labeling conventions revealed a main effect of language familiarity (F[1,69]=77.75, p<.001, partial η^2=.530; Figure 10), such that the accuracy of responses about labeling conventions was higher when asked about familiar language (English) speakers (M=92.36%, SD=32.13%) than when asked about unfamiliar language (Spanish and French) speakers (M=30.56%, SD=40.29%). However, no main effect of children's language background (F[2,69]=1.616, p=.21, partial η^2=.045, *n.s.*) or significant interaction were found (F[2,69]=0.509, p=.60, partial η^2=.015, *n.s.*). These results suggest that children's familiarity with the language being spoken affect children's understanding of labeling conventions such that children understand labeling conventions of a familiar language but are not yet able to extend this understanding to an unfamiliar language.

All children also demonstrated a systematic understanding of labeling conventions for the familiar language but not necessarily for the unfamiliar language. When asked about familiar language speakers, all children responded that the familiar language speaker called objects by English labels at above chance rates (chance=50%; linguistically homogenous monolinguals: t[24]=4.272, p<.001; linguistically diverse monolinguals: t[19]=7.958, p<.001; multilinguals:

t[26]=9.706, *p*<.001). However, when asked about unfamiliar language speakers, the accuracy of linguistically homogenous and linguistically diverse monolinguals' responses were at chance (linguistically homogenous monolinguals: *t*[24]=-1.999, *p*=.06; linguistically diverse monolinguals: *t*[19]=-1.339, *p*=.20), suggesting that monolinguals may have been unsure as to whether unfamiliar language speakers called objects by English labels or "something else." In contrast, the accuracy of multilinguals' responses was significantly below chance when asked about unfamiliar language speakers (*t*[26]=-3.741, *p*=.001), suggesting that multilinguals were systematically responding that the unfamiliar language speaker called objects by English labels. These results demonstrate that regardless of language background, all children were systematically correct in responding that the familiar language speaker called the object by the English label.

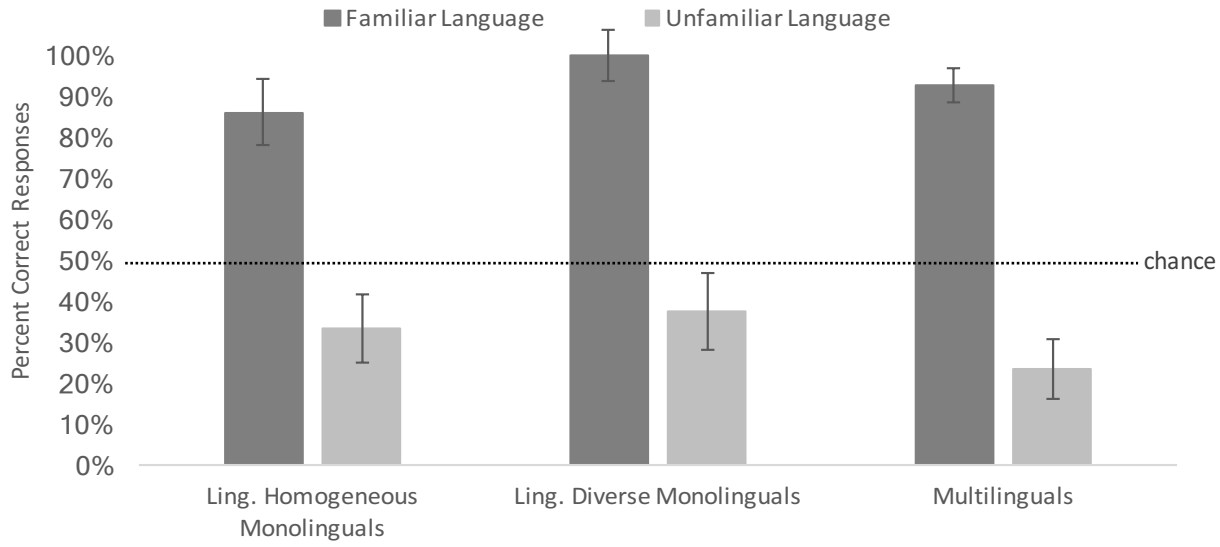


Figure 10. Understanding of labeling conventions: accuracy. Children's understanding of labeling conventions.

Relevance. A follow-up question, "How can you tell?", allowed children to elaborate on their understanding of labeling conventions. Tables 4 and 5 shows the different types of responses children in each language background group provided and the percentages for each type. Regardless of whether children were asked about familiar or unfamiliar language speakers (Tables 4 and 5, respectively), the most common type of response from all children was "I don't know" (32-44% of all responses), which was considered an irrelevant response. The second most common types of responses were relevant responses: naming a language (e.g., "Because she speaks English"; 5%-16% of all responses) and stating the English label for the object (e.g., "Because that's called a spoon"; 7-18% of all responses). These results demonstrate that children may have difficulty explaining why speakers of familiar and unfamiliar languages may or may not call an object by the English label, but when they can provide an explanation, they tend to provide relevant—though not necessarily accurate—explanations that involve naming languages and/or stating the English label.

To further examine the relevance of children's responses regarding labeling conventions, a 3 (children's language background) by 2 (speaker language familiarity) ANOVA examining the relevance of children's responses regarding labeling conventions was conducted. No main effects (language background: $F[2,69]=0.889$, $p=.42$, partial $\eta^2=.025$, *n.s.*; language familiarity: $F[1,69]=0.521$, $p=.47$, partial $\eta^2=.007$, *n.s.*) or interaction were found ($F(2,69)=0.691$, $p=.50$, partial $\eta^2=.020$; Figure 11). Thus, all children provided similar responses regarding labeling conventions, and neither language familiarity nor children's language background affected children's responses.

Table 4

Understanding of labeling conventions: Types of responses when asked about familiar language speakers.

	Irrelevant Responses			Relevant Responses		
	I don't know	Answer with a random word/phrase	Perceptual or functional explanation	Name a language	State English label	State understanding the speaker
Linguistically Homogenous Monolinguals	36%	27%	4%	11%	18%	0%
Linguistically Diverse Monolinguals	32%	0%	28%	8%	12%	12%
Multilinguals	33%	19%	14%	14%	7%	2%

Table 5

Understanding of labeling conventions: Types of responses when asked about unfamiliar language speakers.

	Irrelevant Responses			Relevant Responses		
	I don't know	Answer with a random word/phrase	Perceptual or functional explanation	Name a language	State English label	State *not* understanding the speaker
Linguistically Homogenous Monolinguals	44%	25%	7%	5%	15%	0%
Linguistically Diverse Monolinguals	34%	7%	16%	7%	12%	7%
Multilinguals	32%	21%	11%	16%	8%	0%

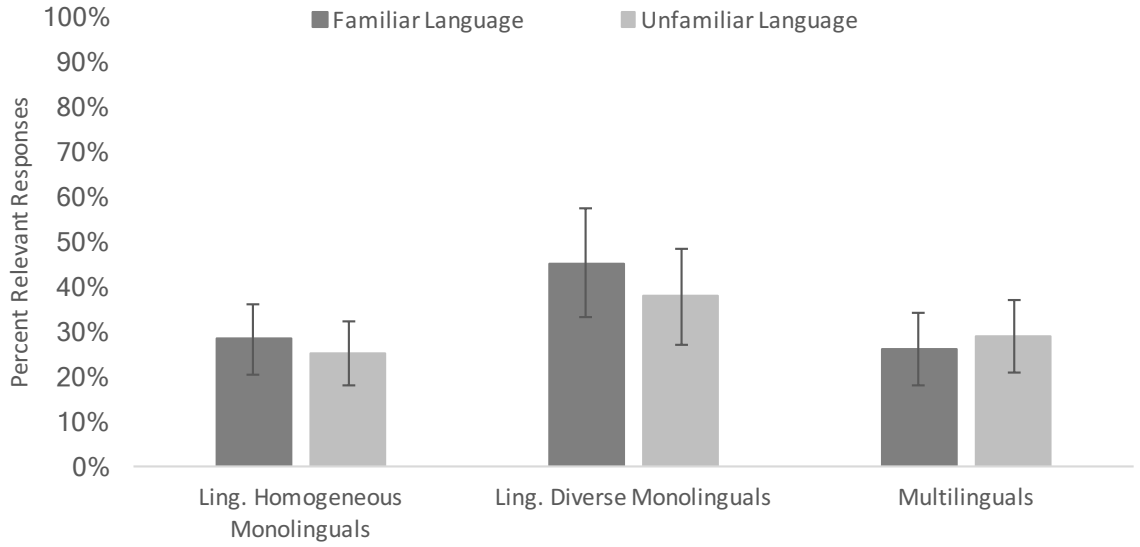


Figure 11. Understanding of labeling conventions: relevance. The relevance of responses children provided in regards to labeling conventions.

Relations among Different Aspects of Language Awareness

To examine how children's development of different aspects of language awareness may relate to their development of other aspects of language awareness, correlations among the different language awareness tasks were conducted. Specifically, composite accuracy scores were calculated for Language Labeling, Awareness of Classroom Language Environment, Comprehension of Different Language Speakers, Understanding of Communicative Consequences, and Understanding of Labeling Conventions. The composite accuracy score for Language Labeling was an average of children's accuracy scores for labeling their own language(s) and labeling their parents' language(s); the composite accuracy score for Awareness of Classroom Language Environment was the same composite accuracy score used in analyses reported above; and finally, composite accuracy scores for Comprehension of Different Language Speakers, Understanding of Communicative Consequences, and Understanding of

Labeling Conventions were averages of children's accuracy scores when asked about familiar language speakers and accuracy scores when asked about unfamiliar language speakers. Separate correlations were run for the three groups of children (Tables 6-8).

Table 6

Correlation Matrix of Accuracy on Language Awareness Tasks: Linguistically Homogeneous Monolinguals.

	1.	2.	3.	4.	5.
1. Language Labeling	1				
2. Awareness of Classroom Language Environment	.096	1			
3. Comprehension of Different Language Speakers	-.166	-.188	1		
4. Understanding of Communicative Consequences	.205	-.150	**.621****	1	
5. Understanding of Labeling Conventions	**.515****	-.037	**.457***	**.579****	1

Notes. *** $p<.001$, ** $p<.01$, * $p<.05$

Table 7

Correlation Matrix of Accuracy on Language Awareness Tasks: Linguistically Diverse Monolinguals.

	1.	2.	3.	4.	5.
1. Language Labeling	1				

2. Awareness of Classroom Language Environment	.269	1			
3. Comprehension of Different Language Speakers	**.478***	.28	1		
4. Understanding of Communicative Consequences	**.584****	**.513***	**.802*****	1	
5. Understanding of Labeling Conventions	**.644****	.274	**.498***	**.718*****	1

Notes. *** $p<.001$, ** $p<.01$, * $p<.05$

Table 8

Correlation Matrix of Accuracy on Language Awareness Tasks: Multilinguals.

	1.	2.	3.	4.	5.
1. Language Labeling	1				
2. Awareness of Classroom Language Environment	.309	1			
3. Comprehension of Different Language Speakers	-.061	-.165	1		
4. Understanding of Communicative Consequences	-.005	-.144	**.583****	1	
5. Understanding of Labeling Conventions	-.233	-.12	**.503****	**.511****	1

Notes. *** $p<.001$, ** $p<.01$, * $p<.05$

For all three groups, children's comprehension of different language speakers was associated with their understanding of communicative consequences (linguistically homogenous monolinguals: $r=.621$, $p=.001$; linguistically diverse monolinguals: $r=.802$, $p<.001$; multilinguals $r=.583$, $p=.002$). Children's comprehension of different language speakers was also associated with their understanding of labeling conventions (linguistically homogenous monolinguals: $r=.457$, $p=.022$; linguistically diverse monolinguals: $r=.498$, $p=.025$; multilinguals $r=.503$,

p=.009). Additionally, children's understanding of labeling conventions was also associated with their understanding of communicative consequences (linguistically homogenous monolinguals: *r*=.579, *p*=.002; linguistically diverse monolinguals: *r*=.718, *p*<.001; multilinguals *r*=.511, *p*=.008). These results suggest that—regardless of language background—the development of children's comprehension of different language speakers, understanding of communicative consequences, understanding of labeling conventions may be related to one another.

Correlations also revealed that among monolingual children, language labeling was also associated with understanding of labeling conventions (linguistically homogenous monolinguals: *r*=.515, *p*=.008; linguistically diverse monolinguals: *r*=.644, *p*=.002). However, language labeling and understanding of labeling conventions was not significantly related for multilinguals (*r*=-.233, *p*=.243, *n.s.*). Such results suggest that language labeling may play a role in monolingual children's language awareness but may not be an important aspect of multilingual children's language awareness.

Interestingly, language labeling was also associated with other aspects of language awareness for linguistically diverse monolinguals. For linguistically diverse monolinguals, language labeling was also associated with comprehension of different language speakers (*r*=.478, *p*=.033) as well as understanding of communicative consequences (*r*=.584, *p*=.007). Additionally, awareness of classroom language environment was also associated with understanding of communicative consequences (*r*=.513, *p*=.021) for linguistically diverse monolinguals. Significant correlations were not found among these variables for linguistically homogeneous monolinguals or multilinguals (all *p*s>.05). These findings suggest that language labeling may be a particularly important aspect of monolinguals' language awareness

development if children are growing up in a linguistically diverse environment and that community linguistic diversity may affect how monolinguals develop language awareness.

Discussion

Experiment 1 aimed to understand whether exposure to linguistic diversity may facilitate monolingual children's development of different conventional aspects of language awareness. Language awareness of monolingual children from linguistically homogeneous and linguistically diverse communities were compared to each other, as well as to that of multilingual children. Overall, findings suggest that community linguistic diversity and multilingualism may affect certain conventional aspects of language awareness but not others. Specifically, community linguistic diversity appears to affect language labeling abilities and ability to talk about communicative consequences, whereas multilingualism only affects language labeling abilities; however, neither community linguistic diversity nor multilingualism affect awareness of classroom language environment, understanding of communicative consequences, or understanding of labeling conventions.

Language Labeling

Children's ability to name and talk about languages differed by multilingualism and community linguistic diversity, respectively. Indeed, bilingual children have been found to be more successful than monolingual children in correctly naming the language(s) they speak (Akhtar et al., 2012). Moreover, parent-report evidence suggests that young multilingual children not only may be aware of their own multilingualism but also express interest in learning more languages (Bailey & Osipova, 2016). The present findings support and extend previous findings by providing further evidence that multilingualism affects children's ability to talk about language and that exposure to community linguistic diversity affects children's ability to talk

about language. Moreover, these results suggest that community linguistic diversity and multilingualism may have differing effects on children's ability to accurately name and talk about language. Although community linguistic diversity does not affect the accuracy with which children name the language they or their parents speak (i.e., English), it may shape children's general ability to talk about their own language background in a relevant manner; however, this does not appear to extend to children's ability to talk about their parents' language background. In contrast, multilingualism may affect children's ability to both accurately name and generally talk about the language(s) they and their parents speak.

Awareness of Classroom Language Environment

Children's awareness of their classroom language environment did not differ by children's exposure to linguistic diversity or multilingualism. However, it is unclear why children lacked awareness of their classroom language environment. One possibility is that children did not know the word "English." Another possibility is that for the monolingual children attending preschool in a linguistically diverse community, they simply did not have knowledge of the fact that some classmates spoke multiple languages; for the multilinguals at those preschools, it is possible that they did not take themselves into account when responding and/or also did not have knowledge of the fact that some classmates spoke multiple languages. On the other hand, it is also possible that what language other children spoke was simply irrelevant information for all children because they could communicate with everyone in their classes (cf. Atagi et al., 2016); this may have been especially true for the linguistically homogenous monolinguals.

Communicative Consequences

Children's understanding of the communicative consequences of language did not differ by community linguistic diversity or multilinguals, but differed instead by whether speakers were speaking a familiar or unfamiliar language. Children demonstrated an understanding that speakers who speak the same language as the children understand them. However, children may have been unsure if speakers of unfamiliar languages would also understand them. Given that four- and five-year-old monolingual children can modify their own language use to be appropriate for their interlocutor (e.g., Clark, 1978; Shatz & Gleman, 1973)—suggesting that monolingual children are able to evaluate their interlocutor and modify their own language use—it is not surprising that both monolingual groups and the multilingual children had a better understanding of communicative consequences of familiar language speakers. However, previous work has also found three-year-old bilingual and trilingual children to be able to identify and use the language appropriate for different interlocutors (e.g., Comeau et al., 2007; Montanari, 2009; Nicoladis, 1998; Petitto et al., 2001). Given that multilingual children in this study also demonstrated better understanding of communicative consequences for familiar than unfamiliar language speakers, it is possible that multilingual children's understanding of communicative consequences is also only limited to the specific languages that are familiar to them and not all languages more generally. Thus, children's familiarity with the language being spoken may be a more dominant factor affecting children's understanding of the communicative consequences of speaking different languages.

In contrast, children's ability to talk about the communicative consequences of speaking different languages was found to differ by community linguistic diversity—more specifically, exposure to linguistic homogeneity. Exposure to linguistic homogeneity was found to affect children's ability to provide relevant explanations regarding the communicative consequences of

talking to a speaker of a different language. It is possible that children with exposure to linguistic homogeneity may be more sensitive to communicative barriers caused by language differences. Children growing up in a linguistically homogenous community may only have experience communicating with others who speak the same language as them; thus, not being able to understand and/or communicate with a speaker may be a unique experience for them that clearly marks a communicative barrier. This may help linguistically homogenous monolinguals to provide more specific explanations, such as "I don't know what she said." In contrast, for children exposed to linguistic diversity, not being able to understand and/or communicate with a speaker may be a more common experience; linguistically diverse communities are not only composed of speakers of different languages, but also speakers with different levels of fluency in the majority language (in this case, English). Thus, communicative difficulties—like ones that may take place between a native speaker and a nonnative speaker of English—are more commonplace in linguistically diverse communities than linguistically homogenous ones. It may therefore be possible that children with exposure to linguistic diversity may have also experienced (or observed) a wider range of communicative events in which it is unclear whether the child can successfully communicate with an interlocutor.

Labeling Conventions

Children demonstrated a systematic understanding of labeling conventions when presented with familiar language speakers. That is, children were systematically correct in responding that the familiar language speaker called the object by the English label, and children's understanding of labeling conventions was specific to familiar language speakers and did not extend to unfamiliar language speakers. Given that two-year-old English-speaking monolinguals have been found to lack understanding of the fact that Mandarin speakers do not

have knowledge of English labels (Byers-Heinlein et al., 2014), it is possible that the three- and four-year-old monolingual children in this study also did not understand that speakers of unfamiliar languages do not have knowledge of the English labels and instead call objects by different labels.

A surprising finding in the present experiment was that multilinguals in this study systematically responded that the unfamiliar language speaker also called the object by the English label. Contrary to the present findings, two-year-old bilinguals who speak English and another language have been found to understand that Mandarin speakers do not know English labels (Byers-Heinlein et al., 2014). However, because it was never explicitly stated in the present study's labeling conventions task that the unfamiliar language speakers did not speak English, it is possible that the multilinguals in this study may have assumed that the unfamiliar language speakers were multilingual like the children and also spoke English (cf. Atagi et al., 2016). Moreover, though some evidence suggests that three- and four-year-old children with regular exposure to another language may be better able to learn foreign words from a foreign speaker than their monolingual or bilingual peers can (Akhtar et al., 2012), the present findings suggest that exposure to linguistic diversity do not affect understanding of labeling conventions. Thus, language familiarity—rather than community linguistic diversity or multilingualism—affected children's understanding of labeling conventions.

Relations among Different Aspects of Language Awareness

Children's development of different aspects of language awareness was found to relate to their development of other aspects of language awareness. Regardless of language background, children's development of comprehension of different language speakers, understanding of communicative consequences, and understanding of labeling conventions were found to be

significantly related to one another. That is, children who could better express their comprehension of different language speakers also had a better understanding of the communicative consequences of speaking different languages as well as a better understanding of labeling conventions. These findings suggest that for all children, these aspects of language awareness may develop in tandem.

Language labeling was also found to be related to understanding of labeling conventions, but only for monolingual children. Moreover, for linguistically diverse monolinguals, language labeling was also associated with comprehension of different language speakers and understanding of communicative consequences. For multilingual children, language labeling was not significantly associated with any of these aspects of language awareness. These findings suggest that language labeling may be critical to monolingual children's language awareness—particularly monolingual children growing up in a linguistically diverse community—but may not be an important aspect of multilingual children's language awareness. It is possible that the ability to label languages may represent a different skill for monolingual and multilingual children. For monolingual children—especially monolingual children living in a linguistically diverse community—the ability to label languages may represent a broader awareness of the existence of different languages and different language speakers in the world. In contrast, because different languages are so common and salient in multilingual children's environment, multilingual children's ability to label different languages may be similar to labeling any other concept in their environment; that is, for multilingual children, labeling different languages (e.g., "Spanish") may be no different from labeling another abstract concept (e.g., "happy").

Future analyses

Though the present analyses focused on group differences in language awareness among children from different language backgrounds, future analyses will build on the presently reported correlations and examine individual differences in children's language awareness. First, mediation analyses will examine whether aspects of language awareness (e.g., language labeling) may mediate the relation between community linguistic diversity and other aspects of language awareness (e.g., understanding of communicative consequences). Second, a composite language awareness score will be calculated and used in a regression to examine whether different aspects of monolinguals' language experiences affect language awareness overall. Aspects of monolinguals' language experiences that would be of interest include (1) hours of exposure to non-English media, (2) whether parents talk to the monolingual child about different languages, (3) number of non-English-speaking or multilingual classmates in the monolingual child's classroom, and (4) proportion of multilinguals in the monolingual child's neighborhood based on Census data. Third, using a composite language awareness score, a separate regression will examine whether different aspects of multilinguals' language experiences affect language awareness overall. In addition to the four predictor variables that will be included in the regression analysis of monolinguals, the aspects of multilinguals' languages experiences that would be of interest also include (1) how much the multilingual child speaks each of her/his languages, (2) how many non-English speakers the multilingual child lives with, and (3) how much each of those non-English speakers speak that non-English language at home. Such analyses examining individual differences will begin to elucidate how children develop language awareness and what aspects of the language environment may matter most for language awareness development.

Overall the present findings suggest that community linguistic diversity and multilingualism—as well as familiarity with the language being spoken—affect different conventional aspects of language awareness. More specifically, only language labeling abilities and the ability to talk about communicative consequences appear to be affected by community linguistic diversity and multilingualism. However, what remains unclear from the present experiment is whether exposure to linguistic diversity alone can be a mechanism for language awareness development. Moreover, for the conventional aspects of language awareness that are specifically affected by exposure to linguistic diversity, it is unclear how much exposure to linguistic diversity is needed to facilitate monolingual children's language awareness. Experiment 2 thus examines whether minimal exposure to even one speaker of a different language can affect monolingual children's development of the conventional aspects of language awareness.

Experiment 2

This experiment examined whether exposure to another language—and a speaker of another language—may be one mechanism underlying children's development of the conventional aspects of language awareness. Of particular interest were the aspects of language awareness that were found in Experiment 1 to vary by exposure to linguistic diversity—that is, language labeling and ability to talk about communicative consequences. Though results from Experiment 1 and previous research (e.g., Akhtar et al., 2012; Dąbrowska & Street, 2006; Levelt, Sinclair, & Jarvella, 1978; Slobin, 1978) suggest that exposure to different languages may facilitate some aspects of monolingual children's development of language awareness, it remains unclear if exposure to another language is a direct mechanism by which monolingual children can develop the conventional aspects of language awareness.

Even brief exposure to a foreign language has been found to affect young children's language development, particularly in the domain of phonetic perception. Monolingual English-exposed infants as young as nine months of age show less perceptual narrowing to English phonemes after twelve 25-minute exposures to a Mandarin speaker (Kuhl, Tsao, & Liu, 2003). Additionally, even just 2 minutes of exposure to foreign accents has been found to change two-year-olds' representations of phonemes such that children are more able to accommodate unfamiliar accents of learned words (Schmale, Cristia, & Seidl, 2012). Given that brief foreign language exposure can affect children's representations of some aspects of language, it is possible that brief foreign language exposure may also affect aspects of children's language awareness as well.

Experiment 2 thus used a brief foreign language exposure intervention to examine whether exposure to another language may be one mechanism driving language awareness

development. If exposure to linguistic diversity is indeed a mechanism underlying children's development of the conventional aspects of language awareness, then the aspects of language awareness that differed by exposure to linguistic diversity in Experiment 1—language labeling and ability to talk about communicative consequences—should also differ in this experiment between pretest and posttest. In other words, the foreign language exposure intervention should improve language labeling ability as well as change children's ability to talk about communicative consequences. All other aspects of language awareness (i.e., awareness of classroom language environment, understanding of communicative consequences, understanding of labeling conventions) should not be affected by the foreign language exposure intervention.

Method

Participants

Four- and five-year-old monolingual English-speaking children (N=15) with minimal exposure to another language participated. Children were recruited from a 4K program at a preschool located in a town in Walworth County, Wisconsin, a county in southeast Wisconsin in the United States; the town in which this preschool was located is largely monolingual English-speaking, with 92.7% of the population speaking only English and only 7.2% of the population speaking a language other than English at home (U.S. Census Bureau, 2015).

Participant characteristics. Participating children were ages four and five years (*M*=4.47 years, *SD*=0.29 years) and were largely exposed to only English at home (*M*=99.93%, *SD*=0.26%); one child had 99% exposure to English and 1% exposure to Norwegian, but the other 14 children had 100% exposure to English at home. An additional four children participated, but their data were excluded due to missing the pretest or posttest (n=3) or not understanding task instructions (n=1).

Materials and Procedure

Children in this experiment participated in a four-day foreign language exposure intervention, preceded by a pretest and followed by a posttest. The pretest was conducted on a Friday; the intervention was conducted on the following Monday through Thursday; and the posttest was conducted on the following Friday, exactly one week after the pretest.

Pretest and Posttest. The pretest and posttest were identical to each other and to the materials and procedures used in Experiment 1. Pretest and posttest measures were also scored in the same way as in Experiment 1. Difference scores between pretest and posttest (posttest scores-pretest scores) were calculated.

Foreign Language Exposure Intervention. The four-day intervention, which took place between the pretest and posttest, involved a native Japanese-English bilingual speaker reading to the children each day. Half of the children (n=9) were randomly assigned to the intervention condition, in which the bilingual speaker read and spoke to the children exclusively in Japanese, and the other half (n=6) were randomly assigned to the control condition, in which the bilingual speaker read and spoke to the children exclusively in English (the four children whose data were excluded were all in the control condition). The bilingual speaker read one picture book to the children on each day and briefly talked to the children to introduce the picture book (e.g., “This is one of my favorite books.”, “I really like the pictures in this book) and conclude the reading (e.g., “Wasn’t that a nice book?”, “I’ll be back tomorrow with another book.”). Translations of the same picture books were read to children the two conditions, and on each day, the bilingual speaker said the same statements to introduce the picture book and conclude the reading. Thus, the only difference between the intervention and control conditions was the language: the

language in which the picture book was written and read (see Appendix G for a complete list of picture books), and the language in which the bilingual speaker talked to the children.

Results

The goal of this experiment was to examine whether exposure to another language is a direct mechanism by which children develop language awareness. More specifically, Experiment 2 aimed to examine whether language labeling and ability to talk about communicative consequences—aspects of language awareness found to differ by exposure to linguistic diversity in Experiment 1—can be changed with exposure to a speaker of another language. Children's language awareness was tested before and after a foreign language exposure intervention and compared with that of a control group. Difference scores between pretest and posttest scores (posttest scores-pretest scores) were used in all analyses. However, descriptive statistics of the pretest and posttest scores are provided in Tables 6, 7, and 9.

Descriptive Statistics of the Intervention and Control Groups

Children in the intervention versus control conditions did not differ in age (t[14]=-0.865, p=.402) or home English exposure (Mann-Whitney U=30.00, Z=-0.816, p=.918). Children in the intervention versus control conditions were also from households that did not differ in income from each other (Mann-Whitney U=10.50, Z=-1.821, p=.081), and the majority of children were from households with annual incomes that were greater than the median income for their ZIP code (U.S. Census Bureau, 2015; X^2[2, n=14]=6.14, p=.046). Additionally, parents of children in the two groups did not differ in educational attainment (Mann-Whitney U=17.50, Z=-1.145, p=.272), with the average parent having an Associate's degree.

Effects of Foreign Language Exposure on Language Awareness

Language Labeling. Children's ability to identify, name, and talk about their own language(s) and their parents' language(s) was measured with the questions, "What language do you speak?" and "What language does your [caregiver 1/caregiver 2] speak?". Children's responses were scored in terms of accuracy and relevance. However, neither accuracy nor relevance of children's responses differed between intervention and control groups or between pretest and posttest. Table 9 provides descriptive statistics of the pretest and posttest accuracy and relevance scores.

Table 9

Descriptive statistics of intervention and control groups' performance on language labeling questions at pretest and posttest.

	Intervention Group (n=9)		Control Group (n=6)	
	Pretest M(SD)	Posttest M(SD)	Pretest M(SD)	Posttest M(SD)
Accuracy				
Self	11.11% (33.33%)	11.11% (33.33%)	16.67% (40.83%)	16.67% (40.83%)
Parents	11.11% (33.33%)	11.11% (33.33%)	0.00% (0.00%)	0.00% (0.00%)
Relevance				
Self	22.22% (44.10%)	22.22% (44.10%)	16.67% (40.83%)	16.67% (40.83%)
Parents	11.11% (33.33%)	11.11% (33.33%)	0.00% (0.00%)	0.00% (0.00%)

Accuracy. Children's responses to the question, "What language do you speak?" did not change from pretest to posttest, regardless of condition. Thus, a Mann-Whitney test comparing the difference scores of experimental and control groups' accuracy in naming their own language revealed no difference between groups (intervention group difference score: M=0.00%, SD=0.00%; control group difference score: M=0.00%, SD=0.00%; Mann-Whitney U=27.00,

Z=0.00, *p*=1.00, *n.s.*). Children in the intervention group and control group did not differ in the accuracy of their responses at pretest (Mann-Whitney *U*=25.50, *Z*=-0.30, *p*=.77, *n.s.*) or posttest (Mann-Whitney *U*=25.50, *Z*=-0.30, *p*=.77, *n.s.*).

Similarly, children's responses regarding their parents' language also did not change from pretest to posttest, regardless of condition. A Mann-Whitney test comparing the difference scores of experimental and control groups' accuracy in naming their own language revealed no difference between groups (intervention group difference score: *M*=0.00%, *SD*=0.00%; control group difference score: *M*=0.00%, *SD*=0.00%; Mann-Whitney *U*=27.00, *Z*=0.00, *p*=1.00, *n.s.*). Children in the intervention group and control group did not differ in the accuracy of their responses at pretest (Mann-Whitney *U*=24.00, *Z*=-0.816, *p*=.41, *n.s.*) or posttest (Mann-Whitney *U*=24.00, *Z*=-0.816, *p*=.41, *n.s.*).

Relevance. The relevance of children's responses also did not change from pretest to posttest, regardless of condition. A Mann-Whitney test comparing the difference scores of intervention and control groups' response relevance in regards to their own language revealed no difference between groups (intervention group difference score: *M*=0.00%, *SD*=0.00%; control group difference score: *M*=0.00%, *SD*=0.00%; Mann-Whitney *U*=27.00, *Z*=0.00, *p*=1.00, *n.s.*). Children in the intervention group and control group did not differ in the relevance of their responses at pretest (Mann-Whitney *U*=25.50, *Z*=-0.255, *p*=.80, *n.s.*) or posttest (Mann-Whitney *U*=25.50, *Z*=-0.255, *p*=.80, *n.s.*).

Similarly, the relevance of children's responses regarding their parents' language also did not change from pretest to posttest, regardless of condition. A Mann-Whitney test comparing the difference scores of intervention and control groups' response relevance in regards to their parents' language revealed no difference between groups (intervention group difference score:

M=0.00%, *SD*=0.00%; control group difference score: *M*=0.00%, *SD*=0.00%; Mann-Whitney *U*=27.00, *Z*=0.00, *p*=1.00, *n.s.*). Children in the intervention group and control group did not differ in the relevance of their responses at pretest (Mann-Whitney *U*=24.00, *Z*=-0.816, *p*=.41, *n.s.*) or posttest (Mann-Whitney *U*=24.00, *Z*=-0.816, *p*=.41, *n.s.*).

Awareness of Classroom Language Environment. Children's awareness of their classmates' language backgrounds was measured with the three questions: "Does anyone in your class speak English?", "Does everyone in your class speak English?", and "Does anyone in your class speak a language other than English?". A composite class language environment awareness accuracy score was created by summing across the three questions. The three questions were also followed-up with "How can you tell?", which was scored for relevance. Difference scores between the pretest composite scores and posttest composite scores (posttest composite scores-pretest composite scores) were used in analyses. Table 10 provides descriptive statistics of the pretest and posttest accuracy and relevance scores.

Table 10

Descriptive statistics of intervention and control groups' performance on classroom language environment awareness questions at pretest and posttest.

	Intervention Group (n=9)		Control Group (n=6)	
	Pretest M(SD)	Posttest M(SD)	Pretest M(SD)	Posttest M(SD)
Accuracy	22.22% (28.87%)	22.22% (28.87%)	61.11% (49.07%)	61.11% (49.07%)
Relevance	22.22% (23.57%)	22.22% (23.57%)	5.56% (13.61%)	5.56% (13.61%)

Accuracy. As with the language labeling questions, children's awareness of their classroom language environment also did not change from pretest to posttest, regardless of

condition. There were no significant differences between intervention and control groups in classroom language environment awareness (intervention group difference score: *M*=0.00%, *SD*=0.00%; control group difference score: *M*=0.00%, *SD*=0.00%; Mann-Whitney *U*=27.00, *Z*=0.00, *p*=1.00, *n.s.*). Children in the intervention group and control group did not differ in their classroom language environment awareness at pretest (Mann-Whitney *U*=14.00, *Z*=-1.630, *p*=.10, *n.s.*) or posttest (Mann-Whitney *U*=14.00, *Z*=-1.630, *p*=.10, *n.s.*).

Relevance. Changes in children's ability to talk about their classroom language environment from pretest to posttest was also examined, and no significant differences between intervention and control groups were found (intervention group difference score: *M*=0.00%, *SD*=0.00%; control group difference score: *M*=0.00%, *SD*=0.00%; Mann-Whitney *U*=27.00, *Z*=0.00, *p*=1.00, *n.s.*). Children in the intervention group and control group did not differ in the relevance of their responses at pretest (Mann-Whitney *U*=16.00, *Z*=-1.497, *p*=.13, *n.s.*) or posttest (Mann-Whitney *U*=16.00, *Z*=-1.497, *p*=.13, *n.s.*). Overall, these results regarding accuracy and relevance are consistent with findings from Experiment 1, in which awareness of classroom language environment did not vary by exposure to linguistic diversity.

Communicative Consequences. Children's comprehension of different language speakers, as well as their understanding of the communicative consequences of speaking different languages was assessed at pretest and posttest. Table 11 provides descriptive statistics of the pretest and posttest comprehension of different speakers accuracy scores and Table 12 provides descriptive statistics of the pretest and posttest understanding of communicative consequences accuracy and relevance scores.

Table 11

Descriptive statistics of intervention and control groups' performance on communicative consequences tasks at pretest and posttest: Comprehension of different speakers.

	Intervention Group (n=9)		Control Group (n=6)	
	Pretest M(SD)	Posttest M(SD)	Pretest M(SD)	Posttest M(SD)
Accuracy				
Familiar language	94.44% (16.67%)	83.33% (25.00%)	50.00% (31.62%)	91.67% (20.41%)
Unfamiliar language	50.00% (39.53%)	55.56% (44.68%)	95.83% (10.21%)	87.50% (20.92%)

Table 12

Descriptive statistics of intervention and control groups' performance on communicative consequences tasks at pretest and posttest: Understanding of communicative consequences.

	Intervention Group (n=9)		Control Group (n=6)	
	Pretest M(SD)	Posttest M(SD)	Pretest M(SD)	Posttest M(SD)
Accuracy				
Familiar language	55.56% (46.40%)	72.22% (44.10%)	66.67% (40.83%)	58.33% (49.16%)
Unfamiliar language	47.22% (50.69%)	50.00% (50.00%)	41.67% (46.55%)	29.17% (40.05%)
Relevance				
Familiar language	22.22% (44.10%)	22.22% (36.32%)	0.00% (0.00%)	25.00% (41.83%)
Unfamiliar language	22.22% (44.10%)	25.00% (43.30%)	0.00% (0.00%)	16.67% (40.83%)

Comprehension of Different Language Speakers: Accuracy. Children's comprehension of different language speakers was assessed with the question, "What was she talking about?" after viewing videos of speakers talking in English, Spanish, or French. A Mann-Whitney test comparing the difference scores of intervention and control groups' comprehension accuracy

revealed a significant difference between groups when asked about familiar language speakers (Mann-Whitney U=8.50, Z=-2.331, p=.026) but not when asked about unfamiliar language speakers (Mann-Whitney U=22.00, Z=-0.703, p=.61, *n.s.*). The difference between groups when asked about familiar language speakers was driven by an improvement in accuracy from pretest to posttest among children in the control group (difference score: M=41.67%, SD=37.64%) and not children in the intervention group (difference score: M=-0.11%, SD=33.33%). Indeed, children in the intervention group—when compared to children in the control group—were significantly more accurate when asked about familiar language speakers at pretest (Mann-Whitney U=7.00, Z=-2.722, p=.006), but the intervention and control groups did not differ at posttest (Mann-Whitney U=22.50, Z=-0.691, p=.49, *n.s.*). Thus, corroborating findings from Experiment 1, exposure to a different language speaker did not affect comprehension accuracy (in the intervention group). However, the control group's comprehension accuracy of familiar language speakers improved from pretest to posttest.

Understanding of Communicative Consequences: Accuracy. To measure children's understanding of the communicative consequences of speaking different languages, children were explicitly told about a speaker's language background (e.g., "She only speaks French and doesn't speak English") and then asked, "If you talk to her, will she know what you said?". The difference scores of intervention and control groups' understanding of communicative consequences revealed no difference between groups when asked about familiar language speakers (Mann-Whitney U=17.50, Z=-1.601, p=.11, *n.s.*) or when asked about unfamiliar language speakers (Mann-Whitney U=20.50, Z=-0.985, p=.33, *n.s.*). Exposure to a speaker of a different language thus did not affect children's understanding of communicative consequences of speaking different languages. These findings are in line with those from Experiment 1, in

which exposure to linguistic diversity did not affect children's understanding of communicative consequences.

Understanding of Communicative Consequences: Relevance. A follow-up question, "How can you tell?", allowed children to elaborate on their understanding of the communicative consequences of speaking different languages. Children's responses did not change from pretest to posttest. Tables 13 shows the different types of responses children in each group provided at posttest and the percentages for each type. Regardless of whether children were asked about familiar or unfamiliar language speakers, the most common types of responses from all children were "I don't know" (17-80% of all responses) and answering with a random word or phrase (e.g., "cat"; 0-42% of all responses)—both of which were considered irrelevant responses. Of relevant responses, the most common types of responses were using speech-related words (e.g., "I hear her talking"; 0-25% of all responses), naming a language (e.g., "Because she speaks English"; 0-17%% of all responses), and stating understanding the speaker (e.g., "Because I know what she said"; 0-17% of all responses). These results demonstrate that children may largely have difficulty explaining why they can or cannot communicate with speakers of familiar and unfamiliar languages, but when they can provide a relevant explanation, they tend to provide explanations that—though not necessarily accurate—involve using speech-related words, naming languages, or stating understanding the speaker.

Table 13

Understanding of communicative consequences at posttest: Types of responses when asked about familiar and unfamiliar language speakers.

	Irrelevant Responses			Relevant Responses		
	I don't know	Answer with a random word/phrase	Because	Name a language	State understanding the speaker	Use speech-related words
Familiar Language						
Intervention	17%	42%	8%	17%	17%	0%
Control	80%	0%	0%	0%	0%	20%
Unfamiliar Language						
Intervention	32%	32%	16%	20%	0%	0%
Control	75%	0%	0%	0%	0%	25%

Changes in the relevance of children's responses regarding communicative consequences from pretest to posttest was further examined via a Mann-Whitney test, which revealed no significant differences between intervention and control groups when asked about familiar language speakers (Mann-Whitney U=18.50, Z=-1.287, p=.20, *n.s.*) or when asked about unfamiliar language speakers (Mann-Whitney U=25.00, Z=-0.398, p=.69, *n.s.*). Thus, exposure to a different language speaker did not affect children's ability to provide relevant explanations regarding the communicative consequences of talking to speakers of different languages.

Labeling Conventions. Children's understanding of labeling conventions was assessed in terms of accuracy and relevance at pretest and posttest. Table 14 provides descriptive statistics of the pretest and posttest accuracy and relevance scores.

Table 14

Descriptive statistics of intervention and control groups' performance on labeling conventions tasks at pretest and posttest.

	Intervention Group (n=9)		Control Group (n=6)	
	Pretest M(SD)	Posttest M(SD)	Pretest M(SD)	Posttest M(SD)
Accuracy				
Familiar language	100.00% (0.00%)	100.00% (0.00%)	83.33% (40.83%)	83.33% (25.82%)
Unfamiliar language	61.11% (46.96%)	58.33% (45.07%)	16.67% (30.28%)	8.33% (12.91%)
Relevance				
Familiar language	16.67% (35.36%)	38.89% (48.59%)	0.00% (0.00%)	0.00% (0.00%)
Unfamiliar language	22.22% (44.10%)	19.44% (39.09%)	0.00% (0.00%)	0.00% (0.00%)

Accuracy. Children's understanding of labeling conventions was assessed with the question, "Do you think she calls that a [English label] or something else?" after viewing videos of speakers labeling objects in English, Spanish, or French. The difference scores of intervention and control groups' understanding of labeling conventions revealed no difference between groups when asked about familiar language speakers (Mann-Whitney U=27.00, Z=0.00, p=1.00, *n.s.*) or when asked about unfamiliar language speakers (Mann-Whitney U=23.50, Z=-0.450, p=.65, *n.s.*). Like the findings from Experiment 1, exposure to a different language speaker thus did not affect children's understanding of labeling conventions.

Relevance. A follow-up question, "How can you tell?", allowed children to elaborate on their understanding of labeling conventions. Children's responses did not change from pretest to posttest. Tables 15 shows the different types of responses children in each group provided at posttest and the percentages for each type. Regardless of whether children were asked about familiar or unfamiliar language speakers, the majority of responses from all children were

irrelevant ones: saying "I don't know" (7-80% of all responses) or "Because" (6-23% of all responses), and answering with a random word or phrase (e.g., "cat"; 0-30% of all responses). Of relevant responses, the most common types of responses were ones that stated the English label for the object (e.g., "tree"; 17-21% of all responses), stated not understanding the speaker (e.g., "Because I don't know what she said"; 0-13% of all responses), and stated that the speaker called the object by the English label for familiar language trials (e.g., "Because she said tree" ; 0-14% of all responses) or a different label for unfamiliar language trials (e.g., "Because she said something else"; 0-10% of all responses). These results demonstrate that children have difficulty explaining why speakers of familiar and unfamiliar languages may or may not call an object by the English label, but when they can provide an explanation, they tend to provide relevant—though not necessarily accurate—explanations that involve stating the English label, stating not understanding the speaker, or stating what the speaker labeled the object.

Table 15

Understanding of labeling conventions at posttest: Types of responses when asked about familiar and unfamiliar language speakers.

	Irrelevant Responses			Relevant Responses		
	I don't know	Answer with a random word/phrase	Because	State English label	State *not* understanding the speaker	State that the speaker called the object by that label
Familiar Language						
Intervention	0%	29%	29%	21%	7%	14%
Control	80%	0%	0%	20%	0%	0%
Unfamiliar Language						
Intervention	7%	30%	23%	17%	13%	10%
Control	78%	0%	6%	17%	0%	0%

Changes in the relevance of children's responses regarding labeling conventions from pretest to posttest was further examined via a Mann-Whitney test, which revealed no significant differences between intervention and control groups when asked about familiar language speakers (Mann-Whitney U=18.00, Z=-1.519, p=.13, *n.s.*) or when asked about unfamiliar language speakers (Mann-Whitney U=24.00, Z=-0.816, p=.41, *n.s.*). Thus, in line with findings from Experiment 1, exposure to a different language speaker did not affect children's ability to provide relevant explanations regarding the labeling conventions.

Discussion

Experiment 2 aimed to examine whether exposure to another language is a direct mechanism by which children develop the conventional aspects of language awareness. Specifically, language labeling and ability to talk about communicative consequences—the aspects of language awareness that were found in Experiment 1 to vary by exposure to linguistic diversity—were of particular interest in Experiment 2 and were expected to change with exposure to another language via the foreign language exposure intervention. All other aspects of language awareness were not expected to be affected by the foreign language exposure intervention.

As expected, awareness of classroom language environment, understanding of communicative consequences, and understanding of labeling conventions did not change with exposure to another language. The foreign language exposure intervention did not change these aspects of children's language awareness, and children in the intervention and control groups did not differ from pretest to posttest in these aspects of children's language awareness. These findings are in line with those from Experiment 1, in which these three aspects of language awareness did not differ by community linguistic diversity nor multilingualism.

Two conventional aspects of language awareness—language labeling and ability to talk about communicative consequences—were expected to change with exposure to another language. Specifically, exposure to linguistic diversity via the foreign language exposure intervention was expected to improve language labeling ability and change children's ability to talk about communicative consequences.

Language Labeling. Exposure to another language did not affect children's language labeling abilities. Specifically, exposure to another language did not affect children's ability to name languages (e.g., "English") *or* talk about language (e.g., "I talk like this"). Like in Experiment 1, the majority of monolingual children in Experiment 2 also could not name English as the language that they and their parents speak. However, the fact that children's ability to talk about language did not differ from pretest to posttest for the intervention group was surprising. Findings from Experiment 1 suggested that exposure to linguistic diversity affects children's ability to talk about language when it pertains to their own language. Additionally, monolingual children with regular exposure to another language have been found to be more able to correctly name the language they spoke than monolingual children with no exposure to another language (Akhtar et al., 2012). Combined with previous findings, the present findings may suggest that more exposure—either exposure for a longer duration or exposure to more than one speaker of another language—may be necessary to improve children's ability to name and talk about language.

Talking about Communicative Consequences. Contrary to what was hypothesized, exposure to another language did not affect children's ability to talk about communicative consequences. Experiment 1 revealed that linguistically homogenous monolinguals—compared to linguistically diverse monolinguals—provided more relevant explanations regarding the

communicative consequences of talking to a speaker of a different language. These findings from Experiment 1 suggested that exposure to linguistic homogeneity may affect how children talk about communicative consequences. However, the present findings provide no evidence of exposure to another language—or lack thereof—to affect children's ability to talk about communicative consequences. One possibility is that more exposure—either exposure for a longer duration or exposure to more than one speaker of another language—may be necessary to affect children's ability to talk about communicative consequences. Another possibility is that being exposed to another language via a book reading is not enough, and that to affect children's ability to talk about communicative consequences, children need an active opportunity to experience communicating—or trying to communicate—with a speaker of another language.

Overall the present findings suggest that short exposure to another language—and to only one speaker of another language—may not affect children's development of the conventional aspects of language awareness. More specifically, even the aspects of language awareness that were found in Experiment 1 to be affected by exposure to linguistic diversity were not found to be affected by the relatively brief foreign language exposure intervention. Although brief exposure to another language and another language speaker did not affect children's development of the conventional aspects of language awareness, it is likely that other aspects of exposure to linguistic diversity—such as longer, more active exposure to another language and opportunities to communicate with speakers of another language—may affect children's development of the conventional aspects of language awareness.

General Discussion

The goals of the present dissertation were to understand whether and how exposure to foreign languages as well as multilingualism affect children's language awareness development. In particular, the present experiments examined the effects of two different kinds of foreign language experience on the development of the conventional aspects of language awareness: (1) community linguistic diversity and (2) brief exposure to one foreign language.

Experiment 1 examined the effects of community linguistic diversity and multilingualism on the development of the conventional aspects of language awareness. Findings from Experiment 1 suggest that community linguistic diversity and multilingualism may affect only some aspects of language awareness—specifically language labeling abilities and ability to talk about communicative consequences. In contrast, other aspects of language awareness—such as understanding of communicative consequences and labeling conventions—were affected by the familiarity with the language being spoken, rather than early language environment. However, neither community linguistic diversity nor multilingualism affected children's awareness of classroom language environments.

Experiment 2 examined whether brief exposure to one foreign language affects language awareness development—specifically, the conventional aspects of language awareness found to differ by exposure to community linguistic diversity in Experiment 1. Brief exposure to a foreign language did not affect any conventional aspect of language awareness development, and critically, did not affect language labeling abilities or ability to talk about communicative consequences.

Altogether, the results of this dissertation suggest that community linguistic diversity and multilingualism indeed shape some conventional aspects of language awareness development.

Though the present findings regarding exposure to community linguistic diversity and multilingualism corroborate previous research, the present findings also put into question what aspect of foreign language exposure may be underlying language awareness development. That is, although brief exposure to a foreign language does not appear to affect the conventional aspects of language awareness development, it is unclear what other aspects of foreign language exposure and early language environments may be relevant for young children's development of the conventional aspects of language awareness.

Future Directions

The present findings point to the need for at least two lines of research inquiry that examine different aspects of foreign language exposure and early language environments. First, future research should examine how different types and duration of foreign language exposure affect language awareness development, and second, further research is necessary to understand how familiarity with a language affects language awareness development.

Types and Duration of Foreign Language Exposure. The present dissertation examined two different types of foreign language exposure: (1) community linguistic diversity—that is, incidental exposure to many languages over many instances in everyday life—and (2) brief exposure to one foreign language, spoken by one speaker, for four days. These two types of foreign language exposure were found to have different effects. Namely, findings from Experiment 2 suggest that brief exposure to another language does not affect children's development of the conventional aspects of language awareness, even in aspects of language awareness development that were found to vary by community linguistic diversity in Experiment 1 (i.e., language labeling, talking about communicative consequences). Moreover, previous research has also found some aspects of language awareness development (i.e., language

labeling) in monolingual children to vary by regular (weekly) exposure another language (Akhtar et al., 2012).

Combined with previous research, the findings of this dissertation suggest that further research is needed to understand what types and duration of foreign language exposure are needed to affect the development of the conventional aspects of language awareness. In particular, linguistically diverse communities may provide children with an array of linguistic opportunities, including opportunities to not only hear other languages and meet speakers of different languages (Howard et al., 2014) but also experience and/or observe more variation in communicative events with speakers of different languages who vary in fluency in their languages. For example, linguistically diverse communities may provide opportunities for children to experience or observe communicating with nonnative speakers of their native language, and in some of these communicative events, it may even be unclear whether communication with the nonnative interlocutor has been successful. Given that community linguistic diversity affords many different linguistic experiences and opportunities for children, future research should examine what aspects of linguistic diversity are relevant for children's development of the conventional aspects of language awareness. Specifically, future research should examine the following types and duration of foreign language exposure that may be afforded by community linguistic diversity: (1) exposure to one versus multiple speakers of another language, (2) duration of foreign language exposure per instance of exposure, (3) number of instances of foreign language exposure, (4) mere exposure versus active communication with speaker(s) of another language, and (5) quality of exposure to speaker(s) of another language.

Effects of Language Familiarity on Language Awareness Development. Similar to the need to further examine different types and duration of foreign language exposure, future research should also examine the effects of language familiarity versus unfamiliarity on children's development of the conventional aspects of language awareness. Experiment 1 found that language familiarity affected all children's understanding of communicative consequences and labeling conventions, such that children demonstrated better understandings of communicative consequences and labeling conventions when they were asked about familiar language speakers than unfamiliar language speakers. It is not surprising that children exhibited better language awareness for familiar language speakers, given that previous research suggests that (1) four- and five-year-old monolinguals are able to evaluate their interlocutor's language understanding and modify their own language use accordingly (e.g., Clark, 1978, Shatz & Gelman, 1973) and (2) two-, three-, and four-year-old children are adept at learning words of their native language from speakers of that native language (e.g., Akhtar et a., 2012; Byers-Heinlein et al., 2014).

What is striking, however, is the effect that language *un*familiarity has on monolinguals' and multilinguals' language awareness development, particularly for understanding of labeling conventions. Monolingual and multilingual children's development of labeling convention understanding has been found to differ. Monolingual two-year-olds have been found to not understand that unfamiliar language (Mandarin) speakers do not have knowledge of words in the children's familiar language (English; Byers-Heinlein et al., 2014). Given that the three- and four-year-old monolinguals in Experiment 1 also did not demonstrate an understanding of labeling conventions for unfamiliar languages, it is possible that a broader, cross-linguistic understanding of labeling conventions develops later than the preschool years. Moreover,

although three- and four-year-old multilinguals in Experiment 1 also did not demonstrate an understanding of labeling conventions for unfamiliar languages, previous research has found two-year-old bilinguals to understand that unfamiliar language (Mandarin) speakers do not know familiar language (English) labels (Byers-Heinlein et al., 2014) and three- and four-year-olds with regular exposure to another language to be better able to learn foreign words from a foreign speaker than monolinguals or bilinguals (Akhtar et al., 2012). Together, these findings suggest that development of labeling conventions may not only vary by language familiarity but also by language experience. Future research should thus examine older children's understanding of labeling conventions for familiar and unfamiliar languages, as well as examine how exposure to community linguistic diversity and multilingualism affect developmental trajectories of labeling convention understanding.

Conclusion

Findings from the present dissertation fit with the literature on the role of early language environments on children's development of the conventional aspects of language awareness. Notably, the present findings demonstrate that community linguistic diversity and multilingualism shape different conventional aspects of children's language awareness development. Additionally, children's familiarity with the language being spoken also affects conventional aspects of children's language awareness, suggesting that children's experiences with particular languages play a role in their language awareness as well. Language awareness development may thus be one of the many components of language and cognitive development that is shaped by different early language environments.

Appendix A: Example Trials of the Communicative Consequences Task

Example first three trials:

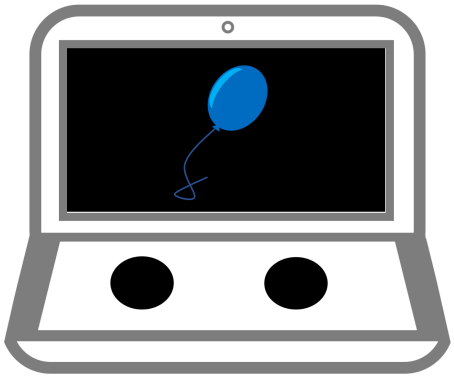
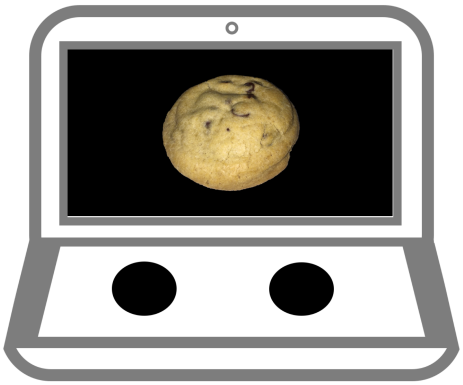
Trial	Video	Post-video questions
Trial 1	Il y a beaucoup de livres à la bibliothèque. Certains livres ont des images, et certains ont seulement des mots! La bibliothèque est un bon endroit pour trouver des livres. 	Experimenter: What was she talking about? [Child responds] Experimenter: Well, she only speaks French and doesn't speak English. If you talk to her, will she know what you said? [Child responds] Experimenter: How can you tell? [Child responds]
Trial 2	Butterflies can be different colors. Some butterflies are red; some are yellow; some are blue; and some are lots of colors! Butterflies are colorful. 	Experimenter: What was she talking about? [Child responds] Experimenter: Well, she only speaks French and doesn't speak English. If you talk to her, will she know what you said? [Child responds] Experimenter: How can you tell? [Child responds]
Trial 3	Comer bocadillos con amigos es delicioso. ¡Los bocadillos pueden ser crujiente, suave, dulce o salado! Siempre es divertido para comer bocadillos. 	Experimenter: What was she talking about? [Child responds] Experimenter: Well, she only speaks French and doesn't speak English. If you talk to her, will she know what you said? [Child responds] Experimenter: How can you tell? [Child responds]

During Trials 4-6, each speaker was presented once more speaking their respective language; however, each speaker talked about a topic that had not yet been presented.

Appendix B: Communicative Consequences Task Scripts

English	Spanish	French
Butterflies can be different colors. Some butterflies are red; some are yellow; some are blue; and some are lots of colors! Butterflies are colorful.	Las mariposas pueden ser de colores diferentes. ¡Algunas mariposas son de color rojo; algunos son de color amarillo; algunos son azules; y algunos son un montón de colores! Las mariposas son coloridos.	Les papillons peuvent être de différentes couleurs. Certains papillons sont rouges; certains sont jaunes; certains sont bleus; et certains sont de nombreuses couleurs! Les papillons sont colorés.
There are many books at the library. Some books have pictures, and some only have words! The library is a good place to find books.	Hay muchos libros en la biblioteca. ¡Algunos libros tienen fotos, y algunos sólo tienen palabras! La biblioteca es un buen lugar para encontrar libros.	Il y a beaucoup de livres à la bibliothèque. Certains livres ont des images, et certains ont seulement des mots! La bibliothèque est un bon endroit pour trouver des livres.
It's fun to go to the park. The park has swings and slides and things to climb! There's always something to do at the park.	Es divertido ir al parque. ¡El parque tienen columpios y toboganes y cosas para subir! Siempre hay algo que hacer en el parque.	Il est amusant d'aller au parc. Au parc, il y a des balançoires, des toboggans, et des choses à grimper! Il y a toujours quelque chose à faire dans le parc.
Eating snacks with friends is yummy. Snacks can be crunchy, squishy, sweet, or salty! It's always fun to eat snacks.	Comer bocadillos con amigos es delicioso. ¡Los bocadillos pueden ser crujiente, suave, dulce o salado! Siempre es divertido para comer bocadillos.	Manger des collations avec des amis est délicieux. Les collations peuvent être croquantes, douces, ou salées! Il est toujours amusant manger des collations.
Trains do a lot of things. Some trains go fast, some go slow, some carry people, and some carry animals! Trains are helpful.	Los trenes hacen un montón de cosas. ¡Algunos trenes pasan rápido, algunos van lento, algunos llevan las personas, y algunos llevan los animales! Los trenes son útiles.	Les trains font beaucoup de choses. Certains trains vont vite, certains vont lente, certains transportent des gens, et certains transportent des animaux! Les trains sont utiles.
The zoo has many different animals. There are monkeys, bears, snakes, and so many other animals! The zoo is a fun place to visit.	El zoológico tienen muchos animales diferentes. ¡Hay monos, osos, serpientes, y tantos otros animales! El zoológico es un lugar divertido para visitar.	Au zoo, il y a beaucoup d'animaux différents. Il y a des singes, des ours, des serpents, et tant d'autres animaux! Le zoo est un endroit agréable à visiter.

Appendix C: Training Trials of the Labeling Conventions Task

Trial	Stimulus	Questions
Trial 1		Experimenter: What do you call this? [Child responds] Experimenter provides affirmative feedback: That's right! You call this a cup. *or* Experimenter provides corrective feedback: Hmm, are you sure? I think it's called a cup. Experimenter: Do you call this a cup or something else?
Trial 2		Experimenter: What do you call this? [Child responds] Experimenter provides affirmative feedback: That's right! You call this a balloon. *or* Experimenter provides corrective feedback: Hmm, are you sure? I think it's called a balloon. Experimenter: Do you call this a balloon or something else?
Trial 3		Experimenter: What do you call this? [Child responds] Experimenter provides affirmative feedback: That's right! You call this a cookie. *or* Experimenter provides corrective feedback: Hmm, are you sure? I think it's called a cookie. Experimenter: Do you call this a shoe or something else?

Appendix D: Example Test Trials of the Labeling Conventions Task

Example first three trials:

Trial	Video	Post-video questions
Trial 1	¡Este juego que vamos a jugar sera muy divertido! La cuchara. [5 second pause] La cuchara. [5 second pause] La cuchara. 	Experimenter: What do you call this? [Child responds] Experimenter: Well, does she call this a spoon or something else? [Child responds] Experimenter: How can you tell? [Child responds]
Trial 2	Ce jeu nous jouons sera amusant! Le poisson. [5 second pause] Le poisson. [5 second pause] Le poisson. 	Experimenter: What do you call this? [Child responds] Experimenter: Well, does she call this a fish or something else? [Child responds] Experimenter: How can you tell? [Child responds]
Trial 3	We're going to have so much fun playing this game! Sock. [5 second pause] Sock. [5 second pause] Sock. 	Experimenter: What do you call this? [Child responds] Experimenter: Well, does she call this a sock or something else? [Child responds] Experimenter: How can you tell? [Child responds]

During Trials 4-6, each speaker was presented once more speaking their respective language; however, each speaker presented a new object that had not yet been presented.

Appendix E: Parent Questionnaire

I. Please fill out the following information about **your child**. You may leave out any information you do not wish to share. If you need more space for your responses, please write them in the blank space at the end of the survey.

1. Child's date of birth: _____ _____, _____ (Month / Date / Year) 2. Sex: ☐ M ☐ F

3. Is your child Hispanic or Latino? Mark one:
   - □ Yes, my child is Hispanic or Latino.
   - □ No, my child is *not* Hispanic or Latino.

4. Please select the racial category or categories that best describe your child. Mark all that apply:
   - □ American Indian or Alaska Native
   - □ Asian
   - □ Black or African American
   - □ Native Hawaiian or Other Pacific Islander
   - □ White

5. What countries has your child lived in for **three months or more** during his/her life up to now?

Country	Duration (number of months or years)	Age range (in months and years)
A)		
B)		

6. What language(s) has ever been spoken **in your home** since your child's birth? _____

7. Does **your child** currently live in a neighborhood where different languages are spoken (ex. you have neighbor(s) who speak Spanish)? Circle one: **Yes / No**

8. Is it common for **you** to hear languages other than English being spoken in public places near your home (ex. in your neighborhood, at the park, at the grocery store, at the pharmacy)? Circle one: **Yes / No**

9. Do you consider your child to be bilingual/multilingual? Circle one: **Yes / No**

10. *In a typical week*, **how many hours** does your child watch/listen to media (ex. TV, YouTube) in languages other than English? _____ hour(s)
    - What programs does your child watch/listen to most frequently? _____

11. What language(s) does **your child speak**?

Language	Does your child speak this language at home?	Age when your child first started speaking this language	Percentage of day your child used this language *in the past month*
A) English	Yes / No		
B)	Yes / No		
C)	Yes / No		

*This column should add to 100%

12. *If your child speaks more than one language*, s/he may frequently **mix words** from their languages in the same sentence (e.g., "I ate a *manzana* [apple]"). *In the past month*, how true was this for your child?

Circle one:	Often true	Sometimes true	Seldom true	Never true
	3	2	1	0

II. Please fill out the following information about **your child's family**. Again, you may leave out any information you do not wish to share.

13. What ZIP Code does your family live in? _____

14. What is your family's street address? _____

15. **Your** relationship to the child (ex. mother, father, nanny): _____

16. What language(s) do **you** speak?

Language	Do you speak this language at home?	Do you speak this language to your child?	Percent of day you used this language *in the past month*
A)	Yes / No	Yes / No	
B)	Yes / No	Yes / No	
C)	Yes / No	Yes / No	

*This column should add to 100%

17. **Caregiver A**'s relationship to the child (ex. mother, father, nanny): _____

18. What language(s) does your child's **Caregiver A** speak?

Language	Does Caregiver A speak this language at home?	Does Caregiver A speak this language to your child?	Percent of day Caregiver A used this language *in the past month*
A)	Yes / No	Yes / No	
B)	Yes / No	Yes / No	
C)	Yes / No	Yes / No	

*This column should add to 100%

19. **Caregiver B**'s relationship to the child (ex. mother, father, nanny): _____

20. What language(s) does your child's **Caregiver B** speak?

Language	Does Caregiver B speak this language at home?	Does Caregiver B speak this language to your child?	Percent of day Caregiver B used this language *in the past month*
A)	Yes / No	Yes / No	
B)	Yes / No	Yes / No	
C)	Yes / No	Yes / No	

*This column should add to 100%

21. Are there other adults who live in your family's home? **Circle one: Yes / No**
    - If YES, what languages do these each of these adults speak?

22. Have you ever talked to your child about how people speak different languages (ex. "Some people speak English and other people speak Spanish")? **Circle one: Yes / No**
    - If YES, please provide an example of *how* you have talked about this with your child:

23. What is the **highest** level of education completed by the following individuals?

You (Mark one)	**Caregiver A** (Mark one)	**Caregiver B** (Mark one)
☐ Some Elementary School	☐ Some Elementary School	☐ Some Elementary School
☐ Elementary School	☐ Elementary School	☐ Elementary School
☐ Some Middle School	☐ Some Middle School	☐ Some Middle School
☐ Middle School	☐ Middle School	☐ Middle School
☐ Some High School	☐ Some High School	☐ Some High School
☐ High School Diploma / GED	☐ High School Diploma / GED	☐ High School Diploma / GED
☐ Professional Certificate(s) / Technical Degree(s)	☐ Professional Certificate(s) / Technical Degree(s)	☐ Professional Certificate(s) / Technical Degree(s)
☐ Some College	☐ Some College	☐ Some College
☐ Associate's Degree(s)	☐ Associate's Degree(s)	☐ Associate's Degree(s)
☐ Bachelor's Degree(s)	☐ Bachelor's Degree(s)	☐ Bachelor's Degree(s)
☐ Master's or Doctoral Degree(s)	☐ Master's or Doctoral Degree(s)	☐ Master's or Doctoral Degree(s)

24. What is your annual net household income? Mark one:

- ☐ Less than $15,000
- ☐ $15,000-$45,000
- ☐ $45,001-$75,000
- ☐ $75,001-$105,000
- ☐ $105,001-$135,000
- ☐ $135,001-$165,000
- ☐ More than $165,000

25. How many people, including yourself, live in your household? Mark one:

- ☐ 2
- ☐ 3
- ☐ 4
- ☐ 5
- ☐ 6
- ☐ 7
- ☐ 8
- ☐ Other: how many? _____

---------- End of Survey ----------

Please use the following blank space and back of this page to continue any responses that required more space.

Appendix F: Preschool Interview

Preschool name: _____

Number of children enrolled at preschool: _____

Percent of children who speak a language other than English at home: _____%

Percent of children who speak a language other than English at preschool: _____%

Are there any children at the preschool who do *not* speak English? YES / NO

Number of teachers/classroom aids at preschool: _____

Percent of teachers/classroom aids who speak a language other than English: _____%

Appendix G: Picture Books used in Experiment 2

Intervention Day	**Intervention Condition: Japanese**	**Control Condition: English**
Day 1	Mori, H. (Trans.). (1989). *Harapeko aomushi*. Tokyo: Kaisei-sha Co. Ltd. (Original work written by E. Carle and published 1969 as *The very hungry caterpillar*)	Carle, E. (1987). *The very hungry caterpillar*. New York, NY: Philomel Books. (Original work published 1969)
Day 2	Tanikawa, S. (Trans.) (1995). *Niji-iro no sakana.* Tokyo: Kodansha Ltd. (Original work written by M. Pfister and published 1992 as *Der Regenbogenfisch*)	James, A. J. (Trans.) (1992). *The rainbow fish*. New York, NY: NorthSouth Books Inc. (Original work written by M. Pfister and published 1992 as *Der Regenbogenfisch*)
Day 3	Jingu, T. (Trans.) (2016). *Kaijyuutachi no iru tokoro.* Tokyo: Fuzambo Publishing Co. (Original work written by M. Sendak and published 1963 as *Where the wild things are*)	Sendak, M. (2013). *Where the wild things are.* New York, NY: HarperCollins Publishers. (Original work published 1963)
Day 4	Matsuoka, K. (Trans.) (1975). *Kuma no kōruten-kun.* Tokyo: Kaisei-sha Co. Ltd. (Original work written by D. Freeman and published 1968 as *Corduroy*)	Freeman, D. (1968). *Corduroy.* New York, NY: Viking Press.

References

Akhtar, N., Menjivar, J., Hoicka, E., & Sabbagh, M. A. (2012). Learning foreign labels from a foreign speaker: The role of (limited) exposure to a second language. *Journal of Child Language, 39*, 1135-1149. doi:10.1017/S0305000911000481

Atagi, N., Goldenberg, E. R., Sandhofer, C. M. (2016). Children's use of linguistic information when learning in a bilingual context. *Journal of Experimental Child Psychology, 144*, 199-208. doi:10.1016/j.jecp.2015.11.005

Ayneto, A., & Sebastián-Gallés, N. (2016). The influence of bilingualism on the preference for the mouth region of dynamic faces. *Developmental Science,* 1-11. doi:10.1111/desc.12446

Bailey, A. L., & Osipova, A. V. (2016). *Children's Multilingual Development and Education: Fostering Linguistic Resources in Home and School Contexts*. Cambridge University Press.

Bialystok, E. (2008). Bilingualism: The good, the bad, and the indifferent. *Bilingualism: Language and Cognition*, *12*(1), 3-11. doi:10.1017/S1366728908003477

Bowey, J. A. (1986). Syntactic awareness in relation to reading skill and ongoing reading comprehension monitoring. *Journal of Experimental Child Psychology*, *41*(2), 282-299. doi:10.1016/0022-0965(86)90041-X

Brito, N., & Barr, R. (2012). Influence of bilingualism on memory generalization during infancy. *Developmental Science*, *15*(6), 812–6. doi:10.1111/j.1467-7687.2012.1184.x

Brito, N., & Barr, R. (2014). Flexible memory retrieval in bilingual 6-month-old infants. *Developmental Psychobiology*, *56*(5), 1156-1163. doi:10.1002/dev.21188

Brito, N. H., Grenell, A., & Barr, R. (2014). Specificity of the bilingual advantage for memory: examining cued recall, generalization, and working memory in monolingual, bilingual, and trilingual toddlers. *Frontiers in Psychology*, *5*, 1369. doi:10.3389/fpsyg.2014.01369

Byers-Heinlein, K., Chen, K. H., & Xu, F. (2014). Surmounting the Tower of Babel: Monolingual and bilingual 2-year-olds' understanding of the nature of foreign language words. *Journal of Experimental Child Psychology, 119*, 87-100. doi:10.1016/j.jecp.2013.09.011

Byers-Heinlein, K., & Fennell, C. T. (2013). Perceptual narrowing in the context of increased variation: Insights from bilingual infants. *Developmental Psychobiology,* 1-18. doi:10.1002/dev.21167

Cartmill, E. A., Armstrong, B. F., Gleitman, L. R., Goldin-Meadow, S., Medina, T. N., & Trueswell, J. C. (2013). Quality of early parent input predicts child vocabulary 3 years later. *Proceedings of the National Academy of Sciences, 110*(28), 11278-11283. doi:10.1073/pnas.1309518110

Clark, E. V. (1978). Awareness of language: Some evidence from what children say and do. In A. Sinclair, R. J. Jarvella, & W. J. Levelt (Eds.), *The child's conception of language* (pp. 17-43). Berlin: Springer.

Comeau, L., Genessee, F., & Mendelson, M. (2007). Bilingual children's repairs of breakdowns in communication. *Journal of Child Language, 34*(1), 159-174. doi:10.1017/S0305000906007690

Dąbrowska, E., & Street, J. (2006). Individual differences in language attainment: Comprehension of passive sentences by native and non-native English speakers. *Language Sciences*, *28*(6), 604-615. doi:10.1016/j.langsci.2005.11.014

de Houwer, A. (2009). *Bilingual first language acquisition*. Bristol, UK: Multilingual Matters.

Diesendruck, G. (2005). The principles of conventionality and contrast in word learning: An empirical examination. *Developmental Psychology, 41*, 451–63. doi:10.1037/0012-1649.41.3.451

Edelsky, C. (1977). Acquisition of an aspect of communicative competence: Learning what it means to talk like a lady. In S. Ervin-Tripp & C. Mitchell-Kernan (Eds.), *Child discourse*. New York, NY: Academic Press.

Fan, S. P., Liberman, Z., Keysar, B., & Kinzler, K. D. (2015). The exposure advantage: Early exposure to a multilingual environment promotes effective communication. *Psychological Science*, *26*(7), 1090-1097. doi:10.1177/0956797615574699

Fenson, L., Dale, P. S., Reznick, J. S., Bates, E., Thal, D. J., Pethick, S. J., Tomasello, M., Mervis, C. B., & Stiles, J. (1994). Variability in early communicative development. *Monographs of the Society for Research in Child Development*, *59*(5), i-185. doi:10.2307/1166093.

Galambos, S. J., & Goldin-Meadow, S. (1990). The effects of learning two languages on levels of metalinguistic awareness. *Cognition*, *34*(1), 1-56. doi:10.1016/0010-0277(90)90030-N

Genessee, F., Boivin, I., & Nicoladis, E. (1996). Talking with strangers: A study of bilingual children's communicative competence. *Applied Psycholinguistics, 17*(4), 427-442. doi:10.1017/S0142716400008183

Gleason, J. B. (1977). Talking to children: Some notes on feedback. In C. E. Snow & C. A. Ferguson (Eds.), *Talking to children: Language input and acquisition*. Cambridge: Cambridge University Press.

Goodman, J. C., Dale, P. S., & Li, P. (2008). Does frequency count? Parental input and the acquisition of vocabulary. *Journal of Child Language, 35*(3), 515-531. doi:10.1017/S0305000907008641

Gordon, K. R., & McGregor, K. K. (2014). A spatially supported forced-choice recognition test reveals children's long-term memory for newly learned word forms. *Frontiers in Psychology, 5*, 1-12. doi:10.3389/fpsyg.2014.00164

Hoff, E. (2003). The specificity of environmental influence: Socioeconomic status affects early vocabulary development via maternal speech. *Child Development*, *74*(5), 1368-1378. doi:0009-3920/2003/7405-0009

Howard, L. H., Carrazza, C., & Woodward, A. L. (2014). Neighborhood linguistic diversity predicts infants' social learning. *Cognition*, *133*(2), 474-479. doi:10.1016/j.cognition.2014.08.002

Huttenlocher, J., Haight, W., Bryk, A., Seltzer, M., & Lyons, T. (1991). Early vocabulary growth: Relation to language input and gender. *Developmental Psychology, 27*(2), 236-248. doi:10.1037/0012-1649.27.2.236

Kovács, A. M., & Mehler, J. (2009a). Cognitive gains in 7-month-old bilingual infants. *Proceedings of the National Academy of Sciences of the United States of America*, *106*(16), 6556–60. doi:10.1073/pnas.0811323106

Kovács, A. M., & Mehler, J. (2009b). Flexible learning of multiple speech structures in bilingual infants. *Science*, *325*(5940), 611–2. doi:10.1126/science.1173947

Kuhl, P. K., Tsao, F. M., & Liu, H. M. (2003). Foreign-language experience in infancy: Effects of short-term exposure and social interaction on phonetic learning. *Proceedings of the National Academy of Sciences*, *100*(15), 9096-9101. doi:10.1073 pnas.1532872100

Levelt, W. J., Sinclair, A., & Jarvella, R. J. (1978). Causes and functions of linguistic awareness in language acquisition: some introductory remarks. In A. Sinclair, R. J. Jarvella, & W. J. Levelt (Eds.), *The child's conception of language* (pp. 1-14). Berlin: Springer.

Moerk, E. L. (1980). Relationships between parental input frequencies and children's language acquisition: A reanalysis of Brown's data. *Journal of Child Language, 7*(1), 105-118. doi:10.1017/S0305000900007054

Montanari, S. (2009). Pragmatic differentiation in early trilingual development. *Journal of Child Language, 36*(3), 597-627. doi:10.1017/S0305000908009112

Nicoladis, E. (1998). First clues to the existence of two input languages: Pragmatic and lexical differentiation in a bilingual child. *Bilingualism: Language and Cognition, 1*(2), 105-116. doi:10.1017/S1366728998000236

Petitto, L.A., Katerelos, M., Levy, B.G., Gauna, K., Tétreault, K. & Ferraro, V. (2001). Bilingual signed and spoken language acquisition from birth: Implications for the mechanisms underlying early bilingual language acquisition. *Journal of Child Language, 28*(2), 453-496. doi:10.1017/S0305000901004718

Pons, F., Bosch, L., & Lewkowicz, D. J. (2015). Bilingualism modulates infants' selective attention to the mouth of a talking face. *Psychological Science, 26*(4), 490-498. doi:10.1177/0956797614568320.

Sachs, J., & Devin, J. (1976). Young children's use of age-appropriate speech styles in social interaction and role-playing. *Journal of Child Language*, *3*(01), 81-98. doi:10.1017/S030500090000132X

Schmale, R., Cristia, A., & Seidl, A. (2012). Toddlers recognize words in an unfamiliar accent after brief exposure. *Developmental Science*, *15*(6), 732-738. doi:10.1111/j.1467-7687.2012.01175.x

Sebastián-Gallés, N., Albareda-Castellot, B., Weikum, W. M., & Werker, J. F. (2012). A bilingual advantage in visual language discrimination in infancy. *Psychological Science*, *23*(9), 994–9. doi:10.1177/0956797612436817

Shatz, M., & Gelman, R. (1973). The development of communication skills: Modifications in the speech of young children as a function of listener. *Monographs of the Society for Research in Child Development, 38*(5), 1-38.

Singh, L., Fu, C. S., Rahman, A. A., Hameed, W. B., Sanmugam, S., Agarwal, P., ... & Rifkin-Graboi, A. (2015). Back to basics: A bilingual advantage in infant visual habituation. *Child Development, 86*(1), 294-302. doi:10.1111/cdev.12271

Slobin, D.I. (1978). A case study of early language awareness. In A. Sinclair, R.J. Jarvella & W.J.M. Levelt (Eds.), *The child's conception of language* (pp. 45–54). New York, NY: Springer-Verlag.

Smith, C. L., & Tager-Flusberg, H. (1982). Metalinguistic awareness and language development. *Journal of Experimental Child Psychology*, *34*(3), 449-468. doi:10.1016/0022-0965(82)90071-6

Tsang, T., Atagi, N., & Johnson, S. P. (under review). Selective attention to the mouth is associated with expressive language skills in monolingual and bilingual infants.

U.S. Census Bureau (2015). *2011-2015 American Community Survey 5-Year Estimates.* Retrieved from

https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_15_5YR_B06007&prodType=table

Weikum, W. M., Vouloumanos, A., Navarra, J., Soto-Faraco, S., Sebastián-Gallés, N., & Werker, J. F. (2007). Visual language discrimination in infancy. *Science*, *316*(5828), 1159-1159. doi:10.1126/science.1137686

Wood, C., & Terrell, C. (1998). Preschool phonological awareness and subsequent literacy development. *Educational Psychology, 18*(3), 253-274. doi:10.1080/0144341980180301