THE ROLE OF EXPERIENCE IN CHILDREN'S LANGUAGE DEVELOPMENT: A CULTURAL PERSPECTIVE

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THE ROLE OF EXPERIENCE IN CHILDREN'S LANGUAGE DEVELOPMENT: A CULTURAL PERSPECTIVE

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Table of Contents

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Editorial: The role of experience in children's language development: A cultural perspective

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Editorial on the Research Topic
The role of experience in children's language development: A cultural perspective

This Research Topic charted a challenging course to re-envision conventional methods and assumptions in language development, a course even more current in this time of global challenge to WEIRD ways (*W*estern, *e*ducated, *i*ndustrialized, *r*ich, and *d*emocratic) and rapprochement to diverse funds of knowledge. The Research Topic begins with the assumption that attending to the diversity of social and cultural contexts in which children learn language(s) allows us to understand better how context helps shape learners' attentional and behavioral patterns.

The articles included in this Research Topic have more than risen to this occasion. A critical goal for this Research Topic was to incorporate perspectives gleaned from underrepresented voices to increase our understanding of language acquisition and enhance future endeavors to ameliorate the effects of poverty, systemic racism, and global unrest from a position that is culturally informed by the strengths that all groups bring to the table. The articles examine understudied populations as defined by cultural and socioeconomic differences (Huang and Kan; Luo et al.; Moreno et al.; Rumper et al.; Southwood et al.; Sperry and Sperry; Ward); mobility and its effects (Huang and Kan; Ward); language survival (Ward); and geographic dispersion (Moreno et al.; Sperry and Sperry; Ward). They address issues of cultural isolation (Moreno et al.; Sperry and Sperry; Ward) and cultural contact (Southwood et al.; Huang and Kan; Ward). They also

help us appreciate the experiences of bilingual/bicultural individuals, either in their dealings in a new culture and land (Huang and Kan) or as long-term residents of established bilingual/bicultural communities (Luo et al.; Rumper et al.). Moreover, the researchers themselves represent diverse perspectives and positionalities. These articles and their authors challenge us to consider how very young language learners might use the panoply of social information gleaned from their heterogeneous families and communities as they sort out the mysteries of semantic, syntactic, and pragmatic features of their language.

Our second desire for this Research Topic was that it reflect the manifold approaches to the study of language acquisition. This desire was met with articles that employ traditional, Bayesian linguistic modeling (Tripp et al.); mixed methods using parental- and teacher-report questionnaires or well-established prompts to complement qualitative analyses (Huang and Kan; Luo et al.; Ward); community viewpoints in the style of participatory research (Rumper et al.); microanalysis of ethnographic investigations (Sperry and Sperry; Ward) and of moment-by-moment parent-infant social interactions (Sun et al.); quantitative analysis in service of intervention design (Moreno et al.; Rumper et al.); correlational research re-interpreting standardized assessment tools (Southwood et al.); and theoretical explorations of what language assessment and evaluation within a culturally sensitive framework should accomplish in order to oppose the current and future heads of the linguistic deprivation hydra that challenges our efforts to understand children in their richness and complexity (Sperry and Sperry; Wang et al.). These articles testify to the strengths of our methodological resources and creativity; nevertheless, several also challenge us to do better as they recognize the limitations of any one approach. The authors of these articles eloquently describe how the give and take of methodological practice can, on the one hand, interrogate unusual or controversial findings within a quantitative work through a more nuanced look at individual, cultural interpretations and belief practices (Huang and Kan); and can, on the other hand, provide the tools necessary to address the child's total linguistic competence in ways that detailed qualitative accounts may miss (Moreno et al.; Ward).

Despite the richness of these contributions, our task is not complete. We are struck by how few of these articles address language achievement past the early childhood years. One reason, we suspect, stems from the divides found in various siloed communities. As children grow, the focus shifts from understanding early language *acquisition* to explaining later differences in language *achievement*. However, language achievement is as multifarious as the speakers, communities, and languages involved. Although all parties in the conversation from scholars to policymakers to speakers themselves seek, in spirit, the best outcomes for children, the approaches taken by some parties often assume a one-size-fits-all, acultural solution that does not adequately address the diverse nature of on-the-ground reality.

For example, in recent years, much attention has been paid to early interventions to increase the amount of vocabulary heard in the homes of children living in poverty; this research has been driven by the goal of improving language achievement in the school years and assumes that later language achievement may be predicated upon a standardized approach to language acquisition. Yet, both the means of language acquisition and the outcomes of language achievement are embedded within rich cultural practices. Often, what language achievement means within the mainstream schooling context poorly translates to what it looks like in the broader contexts of families, communities, and even the marketplace. Once we focus on achievement from any single vantage point, we run the risk of measuring outcomes too narrowly and even of creating the possibility of gaming the system through artificial methods designed to remediate the identified "problem."

This failure to determine what counts as achievement has generated one of the central tragedies in language studies over the past several generations, namely, the perpetuation of the myth of language deprivation within marginalized communities. Several of the articles in this Research Topic index the consequences of deficit thinking, whether it stems from political alliances, socioeconomic forces, or languages in contact. Wang et al. and Sperry and Sperry both suggest ways forward beyond this impasse, capitalizing on language strengths of all learners and acknowledging that language is as much a sociocultural practice situated within the various contexts of a child's life as it is an individual, cognitive, and social-emotional process set apart from meaning-making.

The focus on language strengths brings us back full circle to the reason we began this journey, namely, to query what children, families, and communities can tell us about language acquisition as it occurs on the ground, in their homes, and on an everyday basis. To the extent that any theory or intervention does not begin with this information, we suggest that it will remain ineffective and even harmful. We are reminded of Freire who insisted that theory makers, educators, and policymakers alike cannot operate in a vacuum. Our efforts must begin with the people we serve, remembering that the goal is not to "fix" people whose lives and practices are different from our own, but rather to understand our respective cultural contexts and ask how we can all move forward together.

Author contributions

DS wrote the initial draft of the Editorial and is responsible for its final form. PS, EC, LS,

and HS contributed suggestions and revisions to the manuscript.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Sociocultural Factors Affecting Vocabulary Development in Young South African Children

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Sociocultural influences on the development of child language skills have been widely studied, but the majority of the research findings were generated in Northern contexts. The current crosslinguistic, multisite study is the first of its kind in South Africa, considering the influence of a range of individual and sociocultural factors on expressive vocabulary size of young children. Caregivers of toddlers aged 16 to 32 months acquiring Afrikaans (n = 110), isiXhosa (n = 115), South African English (n = 105), or Xitsonga (n = 98) as home language completed a family background questionnaire and the MacArthur-Bates Communicative Development Inventory (CDI) about their children. Based on a revised version of Bronfenbrenner's (1977) ecological systems theory, information was obtained from the family background questionnaire on individual factors (the child's age and sex), microsystem-related factors (the number of other children and number of adults in the child's household, maternal level of education, and SES), and exosystem-related factors (home language and geographic area, namely rural or urban). All sociocultural and individual factors combined explained 25% of the variance in expressive vocabulary size. Partial correlations between these sociocultural factors and the toddlers' expressive vocabulary scores on 10 semantic domains yielded important insights into the impact of geographic area on the nature and size of children's expressive vocabulary. Unlike in previous studies, maternal level of education and SES did not play a significant role in predicting children's expressive vocabulary scores. These results indicate that there exists an interplay of sociocultural and individual influences on vocabulary development that requires a more complex ecological model of language development to understand the interaction between various sociocultural factors in diverse contexts.

Keywords: expressive vocabulary, CDI, sociocultural factors, South Africa, Afrikaans, isiXhosa, South African English, Xitsonga

INTRODUCTION

Although there is a large and growing body of literature about sociocultural influences on child language development in many parts of the world, there is a dearth of knowledge on how different sociocultural factors interact and influence child language acquisition in African contexts. There are also no traceable studies comparing language acquisition of very young children across several linguistic and sociocultural contexts in southern Africa. Crosslinguistic studies on children's vocabulary size typically focus on English-speaking children (mostly those growing up in the United States) and child speakers of one other language (Bornstein and Cote, 2005). In this study, we examine the influence of sociocultural factors on vocabulary development in toddlers aged 16 to 32 months across four different languages spoken in South Africa: isiXhosa[1] and Xitsonga (Nguni and Thonga Bantu[2] languages, respectively), and Afrikaans and South African English (SAE) (West-Germanic languages).

IsiXhosa is a Southern Bantu language grouped as S41 in Guthrie's (1967/1971) classification. It is a Nguni language with a rich system of agglutinating morphology. Nouns belong to specific noun classes, indicated by a specific noun class prefix on the noun (Demuth et al., 2010), and by an agreement affix on the verb, the form of this affix being determined by the specific noun class prefix on the subject (Demuth et al., 2010). The verb complex is made up of a semantically meaningful stem, in combination with affixes that indicate grammatical characteristics and relationships such as subject and object agreement, tense-aspect, mood and negation, as well as various affixes such as the applicative and causative, which serve to introduce further arguments (see, e.g., Du Plessis and Visser, 1992; Zeller, 2008). Xitsonga is grouped as S53 in Guthrie's (1967/1971) classification and is a cross-border language belonging to the Bantu-branch of the Niger-Congo languages. Concordial agreement between the preverbal subject and the verb is obligatory in most Bantu languages, but there is variation with respect to agreement with the object (Zerbian, 2007); in Xitsonga, such agreement with the object is not obligatory. As stated by Zerbian (2007), Xitsonga displays the structural properties common to Bantu languages, including a system of agglutinating morphology, and a rich noun class system overtly marked with noun class prefixes.

Afrikaans is a West Germanic language closely related to 16th century Dutch and is indigenous to South Africa. It is extremely impoverished on a morphological level in that there are no noun classes, noun prefixes or overtly marked subject-verb or object-verb agreement. Afrikaans does, however, mark plurals and past tense overtly by means of bound morphemes. Afrikaans shows word order variation due to, amongst others, scrambling and left dislocation (Biberauer, 2003). Along with Afrikaans, SAE is also a West Germanic language. Compared to isiXhosa and Xitsonga, SAE is highly impoverished on a morphological level, but not to the extent that Afrikaans is. For example, SAE displays subject-verb agreement, which Afrikaans does not.

These four languages were selected as they are typologically different, and the speaker base of each language is generally regarded as culturally different from the others. We make use of locally developed versions of the MacArthur-Bates Communicative Development Inventory (CDI)[3], a comprehensive parental questionnaire which asks caregivers to indicate the words a child understands and produces across a wide variety of semantic domains (Fenson et al., 1993). We draw on an analytical framework that conceptualizes the impact of sociocultural factors on vocabulary development from an ecological systems theory perspective (see Bronfenbrenner, 1977), in which the individual's development is understood in terms of interactions between different microsystems that can in turn be impacted by larger exo- or macrosystems. The individual has direct contact with the microsystem, such as their home environment. Components in the home microsystem, for example, household socioeconomic status, education of caregivers, and number of children and adults in the household shape everyday socialization practices. Interaction between the microsystems, such as home and school, make up the mesosystem that is in turn linked to and shaped by the larger exosystem. The exosystem relates to the individual without their involvement as an active participant, for instance the location/geographic area of the extended family and neighborhood, and larger economic and social influences. Everyday practices and activities making up different cultural environments both shape and are shaped by these different ecological systems that contribute in different ways to the individual's developmental processes and outcomes (see Markus and Kitayama, 2009; Vélez-Agosto et al., 2017 on reinterpreting culture in Bronfenbrenner's 1977 ecological systems approach).

Known Influences on Vocabulary Development

Previous research points to several individual and environmental factors that influence a child's general development. Similarly, vocabulary development can also be influenced by individual and environmental factors, including cultural aspects of the child's environment (Tardif et al., 2008). Amongst the individual factors are age and sex: Vocabulary size increases with age (e.g., Maital et al., 2000 for Hebrew; Kern, 2007 for French; Bleses et al., 2008 for Danish; O'Toole and Fletcher, 2010 for Irish; Simonsen et al., 2014 for Norwegian). As regards sex, females fairly consistently demonstrate larger vocabularies than age-matched males (e.g., Fenson et al., 1994 for English). Stolarova et al. (2016) did not find differences between the vocabulary size of German-speaking males and females 2 years of age,

[1]In this paper, we use the full, prefixed names of indigenous languages of South Africa. Where the prefixed form appears as group name, it is to be read as referring to the speakers of that language - e.g., *isiXhosa group* refers to the isiXhosa-speaking group.

[2]We acknowledge that the term 'Bantu' was misused during apartheid to refer to black South Africans. However, we use the scientific term 'Bantu' in this paper, albeit circumspectly, to refer to a large and significant language family on the African continent, with 11 languages of this language family being indigenous to South Africa.

[3]The team received full Level I authorization from the MacArthur-Bates Board CDI Advisory Board for the development of CDI adaptations for all South Africa's official languages.

but sex did influence vocabulary composition. For Spanish-speaking children of Mexican descent living in the United States, Jackson-Maldonado et al. (1993) found no sex differences for productive vocabulary. Yet Bornstein and Cote (2005) found uniform sex differences in expressive vocabulary size between 20-month-old speakers of three languages (Spanish, Italian, and American English) across three countries (Argentina, Italy, and the United States) and two geographic settings (urban vs. rural). Demonstrating an interplay between biological and environmental factors, Stolarova et al. (2016) found that 2-year-old females who did not attend a daycare regularly (i.e., who were cared for at home) had a slightly larger vocabulary than their male counterparts and also than boys and girls who did attend daycare regularly.

Other environmental factors that have been shown to influence language development in young children include socioeconomic status (SES) and maternal level of education, the latter at times used as a proxy for the former. Children from more affluent backgrounds have been found to demonstrate better language skills than those from poorer backgrounds (Hoff-Ginsberg, 1998; Reilly et al., 2010; Fernald et al., 2013). Studies have found more affluent children to have larger vocabularies (e.g., Hart and Risley, 1995), and to build their vocabularies at a faster rate (Hoff, 2003). SES does not, however, directly affect language outcomes[4], such as vocabulary size; instead its effect is seen on children's physical and psychological environments. These environments in turn affect children's home learning environment (Attig and Weinert, 2020) and the language input they receive (see below), influencing the opportunities they have for vocabulary learning. SES can thus indirectly affect the child's language experience – for instance, children who attend daycare centers with low teacher–child ratios (such as those found in more affluent areas) have been found to show more rapid development of grammatical skills (Burchinal et al., 2000). Also, adults and children in higher SES homes more frequently engage in joint book reading than those in lower SES homes (Coley, 2002; Attig and Weinert, 2020), and joint book reading has been shown to accelerate language development in a range of settings, both well-resourced and more poorly resourced (Whitehurst et al., 1988; Brown et al., 2018; Knauer et al., 2020), as has storytelling (Nicolopoulou et al., 2015).

The commonly used proxy for SES, maternal level of education, has been found to influence the language input children receive. Children of mothers with higher levels of education have been shown to demonstrate better language skills than their peers whose mothers have lower levels of education (Tomblin et al., 1991; Reilly et al., 2010; also see Hoff, 2003). In terms of productive vocabulary, several studies have shown that a higher level of maternal education correlates with a higher level of expressive vocabulary at different ages. McNally et al. (2019) found, using the British Ability Scales Naming Vocabulary Test with a nationally representative sample of children from the Republic of Ireland, that children of 36 months whose mothers had completed the minimum level of education had a mean vocabulary score almost 6 points lower than that of children whose mothers had a degree-level qualification. Although there is less work on the impact of maternal education on children's expressive vocabulary in African settings, Vogt et al. (2015) reported comparable findings in a Mozambiquan sample using MacArthur-Bates CDIs: Children whose mothers had secondary education or higher produced significantly more words than children whose mothers only had primary education. Maternal level of education accounted for 2.6% of the variance in expressive vocabulary in the Vogt et al. study. However, maternal education did not account for differences in receptive vocabulary. Hoff-Ginsberg (1991) found differences in the language input that college-educated mothers and mothers who only completed high school provided to their children. The college-educated mothers used significantly more words, more different word types, and longer sentences than high school-educated mothers[5]. Hoff-Ginsberg (1991) also found that mothers who have a higher education level expanded their children's utterances more during conversation with their children, make use of more partial self-repetitions and expansions, and ask more questions. Such linguistic behavior has been shown to benefit child language development (Hoff-Ginsberg, 1986), although there is a need for more research on caregiver–child interactions outside of WEIRD settings (where WEIRD refers to Western, Educated, Industrialized, Rich and Democratic; see Henrich et al., 2010). Findings in non-WEIRD contexts include those of Cristià et al. (2017), namely that in a community of forager−horticulturalists in Bolivia, children under 4 years of age are spoken to for less than 1 min per daylight hour. Similarly, Geiger and Alant (2005) found that in a village in Botswana, where they studied child-rearing practices and communicative interactions, there was little verbal interaction between mothers and children under the age of 5 years, and especially infants under the age of 1 year. The reason mothers provided for not conversing with the child during care activities (such as washing, dressing and feeding) was that the child could not yet speak. In fact, conversing with such young children was regarded as unusual and even unacceptable (also see Simonsen, 1990 for Western Samoa). Furthermore, most of the verbal interaction between caregivers in the village in Botswana and young children was instructional (often consisting of short behavior-directing commands from the adult's side) with little verbal response required (or encouraged) from the child.

Taking note of the type of language a child hears in his/her microsystems is important because it could affect the child's language skills. For instance, Huttenlocher et al. (2002) found that children who hear more complex language structures understand and produce more complex structures than those children who are exposed to simpler structures. Weisleder and Fernald (2013) found that the quantity of language infants hear correlates with vocabulary size at 24 months. The frequency with which words are heard also affects their acquisition order.

[4]As stated by Hoff (2003), SES accounted for 5% of the variation in vocabulary size between mid SES and high SES children, but when the effect of maternal speech was removed, SES accounted for only 1% of the variation.

[5]Hearing more, and more complex, language leads to more advanced vocabulary and grammar in children (Huttenlocher et al., 2002). For instance, children who attend daycares with high levels of caregiver speech have been found to demonstrate better language development than their peers from daycares with high levels of peer speech (McCartney, 1984).

For instance, Goodman et al. (2008) found that, within lexical categories, higher frequency of occurrence in parental, child-directed speech is related to earlier age of acquisition, when considering production data. One might predict that the quantity of language a child hears is directly related to the number of adults in the child's environment who provide the child with language input, i.e., that more adults means more speakers and thus more language input (see Soderstrom et al., 2018). However, the context in which the adult–child interaction takes place can influence the quantity of language input the child receives. For instance, a sibling in the home may cause a single adult to direct less language to the child (see Oshima-Takane and Robbins, 2003), and, as stated by Soderstrom et al. (2018), an additional adult in the home could result in the child receiving less instead of more language input, as the adults may talk more to each other than to the child. Also, more people present could mean more talk not directed at the child, and more people talking simultaneously, thereby negatively affecting the amount of language that the child can process (Soderstrom et al., 2018). In contrast, Sperry et al.'s (2018) study of five American communities with different ethnic and SES backgrounds found a 17 to 58% increase in the number of words addressed to a child if one considers the input provided by all caregivers and not only by the primary caregiver, across the SES range studied. This suggests that having more, rather than fewer, interlocutors to provide language input may be beneficial for the child's language development, in line with Weisleder and Fernald (2013).

Geographic location is a factor pertaining to the exosystem, outside of the individual's microsystems. Where a child grows up geographically has been shown to influence the words to which the child is exposed and the number of words the child knows. Regarding types of words, the climate and terrain in the child's environment might influence the terms a child knows for, *inter alia*, weather conditions, food and clothing variations, and types of fauna and flora. In terms of numbers of words varying across geographic locations, Bornstein and Cote (2005) found that Spanish-speaking urban children in Argentina and American English-speaking urban children in the United States have larger expressive vocabularies than their peers in rural areas. Bornstein and Cote (2005) discuss several ways in which rural life differs from urban life, and some of these differences might affect language learning. For instance, mothers in urban areas in Bali expect their children to acquire verbal assertiveness at a younger age than rural mothers do (Williams et al., 2000), which could influence socialization and other parenting practices, in turn influencing language exposure.

Remaining with geographic location as an exosystem-related factor shown to influence child language, Hamilton et al. (2000) found that British infants aged 1;0 to 2;1 have lower scores on both vocabulary comprehension and production than American infants of the same age assessed with a similar instrument (that of Fenson et al., 1994). Similarly, Bornstein and Cote (2005) found that Italian-speaking children in rural Italy had larger vocabularies than Spanish-speaking children in rural Argentina. After dismissing several possible reasons for their finding, Hamilton et al. (2000) speculate that the American infants' higher vocabulary scores could be due to subtle cultural differences between the United Kingdom and the United States, such as differences between the two populations in terms of the number of children who attend daycare. In this regard, the duration of 2-year-olds' daycare experience has been shown to correlate positively with their vocabulary size (Stolarova et al., 2016). Hamilton et al. (2000) also speculate that there could be differences between the British and American parents in terms of the frequency with which they use the words on the assessment instruments during child-directed speech, and that would influence the rate at which the children learn these words, as discussed above.

Sociocultural Factors in South Africa

South Africa is a plurilingual country, with 11 official languages, each with subvarieties, as well as several other languages spoken across the country's surface area of 1.22 million km^2, with each language having more than one area of speaker concentration. Different regions of the country are associated not only with different language combinations but also with different sociocultural environments, even among speakers of the same language.

Microsystem-related factors in South African contexts that warrant special mention include SES and maternal level of education. There is a comparatively low level of education in South Africa: 6% of adults aged 25 to 64 years have had no schooling, 14% have at least some primary school education but no high school, and 68% went to high school but did not necessarily complete all high school grades (Statistics South Africa, 2017). Also, there is vast inequality in family income distribution in South Africa,[6] and about half of South African adults live below the upper-bound poverty line (see Statistics South Africa, 2019). Many South African children are thus raised in low SES households, putting them at potential risk for poor language development. Further, South African children grow up in a variety of household structures, including nuclear family households (a couple with their own children only; 19% of the country's households); single-parent households (a single parent with his/her own children only (11%), and extended households (36%) (Statistics South Africa, 2018). This translates to 25% of South African children living in nuclear households, whereas 62% live in extended households (see Hall and Mokomane, 2018). Most children co-reside with at least one of their biological parents, although large rural-urban differences exist: For instance, 21% of rural and 45% of urban children reside with both their parents whereas 30% of rural and 15% of urban children reside with neither of their parents. Where both parents are absent, the caregiving responsibilities are typically taken up by the grandparent(s) (68%), an aunt or another relative (19%), or siblings (7%) (see Hall and Mokomane, 2018). Whereas the number of adults could increase the quantity of language produced in the home, there is evidence that only child-directed speech (and not speech the child may overhear between adults) correlates with vocabulary size (see

[6]South Africa has a Gini coefficient of 0.625 and the second largest degree of inequality in distribution of family income in the world (The World Bank Group, 2021).

Weisleder and Fernald, 2013). Regarding the number of other children in the household, according to Havron et al. (2019), siblings may either compete for parents' attention, thereby reducing the quantity of child-directed input any one child receives, or may, at least in part, make up for the lost input by themselves serving as a source of language input. In this regard, in the Bolivian community that they studied, Cristià et al. (2017) found that adults provide the majority of language input that children up to the age of 3 years receive, after which the proportion of input received from other children increases.

Research Questions

To establish which sociocultural factors impact the expressive vocabulary of young South African children, we ask the following question: Do individual factors (age and sex), microsystem-related sociocultural factors (SES, maternal level of education, and number of other children and adults in the household), and exosystem-related sociocultural factors (home language spoken and geographic location, i.e., rural vs. urban) affect the size and composition of the expressive vocabulary of South African toddlers who speak Afrikaans, isiXhosa, SAE, or Xitsonga? We divide this question into three parts:

> RQ1: What are the effects of the above-mentioned sociocultural factors on total vocabulary size at the individual, microsystem and exosystem level?
> We hypothesize that being older, being female, and having a larger number of adults and children in the household, a mother with a higher level of education, and higher SES correlate with a larger expressive vocabulary.
> RQ2: When all these sociocultural factors are considered together, how much of the variance in total vocabulary size can be accounted for?
> We hypothesize that age, sex, number of adults and children in the household, maternal education, SES, and geographic location will all account for variance in total vocabulary size. Age is expected to contribute the most, and number of children the least.
> RQ3: Do these sociocultural factors correlate with the vocabulary size in different semantic domains deemed to be common across the four languages concerned?
> We hypothesize that geographic location will be correlated with most semantic domains as these domains might be susceptible to characteristics of an area, e.g., the type of animals encountered, or the types of foods eaten.

MATERIALS AND METHODS

Research Design

This study has a quantitative design and is cross-sectional, crosslinguistic and descriptive in nature. Data for this paper were collected as part of a multilingual, multidisciplinary, inter-institutional research project on the gesture and language development of young South African children in all South Africa's official languages (see Brookes et al., forthcoming; Dowling and Whitelaw, 2018). To obtain information on children's language development for this paper, adapted MacArthur-Bates CDIs and a family background questionnaire for four of South Africa's official languages were completed by the caregivers of Afrikaans-, isiXhosa-, SAE-, or Xitsonga-speaking toddlers of 16 to 32 months.

Participants

Caregivers of 428 children aged 16 to 32 months were recruited via (i) local childcare institutions and local and national not-for-profit organizations offering services directed at families with young children, (ii) existing personal and professional networks of the researchers, and (iii) social media. Caregivers were either one of the child's birth or adoptive parents, grandparents, other family members, or another guardian who parented the child alongside or instead of the biological parent. Inclusion criteria were that (i) the caregiver had to be a South African national (ii) raising a child of 16 to 32 months (iii) in their mother tongue (iv) in South Africa. The exclusion criteria were more than 4 h per day of exposure to another language/other languages in the child's home, and caregiver concern about the child's hearing or communication development. We excluded children who received more than 4 h a day of exposure to other languages to control for the often reported – and contested (see, e.g., Pearson et al., 1993; Hoff et al., 2012; De Houwer et al., 2014) – difference in expressive vocabulary size between monolingual and multilingual children when considering the vocabulary size in each of the multilingual child's languages separately. We also wanted to avoid adding the variable of amount of exposure to each language, given that bilingual children have been shown to have higher vocabulary scores for what is reported to be their first than for their second language (O'Toole et al., 2017). Children for whom concerns about hearing and/or communication development were reported were excluded to limit the number of factors which could cause variation in vocabulary size in our sample, given that our focus was on sociocultural (and not health-related) influences.

Our sampling plan stated that half of the targeted 100 participants for each language had to be male, to control for the often-reported influence of sex on child language skills. For Afrikaans, isiXhosa and Xitsonga, half of the participants had to live in rural areas, to control for the reported effect of geographic location on vocabulary size and composition. For these three languages, there were no specific targets as regards SES. For SAE, half of the participants had to be from low SES homes, regardless of geographic location, because SAE is infrequently spoken as home language in rural areas, but does vary according to SES (see Mesthrie, 2002; Bekker, 2012). **Table 1** shows the number of the participants and their demographic information. As can be seen from this table, the target number of participants was exceeded for all languages apart from Xitsonga. The Afrikaans participants had the highest mean age (1.32 months higher than the youngest language group, isiXhosa). Whereas SAE and isiXhosa each had almost the same number of male and female participants, Afrikaans had more females than males and Xitsonga more males than females. However, an ANOVA yielded no statistically significant group differences for Sex [$F(3,424) = 1.104$, $p = 0.347$] nor for Age [$F(3,424) = 1.410$,

TABLE 1 | Participant demographic information by language.

	Afrikaans	isiXhosa	SAE	Xitsonga	Total
Number of participants	110	115	105	98	428
Child age (in months)					
Range	16–32	16–32	16–32	16–32	16–32
Mean	24.33	23.01	23.66	23.44	23.61
SD	4.75	5.02	4.66	5.05	4.88
Child sex					
Female	61	57	53	42	213
Male	49	58	52	56	215
Geographic setting					
Rural	49	61	3	53	166
Urban	61	54	102	45	262

$p = 0.239$]. Afrikaans, Xitsonga, and isiXhosa collectively had 163 rural and 160 urban participants, and all but three SAE participants were situated in urban areas.

Data Collection Instruments

The MacArthur-Bates CDI has been adapted into nearly 100 languages from a range of language families[7]. It has an infant version (on the gestures, play routines, common action, and words that children of 8 to 18 months can understand and use) and a toddler version (on the words and early morphology, word combinations and sentence complexity of children aged 16 to typically 30/36 months). For the purposes of this paper, only the word section of the toddler version was considered. In each case, the caregivers were asked to indicate on a checklist whether the child understood and produced the word. The South African versions of the CDI have not yet been validated. The question that can arise is whether caregivers in South Africa are able to report accurately on their toddlers' language skills – if the caregivers engage in less child-directed speech, do they know their child well enough linguistically to reliably indicate which words their child understands and produces? Although South African data are not yet available, Alcock et al. (2015) found that in rural Kenya, caregivers were able to accurately report their younger children's receptive vocabulary (at an age when there are few productive words to report) and older children's grammatical errors. Based on this study from Kenya, we worked on the premise that South African caregivers are capable of providing reliable information.

The American English toddler version of the CDI (Fenson et al., 1993) was translated by three adult mother-tongue speakers per language. Hereafter, adaptations (entailing the addition or removal of words) were made based on the outcome of (i) a minimum of two focus group discussions and/or sets of interviews[8] with parents of young children and professional child service providers, (ii) consultation with linguists and speech-language therapists who are mother tongue speakers of the language (five for Xitsonga, three for isiXhosa, three for Afrikaans, and two for SAE), and (iii) 30-min samples of naturally occurring speech from six children per language (see Brookes et al., forthcoming). The preliminary versions of the CDIs and family background questionnaires were piloted with 40 caregivers of 16- to 32-month-olds per language (for Afrikaans, Xitsonga, and isiXhosa, 20 rural and 20 urban; for SAE, 20 low- and 20 mid-SES). After this pilot, statistical analyses of the data obtained guided decisions on further exclusion or replacement of lexical items. From the approximately 1200 lexical items piloted, 733 to 773 vocabulary items per language were retained for the CDIs used in the current study. The CDIs of the West Germanic languages had one more semantic domain than the Bantu language CDIs, as pronouns were not included in the Bantu language CDIs[9]. For the current study, the total CDI vocabulary score and a subset of 10 semantic domains (amounting to approximately half of the total number of lexical items on the CDI) were used for analysis. This selection was made to reduce the number of semantic domains to a manageable number, as the scope of this article did not allow consideration of all semantic domains. These 10 domains were selected based on their similarity in terms of number of items across languages and their tangibility, in that they either are all nouns or refer to games and routines, which we expect would make them more susceptible to sociocultural differences (see, e.g., Potgieter and Southwood, 2016 for a South African study which found that 4-year-old low-SES and mid-SES monolingual children differed significantly in terms of their noun-related but not verb-related vocabulary scores). These 10 domains were ANIMALS, CLOTHING, FOOD AND DRINK, FURNITURE, GAMES AND ROUTINES, PEOPLE, PLACES TO GO, SMALL HOUSEHOLD ITEMS, TOYS, and VEHICLES. **Table 2** contains selected information on the number of lexical items per language version of the CDI used for data collection for this paper.

The family background questionnaire was developed after consulting (i) the literature on demographic and other factors influencing language development in young children, (ii) the results of the 2011 South African census (Statistics South Africa, 2012), and (iii) members of communities speaking the language concerned. The questionnaire included questions on child health and development; childcare arrangements; household composition, income and food expenditure; parental level of education and occupation; and language exposure in and outside of the home, as these factors have been shown to affect child language development in other research contexts. Each language version of the questionnaire was piloted along with the CDI for that language, and questions were subsequently omitted, refined and rephrased based on the feedback received from the parents,

[7] https://mb-cdi.stanford.edu/

[8] For instance, for Afrikaans, there were two focus group discussions (one with professionals and the other with parents of young children), each in a different part of the country; and for isiXhosa, there were two focus groups with parents in rural areas, one focus group with early childhood development workers in an urban area, and individual interviews with eight parents of young children in the same urban area.

[9] The two Bantu languages use a system of subject- and object-agreement (which references within the large noun-class system), and so pronouns are not used in the same way as in the two West Germanic languages. While pronouns do occur in both isiXhosa and Xitsonga, they have a different role and are used for, e.g., emphatic statements, and their construction is varied as they also use agreement. Pronouns therefore did not (in early pilot data) form a part of the vocabulary of children in our age range (see also Smouse, 2013 for isiXhosa).

TABLE 2 | Number of lexical items of the CDI, by language and semantic domain.

	Afrikaans	isiXhosa	SAE	Xitsonga
Total number of semantic domains	22	21	22	21
Total number of lexical items	770	748	773	733
Ten selected semantic domains				
Animals	51	51	52	52
Clothing	33	34	33	34
Food and drink	74	73	74	72
Furniture	33	33	33	32
Games and routines	36	36	36	36
People	22	25	28	25
Places to go	18	18	18	18
Small household items	74	72	74	71
Toys	18	18	18	18
Vehicles	12	12	12	12
10 selected domains combined	371	372	378	370

caregivers and fieldworkers about their clarity, ease of reading, and cultural appropriateness.

Data Collection Procedures

An electronic version of the consent form, family background questionnaire and CDI for each language was created on Qualtrics (Qualtrics, Provo, UT, United States), combined into one online form. The majority of the data were collected by fieldworkers who were either students or employees of child development organizations. They were trained online using Zoom or WhatsApp, as South Africa was in full to moderate lockdown due to COVID-19 at the time of data collection, and contact research was therefore not allowed. All data were collected either using the fieldworkers' smartphones or tablets (using a link sent to them via WhatsApp), or – in cases where fieldworkers did not have their own suitable devices – on tablets couriered to them with the correct language version of the form in Qualtrics preloaded onto the tablet. Where assisted by a fieldworker, caregivers completed the questionnaire and CDI on their smartphones, with the fieldworker being available for consultation throughout. Caregivers without smartphones and/or sufficient literacy skills were interviewed telephonically by the fieldworker who entered the caregivers' responses into Qualtrics. Cellphone credit and internet data to do so were supplied electronically to fieldworkers and caregivers. For some of the Afrikaans and SAE submissions, the electronic form was completed independently by the caregiver. In these cases, the caregivers had sufficiently high levels of literacy, and had access to a suitable electronic device and internet connection.

The consent form, questionnaire and CDI collectively took 40 to 60 min to complete, depending on the number of lexical items the child knew and the caregiver's reading ability and computer literacy. Qualtrics allows completion across multiple sessions (and automatically takes one to the first uncompleted page if reopened on the same device), so caregivers were able to stop and resume as needed. Submission had to take place within a week of first opening the form on Qualtrics; opened but unsubmitted forms were submitted automatically by Qualtrics after a week.

Ethical Considerations

Ethical clearance for the study was obtained from the relevant research ethics committees at the University of Cape Town and Stellenbosch University[10]. Information on the study and informed consent forms were available in the mother tongue of the participants on Qualtrics, and if consent for participation was not granted, Qualtrics did not allow the potential participant to proceed to the family background questionnaire and CDI.

The informed consent form, family background questionnaire and CDI were completed voluntarily and anonymously. Participants could withdraw from the study at any stage by exiting Qualtrics prematurely. Qualtrics records all responses and indicates the percentage completion of each form. Submissions not showing a 100% completion were removed during data cleaning, thereby effectively making it possible for participants to withdraw their data from the study.

Participants who completed the form independently donated their time to the research project. Those who completed the form with the assistance of a fieldworker could supply a mobile phone number to the fieldworker (not via Qualtrics) in order to be sent an electronic supermarket voucher as a thank-you gift (to the value of approximately 10 loaves of bread) via WhatsApp or text message. The research team ensured that all COVID-19-related social distancing protocols of their respective institutions were followed to protect both fieldworkers and participants from undue risk.

Analytical Strategy

In order to address RQ1 and RQ2, hierarchical linear regression was conducted in R version 4.0.2 (R Core Team, 2020), using the *lm* function, to determine whether the selected sociocultural variables can predict the participants' Total vocabulary score. Four separate blocks were applied, controlling for the variables entered into the previous blocks. Age was entered as the first control variable whereas the second block contained the other individual factor, Sex. The third block contained the microsystem factors (SES, Maternal education, Number of adults in the household, and Number of other children in the household), which refer to systems with which the child is said to have direct interaction, whereas the fourth block contained the exosystem factors (Geographic area, which referred to rural vs. urban area, and Language).

RQ3 was answered by calculating correlations, first for all languages combined and then for each language separately. This was done to determine whether any relationships exist between the above-mentioned sociocultural factors and the 10 semantic domains.

RESULTS

The mean expressive vocabulary score and descriptive statistics for the sociocultural factors for each language are shown in **Table 3**. Due to the number of items in the semantic

[10] As the Xitsonga data was collected in healthcare clinics in Limpopo Province, we also obtained permission from the Limpopo Department of Health.

TABLE 3 | Descriptive statistics.

Language	Sociocultural factors	*N*	Range	Mean	SD
Afrikaans	Total vocabulary (%)	110	0–98.05	45.91	30.06
	Children in household	110	0–6	0.95	1.21
	Adults in household	110	1–7	2.84	1.22
	Maternal education	109	2–6	4.92	1.01
	SES composite score	110	1.92–9.09	6.27	1.82
SAE	Total vocabulary (%)	105	0–97.80	45.97	29.10
	Children in household	105	0–8	0.70	1.10
	Adults in household	105	1–8	2.74	1.32
	Maternal education	105	1–6	5.36	0.89
	SES composite score	105	2.86–9.39	7.25	1.44
isiXhosa	Total vocabulary (%)	115	0–84.76	36.76	23.77
	Children in household	115	0–6	1.47	1.51
	Adults in household	115	1–10	2.83	1.53
	Maternal education	112	2–6	4.55	0.93
	SES composite score	115	0–10	4.66	1.70
Xitsonga	Total vocabulary (%)	98	3–100	48.43	26.89
	Children in household	98	0–6	1.93	1.45
	Adults in household	98	1–8	3.19	1.39
	Maternal education	96	3– 6	4.96	0.81
	SES composite score	98	2.12–8.57	4.85	1.53

Maternal Education scale: 1 = no formal schooling, 2 = primary school incomplete, 3 = completed primary school, 4 = high school incomplete, 5 = completed high school, 6 = post-school qualification. SES composite score based on maternal and paternal level of education, maternal and paternal employment status, household income, and household expenditure on food.

domains being slightly different across languages, all scores were converted into percentages to ensure comparability. The mean vocabulary score for isiXhosa-speaking children (37%) was lower than for the other three languages at 46% for Afrikaans and SAE, and 48% for Xitsonga, and these group differences between vocabulary scores were significant [$F(3,424) = 3.850$, $p = 0.010$]. Age differences between the groups could not account for differences in expressive vocabulary size, because although the isiXhosa group's mean age was lower than those of the other language groups (**Table 1**), the intergroup age difference was not statistically significant. Further investigation into possible reasons for the differences in vocabulary size falls beyond the scope of the current study.

Looking at household factors, the number of other children in the household ranged from 0 to 8, but the means ranged from 0.7 for SAE to 1.9 for Xitsonga, indicating that the children in our sample are growing up on average as one of two or three co-residing children. Regarding number of adults in the household, the range for all languages collectively was 1 to 10, with the mean for the Xitsonga group (3.2) being higher than those of the Afrikaans and isiXhosa groups (2.8), and the SAE group (2.7).

Maternal level of education was on a six-point scale, ranging from 1 (no formal schooling) to 6 (at least one completed post-school qualification). For all language groups, there were some mothers with post-school qualifications, but the lowest level of education differed: In the Xitsonga group, the mothers with the lowest level of education had completed primary school, whereas for Afrikaans and isiXhosa, there were some mothers who attended primary school without completing it, and there were mothers in the SAE group with no formal schooling.

Given the extent to which maternal level of education has been reported to correlate with child language skills, we first considered it as a separate sociocultural factor. Maternal level of education did not correlate with vocabulary score in our sample, which was unexpected, given the frequent finding that children of mothers with higher levels of education have better language skills. We therefore decided to not use maternal level of education as the sole proxy for SES. Rather, we employed a composite SES measure, that included maternal and paternal levels of education, maternal and paternal employment status, household income, and expenditure on food. This composite allowed us to compensate for some missing data on sensitive questions[11] regarding SES in the family background questionnaire. Each sensitive question in the family background questionnaire allowed for either "Don't know" or "Don't want to say," which resulted in even answered questions sometimes rendering no data. The composite SES score was calculated out of 10: a SES composite score of 10, for instance, indicates that both parents studied beyond high school and are employed, whereas a score of 0 indicates that both parents are unemployed, that the household income is zero, and that the family has no money to spend on food, and are therefore reliant on food parcels provided by non-government or not-for-profit organizations. For all four languages combined, the SES range was 0 to 10, but as can be seen in **Table 3**, only the isiXhosa group displayed the full range. The Afrikaans group had a higher mean SES score than the isiXhosa and Xitsonga groups, and the SAE group had the highest score. This could be because many of the Afrikaans and SAE participants were recruited online and had access to electronic devices and good internet connections, which could be indicators of comparative affluence, and the SAE participants were almost exclusively from urban areas where remuneration is typically higher.

RQ1 and RQ2: Sociocultural Factors as Predictors of Vocabulary Score

After ensuring that there was no multicollinearity between variables, the variables were regressed in separate models based on Bronfenbrenner's (1977) ecological systems theory. Results of these models can be found in **Table 4**.

The first model was statistically significant [$F(1,420) = 119$, $p < 0.001$], and accounted for 22.1% of the variance, with Age predicting Total vocabulary score with a high significance ($\beta = 0.470$, $p < 0.001$). The addition of Sex in Model 2 significantly predicted the Total vocabulary outcome ($\beta = -0.099$, $p = 0.021$), and this model significantly accounted for an

[11] Questions about level of education may for instance be sensitive in South Africa, where school careers are often ended prematurely for financial reasons (only 40% of the population completes high school; Statistics South Africa, 2012), and higher education is expensive and thus not within reach of everyone. Questions about employment status and earnings are likewise sensitive, because unemployment is rife at 43% (based on numbers provided by Statistics South Africa, 2020), and more employed persons with lower than higher levels of education experienced recent salary decreases (25% of those who did not complete high school vs. 10% of those with a degree).

TABLE 4 | Hierarchical multiple regressions of sociocultural predictors of total vocabulary score.

Block		*B*	SE	β	R^2	Adjusted R^2	ΔR^2
1	Age	2.670	0.245	0.470***	0.221	0.219	0.221
2	Age	2.654	0.244	0.467***	0.231	0.227	0.010*
	Sex	−5.504	2.383	−0.099*			
3	Age	2.630	0.243	0.463***	0.243	0.232	0.012
	Sex	−5.681	2.390	−0.102*			
	Number of other children in household	0.829	0.887	0.042			
	Number of adults in household	1.363	0.903	0.067			
	Maternal education	2.955	1.709	0.102			
	SES	−0.390	0.854	−0.027			
4	Age	2.636	0.243	0.464***	0.252	0.238	0.010
	Sex	−5.491	2.389	−0.099*			
	Number of other children in household	1.042	0.919	0.053			
	Number of adults in household	1.152	0.905	0.057			
	Maternal education	2.973	1.777	0.102			
	SES	−1.226	1.040	−0.084			
	Language	0.177	1.263	0.007			
	Geographic area	6.630	2.895	0.116*			

****Significance at the 0.001 level.*
**Significance at the 0.05 level. Maternal Education scale: 1 = no formal schooling, 2 = primary school incomplete, 3 = completed primary school, 4 = high school incomplete, 5 = completed high school, 6 = post-school qualification. SES composite score based on maternal and paternal level of education, maternal and paternal employment status, household income, and household expenditure on food.*

TABLE 5 | Correlations of 10 semantic domains and sociocultural factors, of all languages combined.

	Animals	Vehicles	Toys	Food and drink	Clothes	Household items	Furniture	Places	People	Games and routines	Total
Sex	−0.085	0.035	−0.087	−0.052	−0.143**	−0.106*	−0.098*	−0.095	−0.128**	−0.098*	−0.112*
Area	0.194***	0.067	0.207***	0.048	0.107*	0.045	0.094	0.143**	0.025	0.083	0.114*
Language	−0.192***	−0.098*	−0.204***	0.112*	−0.026	0.054	−0.013	−0.037	0.034	0.075	0.027
Children (HH)	−0.124*	−0.072	−0.091	0.096*	0.032	0.099*	0.062	0.016	0.169***	0.067	0.058
Adults (HH)	−0.070	0.030	−0.046	0.130**	0.066	0.097*	0.089	0.031	0.130**	0.041	0.069
Maternal education	0.193***	0.084	0.165***	0.025	0.002	0.011	0.043	0.057	−0.042	0.098*	0.071
SES	0.245***	0.072	0.197***	−0.030	0.001	−0.067	0.030	0.090	−0.032	0.045	0.037

****Significance at the 0.001 level.*
***Significance at the 0.01 level.*
**Significance at the 0.05 level.*
Children (HH), number of other children in the household; Adults (HH), number of adults in the household.
Maternal Education scale: 1 = no formal schooling, 2 = primary school incomplete, 3 = completed primary school, 4 = high school incomplete, 5 = completed high school, 6 = post-school qualification. SES composite score based on maternal and paternal level of education, maternal and paternal employment status, household income, and household expenditure on food.

additional 1% of the variance [$F(2,419) = 599$, $p < 0.001$]. The third block, containing the four microsystem factors, described a further 1.2% of the variance [$F(6,415) = 595$, $p < 0.001$]. The fourth block, which contained the two exosystem factors, explained an extra 1% of the variance [$F(8,413) = 590$, $p < 0.001$], where Geographic area significantly predicted Total vocabulary score ($\beta = 0.116$, $p = 0.023$), with rural-situated children having lower scores than urban-situated children. Although only Model 2 underwent a statistically significant improvement, the addition of each variable led to some improvement in the ability of the model to account for variation in vocabulary score. This is evidenced by the increase in adjusted R^2 values with each new model (Model 1:0.219, Model 2:0.227; Model 3:0.232; Model 4:0.238), indicating that the improvement is not an artifact of the regression analysis but rather an effect of the addition of new variables improving the model fit. The final model as a whole accounted for 25% of the total variance in Total vocabulary score.

RQ3: Relationships Between Sociocultural Factors and Semantic Domains

Due to the regression models (reported above) yielding a highly significant influence of age, age was partialed out of the correlations. Refer to **Table 5** for the full output of the languages combined. Every factor was significantly correlated to one or more semantic domains. Notably, Language correlated with less than half of the domains, namely ANIMALS ($r = -0.192$, $p < 0.001$), VEHICLES ($r = -0.098$, $p = 0.044$), TOYS ($r = -0.204$, $p < 0.001$), and FOOD AND DRINK ($r = 0.112$, $p = 0.022$).

TABLE 6 | Correlations of four semantic domains and sociocultural factors, per language.

Language	Sociocultural factors	Animals	Vehicles	Toys	Food and drink	Total
Afrikaans	Sex	−0.231*	−0.012	−0.235*	−0.226*	−0.270
	Geographic area	0.363***	0.143	0.343***	0.307**	0.368***
	Children (HH)	−0.237*	−0.168	−0.147	−0.154	−0.201*
	Adults (HH)	−0.212*	−0.004	−0.167	0.102	0.034
	Maternal education	0.323***	0.040	0.218*	0.063	0.123
	SES	0.365***	0.028	0.222*	0.047	0.137
English	Sex	−0.037	0.085	0.056	0.042	0.027
	Geographic area	−0.003	0.077	0.054	0.004	0.015
	Children (HH)	0.119	0.083	0.172	0.171	0.245*
	Adults (HH)	0.009	0.071	0.053	−0.004	0.058
	Maternal education	−0.021	−0.034	−0.047	−0.006	−0.033
	SES	−0.080	−0.117	−0.133	−0.126	−0.127
isiXhosa	Sex	−0.067	−0.064	−0.137	−0.073	−0.113
	Geographic area	−0.381***	−0.255**	−0.334***	−0.337***	−0.343***
	Children (HH)	0.212*	0.158	0.121	0.159	0.178
	Adults (HH)	0.004	−0.021	0.023	0.205*	0.091
	Maternal education	0.016	0.059	−0.033	0.027	0.092
	SES	−0.099	−0.077	−0.183	−0.025	−0.056
Xitsonga	Sex	0.014	0.129	−0.045	0.004	−0.125
	Geographic area	0.049	0.000	0.105	0.296**	0.313**
	Children (HH)	−0.194	−0.200	−0.084	0.070	0.022
	Adults (HH)	−0.065	−0.001	−0.059	0.095	0.007
	Maternal education	−0.075	−0.043	0.023	0.023	0.017
	SES	−0.102	−0.091	0.002	0.156	0.127

****Significance at the 0.001 level.*
***Significance at the 0.01 level.*
**Significance at the 0.05 level.*
Children (HH), bumber of other children in the household; Adults (HH), number of adults in the household.
Maternal Education scale: 1 = no formal schooling, 2 = primary school incomplete, 3 = completed primary school, 4 = high school incomplete, 5 = completed high school, 6 = post-school qualification. SES composite score based on maternal and paternal level of education, maternal and paternal employment status, household income, and household expenditure on food.

To determine how languages differed from what was found in the combined correlations, correlations were performed for each language separately on those semantic domains that correlated with language (i.e., ANIMALS, VEHICLES, TOYS, and FOOD AND DRINK). Refer to **Table 6** for the full output (with Total vocabulary score inserted for reference). The individual factor Sex significantly correlates with all semantic domains in Afrikaans, except for VEHICLES ($r = -0.012$, $p = 0.899$). Sex yielded no significant correlations in any other languages. The Exosystem factor Geographic area shows a correlation with some semantic domains for all languages, except for SAE. This was to be expected as the SAE group only contains three participants from rural areas. Interestingly, Geographic area only correlates with one semantic domain in Xitsonga (FOOD AND DRINK: $r = 0.296$, $p = 0.004$). The Number of other children in the household only shows a significant correlation in one domain, ANIMALS, in Afrikaans ($r = -0.237$, $p = 0.013$) and in isiXhosa ($r = 0.212$, $p = 0.025$). Number of adults in the household correlates with only one semantic domain for Afrikaans (ANIMALS: $r = -0.212$, $p = 0.028$), and one for isiXhosa (FOOD AND DRINK: $r = 0.205$, $p = 0.031$). Maternal level of education correlates with two semantic domains and only in the Afrikaans group (ANIMALS: $r = 0.323$, $p < 0.001$; TOYS: $r = 0.218$, $p = 0.023$). The final Microsystem factor, SES, is correlated with two domains in the Afrikaans group (ANIMALS: $r = 0.365$, $p < 0.001$; TOYS: $r = 0.222$, $p = 0.021$).

DISCUSSION

Effect of Sociocultural Factors on Vocabulary Size

As the first of its kind from South Africa, the current study set out to discover whether certain sociocultural factors relate to, and influence, vocabulary size and composition across four of South Africa's official languages. Our first research question was whether there is an effect of sociocultural factors, divided into individual, microsystem and exosystem factors, on overall vocabulary size. Results showed that the child's age was the strongest predictor, followed by the child's sex, both of which are individual factors. The only other factor to significantly predict overall vocabulary size was geographic area.

The second research question asked whether combining all sociocultural factors in one model accounts for variance in the

vocabulary outcomes. Findings indicate that the final model accounts for 25% of the overall variance, and that the addition of all sociocultural factors significantly improves the model. It should, however, be noted here that age (which is not a sociocultural factor) was the single variable which accounted for the most variance (22%). The CDI was developed as an assessment tool for measuring toddlers' language development, so it stands to reason that age would be an important predictor of vocabulary size, as shown for a range of languages from different language families (Frank et al., 2021). However, at the microsystem level (considering the number of other children and adults in the household, maternal level of education, and SES), after controlling for the individual factors, a 1.2% increase in variance was found. The addition of the exosystem factors (home language and geographic area) accounted for another 1% of the variance. It can be concluded that the sociocultural factors we investigated – although shown in other published studies to affect language development significantly – are not particularly suited to predicting vocabulary size in our sample of children, and that age is the most important predictor. These findings will be discussed in more detail below.

Effect of Sociocultural Factors on Semantic Domains

To answer the third research question, addressing vocabulary composition, 10 semantic domains of the CDI were selected for their assumed comparability across languages, that is to say, they are the most tangible items, or most common routines, to which the majority of children might be exposed. Findings were mixed for the different domains, with significant correlations for most factors apparent across at least one domain, though in the case of a factor such as sex or geographic area, a significant relationship was found across five and six domains, respectively (as shown in **Table 6**). This echoes the results of the findings from Research Question 1, which also showed sex and geographic area to be significant predictors of vocabulary size. Language was found to be significantly correlated with four semantic domains: ANIMALS, VEHICLES, TOYS, and FOOD AND DRINK. This required further investigation, and correlations were rerun separately in each language for those four semantic domains. Once the languages were scrutinized separately, it came to light that not many correlations remained within languages. For instance, there were no sociocultural factors significantly related to the SAE group for these four domains. This finding is not unexpected given that all but three respondents were from urban areas. However, in the isiXhosa group, all four domains were highly significantly correlated with geographic area (urban vs. rural), and ANIMALS was correlated with number of other children in the household, and FOOD AND DRINK with number of adults. Afrikaans patterned similarly to isiXhosa, although VEHICLES was not correlated with geographic area; ANIMALS was correlated with all sociocultural factors, and TOYS with every factor except number of other children and adults in the household. Xitsonga only showed significant correlations with geographic area in the FOOD AND DRINK domain; no other correlations with geographic area were found. Results could have patterned differently had other semantic domains (for instance ACTIONS (verbs), DESCRIPTIVE WORDS (adjectives and adverbs), TIME, or CONJUNCTIONS) been selected for inclusion.

The overarching aim of this study was to determine the effect of individual, microsystem and exosystem factors on the size and composition of children's expressive vocabulary. Although findings are mixed overall, it can be said that sociocultural factors do play a part in vocabulary size but that, when looking closer at each semantic domain, more specific relationships emerge. A common finding across research questions is that geographic area is highly related to most semantic domains in the South African context. As one would expect, the child's home language is not predictive of overall expressive vocabulary size, it is, however, related to vocabulary size in two semantic domains. The lack of a significant effect of home language highlights that although language and culture are related, they should not be conflated when examining variation in vocabulary size. The geographic area in which a child grows up (rural vs. urban) is more important to consider in this regard than a child's home language. Finer analyses of the data might, however, reveal further differences between languages.

Our finding that geographic area is predictive of vocabulary size concurs with that of Bornstein and Cote (2005) and Vogt et al. (2015), namely, that there are differences in vocabulary size between rural and urban children. Bornstein and Cote found that children from rural areas in Argentina and the United States (but not in Italy) outperformed their urban peers. These differences may be related to the type of language rural vs. urban mothers use (see Camaioni et al., 1998 for Italian), with rural mothers using more directives and urban mothers more labels and descriptions. Whether such rural/urban differences in maternal speech exist in our contexts is still to be discovered. Vogt et al. (2015) found that location significantly predicted expressive vocabulary size. Children from urban areas had substantially larger expressive vocabularies than children from rural areas. They attributed this to SES as their urban sample had higher SES and higher levels of maternal education.

Our current results from four languages indicate that the languages pattern in different ways, and that sociocultural factors are related to different semantic domains in different languages. For example, the ANIMALS semantic domain seems to be the most sensitive to sociocultural factors. Looking at the correlations across languages, it is only sex and number of adults in the household that do not relate with ANIMALS. When each language was considered separately, ANIMALS in the Afrikaans group was related to every sociocultural factor, the only semantic domain patterning in this way. The isiXhosa group also shows relations between ANIMALS and geographic area and number of other children in the household. Although the Afrikaans and isiXhosa groups share geographic area as a common correlation, Afrikaans shows a highly significant positive correlation, whereas isiXhosa shows a highly significant negative correlation. In other words, there is a positive relationship between being from an urban area and good performance on the ANIMALS domain in Afrikaans, but the opposite pattern is found in isiXhosa.

A possible explanation for these findings may lie in the level of exposure children have to animals and representations of animals

in different geographic environments below 30 months of age. In a study of 2- to 3-year-old isiZulu-speaking urban children, names of domestic animals such as *chicken* were produced by 78% of children, but names of wild animals like *lion* and *crocodile* were only produced by 8% and 3% of children, respectively (Kunene and Ahmed, 2016). Children who have early exposure to representations of animals in the form of toys or on television and in books (which is more likely in urban areas with more resources) will produce more animal names than children who have little exposure to animals (in under-resourced urban areas and rural areas) unless there is a greater variety of actual animals in rural areas. Therefore, crosslinguistic analyses should be undertaken with caution because controlling for sociocultural factors is imperative to prevent over- or underestimating a child's performance, especially when compared to other languages which may have different patterns of influence from sociocultural factors. This can be seen especially when comparing the findings from the ANIMALS domain in SAE and Afrikaans, where SAE has no significant correlations with any of the sociocultural factors.

Maternal Education, Family and Language Input

The children in this study were 16 to 32 months old. It could be that the correlations between sociocultural factors and vocabulary size change after toddlerhood, and that differences in maternal level of education or SES (for instance) come to account for more variation in vocabulary size later in the child's life. This would require further investigation. In this study, maternal education did not explain differences in vocabulary size between 16 and 32 months. Previous studies show that children of mothers with higher levels of education demonstrate better language skills, including higher levels of expressive vocabulary, than their peers whose mothers have lower levels of education. There are several reasons for maternal level of education in our study not showing a correlation with vocabulary size: A higher level of maternal education itself does not cause larger child vocabularies; rather, maternal level of education affects the quality and quantity of language input the child receives. However, firstly, in many South African households in which mothers are present, they are not necessarily the primary caregivers of their biological children. Often a household does not have a nuclear structure but includes extended family. Grandmothers, aunts and older female children, both siblings and cousins, are often primary caregivers, and caregiving is culturally a joint responsibility usually among older female family members (McDaniel and Zulu, 1996; O'Laughlin, 1998). In some cases, children are raised by grandmothers, as mothers are migrant workers (see Hall and Posel, 2019). In cases where a female other than the mother provides the majority of the childcare, maternal level of education might be less relevant than primary caregiver level of education. A further reason for our finding of maternal level of education not influencing vocabulary size could be that language socialization practices (more so than maternal level of education) affect children's vocabulary acquisition and that these practices are not directly related to maternal level of education in all South African contexts. This explanation can only be considered further once more information on language socialization practices in our context becomes available.

Havron et al. (2019) found that children with an older sister had better language skills than children with an older brother. These authors state that the finding of the presence of older siblings having a negative effect on a child's language development (see, e.g., Peyre et al., 2016) may be due specifically to the presence of older brothers. In our study, we did not find a correlation between the number of other children in the household and vocabulary size. However, given Havron et al.'s (2019) finding, our correlations for number of other children in the household might present differently should the age and sex of these other children be taken into account. These analyses may reveal more complex relations between vocabulary size and the number, sex and possibly the age of the children who co-reside in one home.

There are not many research findings on the effect of the number of adults in the household on the language input that children receive (however, see Shneidman et al., 2013; Sperry et al., 2018). Soderstrom et al. (2018) compared the language experiences of toddlers who hear language from one or a small number of household members to those who hear language from multiple household members and found no difference in the language development of the two groups at 3 years old. The amount of language directed at the child at 2 years old also appeared not to differ between the two groups.

In line with Weisleder and Fernald (2013), Soderstrom et al. (2018) also found that children in households with many adults might overhear a lot of language (without having as much language directed at them), and only language directed at them predicts their language development. In contrast, Sperry et al.'s (2018) study showed that an increase in adults in the household contributed to an increase in the quantity of child-directed speech, across SES backgrounds, indicating that a more nuanced view of the relationship between SES and child-directed speech is required, one that considers not only differences across socioeconomic strata but also differences within various strata. Caselli et al. (1995) and Caselli et al. (1999) found that Italian-speaking children produce more social words than English-speaking children do and suggested that this difference reflects the tendency for Italians to live in close proximity to their extended family. Qualitative, instead of quantitative, analyses of the types of words children use in one/few-adult households as opposed to those in many-adult households may allow one to discover qualitative differences in the vocabulary composition of young South African children.

Other patterns of correlations between the sociocultural factors investigated in our study and vocabulary size could emerge if field studies examining the nature of language input and social interactions are undertaken. In this regard, it might be important to note that the majority of research findings on child-directed speech are based on Northern contexts. These research findings might not be applicable to South African contexts. Consider that only 46%, 39% and 38% of South African parents report naming objects, counting, and talking about a range of topics, respectively, when interacting with their children aged 3 years and younger, which could point to limited language

input in terms of quality, regardless of the number of adults in the household providing the input. Nearly half (48%) of South African children have never read a book with a parent or guardian (Statistics South Africa, 2018). In fact, in 58% of South African households, there are no books, printed or otherwise (South African Book Development Council, 2016). In this regard, Bradley et al. (1988) found that the availability in the home of books and other resources that could potentially provide cognitive stimulation predicts better later social and cognitive outcomes (including better language skills). It could point to the need to investigate not only the number of adults in the household, but also the type of interaction that each has with the child and the language socialization practices present in the child's household and community. These practices could vary from language community to language community, thereby in part accounting for the difference in the correlations between languages as regards semantic domains – a matter which requires investigation.

SES and Vocabulary Size

It is not clear why in our study, unlike those conducted in many other contexts, no correlation was found between vocabulary size and SES. It could be that our composite SES score was not sensitive enough and should have included other measures, for instance of physical overcrowding of children's dwellings. Children living in overcrowded conditions are likely to be exposed to disorganization in their environments (accompanied by high noise levels and other distractions), placing them at risk for developing a poor understanding and representation of temporal order (Flores, 2004). These conditions might also affect the quantity and quality of the language directed to the children, thereby affecting their vocabulary acquisition. Alternatively, our results might have differed had we not focused on structural aspects of the child's home environment but on process-related aspects, such as parental responsiveness, stimulating behavior of adults during parent–child interaction, and the frequency of joint picture book reading, which Attig and Weinert (2020) found to be associated with SES across the first 2 years of the lives of the children in their sample: Mothers with lower SES interacted with their children less sensitively and in less stimulating manners than mothers with a higher SES. Moreover, parents with lower SES engaged in joint book reading less often with their child than parents with a higher SES. Studies systematically investigating the influence of SES on such processes which affect the child's home learning environment have not yet been conducted in South African contexts.

However, one also needs to consider the possibility that SES and maternal education are not strongly correlated with input in all social contexts. In fact, Sperry et al. (2018)'s comparison of five US communities with different levels of SES showed that vocabulary input varied substantially within a single socioeconomic group and that a focus on maternal input without considering multiple caregivers and other bystander input underestimates language input in low-income environments. Furthermore, we would argue that rich oral cultures may provide extensive language input no matter the level of education of those who provide input to the child. At the same time, one should consider that more input does not necessarily result in a higher expressive vocabulary on the part of the child in cultures that discourage children from talking directly to, or in front of, adults. Heath (1983) makes these language socialization differences clear in her seminal study comparing working- and middle-class adult-child interactions where children in some communities may be observers to adult social interaction and talk rather than direct interlocutors from which speech is explicitly elicited – see also studies in Kenya (Blount, 1971); Papua New-Guinea (Ochs and Schieffelin, 1982), Canada (Crago et al., 1993), and Western Samoa (Ochs, 1984, 1988; Simonsen, 1990).

CONCLUSION

Children develop language in a complex social world in which there is interaction between individual, microsystem and exosystem factors. This exploratory study attempted to identify which sociocultural factors affect child language development in young South African children growing up in a variety of contexts (rural and urban, varied SES, small and large households, well-educated and less well-educated mothers). We took a snapshot of children's lives and of their vocabulary sizes, and also looked at the make-up of their vocabulary in terms of specific semantic domains. We found that the language that they speak affects their vocabulary to a lesser extent than the geographic area (rural vs. urban) in which they are raised. Given the biological and environmental risk factors that many South African children are exposed to concerning language development, it is important to determine which factors affect them most at which stage of their preschool lives, so as to allow for a more solid language base before they enter school. Language socialization and input in the home and community are especially important to investigate, given that schooling has been found to have a negligible effect on vocabulary size by the end of second grade (see Biemiller, 2006 for a discussion). Less than optimal language input at home can thus not necessarily be made up for in the school context.

Some of our results do not concur with those of existing studies, notable those on maternal level of education and SES. Maternal education and SES in our context may be less important than socialization practices and cultural conventions pertaining to child-directed speech. In Northern contexts, maternal level of education and SES often serve as proxies for the quality and quantity of language input that the child receives. However, in our context where categories of education are different and cultural norms could dictate when and how a child is spoken to and is expected to speak, maternal level of education and SES may not directly relate to the child's language abilities as much as in other contexts. These findings raise the question of whether such broad measures are really useful in understanding factors that impact language development across cultures. Nevertheless, child language researchers in the South African context are operating in a comparative knowledge vacuum as regards child-directed speech, parental responsiveness to children's vocalizations, and language socialization practices. We realize that without better knowledge of the processes shaping our children's home learning environments, the study of sociocultural influences on child

language development will remain challenging, because research findings generated in the North may have limited generalizability to South African contexts. This study attempted to generate context-specific findings, and the results indicate that a complex interplay of sociocultural influences on language development of young South African children may be present, and that these would require further consideration in a systematic manner if a fuller understanding of this interplay is to be gained.

DATA AVAILABILITY STATEMENT

The datasets presented in this article are not readily available because "In South Africa, one has to apply for permission to share data when one submits one's application to the research ethics committee, and at that point one has to state who will be granted access to the data. Once ethical clearance has been granted, every request for access to the data requires a request from the PI to the REC for amendment of the ethics application. For this reason, data is not easily shareable." Requests to access the datasets should be directed to FS, fs@sun.ac.za.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by the Research Ethics Committee: Social Behavioural and Education Research, Stellenbosch University and the Faculty of Health Sciences Human Research Ethics Committee, University of Cape Town. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

AUTHOR CONTRIBUTIONS

All authors apart from MM, NB, and SY, who joined the project later, contributed to the conceptualization of the study. FS, HB, HO, MW, MM, MN, MP, NB, OM, and SY were involved in data collection. MW performed the statistical analysis and together with FS wrote the first draft of the manuscript. Thereafter all authors revised the manuscript.

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Social Inference May Guide Early Lexical Learning

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We incorporate social reasoning about groups of informants into a model of word learning, and show that the model accounts for infant looking behavior in tasks of both word learning and recognition. Simulation 1 models an experiment where 16-month-old infants saw familiar objects labeled either correctly or incorrectly, by either adults or audio talkers. Simulation 2 reinterprets puzzling data from the Switch task, an audiovisual habituation procedure wherein infants are tested on familiarized associations between novel objects and labels. Eight-month-olds outperform 14-month-olds on the Switch task when required to distinguish labels that are minimal pairs (e.g., "buk" and "puk"), but 14-month-olds' performance is improved by habituation stimuli featuring multiple talkers. Our modeling results support the hypothesis that beliefs about knowledgeability and group membership guide infant looking behavior in both tasks. These results show that social and linguistic development interact in non-trivial ways, and that social categorization findings in developmental psychology could have substantial implications for understanding linguistic development in realistic settings where talkers vary according to observable features correlated with social groupings, including linguistic, ethnic, and gendered groups.

Keywords: testimony, language acquisition, infant development, social learning, Bayesian modeling, sociophonetics, word learning, epistemic trust

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1. INTRODUCTION

Common wisdom among adults when listening to speech is to "consider the source." The identity of a speaker can provide a wealth of context in interpreting a speech act. Despite this, social reasoning about differences between sources has not heretofore been considered part of early word learning, and is not traditionally included in computational models of infant word learning (e.g., Pinker, 1979; Chater and Manning, 2006; Frank et al., 2009). These models assume that the linguistic content of speech may be characterized without respect to the identity of the speaker. Effectively, this equates to an assumption that learners trust data from all informants equally, and that all informants are equally likely to be speakers of the same dialect. Learners in these models are defined without sociolinguistic or metalinguistic awareness, and without the ability to socially differentiate categories of informants. Instead, the models effectively describe infants as acquiring a single target dialect which is the only linguistic code available in the environment.

The omission of sociolinguistic variation from previous computational models makes them unable to capture effects of non-linguistic social and cultural associations on language learners' responses to linguistic data. It also prevents them from capturing effects of learners' perception

of linguistic group membership on the perception of labels. These factors are known to impact adult linguistic perception: adults perceive typological distinctions between language varieties, such as regional accent or dialect, and have concomitant beliefs about the social significance of these variations being deployed. There is also substantial evidence that adult knowledge of accent and dialect groups impacts speech perception and perceptual learning of speech contrasts (Clopper and Pisoni, 2004). To understand language acquisition we must begin to confront the true complexity of the learning problem, but these simplifying assumptions ultimately render previous models insufficient for investigating effects of social variation on language acquisition.

This paper introduces a model which incrementally departs from key simplifying assumptions in previous models by incorporating existing understandings of infant social evaluation from literature in developmental psychology. Our model instantiates a learner who is acquiring their target dialect in the presence of a single available alternative which has greater variation. Therefore, our listener must be selective in their attention to linguistic informants. To learn their target dialect, the learner must also *avoid* natively acquiring any non-target dialects, a task which requires selective trust in informants as sources of linguistic knowledge, and which learners may simplify by recruiting social beliefs about the relationship between dialect group membership, social group membership, and source quality. We demonstrate that the addition of inferences about talker social and dialect group membership to the speech perception task defines the language learning problem in a way that more effectively and parsimoniously explains and contextualizes existing findings in the literature on infant speech perception.

Our model accounts for infant behavior in response to social agents of varying perceived reliability. This aspect of informant perception is only one element in a full account of early word learning. The work presented here is compatible with existing theories of language learning which have incorporated social cognitive skills in describing the language acquisition process. However, these theoretical models have not directly implemented mechanisms to account for categorical perception of social or dialect groups. Models which integrate acoustic perception and social cognitive skills can be further extended by positing that children may apply their skills differently in response to perceived differences between informants. By treating person perception as a component of speech perception, our model is capable of predicting differences in a listener's responses to informants who are engaged in behaviors judged by adults to be linguistically equivalent, but who have distinctive physical appearances or speech accents. Unlike previous acquisition models, the epistemic trust model presented here accounts for infant behavior in response to social agents of varying perceived reliability, allowing us to pose questions about the role learners' non-linguistic perception of identity plays in the speech perception task.

Moreover, in defining more than one variety of speech, and associations between these varieties and non-linguistic affiliations, we can describe the learner as possessing a metalinguistic awareness in the form of confidence regarding the accuracy of linguistic judgements made under different social circumstances. Supposing that the learner must perceive some nominal social significance in the variation they acquire also allows our model to describe listeners as making distinctions between talkers on the basis of their speech behavior. This framework extends the definition of the language acquisition task to necessarily incorporate processes of person perception, which are predicted to have cascading effects on listeners' attention to both linguistic and non-linguistic behaviors. Further, the model can predict that learners will exhibit metalinguistic judgements regarding the relative quality of an informant's speech behaviors, reserving the most scrutiny for informants belonging to groups which are believed knowledgeable.

2. BACKGROUND

There is a wealth of evidence showing that beliefs about social variation affect adult perception of speech. Adults associate linguistic variation not only with geographical regions but also with numerous socially constructed categories, including genders, sexual orientations, socioeconomic classes and personas (D'onofrio, 2018). Social beliefs influence how adults recognize and interpret speech. For example, Johnson et al. (1999) presented adult listeners with tokens from a synthesized phonetic continuum, and found that the presentation of female faces caused participants to perceive a shifted category boundary, with the effect being strongest for faces which were rated as more stereotypically feminine. These results demonstrate that adults may interpret the same exact speech signal differently depending on the cues to social groupings the listeners receive in advance. Similar effects can be obtained without providing an image of the talker. The listener's linguistic interpretations may also be manipulated with cues and instructions that are merely suggestive of talker features, including age (Hay et al., 2006b), sex (Johnson et al., 1999), and geographical dialect group (Hay et al., 2006a).

Despite our rich knowledge of adult perception, there has been little research on what cognitive building blocks are used to make sense of socially conditioned linguistic variation, and particularly how these building blocks may develop in infancy. Theoretical models such as PRIMIR and the emergentist coalition-model, which stress the importance of social cognitive processes in language acquisition, importantly do not define contrastive roles for social agents based on judgements of their epistemic reliability (Hirsh-Pasek et al., 2000; Werker and Curtin, 2005). The model presented here is compatible with these accounts, and can extend these theories by predicting how infants may respond contrastively to distinctive informants engaged in identical behaviors.

Models of language acquisition which entirely abstract away from social variation in speech have no way to explain how or when socially conditioned perceptual differences emerge. Here we draw on the literature on epistemic trust as a simple and useful starting point for more effectively integrating our knowledge of infant social and linguistic development.

Epistemic trust is the process by which a learner uses direct observations to infer which sources of information are

trustworthy. Evidence from non-linguistic domains indicates that infants perceive both non-linguistic behavior and group membership as relevant to judgements of informant quality in non-linguistic tasks. Infants are more likely to imitate instrumental actions when they are presented with informants who demonstrate competence in the conventional usage of objects (Zmyj et al., 2010), reliability with respect to eye gaze (Tummeltshammer et al., 2014), and emotional cues (Poulin-Dubois et al., 2011). Xiao et al. (2018) compared the responses of 7-month-old infants to talkers of two different racial groups whose eye gaze either more or less reliably predicted the appearance of a stimulus at the indicated location. When the talker's gaze was perfectly reliable, cuing the stimulus 100% of the time, infants were significantly above chance in following the talker's gaze regardless of that talker's racial group. However, when the gaze cue was unreliable, only cuing the stimulus 50% of the time, infants were significantly more likely to follow the gaze of the own-race talker compared to the other-race talker. Given uncertainty about the significance of the informant's behavior, infants appeared to recruit prior beliefs about the relationship between non-linguistic social cues and informant trustworthiness. These kinds of social evaluations may constitute an overlooked source of insight into infant behavior on word learning tasks.

There is also significant evidence that infants learn more effectively from familiar speakers compared to novel speakers (Parise and Csibra, 2012; Fennell and Byers-Heinlein, 2014; van Rooijen et al., 2019). This advantage may be explained with respect to acoustic experience, but may also be interpreted as an effect of epistemic trust. Under the latter account, infants' preferential attention to familiar speakers is borne of their social perception that these speakers are comparatively reliable. Beliefs about epistemic trust grounded in perception of social groups provide a way to extend existing word learning models, situating the predictions they make about word learning behavior relative to explicitly defined and testable hypotheses about not just linguistic, but social objectives.

There is one previous model that has linked epistemic trust to word learning behavior in older children. Shafto et al. (2012) uses epistemic trust to simulate the behavior of the preschool age children on a word learning task. Supposing that the utility of linguistic data is not uniformly consistent across informants supplying those data, they then describe this utility as a probabilistically defined function of the informants' qualities. In other words, some informants will have speech with superior accuracy, and some informants will have qualities associated with superior accuracy. Learners may infer the presence or absence of latent shared intentions between informants, and use these inferences to selectively guide their attention.

In a study by Corriveau et al. (2009), 4- and 5-year-old children were presented with a display of unfamiliar adults labeling unfamiliar objects. The children were then asked to choose an adult to endorse a label for yet another novel object. When the children observed all but one of the adults agreeing on object labels, they preferred to endorse labels from adults who they had observed participating in the consensus, as opposed to those who they had seen dissenting. Since both the labeled objects and the speakers supplying the labels were unfamiliar to the experimental participants, they could not have been relying on prior knowledge of either when selecting labels to endorse; instead, observing an informant participating in a consensus was enough to influence the children's perception of their testimony.

Children preferred to answer the question "Which is the [novel object label]?" with information given by an informant who had previously agreed with a majority, over information from an informant who had dissented. Shafto et al. (2012) successfully modeled this result by asserting that children preferentially attend to the most epistemically reliable *individual* linguistic sources when learning words. Their model was designed to model the behavior of 4- and 5-year-old children, but based on the literature on infants' judgments of epistemic trust reviewed above, there is reason to believe that infants rely on similar socially motivated inferences to guide their processing of speech at a much earlier age.

Moreover, drawing on the literature on non-linguistic social learning, we suggest that infant language learners may fruitfully bring their social knowledge to bear on linguistic tasks. Contrary to the assumptions of previous computational models of early language learning that have largely omitted social perception, it is well-accepted that linguistic and non-linguistic judgments of informants are tightly linked.

For example, studies of the ontogeny of attitudes toward in-group and out-group members (e.g., Mahajan and Wynn, 2012; Buttelmann and Böhm, 2014) are predicated on the assumption that socially motivated cognitive grouping is part of human behavior and likely emerges quite early. Judgments of an informant's value as both a linguistic and a non-linguistic source of information are tightly linked in infants (Kinzler et al., 2007; Schachner and Hannon, 2011). Infants are more likely to imitate non-linguistic behavior and learn novel words from informants who they have observed accurately labeling familiar objects, compared to informants who they have observed using familiar labels inaccurately (Poulin-Dubois et al., 2011; Brooker and Poulin-Dubois, 2013). Liberman et al. (2017) familiarized 9-month old infants with videos of two people who spoke the same or different languages, and found that the infants looked longest to subsequent videos which showed the people who did not share a language affiliating.

Given that infants use both epistemic trust and linguistic behavior to reason about social groups, it is possible that social knowledge may have a reciprocal effect on measures of their linguistic perception. Preverbal infants, including newborns, use non-linguistic observations to discriminate between social partners (Akhtar and Gernsbacher, 2008; Coulon et al., 2011; Maurer and Werker, 2014; Cirelli et al., 2016). Diesendruck et al. (2010) provide evidence that older children distinguish between informants who have demonstrated knowledgeability of conventional label forms and those who have not, more often expecting talkers who have used typical labels to also obey familiar pragmatic conventions for referencing objects. The children expect talkers who show knowledge of the conventions to consistently obey them, but do not extend these expectations to informants who have demonstrated unconventionality in their labeling behavior. This study demonstrates that learners may use

metalinguistic judgements of conformity to guide their linguistic expectations of talkers. We hypothesize that infants may be similarly influenced by metalinguistic perceptions of comparative speech quality in the context of a salient social group.

Supposing that social groups may also have *characteristic linguistic behaviors*, infants' ability to distinguish between informants based on non-linguistic features and behaviors may assist them in identifying and attending to socially meaningful linguistic distinctions. However, there are no existing models of speech perception that incorporate both epistemic trust and listener beliefs about social groups.

The model in Shafto et al. (2012) describes a learner who is sampling from linguistic sources who may be described individually as exhibiting more or less helpful intentions. However, this model still falls short of making a principled connection between infant expectations of linguistic and non-linguistic behavior. Instead of describing a learner who is sampling from linguistic sources whose speech individually may or may not exhibit helpful intentions, we wish to define a learner who also has expectations about the helpfulness of an informant based on non-linguistic observations. The learner's task, then, is still to infer the correct linguistic categories under uncertainty about the quality of the speakers, but now with the additional aid of beliefs which allow them to a priori categorize informants as more or less likely to have helpful intentions based on their putative affiliation with a social group.

The model introduced in the next section describes infants as not only attending to more knowledgeable talkers, but also as attending more to talkers from *characteristically knowledgeable groups*. This new model defines a listener who is capable of reasoning about the talker's membership in both linguistically and non-linguistically defined groups, allowing us to explore how joint perception of cues which indicate shared identities between talkers affects listeners' performance in word learning tasks. Crucially, the model presented here positions speech itself as an affiliative cue, allowing us to characterize the learner's task as preferentially learning the linguistic forms of their own social group. This choice to characterize speech as implicitly associated with social groups represents a significant departure from previous models of language learning.

To model listeners as evaluating variation between speakers for social value, we characterize talkers as exhibiting one of two labeling behaviors: knowledgeable labeling, which consistently has correct form and substance, and unknowledgeable labeling behavior, which does not. Imputing relative knowledgeability allows us to model variation between speakers as more or less desirable, or socially meaningful. Using this new model, we show that there is already evidence that social inference influences early word learning. We show this model can parsimoniously predict effects of variation in the social status of label sources on infants' looking to both labeled objects and people. Further, we show that this effect can explain infant behavior both when the informant's knowledgeability and group membership are apparent, and when these variables are the subject of inference under uncertainty.

The binary contrast we investigate between knowledgeability and unknowledgeability represents a stark simplification of what is known about how infants track informant reliability. However, the present paper offers an initial step in computationally approaching the effect of social knowledge on label learning by positing that learners have attentional preferences for reliable *kinds* of social agents. In effect, previous models have defined a single kind of linguistic listening and learning, predicting that infants will apply this approach uniformly to linguistic data. The model presented here predicts that non-linguistic perception of informants as belonging to categorical kinds will produce metalinguistic perception of an informant's speech quality with respect to their group membership. We demonstrate that metalinguistic expectations of correlations between speech behavior and talker identity can predict infant looking behavior in two experiments.

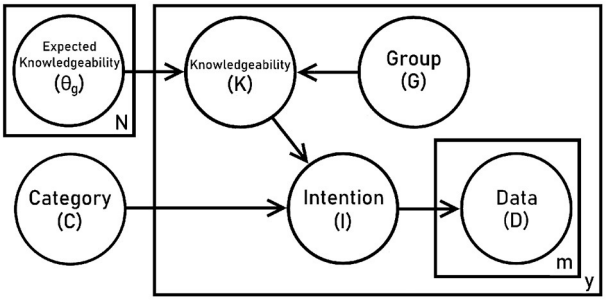

FIGURE 1 | Graphical model for simulating word listening tasks.

3. MODEL

We hypothesize that developmental changes in infant social perception may account for findings which have previously been interpreted to indicate asocial linguistic learning. To test this hypothesis, we compare a model developed to describe social word learning with an asocial word learning model, and contrast their ability to account for infant looking behavior in two experimental tasks.

Our model builds on the model proposed by Shafto et al. (2012), but is distinct in two ways. Firstly, we assume that the knowledgeability of an informant is a function of their group membership. Secondly, we simplify the learner's problem by excluding the possibility of knowledgeable, intentionally deceptive informants. Learners must instead compare informants who are assumed to be at least minimally helpful, with none actively hindering the learner.

To model the learning problem, we assume that all informants speak the target language, and the learner's task is determining which informants are more helpful for the purpose of learning object labels in the target dialect. In the following sections we demonstrate that this model can predict the pattern of results in two experiments investigating infant word learning: a familiar word recognition task (Koenig and Echols, 2003), and a novel word learning task (Rost and McMurray, 2009).

Figure 1 shows our graphical model. We suppose that each speaker may be described with two characteristics: their group membership *G*, and their individual knowledgeability

K. The parameter θ_g defines the characteristic distribution of knowledgeable informants for a given group,

$$p(K|G) = \text{Bernoulli}(\theta_g) \tag{1}$$

The speaker characteristic of knowledgeability encodes how likely it is that the speaker knows the correct label for the object, defined by the linguistic category C. Given the correct linguistic category, and the speaker's knowledgeability, the speaker then forms an intention I to produce speech data D which may or may not be a correct pronunciation of the label. For example, supposing that the object being labeled is a dog, the infant will recognize multiple variant pronunciations as referring to this object, (e.g., both /dɔg/ and /dəg/) but may only identify one pronunciation as the correct form for their dialect.

We present a simple case, assuming that there are only two levels of knowledgeability: knowledgeable speakers always intend to produce the correct label, whereas only a fraction of unknowledgeable speakers do so. However, both kinds of informants are consistent in the labels they produce. They intend to produce the same label each time they label the same object. In other words,

$$\begin{aligned} p(I|C, K = 1) &= \delta_{IC} \\ p(I|C, K = 0) &= \frac{1}{n} \end{aligned} \tag{2}$$

where δ is the Kronecker delta function, taking value one when I matches C and zero otherwise, and n is the number of possible labels. For the simulations in this paper, we assume that the data D that the speaker produces always perfectly matches the speaker's intention I, meaning that data are also distributed as

$$\begin{aligned} p(D|C, K = 1) &= \delta_{DC} \\ p(D|C, K = 0) &= \frac{1}{n} \end{aligned} \tag{3}$$

While there is no practical distinction between I and D in our simulations, we retain this distinction in our model in anticipation that it will be useful for modeling cases of ambiguous and errorful pronunciation in future work.

Although the model employs a binary contrast between knowledgeable and unknowledgeable speakers, it is possible that children make finer-grained distinctions between degrees of knowledgeability. Nonetheless, this simple binary contrast between knowledgeable and unknowledgeable speakers should be considered compelling, as it illustrates that even with the minimum number of speaker states under consideration, task performance can be predicted by predicting how the listener socially differentiates speakers. We show that even this elementary binary distinction between knowledgeable and unknowledgeable speakers allows us to capture effects that previous models are unable to capture. Future work could investigate more complex perceptions by representing knowledgeability as a continuous variable ranging from fully knowledgeable to fully unknowledgeable, or by representing perceived knowledgeability as a more nuanced set of variables indexing beliefs about knowledgeability which differ between contexts.

In effect, the model posits that knowledgeable speakers categorically give trustworthy testimony, and variation in form strictly occurs between unknowledgeable informants. Knowledgeable speakers are defined as homogeneously predictable and undifferentiated with respect to labeling behavior. By contrast, unknowledgeable speakers display characteristic patterns of errors which allow most to be differentiated from knowledgeable speakers by their labeling behavior. This means that the model describes infants as receiving a mixture of three kinds of testimony: correct testimony from knowledgeable sources, correct testimony from unknowledgeable sources, and incorrect testimony from unknowledgeable sources.

This model instantiates epistemic trust by defining the learner as preferring speech sources who are more knowledgeable, and therefore more likely to produce correct labels. Learning labels then relies on a preference for speech events which are informative with respect to the informant's knowledgeability. We then presume that these kinds of speech events may be distributed differently in different groups of talkers. The learner's level of epistemic trust for any given individual is therefore predictable based on that individual's group membership. By characterizing the listener's beliefs about kinds of talkers and the kinds of speech variation characteristically associated with them, we can model the listener as using this knowledge of variation to guide their attention to both labels and the sources which produce them.

If infants rely on beliefs about group membership and characteristic knowledgeability to guide their interpretation of labeling events, we should expect experimental conditions wherein informants are clearly knowledgeable to elicit greater looking times than conditions where informants are apparently unknowledgeable. Supposing that infants can readily distinguish the two types of labeling sources, and reason about which informants' speech is characteristically more useful for the purpose of language learning, perception of non-linguistic differences between informants may deeply impact word learning.

The inclusion of knowledgeability and of groups of informants in this model changes the nature of the word learning problem, relative to what had been assumed in previous models. It contextualizes word learning to a particular group of informants speaking a particular dialect, so that there is no longer just one language in the input, and just one correct label for an object. Instead, there is variation in labels, and only some of the variation corresponds to the learner's target dialect. Although human infants can acquire multiple dialects, and can perceive distinctions between social and dialect grouping, the learner modeled here supposes that social groups have predictable relationships to dialect groups. This model provides a step toward modeling multilingual learners by positing that infants must be able to effectively navigate an input containing two dialects, and use speaker identity to determine when attention to each dialect is appropriate. This enables behavior on tests of lexical knowledge to be described as influenced by beliefs about dialect and social

groups. Attentional biases regarding perceived *kinds* of talkers may allow infants to use non-linguistic social judgements as a proxy for evaluating the informational content of speech.

In two simulations, we show that this inclusion of social information in a model of word learning is crucial for capturing infant behavior on tests of word recognition and word learning. While previous work had already hypothesized that infants attend to social information, we show how this information may be closely intertwined with core inferences in word recognition and learning, suggesting that it is impossible to understand the inferences infants' make when learning their first words without also understanding the role of social information in that learning process. Our computational framework introduces this social context into a model of early word learning for the first time; we show that it captures existing results, and discuss ways that it can facilitate future research on word learning in social contexts.

4. SIMULATION 1

4.1. Task: Listening to Familiar Words

Simulation 1 uses our model to simulate a word recognition task. Koenig and Echols (2003) compared the responses of 16-month old infants to true and false labeling events provided by either live human experimenters or inanimate audio speakers. They found that in response to incorrect labeling events, these infants showed longer looking times to the source of the label when it was a human experimenter. However, they did not look longer to an audio speaker when it was the source of the incorrect object labels. In this scenario, the infants apparently attend to the type of speech source: whether it is a human experimenter or an inanimate speaker, and accordingly have differing expectations about whether the informant will be a reliable source of object labels.

The 16-month old infants were presented with photographic color slides of five familiar objects: a chair, duck, cat, ball, and shoe. As each image was displayed, the informant provided a label for it by reporting "That's a _." In the control condition, all of the labeling events were correct, matching the displayed objects. In the test condition, all of the labels were false. For example, while a picture of a cat is displayed the infant might hear "That's a shoe." Researchers coded the infants' behavior, measuring the amount of time they spent looking to both the displayed object, the sources of the labels, and to their caregiver. In Experiment 1, the infants heard the labels from a human experimenter seated next to them. In Experiment 2, the labels were provided by an audio speaker placed in the same location.

The researchers hypothesized that the infants' attention to the source would be influenced both by the accuracy of the label and the type of source providing it. Indeed, they found a broad effect of label accuracy: the infants looked longer at the object when hearing true labels, than when hearing false labels. They also found an effect of label source: the infants looked longer to both objects and label sources when the label sources were human speakers than when they were audio speakers. Lastly, there was an interaction of these two effects: infants looked longer to their caregivers and to the human speakers when labels were false rather than when they were true, but within the audio speaker condition, their looking to the label source was not significantly affected by accuracy.

Overall, infants looked more to both the object and the speaker in the human labeler condition, as shown by the total area of the bars in the graph on the left of **Figure 2**. Only average looking time was reported, so we are unable to analyze the time course of this data. Comparatively, the total looking time to both the labeler and the object is lower in the audio speaker labeler condition. Provided some certainty that the labeling source belongs to a group which is likely to be unknowledgeable (audio speakers), we will show that a Bayesian model predicts the infant should find correct labeling events from this source more surprising than incorrect labeling events from this source. Likewise, within the condition where the source belongs to a group which is accurately assessed as likely to be knowledgeable (adults) then we expect the infant to find incorrect labeling events more surprising.

In other words, the pattern of looking times corresponds with the infants having a high degree of confidence in their prior beliefs that speech from adults is likely to be much more reliably informative than speech from audio speakers. Koenig and Echols (2003) also included a third experiment to ensure that the difference in infant responses was a result of infants interpreting the human as a labeling source, and not just an effect of their presence. In the presence of a silent human experimenter, infants tended to look away from the object longer during false labeling event without choosing to attend to the silent human. These results demonstrate that the infants' looking behavior is influenced by perceptions which are specific to the speaker.

4.2. Model

We use our model to simulate infants' behavior in the experiments from Koenig and Echols (2003) and show that infants' behavior can be modeled as the result of reasoning about which informants' speech is characteristically more or less useful for the purpose of language learning. We frame infants' speaker perception as an inference on the knowledgeability, K, of the speaker, and contrast expectations about the effect of speaker perception on infant looking behavior in two conditions: with and without the production of labels.

To simulate these data we model the category C as known, corresponding with the infant's access to the visual object display and lack of inconsistent perceptual access cues. The learner is modeled as inferring the speaker's knowledgeability K. Infants are assumed to perceive the group G accurately—adult human or audio speaker—and to already know the θ_g associated with that group.

In the context of labeling, we expect human sources to be experts while audio speakers are less reliable. In our simulation, this assumption can be operationalized by setting the parameters such that adult informants are very likely knowledgeable, while audio speakers are less likely to be knowledgeable, e.g., $P(K = 1|G = adult) = \theta_{adult} > P(K = 1|G = audio) = \theta_{audio}$. From the parameters θ_g we may predict that on average, a more knowledgeable type of speaker will provide more information about an object whose label is unknown than a less knowledgeable type of speaker. However, given that infants

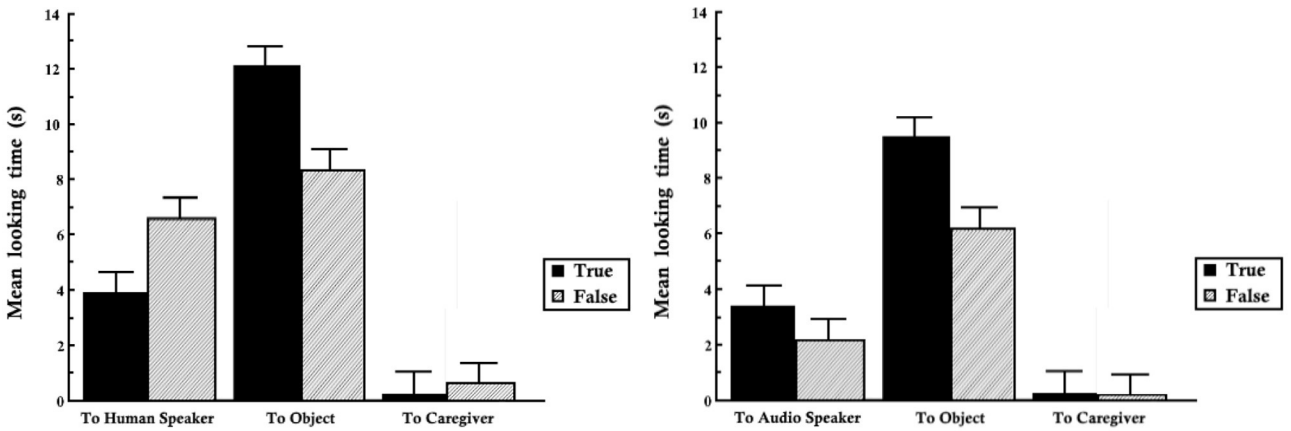

FIGURE 2 | Looking time to parent, label source, and label target for true and false labels from human (experiment one, **left**) and audio speaker (experiment one, **right**).

already knew the labels for all of these objects, we focus on the value of each type of informant for a different inference problem: inferring the speaker quality K.

When the learner observes a label, the impact on their certainty about the labeler's knowledgeability will be different depending on their beliefs about the affiliation of the speaker and the characteristic knowledgeability of their social group. We model this with a measure of information, the Kullback-Leibler divergence, which describes how differently knowledgeability is expected to be distributed before and after observing a label D, in the context of a correct label C and talker affiliation with group G. Equation (4) below describes this measure, and further details are given in **Appendix 1**.

$$D_{KL}(P(K|D,G,C)||P(K|G,C)) = \sum_{K} P(K|D,G,C)\log\frac{P(K|D,G,C)}{P(K|G,C)} \quad (4)$$

We predict that the total looking time will reflect infants' interest in a stimulus, which we index here as relative entropy (KL-divergence). While newer eye-tracking methods do allow tracking of continuous looking behavior and individual fixations, these details were not included in the data we are modeling.

We posit that knowledgeable speakers never produce an incorrect label. This means that on average, data from members of typically knowledgeable social groups—like humans—carry more information about the individual speaker's knowledgeability than data from members of typically unknowledgeable groups do. Moreover, infant looking time to talkers who have provided labels is predicted to be highest for adults labeling objects incorrectly, because this is the most informative scenario regarding informant knowledgeability: an informant that the infant had predicted to be almost certainly knowledgeable, is now revealed to be unknowledgeable. Such data defy the infant's prior expectations both that the informant is knowledgeable, and that their testimony will therefore be correct. This simple model does not include belief updating, but instead predicts that the infant will treat informants as equally unfamiliar on each trial.

4.3. Results

We applied our computational model to simulate infant looking behavior to social actors in response to true and false labels. The black bars in **Figure 2** show the amount of time infants spent looking in response to true labels, while the gray bars measure looks in responses to false labels. Both audio speakers and humans elicited more looks to objects with true labels, and accordingly the black bars in the center of each graph are longer than the gray bars paired with them. Given that infants already know the correct labels of these objects, and given the well-established finding that infants look longer toward the object being labeled in preferential looking paradigms, this benefit of true labels over false labels would be predicted under many different accounts, including those that do not incorporate source evaluation. However, infant looks to the label sources show a different pattern which cannot be explained by a preference for correct label forms.

Infants looked significantly longer to label sources in the condition where they were human speakers producing false labels than inhuman speakers providing correct labels, as shown by the leftmost gray bar in **Figure 2**. The third pair of bars in this left figure shows the same pattern. When infants heard false labels from adult speakers they also looked significantly longer to their caregiver, whose lap they were seated on. However, contrasting true and false labels from audio speakers produces no significant difference in the infant looks to the labeler and caregiver.

Our model can reproduce this qualitative pattern of looking behavior toward the label sources. **Table 1** describes the relative entropy (KL divergence between prior and posterior probability) of the speaker's knowledgeability given four possible circumstances of the labeling utterance—that the speech is either unambiguously supportive (a true label) or contradictory (a false label) to the given category, and that the speaker is either an adult

TABLE 1 | KL divergence of K with D compared to without for each type of observation.

Condition	$D_{KL}(P(K\|D,G,C)\|\|P(K\|G,C))$
Correct adult	0.0846
Incorrect adult	2.3219
Correct audio speaker	0.1701
Incorrect audio speaker	0.2345

or an audio speaker, for an illustrative set of model parameters: $\theta_{audio} = 0.15$ and $\theta_{adult} = 0.85$.

The incorrect adult informant described in the second row of **Table 1** is expected to provide far more information about knowledgeability than any other type of speaker. Even without a bias to perceive adults as more likely to be speech agents than audio speakers, the belief that an adult using incorrect labels is a surprisingly unrepresentative member of a characteristically knowledgeable group can explain infants' predisposition to attend to these informants far longer than others. This pattern is consistent with the experimental results that infants looked longest to these types of labelers.

Figure 3 shows how these predictions change for different values of the model parameters. The interaction effect, in which infants look longest to incorrect adult informants, is summarized by taking the model's predicted difference in looking between incorrect and correct humans, and subtracting the predicted difference in looking between correct and incorrect audio speakers. Lighter colors indicate more looking to adult humans, and darker colors indicate more looking to audio speakers. Essentially, the color captures the size and direction of the interaction effect.

For all scenarios where the priors on the knowledgeability for humans and audio speakers are identical, the difference in the KL divergence for correct vs. incorrect labels is also identical across the two types of informants. This equality can be observed in the identical hue in each box along the main diagonal from bottom left to top right. This means that a model that does not distinguish between types of informants—and thus assumes an equivalent prior on knowledgeability for both—would predict that infants exhibit the same looking behavior toward humans and audio speakers.

The empirical data instead show an interaction in which infants looked much longer to the incorrect human than to the correct human, but showed approximately equal looking to the incorrect and correct audiospeakers. This direction of interaction is shown as lighter colors on the graph, which occur below the main diagonal, and particularly for high priors on human knowledgeability. The model predicts that infants will look longest to incorrect adult humans so long as they believe that human adults are, as a class, the kind of informant which is *most likely* to correctly produce the target dialect. Individuals with apparently deviant behavior are predicted to provide the most informative testimony with respect to the correct priors on knowledgeability, as we have defined unknowledgeable speakers to be unpredictable compared to knowledgeable ones.

There is small difference in **Table 1** between correct and incorrect labels from audio speakers in our simulation that goes in the opposite direction from the trend found in the data. This difference may not be meaningful, however, given that it was not statistically reliable in the empirical data. The size of this predicted effect in the model depends on the prior on audio speaker knowledgability; as the prior gets smaller, the effect is also predicted to get closer to zero (reaching zero when $\theta_{audio} = 0$). No parameter setting in the model predicts an effect in the other direction. Nevertheless, small predicted effects in the model are still compatible with non-significant experimental results, given that experiments do not always have enough statistical power to reveal effects of small magnitude. The key result is the much larger predicted difference in looking times between correct and incorrect labels when the informant is expected to be knowledgeable.

4.4. Discussion

In our simulation, the relative entropy of infants' beliefs before and after hearing a label closely mirrored their looking behavior toward label sources. These results confirm the importance of perception of group membership on infants' behavior. The differences in looking behavior in response to humans and audio speakers fall straightforwardly out of a model where these different groups of speakers have different characteristic levels of knowledgeability. While the original model from Shafto et al. (2012) captures inferences about the knowledgeability of individual informants, the inclusion of groups in our model was crucial for reproducing infants' behavior: it provides a prior distribution over knowledgeability that differs between the two experimental conditions. A model that did not distinguish between groups of informants would incorrectly predict identical patterns of infant looking behavior for both human and inanimate speech sources. These findings suggest that beliefs about social groups play a role in lexical learning even in very young infants' word recognition processes.

Infants' looking behavior toward the social actors when they provide incorrect labels is crucial to distinguishing our account from alternatives. Although across the conditions, infants' overall looking to both social actors and objects is higher when adults supply the labels, this pattern could be evidence either by a preference for the adult labelers or a dispreference for the audio speakers, without necessarily requiring inferences about knowledgeability. However, the prior belief that adult labelers are more trustworthy, and can be expected to more often provide correct labels, predicts both the overall pattern of longer looking in response to adult labels, and the significantly longer looking times to both the adult labeler and caregiver in response to incorrect labels.

While the two "social groups" in this experiment were humans and audio speakers, children are likely to have a more general ability to sort informants into social groups that have different characteristic levels of knowledgeability about the target dialect. This could have far-reaching implications. For example, Supposing that evaluation of informant knowledgeability incorporates both linguistic and non-linguistic social perception, the function of attentional and memory processes controlling

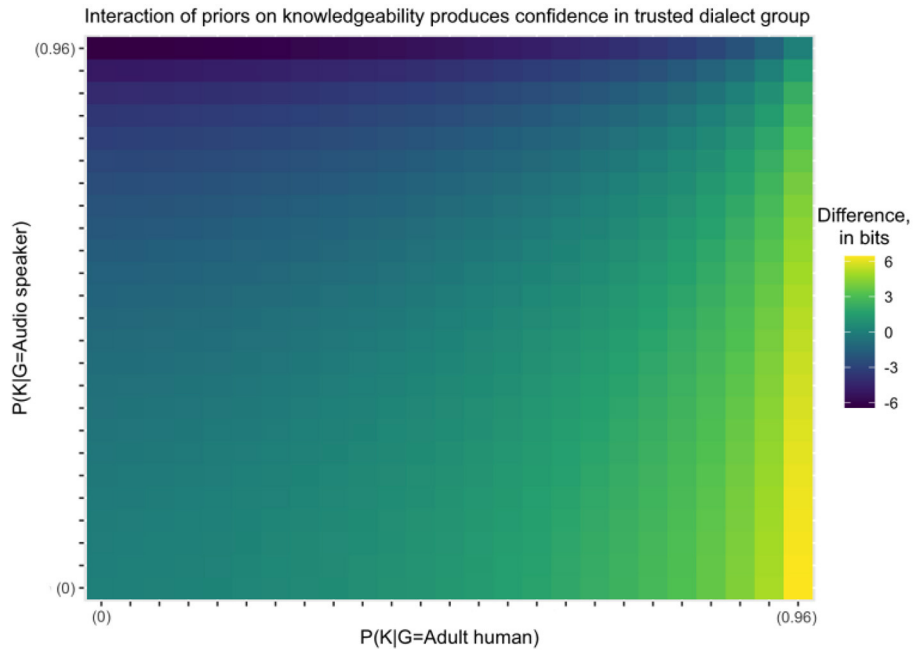

FIGURE 3 | The difference between the KL divergence for adult humans given incorrect and correct data, less the difference between the KL divergence for audio speakers given incorrect and correct data. The axes on the graph span most of the range between 0 and 1, but omit the last interval because KL divergence after hearing incorrect data is undefined when the prior on knowledgeability is 1.

lexical-phonetic perception in learners is predicted to vary even among speakers who share a language, by virtue of the distinct social beliefs entailed by membership in different social groups defined by dialect. If children expect membership in socially defined groups to predict the form and meaning of speech, we should predict differences in performance on tests of language knowledge by children with distinct social backgrounds.

Perception of non-linguistically defined groups and informant states, such as perceptual access cues, may also influence learners' attention to linguistic cues and their beliefs about them. Koenig and Echols (2003) included an experiment with both a silent human and an audio speaker to confirm that the longer looking times in response to adult labels were not simply driven by the physical presence of the human labeler, and found that there was a marginally significant effect on looking to the object, but no significant effect on looking to the labeler or the caregiver. In a fourth experiment, infants were presented with a human labeler who faced away from the visual display. Again, no significant effect was found for looks to the caregiver, however they did find an effect of condition—infants tended to look longer to the backwards facing human labeler for true labels. These results are consistent with our hypothesis that while infants assume that human informants as a group are more knowledgeable than audio speakers, their responses to labels are also influenced by sophisticated reasoning about the knowledgeability of individual informants.

The binary contrast used in this model is a simplification. Many experiments have shown infants are capable of acquiring labels from audio speakers. However, there is also significant evidence that infants' social abilities are intrinsic to natural language learning. For example, infants who receive live exposure to a phonetic contrast, when tested on the contrast, outperform infants exposed via digital displays Kuhl (2007). Although we predict that infants will more readily learn from live human sources compared to audio speakers, we do not predict that infants cannot learn from dispreferred sources, but rather that infants *expect to learn more* from the testimony of preferred sources and will be comparatively hyperattentive to deviance among informants of preferred social categories.

Our model is compatible with theoretical accounts of cross-situational word learning which seek to integrate infant attention to acoustic and social cues. However, our model further posits a mechanism to specifically explain how children acquire the ability to interpret linguistic variation in the context of social *identities* in addition to social behaviors. Demonstrating this experimentally requires studies which contrast informants in social identity and epistemic reliability.

In the next section we provide further evidence in support of our model, applying it to describe infants' behavior on a word learning task, where the label for an object is not known in advance. Novel labels preclude infants from using their lexical knowledge to make judgements about the knowledgeability of individual speakers based solely on those speakers' own utterances. We show that we can nevertheless model infants' behavior by assuming that they use agreement between talkers to make inferences about individual speaker's knowledgeability. Thus, social inference appears to play a key role in infants' lexical

processing, even when infants are still learning the meanings of the words that they hear.

5. SIMULATION 2

5.1. Task: Listening to Novel Words

Simulation 2 uses our model to simulate a novel word learning task. A large body of work has used an audiovisual habituation experiment called the Switch Task to investigate early word learning. Results from Switch task experiments show that infants who can perform well on a task discriminating two lexical neighbors, or words which differ by a single phoneme (e.g., "buk" and "puk"), nevertheless do not consistently discriminate those same labels after being habituated to the presentation of these speech tokens as the labels of two different objects (Stager and Werker, 1997). This difficulty does not appear for pairs of words which differ by multiple phonemes (e.g., "lif" and "neem") (Werker et al., 1998). Slightly older infants show significantly improved performance, with 17-month-old infants being successful at learning the phonetically similar words (Werker et al., 2002).

We focus on one variation on the Switch task experiment by Rost and McMurray (2009), which showed that exposure to multiple speakers during habituation helps support 14-month-old infants' success on the Switch task. Rost and McMurray (2009) trained infants on two lexical neighbors ("buk," "puk") in a Switch task, with stimuli recorded either from a single speaker, or from a total of 18 different speakers. Unlike the infants who heard exemplars recorded in a single voice, infants in the condition with multiple speakers successfully discriminated lexical neighbors on the switch trials. **Figure 4** shows that the difference in looking time between same and switch trials is enhanced in the condition with multiple speakers.

The authors attributed the infants' success in the multiple-speaker condition to a greater availability of useful phonetic variation in the input. Apfelbaum and McMurray (2011) subsequently modeled these results using associative learning principles. Instead of the infants attending to the acoustic cues which indicate the speech contrast being tested, their account predicts that infants may be attending in their perceptual learning primarily to acoustic cues characteristic of a particular speaker—in their model, characteristics of the speaker's voice are mistakenly associated with the object. Attending to speaker-specific cues causes the model to fail to register the phonological contrast between two labels simply because they were spoken by the same person. In the multiple speaker condition, where cues to speaker identity are different with each observed token, it is not possible for the learner to make this mistake.

This explanation for differences between the single speaker and multiple speaker Switch task conditions relies on the supposition that infants are demonstrating immaturity in their knowledge about which phonetic cues are relevant for distinguishing object labels. Rost and McMurray (2009) and Apfelbaum and McMurray (2011) both argued that exposure to a more diverse data set better facilitated the categorical learning by clarifying which cues were relevant for distinguishing the label.

However, although maturation in general knowledge of phonetic variation is one possible factor driving the Switch task results, there is already evidence that sociophonetic perception may play a role in guiding infant attention to phonological contrasts: 14 month old performance on the Switch task can be disrupted by non-phonological sociophonetic cues to gender (Quam et al., 2017). Moreover, the presentation of multiple speech sources may license a social inference that agreement among the speakers is indicative of reliability (Fennell and Waxman, 2010). We formalize this idea of social inference and show that our model predicts infants' behavior in Rost and McMurray (2009). Moreover, contrary to previous models, it predicts that infants will exhibit this behavior even if they can categorize speech sounds and identify the referent of the speech act in an adult-like way.

5.2. Model

We use the model from Shafto et al. (2012) of reasoning about categories and speakers of unknown reliability to simulate two experiments from Rost and McMurray (2009), contrasting the behavior of infants habituated to exemplars which were produced by either a single speaker, or by multiple speakers. We model the seven unique speakers that infants heard; in our simulation, we treat the learner as having received one data point from each speaker. In the previous simulation we presented, infants were able to directly observe what groups informants belonged to, and use their knowledge of familiar labels to infer informant quality, however, the experiments from Rost and McMurray (2009) test infants on their ability to learn novel words. We therefore assume that the infant's task includes inferring, rather than observing, the informants' group membership, and learning the novel label. Specifically, they observe some data D and infer the correct category C under uncertainty about speaker knowledgeability K. In the single speaker condition, all observations are attributed to one source, whereas in the multiple speaker condition, each observation may be attributed to a different source.

The simulations presented here use a hypothesis space of three possible labels (puk, buk, and duk) for illustrative purposes, but the qualitative results are not driven by the number of categories. We assume a uniform prior on the label C. We also assume that the prior probability of any given informant being knowledgeable is 0.5; this encodes the type of maximum uncertainty that might come from integrating over all possible groups.

The participants in Experiment 1 from Rost and McMurray (2009) heard seven consecutive instances of the same exemplar. We simulate the beliefs of the infant at the end of this habituation period by using our model to calculate the joint posterior probability of the category and the speaker's knowledgeability after seven instances of the same unambiguous token. We then compute the extent to which the model believes that the label seen during habituation is the correct label by computing the model's marginal posterior distribution over labels.

We model the infant's looking time as the result of a joint inference on (C, K) for a sequence of data points $\vec{D}$. We predict that looking time will correlate with certainty about the speaker's reliability. In this condition, all the data points are associated with a single belief about the knowledgeability of the speaker.

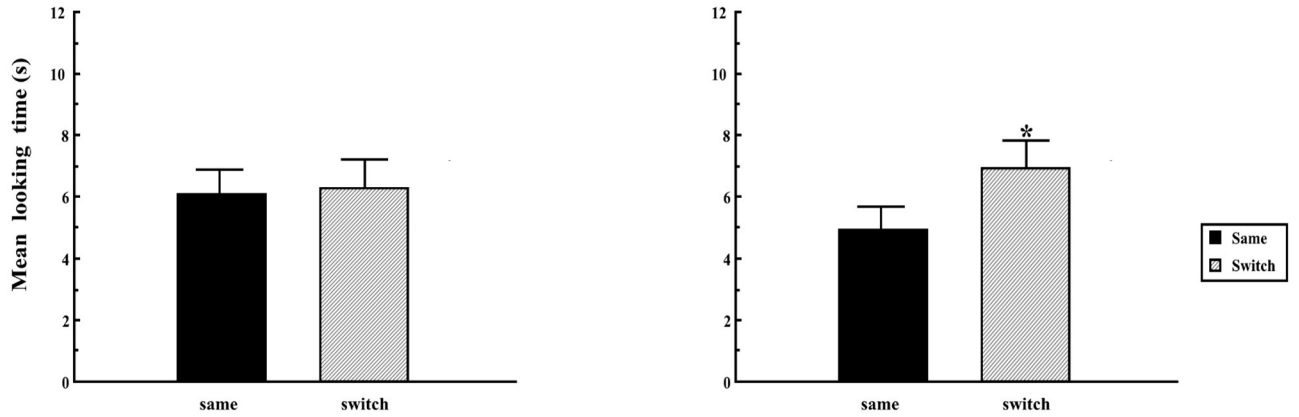

FIGURE 4 | Experimental results from Rost and McMurray (2009): 14 month-old infants do not have significantly longer looking time to the labeled object on switch trials after exposure to a single speaker **(left)** but they do after exposure to multiple speakers **(right)**. The asterisk indicates a statistically significant increase in looking on the switch trials compared to the same trials.

The joint posterior probability of the category and speaker's knowledgeability is given by Equation (5).

$$P(C, K|\vec{D}) = \frac{P(\vec{D}|C, K)P(C, K)}{\sum_{C',K'} P(\vec{D}|C', K')P(C', K')} \quad (5)$$

For the condition where the infant hears labels from multiple speakers, we model this as a joint inference on $(C, \vec{K})$ for a sequence of data points $\vec{D}$. In this condition, each data point is the contribution of a distinct speaker, and as such is associated with a unique belief about knowledgeability specific to this speaker. In other words, for a set of data with m elements, the listener must now infer a sequence $\vec{K}$ with length m.

$$P(C, \vec{K}|\vec{D}) = \frac{P(C, \vec{K})P(\vec{D}|C, \vec{K})}{\sum_{C',K'} P(C', \vec{K}')P(\vec{D}|C', \vec{K}')} \quad (6)$$

Table 2 illustrates how the size of the hypothesis space grows when observing three speakers. With the evaluation of additional speakers, it would continue to grow exponentially. This makes the posterior distribution too complex to calculate analytically, so we instead use Gibbs sampling, a Markov chain Monte Carlo method that allows us to perform approximate inference (Geman and Geman, 1984). Given the conditional distributions, $P(C|\vec{K}, \vec{D})$ and $P(\vec{K}|C, \vec{D})$, the Gibbs sampler iteratively samples from these, using the new value obtained at each step to sample from the other conditional distribution. This iterative sampling process converges to approximate the joint distribution described in Equation (6). For a more detailed description, see **Appendix 2**.

5.3. Results

In modeling looking times in the Switch task, we assume that increased certainty about the label, C, is expected to correlate with increased looking to the target image on switch trials, as a result of infants being more surprised at the novel label. By contrast, infants who are unsure of the label should demonstrate lower looking times, because their existing uncertainty makes a new label less surprising.

Table 3 shows the posterior probability the model assigned to each label after familiarization, across the two conditions. The table shows the predicted probability of each label, or category, C, being the correct name for the object, given an observation of data, D. In this case, the infant has observed seven tokens of the label "buk" associated with the object during habituation. The model predicts that infants will be much more confident of the object label after hearing multiple speakers agree. This

TABLE 2 | Hypothesis space given a scenario where the object label (C) is known, but the knowledgeability of three informants (K_1, K_2, K_3) is unknown.

Category and first speaker (C, K_1)	Second speaker (K_2)	Third speaker (K_3)
$C = \text{buk}, K_1 = 0$	$K_2 = 0$	$K_3 = 0$
		$K_3 = 1$
	$K_2 = 1$	$K_3 = 0$
		$K_3 = 1$
$C = \text{buk}, K_1 = 1$	$K_2 = 0$	$K_3 = 0$
		$K_3 = 1$
	$K_2 = 1$	$K_3 = 0$
		$K_3 = 1$

TABLE 3 | Posterior probability of the label after seven observations of "buk."

	Single speaker	Multiple speaker
Label	$P(C \mid D)$	$P(C \mid D)$
C = "buk"	0.6667	0.9992
C = "puk"	0.1667	0.0004
C = "duk"	0.1667	0.0004

occurs because agreement among speakers increases the model's belief that not all the speakers are unknowledgeable. Since unknowledgeable speakers do not always produce the correct label, this makes it more likely that speakers in agreement are knowledgeable, and have supplied the correct label. These results demonstrate that infant behavior can be predicted by the same model of reasoning about epistemic trust that described the behavior of 4 and 5 year old children.

5.4. Discussion

The simulation in section 4 applied a computational model to simulate infant behavior which is well-accepted as attributable to infants' evaluation of informant quality. The simulation of infant perception of labels in Rost and McMurray (2009) demonstrates that experiments in the literature that haven't previously been considered in the context of social inference may nevertheless be explained that way. We demonstrate that the pattern of results can be interpreted as evidence of social inference in word learning. Rather than changes in the infant's capacity for phonetic learning, social development may be the best explanation for observed behavioral changes, with infants making increasingly sophisticated judgements about group membership which selectively facilitate the learning of fine phonetic detail only in appropriate social scenarios. We argue that the cognitive development which underpins infant progress on the Switch task may be governed by changes in the meta-cognitive function of epistemic trust. Rather than simply reflecting more sophisticated phonetic perception, improvement on the Switch task at 18 months may reflect infants' developing strategies for determining informant group membership and reliability. Fine grained attention to contrastive phonetic cues may be gated by the infant's perception of an informant as giving reliable information about the phonetic characteristics of a particular language variety. Accordingly, we can explain the infant's ability to learn more precise phonetic detail by attributing to the infant (1) knowledge of an informant's group membership, and (2) the expectation that sources affiliated with reliable groups provide superior testimony. In the presence of apparently less reliable sources, we still predict that infants will learn, but that rather than acquiring fine phonetic detail, they will instead learn broader phonetic contrasts. In contexts where the presence of more reliable sources can be more confidently inferred, we predict that learners will selectively attend to phonetic detail provided by individual informants judged to be knowledgeable. While the majority of Switch task studies have attempted to measure infant recognition of words by assuming that the representational structures at issue did not reflect any meaningful variation in encoding of details about informants or their reliability, we argue that their results nevertheless also support our conclusions.

In what follows, we discuss two main alternative explanations that are often given to account for findings in the Switch task literature, and discuss their compatibility with our account. The first is that infants who fail on the Switch task do so due to a resource limitation. The second is that infants who fail on the Switch task do so due to the ambiguity or absence of referential cues. We argue that the source selection hypothesis is a parsimonious explanation which effectively unites both accounts.

5.4.1. The Cognitive Load Account

Associating an object with a label also requires the coordination of other cognitive processes, including attention, segmentation, and inference about the speaker's referential intent. The failure to demonstrate phonemic discrimination on the Switch task has sometimes been attributed to a resource limitation (Stager and Werker, 1997; Pater et al., 2004). The source evaluation account is compatible with these accounts, however it further provides a specific falsifiable prediction regarding the difficulty of the task: word learning is most likely to be evident under task conditions which facilitate inferences that the informant is a member of a trusted social group. Developmental changes on the Switch task may be best explained with reference to changing strategies for evaluating informants.

The cognitive load hypothesis is supported by infant improvement in performance on variations on the Switch task which are designed to be easier. Fourteen-month old infants perform above chance on a simpler Switch task administered with a preferential looking paradigm, consistent with the hypothesis that declines in performance observed under other conditions are the result of task difficulties (Yoshida et al., 2009). This slight preference is predicted by the model given in Apfelbaum and McMurray (2011), and under the assumption that the experimental participant assigns the event that the speaker in the habituation phase is knowledgeable a non-zero probability, our model predicts more looking to the labeled object during a preferential looking test as well.

In tasks involving familiar words and objects, 14-month-olds demonstrate increased sensitivity to phonetic detail (Swingley and Aslin, 2002; Fennell and Werker, 2003, 2004; Fennell, 2012). Supposing at least part of infants' difficulty in succeeding at the Switch task with minimally different labels is attributable to the increased task requirements of the audio-visual associative learning required to respond to novel words, then the presentation of familiar stimuli should alleviate that difficulty. In effect, the participants' prior knowledge may facilitate the task.

In our model, we can simulate this contrast by increasing θ_g, the characteristic group knowledgeability. The parameter K in our model predicts the likelihood of an informant both correctly identifying and labeling the referent, which, whether familiar or novel, is known to the experimental participant. Assuming that the infant believes that a familiar object is more likely to be known to their interlocutor, or that the object is simply more salient (and thus more likely to be known), an increase in $P(K|G)$ simulates the effect of familiar stimuli. Rather than the familiarity of the lexical items facilitating lexical processing, it may facilitate epistemic trust in the informant, indirectly resulting in greater phonetic sensitivity.

5.4.2. The Referential Ambiguity Account

Performance on the Switch task improves when the novel word is embedded in an overtly referential phrase (i.e., "look at the *blick*") (Fennell and Waxman, 2010) or when the training phase contains familiar named objects (Fennell et al., 2007). However,

when familiar objects in habituation are paired with exclamations (e.g., "Wow!" or "Whee!"), no improvement is observed (Namy and Waxman, 2000). These results have been interpreted as support for the hypothesis that 14-month-old infants' failure on the Switch task is a consequence of referential ambiguity. Cues which make the stimulus presentation more clearly a referential act increase the likelihood that infants demonstrably create a mapping between the word and object using fine phonetic detail.

Other studies demonstrate that the infants are more likely to succeed on the Switch task when additional referential cues are present. For example, 14-month olds look longer to switch trials after being exposed to pre-test trials showing the speaker labeling familiar objects (Fennell and Waxman, 2010). Fennell and Waxman (2010) interpreted these results to indicate that the infants were assisted in making inferences about the referential intentions of the speakers. In other words, strong referential cues helped the infants infer that the provided label was intended by the speaker to correspond with the object.

Our hypothesis is consistent with this one, but makes an important distinction in scope. Because Fennell and Waxman (2010) discuss infant inference about the referential nature of observed speech provided by a single individual, these data cannot distinguish between hypotheses which rely on characterizing the infant's perception of the specific informant's intentions and the infant's perception of the label when used by other informants. It is possible that the participants interpreted pre-test trials displaying accurate labeling behavior as evidence that the speaker is not only intentionally engaging in referential acts, but is doing so credibly as a member of the infant's social and linguistic in-group. The subsequent improvement in performance for these infants may demonstrate that they formed a belief that beyond their intent to refer, the speaker is epistemically a source of accurate linguistic data. Rather than simply inferring whether the speaker intends to label the object, the participant may also be concerned with whether the label is accurate and likely to be used by other speakers of their language. The latter inference is captured by our model.

The task is designed to make the labeled object salient to the experimental participant, so if we assume, as we have before, that the infants do know which object is being referred to, the inclusion of additional cues that the speech act references this object may again be encoded as an increase in the parameter θ_g. Rather than simply tracking the speech acts themselves, a listener who is also sensitive to source may interpret additional referential cues as a reflection on the individual knowledgeability or group membership of the linguistic informant. We expect any stimuli which bias the infant to believe the informant is more likely to select both the correct referent and label will also result in them being more surprised on switch trials, consequently improving performance on the task.

Inferences about the quality of the informant may also account for evidence from Galle et al. (2015) that increased acoustic variability helps infants' performance on the Switch task even when the increased variability is provided by a single talker. The variability of stimuli in Galle et al.'s experiment were designed to be naturalistic, varying across several speaking styles. The presented acoustic variation is therefore likely similar to the sort infants are accustomed to regularly encountering from reliable linguistic informants in their environment, potentially increasing infants' prior beliefs about K.

Increased visual variability in the presented objects, however, does not appear to improve infant performance (Höhle et al., 2020). Meta-analysis of Switch task experiments reveals that language-typical words are easier for infants to learn, and show a consistent advantage for bilingual infants over monolingual infants (Tsui et al., 2019). These findings are consistent with the hypothesis that performance on this task reflects infant social evaluation of informants for their knowledgeability about specific dialects.

6. GENERAL DISCUSSION

In this paper, we have analyzed two previous infant word learning experiments and have shown that their results can be predicted by a model which incorporates infants' beliefs about the relative value of informants. We extended a model from Shafto et al. (2012), created to describe word learning behavior in 5 year old children, which posits that learners recruit perception of the probability that talkers will correctly label objects. The word learning task in this model is described as relying upon inferences about both the label and the quality of the source. We then showed that this probabilistic model effectively simulates two experiments from the literature on infant perception of labeling: Koenig and Echols (2003), which investigates the looking patterns of infants to objects given exposure to familiar labels, and Rost and McMurray (2009), which investigates the looking patterns of infants to objects following habituation to a novel label.

The explanation provided for infants' behavior by our first simulation is similar to the original interpretation given by the authors of the study, but our simulation embeds that explanation within a formal model of socially informed word learning. Our extension of the model from Shafto et al. (2012) describes how learners might generalize beliefs about epistemic trust across groups of talkers, allowing the characteristics of a talker's group to constrain listeners' reasoning about the meaning of specific utterances.

In our second simulation, we have further demonstrated that infants recruiting these beliefs about characteristically knowledgeable groups may also explain their behavior in contexts where informant knowledgeability is unknown. Using metalinguistic knowledge regarding which combinations of speech varieties are likely being deployed by the multiple talkers, the learner can use the collective testimony of talkers who are individually of unknown quality as evidence to reason about the current talker's knowledgeability. This explanation differs substantially from previous accounts: rather than immature phonetic representations, our account attributes infants' trouble in the Switch Task to their developing sociolinguistic competence. Word learning settings may be more difficult than simple phonetic discrimination precisely because infants are performing the more complex task of inferring speaker

trustworthiness. Both simulations demonstrate that infants' looking behavior when hearing words may be explained with reference to social beliefs about the likelihood of agreement among talkers.

While the model set forth in this paper has not previously been used to describe infant language acquisition, we have shown that it provides a potential explanation for effects already established in the literature. Our simulations demonstrate that language learners may well be recruiting processes of epistemic trust to guide lexical acquisition much earlier than previously suggested.

Our results point to a new theoretical framework in which the object of lexical learning is not simply the acquisition of lexical forms, but rather, a metalinguistic framework for reconciling competing hypotheses about the lexical identities of individual speech tokens. Under this account, the learner's attention is distributed according to beliefs about the social and dialect group membership of the source, and the listener's perception of their own possible accuracy in identifying informants who are knowledgeable about their target dialect. The less likely a learner believes they are to be able to correctly predict whether a source is knowledgeable, the more certain they may then be that attending to this source will be surprising and informative about the speaker's knowledgeability. On the other hand, the more certain a learner can expect to be about the knowledgeability of an individual talker *before observing their speech*, the more likely they will be to judge that talker's testimony uninformative. Perfectly knowledgeable informants are predicted to produce useful, novel information about knowledgeability at lower rates than imperfect informants whose behavior is overall more unpredictable. The labels which will be most informative about the distribution of knowledgeability will therefore be incorrect labels produced by informants who are expected to be knowledgeable.

Therefore, we may describe language learners as fruitfully relying on differences in the relative perception of uncertainty to discriminate between linguistic informants. Differences in the breadth or specificity of listener social beliefs about contrasts between kinds of speakers may also predict differences in task complexity, both within groups and at the level of individual differences. Infants from different backgrounds may take different approaches to the same apparent task. Learners who have beliefs which cause them to more confidently discriminate among informants are predicted to selectively respond to informants they believe knowledgeable, displaying increased precision in their phonetic perception. Contrastively, we predict that learners with more uncertainty about the distribution of knowledgeable informants will display both weaker informant preferences and coarser phonetic perception. We predict that improvement on the Switch task with age can be explained by older infants requiring fewer contextual cues to resolve ambiguity between possible interpretations.

In what follows, we contextualize our model relative to the larger literature surrounding children's sociolinguistic competence during language acquisition and lay out our broader proposal for conceptualizing the problem of word learning. We then sketch fruitful directions for future work.

6.1. Evidence of Infant Sociolinguistic and Metalinguistic Knowledge

Our findings show that the receptiveness of preverbal infants to both familiar and novel lexical items can be described as the result of infant beliefs regarding the informant's membership in abstract social groups. Although our framing of the word learning problem as also involving social inference is a novel perspective with respect to models of word learning, it is consistent with a large body of literature showing that even very young children have substantial sociolinguistic competence. For example, 12 month old have been shown to use talker specific voice characteristics to learn talker-dependent linguistic structure, successfully generalizing grammatical rules learned from a single talker to sentences from novel talkers (Gonzales et al., 2018).

Language variation is correlated with social differences from an early age. Along with linguistic knowledge, developing language users also acquire social identities which influence their linguistic behavior. For example, gendered differences in speech are often associated with biological distinctions caused by sexual dimorphism, such as vocal tract length. However, gendered differences have been found to emerge in the speech of children before their physical development diverges. Perry et al. (2001) found that adults rated the speech of children aged 4–8 years as having distinctive genders, despite the fact that vocal tracts of boys and girls at this stage of development are structurally indistinguishable. Likewise, differences in gendered speech are not consistent across languages, as would be expected if they were solely predicted by physical characteristics (Cherng et al., 2002). Even within isolated and ethnically homogeneous populations, children inevitably acquire and deploy culturally specific metalinguistic and sociolinguistic knowledge.

The literature also provides evidence for the integration of linguistic and non-linguistic talker perception processes in infants. Infants represent differences between groups of talkers, and use this information to guide both their linguistic and non-linguistic social preferences, preferring to socially engage with talkers who use familiar rather than unfamiliar languages (Kinzler et al., 2007). In the second year of life, children show some evidence of being sensitive to cues that the speaker is uncertain about referring to an object, preferentially learning labels in conditions where the label is spoken with confidence (Brosseau-Liard and Poulin-Dubois, 2014).

By 5 years of age, children preferentially select same-race social partners, but show even stronger preferences for talkers with familiar over foreign speech accents (Kinzler et al., 2009). "In-group identity" is commonly accepted to emerge early, arising from processes of self-categorization (Spears, 2020). However, there has been very little previous work investigating how this kind of categorical social perception influences lexical

learning. Infants are known to rely on knowledge of the in-group to guide their social learning, but we can expect social knowledge to reciprocally affect their language acquisition. Linguistic and non-linguistic notions of in-group status appear to be intrinsically connected.

If infants' speech expectations are affected by perception of speaker affiliations, such as speech accent and appearance, we could expect infants to interpret phonetic information differently depending on the visual presentation of the talker. Weatherhead and White (2018) provide some preliminary experimental evidence to support this claim. In this study, 16 month old infants were exposed to familiar words either in a familiar or unfamiliar accent. The 16 month old infants possessed some expectations about accent and race, namely that familiar-race speakers are likely to pronounce words in familiar ways, while unfamiliar-race speakers are not. This evidence suggests that language learners' mental representations are associated with beliefs about identity, and that a perception of shared identity may make speech easier to process.

Corriveau et al. (2016) exposed children of backgrounds with varying socio-economic status (SES) to informants who either used passive or active voice constructions to describe images. They found that children from high SES backgrounds show a preference to learn novel words from informants who used the more complex syntax, while children from lower SES backgrounds preferred the informants who used simpler sentence structure. The finding suggests that despite both groups of children demonstrating understanding of the more complex syntactic form, that the relative amount of experience with informants who use each form predicted their selective trust in novel informants exhibiting the same behavior.

It is clear from this literature that perceptions of social and linguistic similarity are correlated. The present model demonstrates an explanation for why. Both may be interpreted a product of learners seeking informants who are representative of the epistemically preferable in-group, having both linguistic and non-linguistic attributes. The relationship between perception of social and linguistic groupings is bidirectional; an informant's linguistic attributes influence the interpretation of their non-linguistic behavior, and an informant's non-linguistic attributes likewise influence the interpretation of their linguistic behavior. It is not possible to address bias in the use or study of language without acknowledging how linguistic and non-linguistic cognitive processes are necessarily intertwined.

6.2. Reconceptualizing the Word Learning Problem

The literature reviewed in the previous section on the interaction between social groups and language, together with our modeling results showing that social inference likely plays a role in word learning, suggests that we need to reconceptualize the word learning problem. Instead of framing the word learning problem as proceeding in an asocial way, we need to view it as requiring learners to compare different talkers' social value as informants for language acquisition. The abstraction of a homogeneous speech community effectively denies the well documented ability of children to perceive contrastive social value between multiple alternative linguistic codes, and differences in their effect when employed by distinctive types of talkers. Incorporating non-linguistic talker perception and epistemic trust into a word learning model allows us to begin remedying several consequences of the asocial conceptualization of word learning.

Firstly, the present model permits the learner to perceive multiple varieties of the same language. In order to acquire a specific variety, the learner must be able to differentiate talkers using the dialect which they aim to acquire from talkers using different varieties—that is, they must be able to perceive speakers as more or less representative talkers of the target variety. Rather than generalizing observed variations in speech and communication patterns to all talkers, language learners' generalizations intrinsically describe contrasting subsets of talkers, each speaking a different variety of the same language. Our model presumes a learner who may interpret non-linguistic features as signals of linguistic utility through associative learning, and use these to identify subsets of talkers who may be more or less useful for acquiring their target variety.

However, whereas in our model, learners filtered out data from the non-target variety, this is unlikely to be accurate: developing a preference to imitate the acoustic patterns of, for example, either male or female talkers does not prevent children from acquiring linguistic units from the dispreferred category of talkers; the value of a particular informant may therefore eventually need to be modeled with a gradient measure of utility relative to a desired subset of talkers, rather than a categorical distinction between knowledgeable and unknowledgeable talkers. In this way, learners acquiring a target dialect would be able to draw on data even from informants who don't speak their target dialect, but who do speak the same language; but they would still treat data from same-dialect vs. different-dialect informants in fundamentally different ways.

Positing that there is one language variety which is considered more representative of knowledgeability than others predicts that a speaker who recognizes multiple dialects of a language will nonetheless favor one dialect over others. Such a model can potentially account for how learners develop principled beliefs about the form and content of speech from same race and other race informants, as well as the role of vernacular and standard dialectal items and structures within a given community of practice. Early in development listeners might to respond differently to dialects not just as a function of exposure but of attitudes toward the speech affected by the beliefs about the quality of that exposure.

Data from knowledgeable speakers will aid in the prediction of both what referential content other knowledgeable speakers provide and what referential content they will not. Conversely, data from unknowledgeable speakers is not helpful in predicting the referential content of labels from either knowledgeable or other unknowledgeable speakers. In effect, knowledgeable speakers are not only expected to produce reliable speech, they

are also expected to produce speech which can be **reliably recognized as reliable**, inducing in the listener not only a greater degree of confidence in their interpretation of the speech, but also a greater degree of confidence in the metalinguistic framework which produces that interpretation.

Previous computational models of language acquisition have relied on the abstraction that infants wholly dissociate their perception of the speech from that of the speaker, and therefore these models cannot predict any of the known effects of source evaluation on acquisition. We have shown that with incremental departures from the abstraction of an asocial learner expecting a monodialectal input, we are able to better capture patterns of infant behavior on tests of word knowledge. The perception of affiliative cues signaling informant group membership is therefore expected to have significant effects on language outcomes. Rather than excluding linguistic and non-linguistic affiliative judgements of language users from our understanding of the word learning problem, we instead argue that we should define learners as necessarily recruiting these non-linguistic judgements to validate their solutions to the language learning problem.

6.3. Investigating Infant Knowledge About Informants

Both of the simulations we have presented suggest that preverbal infants are epistemically evaluating sources of linguistic information. In effect, infants who are failing to attend to informants and detail in their speech may be demonstrating an expectation that the source and/or their data are not trustworthy. Experiments which control for infants' perception of source reliability are needed to provide more explicit support for this interpretation of the literature. To explore the link between processes of epistemic trust, social inference, and language acquisition, several directions are fruitful avenues for future research.

A crucial prediction of our theory is that in acquiring a specific speech variety, not all sources will be equally useful to a language learner. If the child is rationally interpreting evidence of label variation in a social setting, we should expect their attention to be distributed in accordance with their beliefs about the usefulness of speakers and kinds of speakers. There are a number of ways one could test this, including within existing paradigms such as the Switch task.

For example, suppose a Switch task preceded by a habituation featuring labeling from two speakers. The source-tracking hypothesis predicts that whether listeners demonstrate sensitivity to a phonetic contrast will be partially predicted by their belief that the speaker is knowledgeable. Supposing one of the speakers heard in pre-test is more reliable at labeling familiar objects, infants who hear this speaker's voice on test trials should be more likely to attend to switch trials than infants who hear the less reliable speaker's voice at test. Likewise, the use of a pre-test demonstration where the speaker is shown to be more or less reliable using non-linguistic cues (such as indicating with gaze where an object will appear) may diminish the beneficial effect of naming familiar objects pre-test. If infants are attending to the reliability of the speaker, then demonstrations that they are unknowledgeable in other ways may cause the infant to disprefer attending to that informant's phonetic variation.

More broadly, under the source selection account, preferences for informants which are formed early on may have far reaching effects, shaping the development of the lexicon for years afterwards. To explore this hypothesis, it is necessary to conduct a systematic comparison of infant performance after exposure to different amounts of testimony from differing numbers of informants. It is also necessary to determine how allocation of epistemic trust may vary between populations. Children from different cultural backgrounds and learning in different modalities are expected to eventually acquire distinct strategies for determining the reliability of an informant. Therefore, before we may tease apart the effects of exposure and epistemic trust on word learning, we must understand normal variation in its application. The present work suggests a new research program uniting studies of developmental social psychology with psycholinguistic processing, to discover how variation in phonetic representations are affected by the perception of identity, including attributes such as authority, gender, and race.

We have shown that uniting accounts of selective trust with language learning has the potential to deepen our understanding of many areas of linguistic study. A research program in early sociophonetic learning has the potential to increase understanding of variation in language outcomes owing to differences in cultural background, identity, and disordered language skills. In applied linguistics, it may assist in understanding the etiology of academic achievement gaps, or functional differences between typically developing and developmentally disabled language users.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

AUTHOR CONTRIBUTIONS

AT, NF, and WI designed the research, developed the model, and edited it. AT implemented the model, conducted the simulations, and analyzed the results. AT wrote the initial draft of the manuscript. All authors contributed to the article and approved the submitted version.

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1. APPENDIX 1: MODELING LISTENING TO FAMILIAR WORDS

In our first simulation we model data from Koenig and Echols (2003). We use Kullback-Leibler divergence, which describes the relative entropy of a distribution compared to a reference distribution, to measure the average number of bits learned about the speaker's knowledgeability after hearing them label an object. Specifically, we measure the difference between the posterior distribution over knowledgeability to the prior distribution,

$$D_{KL}(P(K|D,G,C)||P(K|G,C)) = \sum_{K} P(K|D,G,C)\log\frac{P(K|D,G,C)}{P(K|G,C)} \quad \text{(A1)}$$

We expand the posterior distribution $P(K|D,G,C)$ using Bayes' rule,

$$P(K|D,G,C) = \frac{P(D|K,C)P(K|G)}{\sum_{K'} P(D|K',C)P(K'|G)} \quad \text{(A2)}$$

where K is independent of C, and D is independent of G when conditioned on K. Substituting this expression into Equation (A1) and canceling terms yields

$$\sum_{K}\frac{P(D|K,G,C)P(K|G,C)}{\sum_{K'} P(D|K',G,C)P(K'|G,C)}\log\frac{P(D|K,G,C)}{\sum_{K'} P(D|K',G,C)P(K'|G,C)} \quad \text{(A3)}$$

The prior on knowledgeability, $P(K|G)$, is given in Equation (1), and the likelihood term, $P(D|K,C)$, is given in Equation (3).

2. APPENDIX 2: MODELING LISTENING TO FAMILIAR WORDS

In our second simulation we model data from Rost and McMurray (2009). Infants in the single speaker condition heard several datapoints from the same speaker. We assume they jointly inferred the label C for the object and the knowledgeability K of the speaker using Bayes' rule,

$$P(C,K|\vec{D}) = \frac{P(\vec{D}|C,K)P(C)P(K)}{\sum_{K',C'} P(\vec{D}|C',K')P(C')P(K')} \quad \text{(A4)}$$

where we assume uniform priors over C and K, and the likelihood $P(\vec{D}|C,K)$ is the product of the likelihoods of the data points, $\prod_j P(D_j|C,K)$. This likelihood function is given in Equation (3).

In the multiple speaker condition, infants heard datapoints from several speakers. We assume they jointly inferred the label C for the object and the knowledgeability K of each of the speakers, $P(C,\vec{K}|\vec{D})$.

Because the number of hypotheses grows exponentially With the number of speakers, we use Gibbs sampling to estimate this posterior distribution. We initialize C by sampling a uniform multinomial distribution and alternate between sampling $\vec{K}$ by sampling each speaker's K from its conditional distribution given current beliefs about the true label of the object,

$$P(K_j|C,D_j) = \frac{P(D_j|C,K_j)P(K_j)}{\sum_{K'_j} P(D_j|C,K'_j)P(K'_j)} \quad \text{(A5)}$$

and resampling C from its conditional distribution given current beliefs about the knowledgeability of the speakers,

$$P(C|\vec{K},\vec{D}) = \frac{P(\vec{D}|C,\vec{K})P(C)}{\sum_{C'} P(\vec{D}|C',\vec{K})P(C')} \quad \text{(A6)}$$

where j indexes over data points and each data point is assumed to have been produced by a different speaker. The likelihood term $P(\vec{D}|C,\vec{K})$ in Equation (A6) is the product of the likelihood terms for each data point, $\prod_j P(D_j|C,K_j)$. This likelihood, also used in Equation (A5), is given in Equation (3). We again assume uniform priors over C and K. The Gibbs sampler was run for 1,000 iterations and analysis was done on every third sample after a burn-in period of 100 iterations.

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BRIEF RESEARCH REPORT
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Parental Beliefs and Knowledge, Children's Home Language Experiences, and School Readiness: The Dual Language Perspective

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Parental beliefs and knowledge about child development affect how they construct children's home learning experiences, which in turn impact children's developmental outcomes. A rapidly growing population of dual language learners (DLLs) highlights the need for a better understanding of parents' beliefs and knowledge about dual language development and practices to support DLLs. The current study examined the dual language beliefs and knowledge of parents of Spanish-English preschool DLLs (n = 32). We further asked how socioeconomic and sociocultural factors were associated with parental beliefs and knowledge, and how parental beliefs and knowledge related to DLLs' home dual language experiences and school readiness skills as rated by their teachers. Results suggested both strengths and opportunities for growth in parental beliefs and knowledge. Moreover, parents from higher-SES backgrounds reported beliefs and knowledge that were more consistent with scientific evidence. Furthermore, parental beliefs and knowledge was positively related to relative Spanish input at home and negatively related to the frequency of English language and literacy activities. However, parental beliefs and knowledge were not associated with children's dual language output at home or the frequency of Spanish language and literacy activities. Finally, parental beliefs and knowledge were associated with children's school readiness skills in Spanish but not in English. Together, these findings highlight the need for culturally responsive interventions and parent education programs, which must recognize both the strengths and areas of improvement in parents of DLLs and support parents to transform knowledge into high-quality language and literacy experiences that benefit DLLs.

Keywords: dual language learners, dual language development, parental beliefs and knowledge, home dual language experiences, school readiness

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INTRODUCTION

In the United States, one in four preschoolers are dual language learners (DLLs), or children who are exposed to a language other than English at home (U.S. Census, 2018). Parents' dual language practices, including their dual language use and engagement in language and literacy activities, are strong predictors of DLLs' language and academic outcomes (Hoff et al., 2012;

Song et al., 2012, 2021; McCabe et al., 2013). Parents' practices are affected by their beliefs and knowledge (Weigel et al., 2006; Suskind et al., 2018). Furthermore, the beliefs and knowledge of DLLs' parents are embedded in their socioeconomic and sociocultural contexts, which often present unique challenges for their practices to support DLLs (Coba-Rodriguez et al., 2020; Cycyk and Hammer, 2020). As dual language development becomes a prominent phenomenon, there is a critical need to examine how parents' beliefs and knowledge regarding dual language development relate to DLLs' dual language experiences at home and their developmental outcomes.

Both sociocultural perspectives (Vygotsky, 1978; Rogoff, 2003) and the bioecological theory (Bronfenbrenner and Morris, 2006) emphasize the role of contexts in shaping and affecting children's development. According to the sociocultural theory, children develop language skills through engaging in social and language interactions with others, especially their parents (Vygotsky, 1978; Rogoff, 2003). Parents construct the social and cultural context for early learning, thereby playing a crucial role in children's language and cognitive development (Reis et al., 2000; Tamis-LeMonda et al., 2014a). In the bioecological model (Bronfenbrenner and Morris, 2006), children's development is embedded in a nested system of contexts. Frequent reciprocal interactions between the child and social partners (e.g., parents) in the immediate environment are proximal processes viewed as the primary mechanism for development. Furthermore, the proximal processes are affected by the characteristics of the child (e.g., age) and the environment (both immediate and more remote; e.g., socioeconomic status or SES, culture). The developmental niche theory (Super and Harkness, 1986) highlights parents' knowledge and beliefs about child development as a modifiable, proximal factor that drives parenting practices and children's home learning experiences. Guided by these theories, we hypothesize that parents' beliefs and knowledge about dual language development are shaped by their socioeconomic and sociocultural backgrounds, and further affect children's dual language experiences and developmental outcomes.

Therefore, we examined what parents of Spanish-English DLLs believe and know about dual language development and practices to support DLLs, how socioeconomic and sociocultural factors were associated with parental beliefs and knowledge, and how parental beliefs and knowledge, in turn, related to DLLs' dual language experiences at home and school readiness skills.

Parental Beliefs and Knowledge About Dual Language Development and Practices

There is growing knowledge regarding the characteristics of dual language development and evidence-based practices that support it (e.g., Byers-Heinlein and Lew-Williams, 2013; Hammer et al., 2014; Genesee, 2015). Research has shown that early exposure to two languages does not increase the risk for language delays or impairments (Genesee, 2015). Although DLLs may have lower levels of skills in each language compared to monolingual children (Vagh et al., 2009; Marchman et al., 2010), their knowledge (e.g., vocabulary size and grammatical skills) across the two languages is comparable to that of monolingual children (Pearson et al., 1993; Thordardottir et al., 2006; Hoff et al., 2012). Additionally, bilingual children may display behaviors unique to dual language development, such as code switching or language mixing, which do not indicate confusion (Hammer et al., 2014). Furthermore, bilingual children have been found to outperform monolingual children in certain aspects of social and cognitive development, such as theory of mind (Siegal et al., 2010) and metalinguistic awareness (Diaz and Farrar, 2018). For instance, a recent meta-analysis suggested a medium-sized bilingual advantage in children's theory of mind ability, after adjusting for language proficiency (Schroeder, 2018).

In terms of evidence-based practices to support DLLs, parental language input in both English and the home language can be beneficial. While early English proficiency has been found to predict children's academic growth, strong home language skills support English and academic learning, socio-emotional adjustment, and positive family relationships (Oh and Fuligni, 2010; Halle et al., 2012; Hammer et al., 2014; Tamis-LeMonda et al., 2014b). Most importantly, the quantity (e.g., number of words directed to children) and quality (e.g., back-and-forth conversations, frequent book reading activities, rich learning materials) of language environment provided by parents matter more than the type(s) of language parents use (Unsworth, 2016; Song et al., 2021). Thus, parents should speak with their children in the language(s) they are most proficient in so as to maximize the quality of their language input. In regard to school language environment, dual language programs have been found to support DLLs' home language development without slowing down their English growth (Durán et al., 2013; Collier and Thomas, 2017; Garcia, 2018).

Yet, little is known about what parents of DLLs believe and know about dual language development and practices. Past qualitative work suggests that parents of DLLs highly value bilingualism (e.g., Farruggio, 2010; Kang, 2013; Lee et al., 2015). In particular, Latino parents consider English skills as fundamental to children's academic success and view the use of Spanish as a bridge to English learning and a way to enhance family ties and cultural identity (Lee et al., 2015; Olivos and Lucero, 2018; Coba-Rodriguez et al., 2020; Cycyk and Hammer, 2020). Some parents of Spanish-English DLLs believe that bilingualism facilitates abstract thinking and brain development (King and Fogle, 2006). These beliefs and knowledge are in line with research that finds early skills in two languages to be associated with academic and social-emotional outcomes (Halle et al., 2012; Hammer et al., 2014; Tamis-LeMonda et al., 2014b) and certain social and cognitive advantages (Bialystok, 2009; Siegal et al., 2010).

Despite their strong desire to raise children to be bilingual, parents have uncertainty and misconceptions about how children develop dual language skills and how parents can best support them (Cycyk and Hammer, 2020). Some Latino immigrant parents believe that they are responsible for teaching

children Spanish and the school should teach children English (Adair and Tobin, 2008; Lee et al., 2015), whereas others express the feeling of guilt for not providing adequate English input (Coba-Rodriguez et al., 2020). Parents of DLLs are also concerned that early exposure to two languages may confuse children, cause or worsen language delays, or hinder English acquisition and school learning (Yu, 2013; Lee et al., 2015; Olivos and Lucero, 2018; Cycyk and Hammer, 2020; Piller and Gerber, 2021), even though views of detrimental effects of bilingualism have been firmly rejected by research (Espinosa, 2013; Hammer et al., 2014). Moreover, although research has demonstrated the benefits of supporting home language at school (Bialystok, 2018), parents report mixed attitudes toward dual language programs. While some parents embrace dual language programs (Olivos and Lucero, 2018), others are worried that these programs provide insufficient English or inferior home language input (Farruggio, 2010; Lee et al., 2015).

Parental Beliefs and Knowledge in Sociocultural Context

According to the bioecological theory of development, parents' beliefs, knowledge, and developmental goals are heavily influenced by their ecological and sociocultural environment (Bronfenbrenner and Morris, 2006). Yet, little is known about the variations in parents' perspectives toward dual language development. Here we asked whether parental dual language beliefs and knowledge varied by parents' socioeconomic, immigration, and linguistic backgrounds.

Prior work suggests that parents' native-born status as well as higher socioeconomic status (SES) and English proficiency are associated with more knowledge about infant development (Glick et al., 2009; Keels, 2009; Rowe et al., 2016) and early language and literacy development (Davis et al., 2016; Gonzalez et al., 2017; Suskind et al., 2018). This might be explained by disparities in parents' access to professional sources of developmental knowledge (Rowe et al., 2016).

However, whether these findings apply to parents' *dual language* beliefs and knowledge remains unclear. Qualitative work finds that parents often seek knowledge about dual language development from scientific research and professionals (King and Fogle, 2006), which might suggest an advantage for parents from higher-SES background. However, educational and health professionals sometimes provide misinformation on dual language development (Yu, 2013; Langdon, 2015). Additionally, there is some, albeit limited, evidence that parents' personal experiences as immigrants and/or DLLs help them develop an understanding of dual language development and strategies for achieving bilingualism (King and Fogle, 2006; Lee et al., 2015). For instance, immigrant parents who recently came to the United States tended to show more positive attitudes toward heritage language maintenance than those who had lived in the country longer (Orozco, 2008; Farruggio, 2010; Barbosa, 2015). Immigrant parents who were fluent bilinguals also believed in the benefits of early dual language exposure (King and Fogle, 2006).

Parental Beliefs and Knowledge in Relation to Children's Home Dual Language Experiences and Developmental Outcomes

Parental beliefs and knowledge are manifested in their parenting practices and children's home learning experiences, which contribute to children's language and school readiness skills (Rowe et al., 2016; Suskind et al., 2018). For example, Latino mothers' beliefs about the facilitative role of literacy activities predicted the frequency of mother-child shared-reading at home and children's vocabulary and emergent literacy skills (Gonzalez et al., 2010; Cottone, 2012; Davis et al., 2016). However, the relation between parental dual language beliefs and knowledge and children's dual language experiences can be more complicated. Although parents' beliefs shape their language use strategies with DLLs (see De Houwer, 1999), multiple challenges, including parents' limited language proficiency, the lack of resources, and children's changing language skills and preference, can lead to discrepancies between what parents believe and what they do (Guardado, 2002; Liang, 2018).

To our knowledge, there have only been two quantitative studies examining the associations between parental dual language beliefs and knowledge and children's dual language experiences and/or developmental outcomes. One study with Latino parents of 2- to 4-year-old children found that the more parents believed in children's ability to learn two languages and considered teaching children Spanish and avoiding language mixing to be important, the more Spanish was used at home (Mancilla-Martinez and Lesaux, 2014). The research team also replicated this finding in parents of school-aged, Spanish-English DLLs who had limited English proficiency (Hwang et al., 2020). That is, parents who believed in children's ability to learn two languages were more likely to construct a Spanish-dominant environment at home, presumably to compensate for the overwhelmingly English-speaking environment outside home. They also found that Spanish use at home was negatively associated with children's conceptual vocabulary (i.e., total concepts children knew across English and Spanish). Hwang and colleagues speculated that the negative effect of parental beliefs on children's conceptual vocabulary might be due to children's preference to complete the conceptual vocabulary tests in English rather than Spanish, despite their limited English proficiency. Although these two studies are informative, little is known about how parental beliefs and knowledge are related to other aspects of children's dual language experiences at home (e.g., the frequency of language/literacy activities) or child outcomes beyond vocabulary skills.

The Current Study

Research on parental dual language beliefs and knowledge is primarily qualitative, which provides important insights into the complex and diverse perspectives of parents of DLLs. However, quantitative work can help us describe parental beliefs and knowledge at the group level and understand how parental beliefs and knowledge relate to parents' socioeconomic and sociocultural backgrounds, children's dual language experiences

at home, and developmental outcomes. Synthesizing the themes from past work, we developed a survey to examine the beliefs and knowledge of Spanish-English DLLs' parents and asked three research questions.

(1) What are parents' beliefs and knowledge about dual language development and practices to support DLLs? We expected to identify both strengths and opportunities for growth in parents' beliefs and knowledge.
(2) How do parents from different SES, immigration, and linguistic backgrounds vary in their beliefs and knowledge? Although these factors predict parents' developmental knowledge, prior qualitative work suggests that the variations in parents' dual language beliefs and knowledge may not follow the same pattern.
(3) How do parental beliefs and knowledge relate to the dual language use at home, the frequency of language and literacy activities in English and Spanish at home, and children's school readiness in the two languages? We expected parental beliefs and knowledge to be associated with more Spanish use at home. Yet little is known about how parental beliefs and knowledge might relate to language and literacy activities and children's school readiness skills.

METHODS

Participants

Participants were 32 primary caregivers (30 mothers, 1 father, and 1 grandparent; hereafter referred to as parents) and their 3- to 5-year-old Spanish-English DLLs. All participating children were exposed to Spanish from at least one of the following social partners: mother, father, siblings, other adults in the household, and/or the child's friends. These participants were recruited from 14 classrooms in a preschool in a metropolitan area in the United States. Seventy-five percent of the parents self-identified as Latino and 25% as African Americans. Four out of the eight African American parents were bilingual in English and Spanish. Although the other four African American parents did not speak Spanish, their children were exposed to Spanish from other people such as their father.

Procedure

Parents were asked to fill out a questionnaire about their demographic information, dual language beliefs and knowledge, and children's dual language experiences at home. The questionnaire was available in both English and Spanish. Children's school readiness skills were rated by the lead teachers and teaching assistants in each classroom.

Measurements

Demographic Information

Parents reported on their ethnicity, educational level, household income, native-born status, and number of years living in the United States. Parents also reported how well they could understand, speak, read, and write in English and Spanish, respectively (1-not well at all, 4-very well; adapted from the Early Childhood Longitudinal Study, Birth Cohort; see Baker, 2014). An average score was calculated to indicate parents' proficiency in each language.

Parental Dual Language Beliefs and Knowledge

To assess parental beliefs and knowledge, we adapted the Questionnaire for Early Childhood Teachers of Dual Language Learners (Song et al., 2020) and developed a survey with 15 statements that were either consistent or inconsistent with the scientific evidence of dual language development and practices that support it (see **Table 1**). Parents rated each statement on a 4-point scale (1-strongly disagree, 4-strongly agree). The survey yielded good reliability (Cronbach's alpha = 0.726). Ratings for statements that were inconsistent with the scientific evidence were reversely coded. A composite score was calculated for each parent by averaging their ratings for all statements, with higher values indicating beliefs and knowledge more consistent with scientific evidence. We also coded parents' responses into 1-correct/0-incorrect and calculated the average correct rate for each item.

Children's Home Dual Language Experiences

Parents reported on the language(s) children heard from mother, father, younger sibling(s), older sibling(s), other adult(s) in the household, and children's friends respectively (i.e., *language input*; 1-Only Spanish, 5-Only English), and children's use of English and Spanish with these social partners respectively on the same scale (i.e., *language output*; see Branum-Martin et al., 2014). An average score was calculated for dual language input and output, respectively.

Additionally, parents reported on how frequently family members engaged in language and literacy activities in English and Spanish with their children (i.e., reading, telling stories, teaching letters, rhyming games, and teaching words; 1-Never, 5-Everyday; Lonigan and Farver, unpublished). An average score was calculated to indicate the *frequency of language and literacy activities* in English and Spanish, respectively.

Children's School Readiness Skills

Both the lead teacher and teaching assistant in each classroom rated children's school readiness skills in English on 12 items (e.g., "Can express his/her needs, wants, and thoughts in age-appropriate English."; 1-not yet, 5-proficient; adapted from the Early Childhood Longitudinal Study, Kindergarten; National Center for Educational Statistics, 1998). Children's school readiness skills in Spanish were rated by the lead teacher and/or teaching assistant who understood Spanish using the same items. Ratings from the lead teachers and teaching assistants were highly correlated (English: $r = 0.91$, $p < 0.001$; Spanish: $r = 0.74$, $p < 0.001$). A composite score was created for each language by averaging both teachers' ratings on all the items.

Missing Values

Two percent (4 out of 192 responses) of the demographic variables were missing and were imputed by SPSS's multiple

TABLE 1 | Descriptive statistics for parental beliefs and knowledge about dual language development (sorted by correct rates from lowest to highest).

Statements	*M*	*SD*	Strongly disagree	Disagree	Agree	Strongly agree	Correct rate	Non-parametrics binomial test	*p*
Immigrant parents should try to speak English as much as they can so that their children will do well in United States preschools and schools.	2.62	0.79	12.5%	18.8%	62.5%	6.3%	31.3%	1.95	0.052
A parent can only support a child's dual language development if she/he can speak English and another language (e.g., Spanish).	2.53	0.72	6.3%	40.6%	46.9%	6.3%	46.9%	0.18	0.860
English-speaking children may show academic and language delays in dual language programs.	2.42	0.81	12.9%	38.7%	41.9%	6.5%	51.6%	0.00	1.000
For dual language learners, although skills in each language may fall behind monolingual children early on, the total growth in both languages (e.g., total vocabulary of English and Spanish) is comparable to monolingual children (i.e., children who only speak English).	2.67	0.66	0.0%	43.3%	46.7%	10.0%	56.7%	0.55	0.584
Being in an English-only preschool program is the best way for a young dual language learner (a child learning two languages) to acquire English.	2.22	0.75	18.8%	40.6%	40.6%	0.0%	59.4%	-0.88	0.377
If support in the home language (e.g., Spanish) is not continued during the school years, dual language learning children will not become fluent bilinguals.	2.72	0.77	6.3%	28.1%	53.1%	12.5%	65.6%	1.59	0.112
When children mix two languages in their communication (e.g., mixing words from two languages in a sentence), they are confusing the two languages as being one.	2.25	0.62	9.4%	56.3%	34.4%	0.0%	65.7%	1.59	0.112
Young dual language learners are often confused about which language to speak in social situations.	2.09	0.64	15.6%	59.4%	25.0%	0.0%	75.0%	2.65	0.008
Immigrant parents whose children are showing language delays should stop using the home language and speak only English so as not to confuse the children.	2.00	0.68	22.6%	54.8%	22.6%	0.0%	77.4%	2.87	0.004
Children who are exposed to two languages may experience delays in cognitive development due to the dual-language exposure.	1.74	0.86	48.4%	32.3%	16.1%	3.2%	80.7%	3.23	0.001
Hearing two or more languages in childhood may cause confusion and put children at greater risk for language delay or impairment.	1.94	0.67	25.0%	56.3%	18.8%	0.0%	81.3%	3.36	0.001
Use of the home language (e.g., Spanish) by children or parents at home slows down children's English learning and should be discouraged.	1.69	0.69	43.8%	43.8%	12.5%	0.0%	87.6%	4.07	0.000
Although dual language learners may show delays in their second language initially, they can catch up to monolingual children (i.e., children who only speak English) if they receive enough support.	3.13	0.56	0.0%	9.7%	67.7%	22.6%	90.3%	4.31	0.000
If rich dual language input is maintained, dual language learners can catch up with their monolingual peers.	3.03	0.54	3.1%	3.1%	81.3%	12.5%	93.8%	4.77	0.000
Preschool programs that support home language (e.g., Spanish) benefit children's development of English skills.	3.14	0.44	0.0%	3.4%	79.3%	17.2%	96.5%	4.83	0.000

imputation. We presented below the pooled results from 20 imputed datasets. There were no missing data for parental beliefs and knowledge and children's home dual language experiences. The teacher-rated school readiness data were missing for 5 children, because both the teacher and teaching assistant in the classroom were on sick leave during data collection, and the new teachers did not know the children well enough to provide the ratings. These children were excluded from the analyses involving school readiness outcomes.

RESULTS

Descriptive statistics for child and parent demographic variables, parental dual language beliefs and knowledge, children's home dual language experiences, and children's teacher-rated school readiness skills are presented in **Tables 1**, **2**. The families had relatively low income, with 83.4% having an annual household income of no more than $50,000, way below the local region's median household income for a family of four at $74,533 (The American Community Survey, 2019)

TABLE 2 | Descriptive statistics for demographic variables, children's home dual language experiences, and children's school readiness skills.

	Mean (*SD*) or%	Min	Max
Child characteristics			
Age (months)	48.88 (5.40)	37.82	65.15
Males	37.50%		
Parent characteristics			
Age (years)	32.47(8.33)	22	69
Ethnicity			
Latino	75%		
African American	25%		
Educational level			
1-Lower than high school	9.4%		
2-High school or GED	37.5%		
3-Some college	15.6%		
4-Associate degree	12.5%		
5-Bachelor's degree	21.9%		
6-Graduate degree	3.1%		
Household annual income[a]			
1-<$5k	10.0%		
2-$5k-$15k	13.3%		
3-$15k-$25k	26.7%		
4-$25k-$50k	33.3%		
5- $50k-$75k	10.0%		
6-$75k-$100k	3.3%		
7->$100k	3.3%		
Native born	60%		
Years living in the United States (for foreign born only)	20.75(9.31)	10	38
English proficiency[b]	3.38(1.05)	1	4
Spanish proficiency[b]	2.83 (1.20)	1	4
Home dual language experiences			
Language input[c]	3.66(0.88)	1.8	4.83
Language output[d]	4.01(1.06)	1.4	5
English language and literacy activities[e]	3.89(0.92)	1.33	5
Spanish language and literacy activities[e]	2.54(1.19)	1	4.67
Children's school readiness skills in English[f]	3.13(0.96)	1.67	4.83
Children's school readiness skills in Spanish[f]	1.80(1.03)	1	4.63

[a]*At the time of data collection, the region's median household income for a family of four was $74,533 (The American Community Survey, 2019) and the national median household income for a family of four was $68,703 in 2019 (Semega et al., 2020).*

[b]*Average score of 4 items examining parents' ability to understand, speak, read, and write in English and Spanish (1-Not well at all, 2-Not well, 3- Well, 4- Very well).*

[c]*Average score of 6 items on the types of language mother, father, older siblings, younger siblings, other adults, and friends use when speaking to the target child (1-Spanish only, 2-Mostly Spanish, 3-Spanish and English equally, 4-Mostly English, 5-English Only).*

[d]*Average score of 6 items on the types of language the target child use when speaking to mother, father, older siblings, younger siblings, other adults, and friends (1-Spanish only, 2-Mostly Spanish, 3-Spanish and English equally, 4-Mostly English, 5-English Only).*

[e]*Average frequency of family members engaging in different language and literacy activities (i.e., reading, telling stories, teaching letters, rhyming games, and teaching words) with the target child (1-Never, 2-Less than once a month, 3-A few times a month, 4-A few times a week, 5-Everyday).*

[f]*Teachers' average rating of children's school readiness skills in English and Spanish (12 items for each language; 1-not yet, 2-beginning, 3-in progress, 4-intermediate, 5-proficient).*

and the national median household income of $68,703 in 2019 (Semega et al., 2020).

Parents' Beliefs and Knowledge About Dual Language Development and Practices

As a group, parents scored 2.87 (*SD* = 0.30, range = 2.33–4.00) on the parental beliefs and knowledge survey and had an average correct rate of 71% (*SD* = 0.15; range = 33%–100%), suggesting that in general, parental dual language beliefs and knowledge were more consistent with scientific evidence than not. At the same time, there existed substantial variation in parents' beliefs and knowledge. One parent responded to all statements correctly, whereas some parents responded to less than half of the statements correctly.

Table 1 presents descriptive statistics for parental responses. Among the 15 statements, the correct rates ranged from 31.3% to 96.5%. Non-parametric binomial tests suggested that the correct rates of 6 statements were significantly greater than chance at the Bonferroni-adjusted significance level ($p < 0.05/15 = 0.003$; see **Table 1**).

Most parents believed that dual language exposure does not increase the risk for cognitive or language delays (81%), and that immigrant parents whose children have language delays should continue using their home language (77%). Similarly, 75% of parents believed that young DLLs understand which language to speak in social situations. However, 44% of parents viewed code-switching (e.g., mixing words from two languages in a sentence) as a sign of confusion, even though research has shown that it is a natural characteristic of dual language development (Hammer et al., 2014).

When comparing dual language and monolingual development, over 90% of parents believed that DLLs are able to catch up with their monolingual peers in English when receiving sufficient support. Yet, parents were less certain about whether DLL children's total growth in both languages (e.g., total vocabulary of English and Spanish) is comparable to monolingual children's skills in one language, with only 57% of parents agreeing with this statement.

In terms of practices to support dual language development, although most parents (88%) believed that the use of home language by children or parents at home does not slow down English development, some parents still had misconceptions and misunderstanding. For example, 69% of our sample agreed that immigrant parents should speak English as much as possible with their children to support their children's school learning; about 50% thought that parents can only support a child's dual language development if they can speak English and another language; and about 34% did not realize that continued support in the home language during the school years is necessary for DLLs to become fluent bilinguals.

Finally, parents held mixed beliefs about dual language education. Almost all parents (97%) believed that preschool programs that support home language benefit children's English development. Yet, about 40% of the parents considered English-only programs as the best way to support DLLs' English learning,

and about 48% of parents agreed that dual language programs could be harmful to English-speaking children.

Relating Parental Beliefs and Knowledge to Demographic Factors

We conducted correlations and *t*-tests to examine whether parental beliefs and knowledge varied by their SES, immigration, and linguistic backgrounds. Parental education (r = 0.37, p = 0.036) and household income (r = 0.51, p = 0.007) were positively correlated with parental beliefs and knowledge. Parental beliefs and knowledge did not vary by their native-born status ($t(30)$ = 0.12, p = 0.907), English proficiency (r = 0.20, p = 0.276), or Spanish proficiency (r = 0.15, p = 0.408).

Relating Parental Beliefs and Knowledge to Children's Home Dual Language Experiences and School Readiness Skills

We first conducted bivariate correlations to examine whether parental beliefs and knowledge were associated with children's dual language experiences at home and their school readiness skills in English and Spanish. Parental beliefs and knowledge were not significantly correlated with dual language input (r = −0.13, p = 0.483) and output (r = −0.01, p = 0.969), the frequencies of English (r = −0.19, p = 0.301) and Spanish (r = −0.10, p = 0.601) language and literacy activities, or children's school readiness skills in English (r = 0.21, p = 0.289) and Spanish (r = 0.29; p = 0.147). These bivariate correlations were not significant, probably because they did not account for the variations in parents' English and Spanish proficiency and other demographic factors. It is therefore important to examine how parental beliefs and knowledge relate to children's dual language experiences and school readiness outcomes in multiple regression models that control for relevant individual and contextual factors.

We next conducted multiple regression models, using parental beliefs and knowledge as the key predictor, and the dual language input and output, the frequencies of language and literacy activities in English and Spanish at home, and children's school readiness skills in English and Spanish as the dependent variables. We examined whether each dependent variable was associated with any of the demographic variables (i.e., parental education, ethnicity, native-born status, and language proficiency as well as household income and child age). Demographic variables that were correlated with each dependent variable were controlled in the respective regression models.

As shown in **Table 3**, parental beliefs and knowledge were associated with relatively more Spanish input at home ($b(SE)$ = −0.62(0.28), *beta* = −0.21, p = 0.028; $F(6, 25)$ = 18.92, R^2 = 0.82, $p < 0.001$; see Model 1) but were not related to children's dual language output (p = 0.287; see Model 2), after controlling for parents' English and Spanish proficiency, native born status, educational level, and ethnicity. Furthermore, parental beliefs and knowledge were negatively associated with the frequency of English language and literacy activities ($b(SE)$ = −0.88(0.38), *beta* = −0.29, p = 0.019; $F(5, 26)$ = 9.98, R^2 = 0.66, $p < 0.001$; see Model 3), after controlling for parents' English and Spanish proficiency, native born status, and child age. However, parental beliefs and knowledge did not significantly predict the frequency of Spanish activities (p = 0.183; see Model 4), above and beyond parents' English and Spanish proficiency, native born status, and ethnicity. Finally, parental beliefs and knowledge were positively associated with children's school readiness skills in Spanish ($b(SE)$ = 1.91(0.50), *beta* = 0.35, p = 0.016; $F(4, 22)$ = 8.72, R^2 = 0.61, p = 0.016; see Model 6), after controlling for parents' English and Spanish proficiency and native born status. The prediction was not significant for school readiness skills in English (p = 0.211; see Model 5) after controlling for child age. Given the small sample size and the number of predictors, our models are underpowered and prone to error, so regression findings need to be interpreted with caution.

DISCUSSION

In this study we examined the beliefs and knowledge parents of Spanish-English DLLs had about dual language development and practices to support DLLs. We also asked how parental beliefs and knowledge were associated with their socioeconomic and sociocultural backgrounds, as well as children's dual language experiences at home and school readiness skills. Three key findings emerged. First, parents showed both strengths and misconceptions in their understanding of dual language development and practices. Second, parents from higher-SES backgrounds had dual language beliefs and knowledge that were more in line with scientific evidence. Third, parental beliefs and knowledge were associated with some, but not all, aspects of children's dual language experiences, as well as children's school readiness skills in Spanish. Due to the small sample size, our investigation was exploratory, and the findings should be interpreted cautiously. Nonetheless, the current study has both theoretical and practical contributions. Theoretically, the current study expanded prior evidence of the role of parent-child relationship and interactions on children's social and cognitive development, such as individual's behavior (Berscheid, 1999; Reis et al., 2000), prosociality (Eisenberg et al., 2016), and evaluation processes (Geraci, 2020; Marshall et al., 2020), by applying the sociocultural theory, the bioecological model, and the developmental niche theory to the dual language learning context. Practically, the study added to the limited quantitative empirical data regarding parental beliefs and knowledge about dual language development and its relations with DLLs' dual language experiences and developmental outcomes, thereby informing the development of caregiver-focused language interventions for DLL families. We discuss the three key findings and their theoretical and practical imports in each of the following subsections.

Strengths and Misconceptions in Parental Beliefs and Knowledge

Parents in our sample displayed multiple strengths in their dual language beliefs and knowledge. Most parents recognized the benefits of supporting home language development

TABLE 3 | Parental beliefs and knowledge predicting children's home dual language experiences and school readiness skills.

	Model 1: Dual language input[a]					**Model 2: Dual language output[a]**				
	B	***SE***	***Beta***	***t***	***p***	***B***	***SE***	***Beta***	***t***	***p***
Parent English proficiency	0.38	0.11	0.45	3.59	0.000	0.70	0.17	0.69	4.04	0.000
Parent Spanish proficiency	−0.38	0.10	−0.51	−3.63	0.000	−0.36	0.18	−0.40	−2.03	0.042
Parent native born	−0.11	0.25	−0.06	−0.43	0.670	−0.74	0.44	−0.35	−1.68	0.094
Parent education	0.13	0.07	0.21	1.86	0.063	0.14	0.12	0.19	1.17	0.241
Latino	−0.14	0.25	−0.07	−0.56	0.579	−0.15	0.41	−0.06	−0.36	0.722
Parental beliefs and knowledge	−0.62	0.28	−0.21	−2.20	0.028	−0.50	0.47	−0.14	−1.06	0.287
Model fitness	$F(6, 25) = 18.92$, $R^2 = 0.82$, $p < 0.001$					$F(6, 25) = 8.60$, $R^2 = 0.67$, $p < 0.001$				
	Model 3: English language and literacy activities					**Model 4: Spanish language and literacy activities**				
	B	***SE***	***Beta***	***t***	***p***	***B***	***SE***	***Beta***	***t***	***p***
Parent English proficiency	0.48	0.15	0.55	3.14	0.002	−0.02	0.21	−0.02	−0.09	0.929
Parent Spanish proficiency	−0.04	0.11	−0.05	−0.36	0.721	0.58	0.20	0.58	2.86	0.004
Parent native born	0.25	0.33	0.14	0.75	0.454	−0.52	0.48	−0.22	−1.08	0.282
Latino	–[b]	–	–	–	–	0.08	0.49	0.03	0.16	0.874
Child age	−0.06	0.02	−0.32	−2.68	0.007	–	–	–	–	–
Parental beliefs and knowledge	−0.88	0.38	−0.29	−2.34	0.019	−0.72	0.54	−0.18	−1.33	0.183
Model fitness	$F(5, 26) = 9.98$, $R^2 = 0.66$, $p < 0.001$					$F(5, 26) = 6.99$, $R^2 = 0.57$, $p < 0.001$				
	Model 5: Teacher−rated school readiness in English					**Model 6: Teacher−rated school readiness in Spanish**				
	B	***SE***	***Beta***	***t***	***p***	***B***	***SE***	***Beta***	***t***	***p***
Parent English proficiency	–	–	–	–	–	−0.41	0.19	−0.42	−2.19	0.029
Parent Spanish proficiency	–	–	–	–	–	−0.03	0.15	−0.03	−0.19	0.850
Parent native born	–	–	–	–	–	−0.85	0.40	−0.41	−2.14	−0.033
Child age	0.08	0.03	0.41	2.27	0.023	–	–	–	–	–
Parental beliefs and knowledge	0.71	0.57	0.22	1.25	0.211	1.19	0.50	0.35	2.40	0.016
Model fitness	$F(2, 24) = 3.28$, $R^2 = 0.22$, $p = 0.055$					$F(4, 22) = 8.72$, $R^2 = 0.61$, $p = 0.016$				

[a] *Higher value indicates relatively more English and less Spanish input/output at home.*
[b] *Demographic variables that were not associated with the dependent variable at the bivariate level were not included in the model.*

in the home and school contexts and rejected the false beliefs that dual language exposure causes or worsens cognitive or language delays. These beliefs are consistent with prior findings that bilingualism and home language growth benefit children's social and cognitive development, such as academic performance (Tamis-LeMonda et al., 2014b), socioemotional adjustment (Hammer et al., 2014), family relationship (Oh and Fuligni, 2010), metalinguistic awareness (Diaz and Farrar, 2018), and theory of mind (Siegal et al., 2010). These evidence-based beliefs should be recognized as strengths and reinforced in parent education and intervention programs to motivate and empower parents of DLLs.

Nonetheless, there existed opportunities for improvement. Parents tended to misperceive characteristics of dual language development as indicators of problem or disadvantage. Many of them viewed code-switching as a sign of confusion and did not realize that when there is sufficient support in either language, DLLs' total growth across the two languages is comparable to monolingual children's skills in one language. Yet, empirical research has suggested that code-switching is a normal and natural phenomenon in the course of dual language development (Hammer et al., 2014), and that DLLs' total language knowledge across the two languages is similar to, if not larger than, that of monolingual children (Pearson et al., 1993; Thordardottir et al., 2006; Hoff et al., 2012). These misconceptions of parents could lead to unnecessary concerns about children's language development and discourage parents from exposing children to two languages (Lee et al., 2015; Cycyk and Hammer, 2020). Additionally, some parents underestimated the importance of continued support in the home language and viewed using English at home and school as the best way to promote DLLs' English and academic growth. Ample evidence has suggested that dual language programs are equally, if not more, effective in supporting English development compared to English-only programs (Barnett et al., 2007; Collier and Thomas, 2017), and that the quality of language input is more important than which language children hear (Paradis, 2011; Song et al., 2012, 2021). However, this set of knowledge still needs to be communicated to parents of DLLs. Together, these findings highlight specific areas of parental dual language beliefs and knowledge that need to be improved, thereby informing the development of culturally responsive interventions and services.

Parental Beliefs and Knowledge in Relation to Demographic Factors

We found enormous variations in parental dual language beliefs and knowledge (see also Mancilla-Martinez and Lesaux, 2014; Hwang et al., 2020). More importantly, these variations were associated with SES. Parents with higher levels of education and income showed greater levels of dual language beliefs and knowledge. This finding is consistent with prior work on SES differences in parents' knowledge about general infant development and early language and literacy development (Davis et al., 2016; Rowe et al., 2016; Gonzalez et al., 2017; Suskind et al., 2018). There is evidence that parents gain dual language beliefs and knowledge from professionals and scientific research (King and Fogle, 2006). Parents from higher-SES background might have greater access to these sources of information (Rowe et al., 2016). Therefore, there is a need to make research-based information on dual language development and practices more accessible to low-SES parents in order to enhance their knowledge.

We did not find any association between parental beliefs and knowledge and their native-born status or English or Spanish proficiencies. These findings challenge the deficit view of the knowledge and practices of immigrant parents (Song, 2019). While being native-born and being proficient in English may be related to higher levels of parental knowledge in other areas of child development (e.g., general development and early language development; Glick et al., 2009; Keels, 2009; Suskind et al., 2018) through more exposure to such knowledge, immigrant parents' own dual language experiences might provide unique knowledge and skills, as part of the households' Funds of Knowledge, to support DLLs' development and learning at school (González, 2005; King and Fogle, 2006).

Parental Beliefs and Knowledge in Relation to Children's Home Dual Language Experiences and School Readiness Skills

In line with the sociocultural perspectives, which emphasize the critical role of parents and parent-child interactions in children's language acquisition (Vygotsky, 1978), our findings revealed that parental beliefs and knowledge might shape how they construct children's dual language learning environment and impact DLLs' development outcome. Higher levels of parental beliefs and knowledge predicted more Spanish input at home and less frequent English language and literacy activities. Parents who had views that were more consistent with research evidence might recognize the importance of providing sufficient and sustained home language exposure to dual language development, therefore placing more emphasis on Spanish input at home but considering school to be more responsible to teach children English (Adair and Tobin, 2008; Lee et al., 2015). However, parental beliefs and knowledge were not related to children's dual language output or the frequency of Spanish activities. Perhaps children's dual language output is influenced by their own language preference or language skills rather than their parents' expectations. Additionally, parents may not be aware of the importance of engaging DLLs in language and literacy activities in Spanish beyond merely speaking Spanish with them or have limited time and resources for these activities (Liang, 2018).

Parental beliefs and knowledge predicted children's school readiness skills in Spanish but not in English. These findings offer preliminary support for the link between parental beliefs and knowledge and DLLs' school readiness skills. Although the current study did not have enough power to test mediation models, parents with greater knowledge of dual language development and practices may better support DLLs to develop school readiness through providing Spanish input at home. Spanish input may strengthen parent-child relationship (Oh and Fuligni, 2010; Liang, 2018; Cycyk and Hammer, 2020), which further supports language and cognitive development. For instance, there is evidence that DLL children's Spanish fluency was related to the quality of parent-child relationship, which in turn predicted children's school performance (Schofield et al., 2012). It is also possible that parents with children who showed stronger school readiness skills in Spanish developed stronger beliefs about children's ability of learning two languages and the benefits of bilingualism.

Limitations

The study has several limitations. First, given the exploratory nature of the study, the small sample size, and the relatively large age range of the target children (3- to 5-year-old), findings must be interpreted with caution and replicated in future work. In particular, more work is needed to understand whether these findings are generalizable to DLL children in varying age groups and families from different linguistic, cultural, and socioeconomic backgrounds. It would also be meaningful to further ask whether the association between parental beliefs and knowledge and child outcome is mediated by children's dual language experiences at home. Additionally, our survey of parental dual language beliefs and knowledge is still preliminary. We are currently revising the survey to capture a more comprehensive picture of parental dual language beliefs and knowledge (e.g., how to provide high-quality language environment for DLLs, DLLs' developmental milestones), which will be given to a larger and more diverse sample of parents of DLLs, allowing assessment of the psychometric property of the instrument. Furthermore, the study was correlational, which precludes causal inferences. Experimental and longitudinal work is needed to examine how parental beliefs and knowledge is related causally to DLLs' dual language experiences and developmental outcomes and how parental beliefs and knowledge might change over time. Finally, we used teacher reports of children's school readiness skills. Future research should also include direct and/or observational assessments and examine other developmental outcomes.

CONCLUSION

Understanding parental dual language beliefs and knowledge is a necessary step to supporting families of DLLs. This study revealed both accuracy and misconceptions in parental dual language beliefs and knowledge. Parental dual language beliefs and knowledge varied by SES and were associated with DLLs' dual language experiences at home and school readiness skills in Spanish. Together, these findings highlight the essential role parents play in dual language development. There is a need for culturally responsive interventions and parent education programs, which must recognize both the strengths and areas of improvement in parents of DLLs and support parents to transform knowledge into high-quality language and literacy experiences that benefit DLLs.

DATA AVAILABILITY STATEMENT

The datasets presented in this article are not readily available because only members of the research team are allowed to have access to the data. Requests to access the datasets should be directed to rufan.luo@rutgers.edu.

ETHICS STATEMENT

The study was reviewed and approved by the Rutgers University Institutional Review Board. Written informed consent to participate in this study was provided by the participants or the participants' legal guardian.

AUTHOR CONTRIBUTIONS

RL contributed to the study design, data collection, data analysis, and manuscript writing. LS contributed to the study design, data analysis, and manuscript writing. CV and GS-B contributed to the data collection. All authors contributed to the article and approved the submitted version.

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Narrative Elicitation as Ethnography: Methodological Insights From the Examination of Children's Perspective Marking in Amdo Tibetan

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This paper employs a case study with Amdo Tibetan children to demonstrate the benefits of narrative elicitation for ethnographic language socialization research in under-studied languages. Primarily by examining spontaneous verbal interaction, existing language socialization research has demonstrated how salient grammatical resources shape children's understanding of cultural belief systems pertaining to sociality and the appropriate display of emotion. However, spontaneous data do not always capture children's full linguistic repertoires and competencies, and may therefore present a partial picture of their mastery over particular grammatical systems. One such area that remains to be studied is how children use interactional cues to build their emerging knowledge of grammatical perspective marking in Tibetan languages. This paper integrates narrative elicitation with ethnographic methods from language socialization to examine how Amdo Tibetan children mark perspective using evidentiality, the grammatically-obligatory encoding of knowledge source, an area not frequently documented in language socialization studies. Language socialization research involved 15-months of participant observation, audio-video recording, and analysis of spontaneous interactions with children aged 1–4. This ethnographic research found that adults' narratives highlighted local theories about the importance of compassion (Tib. *snying rje*) by using grammatical evidentiality to emphasize characters' direct experiences in the story-world. However, grammatical evidentiality was under-represented in children's spontaneous talk. To provide further insight into children's mastery of evidentiality in this culturally salient communicative genre, I conducted narrative elicitation tasks with seven Amdo Tibetan children, aged 2–7. By framing narrative elicitation tasks as forums for social interaction in family homes, I adapted a method traditionally used in experimentation to complement the study of naturalistic interaction. Interaction analysis of the elicited narratives found that family members positioned young children as novice narrators, leading to dialogic rather than monologic narratives. Young children co-constructed shared perspectives on narrated events, and used evidentiality in conventionalized ways by mirroring the grammatical forms of adults' previous utterances. By adapting narrative elicitation

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tasks to language socialization's ethnographic methods, this paper models how qualitative researchers can locate patterns in children's experiences of language across complementary settings of data collection, an endeavor that is particularly important to research with child speakers of under-documented languages.

Keywords: language socialization, ethnography, narrative elicitation, language endangerment, perspective marking, evidentiality, Tibetan language

INTRODUCTION

This paper employs a case study from an Amdo Tibetan community (Qinghai, China) to demonstrate how narrative elicitation can be used in the ethnographic investigation of young children's language development. The paradigm of language socialization provides us with the most widely accepted, comprehensive methodology for conducting ethnographic research on language acquisition, especially (but not exclusively) on young children's first language acquisition (Schieffelin and Ochs, 1984). Language socialization researchers share the conviction that language systems emerge through social interaction. As a result, children's experiences of language are inseparable from the everyday communicative routines and belief systems that constitute the cultures they are raised in. Grounded in the discipline of Anthropology, language socialization researchers employ specialized ethnographic methods involving four key features: (1) longitudinal research design; (2) field-based collection and analysis of audio-visual recordings; (3) sociohistorical contextualization of data; and (4) consideration of the links between immediate settings of interaction, and social and political systems (Garrett, 2008). While the first two features show significant methodological overlap with field linguistics and language documentation, the second two features are shared by cultural and linguistic anthropology more broadly.

Language socialization's ethnographic attention to local communicative practices lends itself to a preference against working with elicited data (Miller et al., 2014, p. 190). The explicit focus on spontaneous verbal interaction has led to major advances in our understandings of the dialectical relationship between language and cultural systems. At the same time, language socialization's expansive theoretical orientation leaves room for additional modes of inquiry. In interpreting spontaneous language data, language socialization scholars draw together interdisciplinary theories, including developmental psychology's attention to attachment and relationality in the socialization of emotion (Clancy, 1986; Fung, 1999; Takada, 2019), educational psychology's interest in the interactional construction of identity (Cook, 1996; He, 2004), and cultural psychology's incorporation of experimental tasks into participant observation (Rogoff et al., 1998; Xu, 2019). Language socialization research with naturalistic data has documented how local communicative routines shape young children's emotional experiences and social relationships, a point of interest that unites the disciplines of Psychology, Education, and Anthropology.

However, spontaneous data do not always demonstrate children's full linguistic competencies, and may therefore present a partial picture of children's mastery over key grammatical systems. One such area that remains to be studied holistically is how young children use interactional cues in grammatical perspective marking. Children (and other language learners) only begin to produce syntactic forms well after they comprehend them (Clark, 2009, p. 14). Therefore, young children may not readily use all grammatical resources that are salient in the language input they encounter. In communities where languages are shifting and we have limited documentation of key grammatical resources, it is particularly pressing to uncover children's full knowledge of how to mark perspective and display emotion in line with cultural belief systems.

Existing literature has addressed socialization into community expectations surrounding perspective-marking and emotional expression by examining content-based and grammatical patterns in adults' speech to children, as well as children's multimodal contributions to spontaneous narratives. For example, Burdelski and Mitsuhashi (2010), Clancy (1999), and Suzuki (1999) addressed how Japanese teachers and caregivers use grammatical resources to shape children's emotional alignment with evaluations. Lo (2009) showed how, in a Korean heritage language school, teachers used grammatical evidentiality to evaluate students as morally worthy or suspect. Studies of American (Hérot, 2002), Chinese (Huang, 2011), and Japanese (Takada, 2019) family interactions found that caregivers use affect lexicon, or vocabulary related to emotion, to guide children's behavior and provoke their expressions of empathy. Everyday narrative is a particularly rich discourse genre for enacting emotion socialization. When narrators report and re-enact their own or others' responses to past events, they provide a model for expected emotional reactions (Ochs and Capps, 2001, p. 135–155). For example, Miller's et al. (1996) comparison of everyday narratives in American and Taiwanese families shows how caregivers tell stories *about* children that portray others' emotional reactions to their past actions. Morita (2019) demonstrated that even very young toddlers actively respond to such everyday storytelling, using movement and the physical environment to claim co-tellership and assert their knowledge when adults are speaking about them. These studies demonstrate that, as children build communicative competence, they learn to associate specific grammatical resources with emotional displays. Also, when children learn to use grammatical resources to express emotions in culturally specific ways, they internalize systems of moral value (Clancy, 1986; Lo and Fung, 2014).

TABLE 1 | Frog story elicitations by primary teller.[1]

Name	Sonam	Sakya	Lhamo	Tashi	Dawa	Dolma	Yeshi
Age at elicitation	2;8	4;0	4;2, 4;5, and 5;7	4;4	5;10	5;10 and 7;3	6;9
Date(s) of elicitation	6/11/2017	3/18/2017	1/22/2017; 4/30/2017; 6/18/2018	6/21/2017	1/22/2017	1/22/2017; 6/18/2018	4/23/2017

Although this existing research has addressed the coordination of emotion in light of differences in adults' and children's repertoires, spontaneous data do not always demonstrate children's full mastery over salient grammatical systems. As Ochs (1986, p. 835) emphasizes, social values and culturally shaped subject positions motivate and constrain language repertoires. Therefore, identifying the values that a community associates with specific grammatical systems and aged subject positions (Berman, 2019) can explain the presence or absence of certain features in child language. Regardless of language input, children may avoid producing grammatical systems or entire codes (Meek, 2008) that are inconsistent with their identities. These cultural effects on repertoire intersect with the accepted crosslinguistic finding that children may produce syntactically embedded features, such as evidentiality, later in their chronological development. Crosslinguistic studies using psycholinguistic methods suggest that children produce direct evidential marking around age two, but do not produce contrastive evidential marking until after age 4 (Aksu-Koç, 1988 on Turkish; Courtney, 2014 on Quechua), and may not comprehend evidential contrasts until middle childhood (de Villiers and Garfield, 2009 on Central Tibetan). When salient socializing routines involve grammatical systems that are under-represented in children's spontaneous repertoires, additional methods are required to clarify children's full communicative competence. As Andersen (2014) found, for example, semi-structured play routines that position participants in a range of social roles can illuminate children's knowledge of how to mark registers that are inconsistent with their aged identities.

In this paper, I build on literatures from language socialization and the pragmatics of evidentiality to suggest a supplementary method for examining children's uses of key grammatical systems. With a case study of perspective marking in Amdo Tibetan narratives, I demonstrate how narrative elicitation tasks can clarify children's socialization to use culturally valued language structures. As recent work in documentary linguistics suggests, adults' collaborative approaches to elicitation tasks can provide insight into a language's encoding of social cognition (San Roque et al., 2012). Using a similar lens, I present narrative elicitation tasks as socially and culturally situated activities, in an ethnographic setting where there is an obvious mismatch between children's and adults' linguistic repertoires. By employing interaction analysis, this paper positions semi-structured narrative elicitation as an ethnographic method, which can be used to locate patterns in children's experiences of language across complementary settings of data collection. By taking local concerns over children's social and linguistic development as a starting point for defining the object of analysis, this paper offers a research design that is community-based. It also provides a new orientation to a method generally considered to be experimental rather than ethnographic. This approach is particularly well-suited to addressing the language experiences of child speakers of under-documented languages, in settings where language shift threatens the intergenerational continuity of communicative routines.

MATERIALS AND METHODS

This section describes the data set examined in the results, details the methods used to collect and interpret the data, and outlines the interpretive decisions that motivated the use of semi-structured elicitation.

The Data Set

The data examined in this paper include a collection of ten elicited Frog Story narratives, told by seven Amdo Tibetan children, aged two through seven, with their caregivers and/or siblings (**Table 1**). I examined children's Frog Story narratives alongside five folktales elicited from young adults. I contextualized these narrative elicitations with adults' descriptions of the functions of narrative in childrearing. Two of the children were enrolled as focal participants in a related longitudinal research project. The other five child participants and the adult participants were recruited from among these two children's community members.

The narrative elicitation procedure sought to document children's grammatical repertoires in socially-situated experiences of storytelling. The elicitation procedure used a picture book prompt to present one child narrator, the primary teller, with a structured event sequence. I hypothesized that using a picture book prompt would encourage children to produce evidentiality, which was salient in adult narratives to children, but under-represented in children's spontaneous talk.[2] Evidentiality refers to the grammatically-obligatory marking of

[1] All names are pseudonyms. Children's ages are given in years; months. Lhamo and Dolma participated in the narrative elicitation task more than once, to allow me to examine changes in their individual language repertoires over time for a separate project.

[2] A comparison with spontaneous narratives is beyond the scope of this article. See Ward (2021) for an examination of spontaneous interactions involving narrative as moral socialization. In these interactions, children responded to adults' narratives. Specifically, a 6-year-old child marked past sequences with direct evidentials, while younger children used directives and formulaic expressions without evidentials.

knowledge source. Evidentiality involves perspective marking, and is therefore a potent resource for articulating emotional displays. As elaborated below, the Amdo Tibetan evidential system is integrated with tense/aspect. I hypothesized that, because children's everyday talk tended to feature directives and remain focused on present activities, evidentiality was under-represented in spontaneous data. I hypothesized that a set of temporally sequenced images would prompt children to produce evidentiality. To examine this hypothesis, I piloted a narrative elicitation task with two children who were focal participants in the longitudinal study, Lhamo (age 4;2) and Dolma (age 5;10). In these first narrative elicitations, Lhamo and Dolma marked perspective with evidentials, revealing uses of grammar that were under-represented in their spontaneous talk. Due to the success of these initial samples, I recruited five additional child participants for narrative elicitation.

Mercer Mayer's (1969) wordless picture book *Frog, Where Are You?,* which has been used frequently in crosslinguistic studies (Bamberg, 1987; Stromqvist and Verhoeven, 2004), served as the elicitation prompt. In traditional Frog Story methods, participants are unfamiliar with the picture book before beginning their narratives. Participants are then instructed to look through the entire picture book. After viewing all of the pages, participants are instructed to retell the story while looking at each picture in sequence (Berman and Slobin, 1994).[3] In this study, the wordless picture book was used to spark engagement in a social activity of storytelling. In each elicitation, I pre-identified one young adult or child to be the primary teller. I conducted the narrative elicitations in the primary teller's home. When children were primary tellers, adult caregivers and one or more of the children's siblings co-constructed the emerging narrative. The primary teller did not look through the pictures ahead of time, but crafted the narrative as they moved through the picture book.

I video-recorded all narrative elicitations, and transcribed them morpheme-by-morpheme alongside one of the child narrator's adult family members. I used the Leipzig glossing rules to annotate the data.[4] Employing language socialization methods, I approached transcription sessions as an ethnographic practice (Schieffelin, 1990, p. 31). Adult assistants offered ongoing commentary on linguistic features as well as their beliefs about narratives and childrearing. Caregivers' interpretations and comments were included in annotations, and used as contextual ethnographic data.

With this approach to narrative elicitation, I did not attempt to use the picture book as a stimulus in a regularized experiment. Rather, I developed a method of flexible prompting, with the goal of observing how children and families responded to a novel storytelling situation. This allowed me to collect data that complemented naturalistic interaction and were appropriate for interaction analysis. Children's participation in the social settings of elicitation, as well as the form and content of their talk, serves as the primary object of analysis in this paper.

Interaction Analysis

After collecting and transcribing the elicited narratives, I used interaction analysis to examine children's uses of evidentiality in perspective marking. Interaction analysis is derived from conversation analysis (Goodwin and Heritage, 1990) and language socialization (Duranti et al., 2014). It is an empirical method of interpreting how participants build on each other's contributions to ongoing talk. Interaction analysis takes particular interest in the sequential unfolding of talk, which provides the researcher with direct access to collaborative meaning-making (Sacks et al., 1974). That is, interaction analysis highlights the turn-by-turn processes through which participants build intersubjective alignments, using language and other semiotic resources.[5] Interaction analysis is particularly well-suited to examining perspective marking because it reveals how participants coordinate shared and evolving knowledge states in real-time. These processes build our knowledge of language, as we respond to and identify our own and others' emotional and epistemic states. The patterns of linguistic perspective marking that interaction analysis reveals in local communicative settings intersect with broader cultural value systems (de León and García-Sánchez, 2021).

The Linguistic Setting: Examining Perspective Marking Through Evidentiality

Evidentiality refers to a set of grammatical resources that speakers use to talk not only about *what* they know, but also *how* they know it. While speakers of all languages discuss their information sources through words, about a quarter of the world's languages include grammatical evidentiality, or morphemes that speakers *must* use to specify the knowledge source behind every utterance. Evidential morphemes can express additional meanings alongside knowledge source. This is true in Tibeto-Burman languages, where evidential morphemes also express time (tense/aspect) and subjectivity (self vs. others' perspectives). In Amdo Tibetan, evidential morphemes encode participants' positionality in relation to one another and their objects of joint attention. Specifically, Amdo evidential markers differentiate three major categories of knowledge: (1) "egophoric" evidentials articulate knowledge gained through personal involvement or experience; (2) "factual" evidentials articulate general knowledge; and (3) canonical evidentials articulate contingent knowledge

[3]Larger-scale crosslinguistic projects have used different media for elicitation tasks, including short films (Chafe, 1980) and in-person and pre-recorded narratives (Mushin, 2001).

[4]The Leipzig Glossing Rules: Conventions for interlinear morpheme-by-morpheme glosses. Available online at: https://www.eva.mpg.de/lingua/pdf/Glossing-Rules.pdf (accessed December 14, 2020).

[5]Although recent language socialization research uses interaction analysis to look at the coordination of language with other embodied communicative resources, such as touch and gaze (Goodwin and Cekaite, 2018), this paper retains a focus on a specific grammatical system. This focus is relevant to methodological issues in ethnographic research with child speakers of under-documented languages whose grammatical systems are vulnerable to endangerment. As Evans et al. (2018) argue, despite the inseparable links between language and other semiotic systems, "our understanding of the full panoply of grammatical means used across languages for intersubjective coordination remains basic" (112).

TABLE 2 | Amdo perfective and progressive evidential markers.

	Egophoric (EGO)	Factive (FCT)	Canonical Evidential: Direct (DE)	Canonical Evidential: Indirect (IE)
Perfective	*ø/-a*	*–nə.re*	*–t^{h}a*	*–zə$\vec{k}$*
Progressive	*ø*	*–nə.re*	*–kə*	–

(DeLancey, 2018, p. 580).[6] Canonical evidentials can articulate either sensory perception such as witnessing ("direct evidential"), or inference ("indirect evidential"). The three categories of egophoric, factive, and canonical evidential are affixed to finite clauses as suffixes or clitics, and differ based on the phrase's tense/aspect, as well as the main verb's class.

In Amdo narratives, the use of non-stative verbs in the perfective and progressive aspects is most salient. When analyzing the elicited narratives, I therefore focused on evidentiality in these specific verb configurations. Amdo speakers discussing completed past events (the perfective aspect) must choose from amongst four different suffixes: (1) zero marking (or *–a*) (egophoric); (2) *–nə.re* (factive); (3) *–t^{h}a* (canonical direct); (4) and *–zə$\vec{k}$* (canonical indirect). Speakers discussing ongoing events (the progressive aspect) must choose from amongst three different suffixes: (1) zero marking (egophoric); (2) *–nə.re* (factive); (3) and *–kə* (canonical direct). **Table 2** summarizes these morphemes.

The categories of egophoric, factive, canonical direct, and canonical indirect allow speakers to indicate their perspectives on sequenced events. I counted the total number of tokens of each perfective evidential marker by primary teller, to illustrate the considerable variability in children's repertoires, as opposed to adults' more regularized repertoire (**Tables 3**, **4**). I attributed these differences to the pragmatics of the interactional setting, which led interlocutors to use evidentials to focus on distinct narrative dimensions (Ochs and Capps, 2001, p. 20). While adults' monologic narratives centered on narrated events, or those events unfolding in the world of the story, children's dialogic narratives highlighted narrative events, or the social world of storytelling.

I focused on evidentiality because this grammatical system is a context-dependent way of marking perspective. While evidentiality was originally understood as speakers' marking of "attitudes toward knowledge" (Chafe and Nichols, 1986, p. vii), later crosslinguistic studies defined evidentiality more narrowly, as the grammaticalized marking of information source

[6]There is currently no consensus on the correct terminology for these categories (for alternatives see Hein, 2001; Zeisler, 2004; Tournadre and LaPolla, 2014). I chose to follow the recent terminology of DeLancey (2018). I use the term "canonical evidentiality" to refer to Amdo suffixes that are united in a single paradigm with factive and egophoric markers, but that encode semantics of knowledge source common to the evidential systems frequently attested across languages. While currently documented Tibetan languages share this three-way evidential distinction between egophoric, factive, and canonical, the specific evidential markers are not cognates. Also, the canonical evidential category is more or less elaborated in different tense/aspect constructions across Tibetan languages.

TABLE 3 | Adult's elicited monologic narratives: perfective evidential markers.

Age of Narrator	20	21	21	21	22
Tokens of EGO (*ø*)	0	0	0	0	0
Tokens of FCT (*–nə.re*)	0	0	2 in quoted speech	0	0
Tokens of DE (*–t^{h}a*)	0	0	1 in quoted speech	0	0
Tokens of IE (*–zə$\vec{k}$*)	29	18	19	36	16
Total perfective clauses	29	18	22	36	16

TABLE 4 | Children's elicited narratives: perfective evidential markers of primary tellers.[7]

Age	4;0	4;2	4;4	4;5	5;7	5;10	5;10	6;9	7;3
Tokens of EGO (*ø*)	4	1	8	12	13	2	6	11	8
Tokens of FCT (*–nə.re*)	0	8	2	11	17	15	46	28	5
Tokens of DE (*–t^{h}a*)	7	16	3	5	1	0	0	0	1
Tokens of IE (*–zə$\vec{k}$*)	7	1	14	4	7	5	3	0	5
Total perfective clauses	18	26	27	32	38	22	55	39	19

(Aikhenvald and Dixon, 2014). While the question of whether the core semantics of evidential markers articulate information source, speakers' perspectives on their knowledge, or additional epistemic meanings remains a subject of lively debate amongst typologists, scholars agree that Tibetan paradigms of evidentiality include markers of subjectivity and therefore serve to mark perspective (Hill and Gawne, 2017). Regardless of researchers' stances on the universal semantics of evidentiality, studies of the pragmatics of adult narratives note that evidentiality differentiates self/other perspectives (Mushin, 2001; Tournadre and LaPolla, 2014, p. 241; DeLancey, 2018; Howard, 2018; Nuckolls, 2018). Several studies of evidentiality in adults' conversational sequences show that speakers choose evidential markers based on sensitivity to their interlocutors' perspectives (Dwyer, 2000 on Salar; Gipper, 2011 on Yurakare; Gawne, 2013 on Yolmo). In other words, speakers' uses of evidential morphemes demonstrate how they position their emotional and epistemic states in social contexts. The literature on perspective marking through evidentiality provides an empirical foundation for using interaction analysis to interpret the pragmatics of Amdo Tibetan evidentiality, and to connect these findings to the cultural values observed through ethnographic participant observation.

The Ethnographic Setting: Participant Observation as a Pathway to Narrative Elicitation

My analysis is informed by 15 months of language socialization research (2016–2018) that resulted in a corpus of over 65 h of spontaneous language data. The narrative elicitations examined in this paper complement a longitudinal research project, which compared the language socialization of four Amdo Tibetan children aged 1–4 who were growing up in rural and urban

[7]Because Sonam (age 2;8) produced very few perfective finite clauses, he is excluded from the token analysis represented in **Table 3**.

settings.[8] All participants were native speakers of Amdo Tibetan, a language with an estimated 1.8 million speakers (Ethnologue, 2020).[9] The participants all reported Farmer Talk (Tib. *rong skad*),[10] the variety of Amdo Tibetan shared amongst farming communities in Qinghai, as their mother tongue. Due to significant regional variation between forms of Amdo Farmer Talk, I only enrolled participants who were living in or traced their heritage to Tsholho Tibetan Autonomous Prefecture, in Qinghai province.

Despite ongoing shift to the dominant language of Mandarin, Amdo Tibetan Farmer Talk was the primary medium for language socialization in early childhood in all focal families. Due to the continued acquisition of Amdo Farmer Talk amidst significant pressures for language shift, the grammatical details of young children's communicative practices are an important avenue of investigation to ensure cultural and linguistic survival. The broad goal of this longitudinal research was to examine how a host of economic and cultural changes were affecting young Amdo children's social and linguistic development. Amdo communities are facing urbanization on an unprecedented scale, the recent introduction of Mandarin as a lingua franca, and restrictions on traditional livelihood strategies (Yeh and Makley, 2019). In this context, Amdo parents expressed considerable anxiety about the loss of peer group play as the primary setting of young children's socialization, and noted pressure to socialize their children through mainstream schooling and structured extracurricular activities. Amdo parents expressed concern that the youngest generation's social development would suffer from a lack of strong peer relationships built in early childhood. Amdo parents also associated language shift to Mandarin with children's lack of access to close-knit peer relationships in their early socialization (Ward, 2019, p. 156–157). Due to these linked anxieties about language shift and social development, cultivating Tibetan moral values became a focal point of everyday communicative routines. Narrative was a key discourse genre through which parents addressed these concerns.

My decision to isolate Amdo's evidential system for analysis using a picture book elicitation prompt emerged from participant observation, which highlighted moral concerns in local theories of childrearing. In everyday talk to young children, adults told elaborate stories with the explicit goal of teaching them compassion (Tib. *snying rje*). Compassion is a Tibetan Buddhist value, which emphasizes avoiding harm to all living beings. Amdo adults used the value of compassion to ensure the cultural reproduction of their community, and to mark their difference from other ethnolinguistic groups (Ward, 2019, p. 191–194). Amdo adults even used narratives as a form of discipline, aiming to teach their children appropriate ways of articulating emotional states and performing sociality. In the course of participant observation, Amdo adults described children's stories as a form of positive discipline that increased loving relationships between parents and children (Ward, 2019, p. 197).

The same emphasis on compassion crosscut discourse about narrative, everyday disciplinary practices, and explicit moral socialization. In rural and urban homes, spontaneous narrative practices ranged from highly structured, involving an extended monolog to a captivated audience, to highly spontaneous and improvised. In structured narratives, a single caregiver would read a picture book or tell a monolog to multiple children. Picture books depicting traditional Amdo children's tales became readily available by the early 2000s, and are increasingly popular within China and abroad.[11] In spontaneous narratives, adults told improvisational stories, often using animal characters, to shape children's behavior. For example, when children dug up plants or handled insects, a supervising adult often launched into a spontaneous narrative that described the feeling states of the affected creatures. These spontaneous narratives functioned as discipline by emphasizing other beings' emotional responses, rather than by issuing explicit directives (Ward, 2021).

These details of the ethnographic setting, the community's moral orientation toward compassion, and family's uses of orality and literacy are relevant to my methodology. My motivation for developing the narrative elicitation task examined in this paper arose by identifying: (1) points of particular discursive emphasis in adults' everyday talk about children's social and linguistic development, (2) salient communicative routines in children's moral socialization that focused on cultivating compassion through narrative, and (3) cultural norms surrounding literacy and orality in storytelling.

RESULTS

Adults and children framed narrative elicitation tasks differently. This contributed to unique patterns in the observed narrative repertoires, and highlighted how Amdo children use evidentiality in a range of functions sensitive to the social world of storytelling.

[8]Due to the longitudinal and holistic design of language socialization research, a small sample size of four to six focal children is standard practice (Garrett, 2008, p. 192–193). I sampled everyday talk with each child in their family home, for ∼2–4 h every three months. Data collection involved both audio recordings with contextual fieldnotes, and video recordings. Decisions about whether to use audio or video were motivated by participants' concerns about confidentiality, and my concerns about the sensitive nature of conducting long-term fieldwork with a minoritized community in western China. Focal participants were recruited through my existing social connections in Xining city, the provincial capital of Qinghai province. The focal children were chosen based on their parents' mother tongue (Amdo Farmer Talk) and region of origin (Tsholho Tibetan Autonomous Prefecture).

[9]Amdo Tibetan is part of a "sprachbund," a region where genetically unrelated languages show significant structural adaptation to one another (Janhunen, 2012). With increasing pressures to assimilate to an expanding market economy, many Amdo Tibetan communities are experiencing language shift to the state's official language of Mandarin. Despite these pressures, Amdo Tibetan is considered "stable" because it remains the primary medium for socialization in young children's family interactions [Ethnologue, 2020. "Tibetan, Amdo." Available online at: https://www.ethnologue.com/language/adx (accessed October 6, 2020)].

[10]Tibetan words with literary equivalents are depicted using the Wylie (1959) transliteration system. Due to the phonological and grammatical differences between Amdo Farmer Talk and literary Tibetan, narratives are rendered in the International Phonetic Alphabet.

[11]Children's books are published through multiple Chinese "minority nationality presses" in major cities. Several non-profit organizations aim to expand access to children's books in written literary Tibetan, and partner with Chinese minority nationality presses to disseminate the books, including Tibetan Arts and Literature Initiative (TALI, https://talitibet.org) and the Trace Foundation (http://www.trace.org/).

As primary tellers, Amdo adults framed the narrative elicitation task as a monolog. They consistently used evidentiality to differentiate their subjective perspectives from those of the story's characters. This heightened attention to distinguishing the perspectives of self and other formulated a genre of fictional children's stories that adults described as consistent with moral socialization into compassion. Although crafted for a child audience, adults' narratives focused on the world of the story. In contrast, when children were primary tellers, the narrative elicitation task became dialogic. Collaborating children and adults used a more diverse set of evidential markers, focusing on the social world of storytelling. When children responded to adults' sequential contributions, they mirrored adults' uses of evidentiality, displaying sensitivity to their interlocutors' perspective-marking.

This section discusses three significant findings: (1) Amdo adults' monologic folktales showed patterned uses of evidentiality that relate to the community's emphasis on moral socialization; (2) In dialogic Frog Story narratives, children used evidentiality to align with their co-tellers' perspective-marking; (3) In dialogic Frog Story narratives, adults asked prompting questions to scaffold children's production of the conventionalized narrative genre.

Adults' Perspective Marking in Elicited Monologic Narratives

When adults were positioned as primary tellers of folktales, they created monologic narratives that consistently distinguished their own narrative voice from the characters' experiences and internal states. In fact, as primary tellers, adults marked *all* past events with the indirect evidential, except when embedding characters' perspectives in reported speech (**Table 3**). This form of perspective marking was an affective display crafted for children's moral socialization. With this conventionalized use of indirect evidentiality, adults emphasized that they did not directly witness or experience narrated events. This narrative strategy highlighted the direct experiences and internal feeling states of the characters. By focusing on characters' direct experiences, adult narrators oriented children toward compassion without explicitly directing their behavior. In other words, adults used perspective marking to articulate a culturally valued disposition, which requires attention to the boundaries of egocentric knowledge.

In example one, Dolma Tso, a young adult narrator, retold a common folktale:

Example 1: Dolma Tso (age 21)[12]

1 *na-ŋamo* *zə̄k.kə-ta*
RED-before IA-PRT
A very long time ago,

2 *dʑe̱l.moŋ* *ma* *wu* *ɤɲi* *ra*
monkey mother son DUAL and
A monkey mother and son, and

3 *rəwoŋ* *ma* *wu* *ɤɲi-ta*
rabbit mother son DUAL-PRT
A rabbit mother and son

4 *rə^{h}kor-ji* *de-**zə̄k***
neighborhood-LOC stay\PST-IE
lived in a neighborhood.
[DT Monkey and Rabbit 3.8.2017]

Dolma Tso used the indirect evidential to close the opening sequence (line 4). This narrative strategy depicted a fictional, temporally distant narrative setting, and backgrounded plot events to make characters' direct sensory experiences and feeling states more apparent.

When using reported speech, the same narrator articulated characters' experiences with the direct evidential. In example two, Dolma Tso told a story about a shepherdess who came across a monster while grazing her sheep on a mountain. The monster ate several of the sheep in her care and threatened to eat her, as well. The next day, the shepherdess was crying as she walked along the mountain trail, frightened but resigned to her fate of being eaten. However, she suddenly encountered a rabbit. With the help of the wily rabbit, the shepherdess was able to capture the monster and throw him off the mountain. In example two, Dolma Tso was recounting the moment when the shepherdess met the rabbit on the trail, and the rabbit asked her why she was crying:

Example 2: Dolma Tso (Age 21)

1 *k^{h}ər-kə* *ze-nə*
3-ERG say-FOC
She (the shepherdess) said (to the rabbit),

2 *teraŋ* *soŋ-ne* *ɲetab* *zə̄k* *joŋ-jɯn-ne*
today go\PST-ABL monster DA come-PFC-ABL

3 *lik̄* *zə̄k* *si-taŋ-**t^{h}a***
sheep DA kill\PST-AUX-DE
"When (I) went today (to the mountain), the monster had come and killed the sheep.

4 *naŋka* *ŋa* *sa-^{r}dʑi-ze-**kə*** *ze-**zə̄k***
tomorrow 1\DAT eat-FUT-say-DE say\PST-IE
'Tomorrow I will eat you,' (the monster) says," (the shepherdess) said.
[DT Monster 3.8.2017]

Dolma Tso contrastively used evidentials to shift amongst three perspectives: her own, that of the shepherdess, and that of the monster as reported by the shepherdess. In line 1, she introduced the reported speech event. In lines 2-3, she quoted the shepherdess' speech to rabbit, and closed the finite clause with the perfective direct evidential marker (*–t^{h}a*). This use of the direct evidential is embedded in the shepherdess' speech to the rabbit, showing that the shepherdess had personally witnessed the monster killing the sheep. In line 4, the narrator doubly embedded reported speech. She voiced the shepherdess' quotation of the monster's speech with progressive direct evidential (*–kə*). When closing the event

[12]Examples are transcribed in the International Phonetic Alphabet. Interlinear transcription identifies morphemes using the Leipzig glossing rules (https://www.eva.mpg.de/lingua/pdf/Glossing-Rules.pdf). Evidential morphemes are bolded in the transcripts. Additional paralinguistic features are marked following the conventions of conversation analysis (Sacks et al., 1974).

sequence, the narrator shifted back to her own perspective. She encoded the matrix verb of speaking with the perfective indirect evidential (*–zək͡*). With this switch, the narrator transitioned from speaking as the shepherdess to speaking as herself. The narrator differentiated the character's direct experience of being verbally threatened from her own indirect knowledge of the narrative's plot. This sequenced calibration of self/other perspectives marks the boundaries of access to others' internal states and lived experiences. The narrator's consistent marking of experiential distance heightens the audience's sensitivity to characters' internal states, focusing attention on the internal story-world.

Children's Elicited Narratives: Aligning Perspectives in Collaborative Storytelling

Children's elicited narratives were highly collaborative. Possibly because children do not tend to take on the role of sole narrator in spontaneous moral socialization, siblings and parents participated in narrative elicitation tasks by prompting the child who had been identified as the primary teller. This different social orientation to the elicitation task resulted in a focus on the narrative events in the social world of storytelling, as opposed to the story-world itself. In other words, participants more explicitly oriented toward each others' unfolding perspectives.

In their elicited narratives, children showed variable uses of evidentiality, producing the full range of evidential morphemes in perfective finite clauses with non-stative verbs (**Table 4**). Children produced evidential marking far more frequently than in everyday talk. However, the diversity in children's evidential configurations suggests that, even by age seven, they do not use the pattern of indirect evidential marking found in adults' monologic narratives. The variability in children's uses of evidentiality falls in line with previous experimental findings on the expected developmental trajectory for acquiring this grammatical system. Previous experimental studies suggest that, even by middle childhood, children do not fully comprehend evidential contrasts (Ozturk and Papafragou, 2015). An ethnographic reading of these elicited narratives, however, requires us to address the fact that family members did not position children as sole narrators. When a child was identified as the primary teller, adults and other children took on roles as active co-tellers. When collaborating in children's narrative elicitations, adults also used a wider range of evidentials than in their own monologic narratives. These more variable evidential configurations arose because, when families framed the elicited narratives as dialogic, adults and children moved more actively between the internal story-world and the social world of storytelling.

Interaction analysis therefore suggested that the social setting of the narrative elicitation task, as well as the participants' aged identities (Berman, 2019, p. 45–46), shaped the resulting repertoires of evidentiality. Instead of presenting a fixed perspective on narrated events and adopting a consistent emotional disposition, adults and children oriented toward each other's unfolding knowledge in the course of the narrative elicitation task. Examining the sequenced uses of evidentiality in these dialogic narratives provides insight into children's competencies in calibrating their perspectives to the social world of storytelling. Both adults and children coordinated their evidential usage with previous turns at talk, collaboratively building a shared perspective on the narrated events. Therefore, when children produced evidentiality in narrative, they were highly attuned to other participants' interactional cues.

When peers collaborated with the primary teller, the children built a shared perspective on narrated events by mirroring each other's evidential marking. They also marked the ends of event sequences by using evidentials to shift the perspective that had been established in previous turns. In example three, Sakya (aged 3;8), the primary teller, used contributions from her 3-year-old cousin (C) and her mother (M) to advance the plot sequence. Sakya had flipped the page of the Frog Story picture book, to an image where a swarm of bees rose out of a hive and chased the child protagonist and his dog. Sakya and Cousin narrated this event, before Mother turned the page to reveal that the child had escaped by climbing up a tree. Mother turned the page one more time, showing an image of the child falling from the tree.

Example 3: Sakya Dolma (age 3;8), Cousin (age ∼3), Mother

1	Sakya	*baɪ̯ma*	*maɪ̯.ɪ̯a.zək͡*	*joŋ-**tʰa***
		bee	many	come\PST-DE
		Many bees came.		
2	M	*o::*		
		EXCL		
		Oh?		
3	C	*baɪ̯ma*	*maɪ̯.ɪ̯a*	*maɪ̯.ɪ̯a*	*joŋ-we*
		bee	many	many	come-CVB
		After many, many bees came			
4		*hadzik͡*	*sa.dzu*	*sa-ma-tʰəb-**a***	*baɪ̯ma*
		small.dog	snack	eat-NEG-able-EGO	bee
		The small dog wasn't able to eat the bee as a snack.			
5	M	*o:: ((turning page))*	*ⁿdi*?		
		EXCL	DEM		
		Oh! ((turning page)) This?			
6	Sakya	*ⁿdi*	*ɕaji*	*doŋgo*	*gi-go-**k**ə*
		DEM	child	tree	climb\PRS-CONT-DE
		This (is) a child climbing a tree.			
7	C	*ɕaji*	*doŋgo*	*gi-go-**k**ə*	
		child	tree	climb\PRS-CONT-DE	
		The child is climbing a tree.			
8	M	*°hh°*	*((turning page))*		
		((intakes breath while turning page))			
9	Sakya	*ɕaji*	*doŋgo-ne*	*hoŋ-soŋ-**zək͡***	
		child	tree-ABL	fall-AUX-IE	
		The child fell from the tree.			

[SD Frog Story 3.18.2017]

In example three, Sakya and Cousin used evidentiality to align their perspective marking across three unfolding events: the arrival of the bees, the child climbing a tree to escape the bees, and the child falling from the tree. While the children's shared perspective focused on the images, themselves, Mother provided subtle backchannel cues to prompt the children to sequence the plot.

In line 1, Sakya used the direct evidential (*–t^{h}a*) to mark the bees' arrival. Sakya's use of the direct evidential emphasized her own witnessing of the picture, which positions this event in the world of storytelling rather than the world of the story. That is, Sakya privileged her visual knowledge of the event from the picture book's images, but did not advance the plot sequence. In line 2, Mother provided a backchannel cue, which may have prompted Sakya to articulate a subsequent event. In lines 3-4, Cousin explained the outcome of the bee's arrival, using the egophoric evidential (*–a*). Cousin responded to Sakya's previous utterance by suggesting her subjective interpretation of the image in the picture book. Like Sakya, Cousin positioned the bees' arrival in the immediate interactive setting by describing her personal observations of the picture book itself. In line 5, Mother turned the page to prompt the children's continued narration. In line 6, Sakya used the direct evidential, this time in the progressive aspect. In line 7, Cousin mirrored Sakya's evidential usage. In these two lines, Sakya and Cousin emphasized their shared visual access to the image of the boy climbing the tree; they emphasized their emergent knowledge of the picture. In line 8, Mother prompted the children to advance the plot by turning the page and issuing an inbreath to indicate anticipation. In line 9, Sakya responded by reporting that the child fell from the tree, now with the indirect evidential in the perfective aspect (*–zə$\vec{k}$*). Line 9 represents a shift in Sakya's perspective. Rather than emphasizing her ongoing visual access to the images, Sakya marked the sequence's closure by expressing epistemic distance, which positioned the narrated event in the world of the story. Sakya emphasized the sequence's closure following Mother's affective display of anticipation with her inbreath. With this shift, Sakya may have been responding to Mother's paralinguistic cue to advance the plot sequence.

In example three, Sakya and Cousin co-constructed an event sequence primarily by emphasizing their shared visual knowledge of the picture book. Following Mother's cues to advance the plot, Sakya shifted her perspective to resolve an event sequence. When she did so, Sakya also displaced her own subjective perspective, and positioned the child's final act of falling from the tree within the realm of the story-world.

Not all event sequences involved children's displacements of their subjective perspectives. In example four, two children sequenced events while continuing to privilege the social setting of collaborative storytelling. Lhamo (age 4;2) was the primary teller, and was looking at Frog Story's opening pages. In these images, the child protagonist is pictured leaning out of a window along with their dog, calling out for their lost pet frog. The dog's head is stuck inside the pet frog's empty jar. In the adjacent page, the dog is pictured falling out of the window. When Lhamo hesitated to move the narrated events forward, her older sister, Dolma (age 5;10), latched onto her utterances to prompt her.

Example 4: Lhamo (age 4;2) and sister Dolma (age 5;10)

1	Lhamo	*^{n}di.ni.ta wumo ^{n}di.ni.ta=*
		then girl then
		Then, the girl, then=
2	Dolma	*=wumo-kə ↑balwa::↓ =*
		girl-ERG fro::g
		=(the) girl (went) "↑fro::g↓"=
3	Lhamo	*=↑balwa::↓ ze-**k**ə=*
		fro::g say-DE
		=says "↑fro::g↓"=
4		*ə:: ^{n}di.ni.ta k^{h}ə-a ^{n}di.ni^{n}di.ni*
		uh then 3-DAT here here
		Uh, then, she, here, here
5		*^{m}ɲə gen hapa-ki ^{n}di*
		person over.there dog-ERG DEM
		the person over there, the dog, this
6		*k^{h}ər-ki go ^{n}dɪ.mo.zə$\vec{k}$ -kə taŋ-ŋo-taŋ-**t^{h}a***
		3-ERG door like.this-INST fall-NMZR-AUX-DE
		he went and fell like this from the door
7		*(.) ^{n}di.ni.ta=*
		(.) then
		(.) Then=
8	Dolma	*=^{n}di.ni.ta ^{n}dɪ.mo.zə$\vec{k}$ jo*
		=then like.this COP\EXIS
		=Then, there's a thing like this
		((pointing to jar stuck on the dog's head))

[LT Frog Story 1.22.2017]

In line 1, Lhamo spoke fluently but did not advance the plot. In response, in line 2, Dolma interjected, imitating the child's act of calling out to their frog. In line 3, Lhamo latched onto Dolma's utterance, repeating Dolma's voicing of the child by reproducing her intonation. Lhamo closed the child's quoted speech with a verb of speaking, using the progressive direct evidential. This construction demonstrated Lhamo's integration of Dolma's suggestion into the plot; when she formulated the narrated event, Lhamo emphasized her witnessing of Dolma's enactment, thus focusing on the social world of storytelling. In line 4, Lhamo began to formulate the subsequent event with word searching. By line 6, Lhamo had conceptualized the event, and reported that the dog fell from the window ("door") with the perfective direct evidential. Again, Lhamo emphasized her own sensory knowledge of the events, positioning the completed event within her domain of knowledge about her immediate social setting. In line 8, Dolma drew on a lexical item in Lhamo's previous utterance ("like this") to provide additional information about the image.

Example four shows how Lhamo and Dolma co-constructed a narrated event sequence while remaining grounded in the storytelling world. The two children built upon each other's previous utterances to advance the plot sequence. They portrayed the unfolding events through their visual access to the picture book's images, and their aural access to the sonic form of each other's contributions.

Interactional Scaffolding: Children's Socialization to a Narrative Discourse Genre

In the course of narrative elicitation tasks, adult's contributions offered a form of scaffolding, where they prompted children

to advance a plot sequence situated within the story-world. Adults and children alike drew on the pragmatic properties of evidentiality to access the story-world. Amdo Tibetan evidentials feature an "anticipation rule" (Tournadre and LaPolla, 2014, p. 245) meaning that, when speculating or asking about another's experience, speakers use the evidential marking they expect their addressee to use in response. In question-answer sequences, this anticipation rule is particularly pronounced, because the responsibility for articulating knowledge source shifts from the speaker to the addressee. With their questioning prompts, adults mediated children's displacement of events from the world of storytelling into story-world.

In example five, Tashi (age 4;4) constructed her Frog Story with extensive prompting from her Mother. When formulating her questions, Mother managed her expectations about the conventionalized framing of narrated events in light of Tashi's contributions. Tashi and Mother moved between the world of storytelling, where they co-constructed visual knowledge of pictures, and the story-world, where they displaced an event sequence.

Example 5: Tashi (age 4;4) and Mother (M)

1 M *o:: ⁿdɪ.mo.ⁿdi tɕɪ.zək⃗ jo.kə naŋ-ŋa*
EXCL this.thing what COP\EXIS in-LOC
Oh, what's this thing inside? ((pointing to jar in picture))

2 Tashi *naŋ-ŋa ba—* (.) *naŋ-ŋa ɕaji jo.kə*
in-LOC ba— in-LOC child COP\EXIS
inside fro—(.) there's (a) child inside.

3 M *o: ɕaji jo (.) tɕʰi go-**k**ə*
EXCL child COP\EXIS\EGO what do-DE
Oh, there's (a) child. What's (the child) doing?

4 Tashi *ɕaji-kə balwa ʰti-de-da-jo-**k**ə*
child-ERG frog look-CVB-CVB-PROG-DE
The child keeps looking at (the) frog.

5 M *oleɪ (.)ⁿdə tɕɪ.zək⃗ re*
EXCL (.) that what COP\FCT
Wow (.) What's that? ((pointing to dog))

6 Tashi *da hapa*
EMP dog
(A) dog!

7 M *o::* (.) *hapa-kə tɕʰi go-**k**ə*
EXCL (.) dog-ERG what do-DE
Oh! (.) What's (the) dog doing?

8 Tashi *hapa-kə balwa naŋ-ŋa ʰti-da-jo-**k**ə*
dog-ERG frog in-LOC look-CVB-PROG-DE
(The) dog is looking at (the) frog inside.

9 M *o:: re ⁿdi.ni.ta ⁿdi.ni.ta*
EXCL COP\ESS\FCT then then
Oh, yes. Then, then

10 *tɕʰi taŋ-zə**k**⃗*
what happen\PST-IE
What happened?

11 Tashi *ⁿdi.ni.ta-- a:: a:: da wumo ɤŋil-soŋ-zə**k**⃗*
then uh uh EMP girl sleep-PST-IE
Then, uh, uh so (the) girl slept.

12 *da balwa go-a soŋ-zə**k**⃗*
EMP frog outside-LOC go\PST-IE
So (the) frog went outside.

In this excerpt, Mother and Tashi move between the social world of storytelling and the narrative-internal story-world. In line 1, Mother prompted Tashi to describe the picture by asking what is inside the jar. In line 2, Tashi responded, noting the presence of the child. In line 3, Mother acknowledged Tashi's statement through repetition. She then asked about the child's ongoing activity, using the progressive direct evidential. In line 4, Tashi responded by describing the child's action of looking at the frog. Tashi used the same evidential construction as in Mother's question. In this question-answer exchange, Tashi and Mother highlight their shared visual knowledge of the pictures, remaining focused on the social activity of co-telling. This orientation continued as they described the ongoing narrated events using the progressive aspect in lines 5–8.

In lines 9–10, Mother shifted their joint orientation. She used the indirect evidential in the perfective aspect to ask Tashi to describe the next event. This prompted Tashi, in lines 11–12, to displace the event sequence into the story-world. Tashi again used the same evidential configuration as Mother. At this point, Mother and Tashi have shifted from describing each image in detail, to conveying a coherent event sequence. Mother's prompting questions led Tashi to use indirect evidential marking, characteristic of the conventionalized Amdo Tibetan narrative discourse genre, to advance the narrated events.

After Tashi and Mother established the temporal frame of the event sequence in lines 9–12, they continued to remain within the story-world by marking perfective clauses with the indirect evidential. In her prompting questions, Mother used the perfective indirect evidential to scaffold Tashi's advancement of the plot sequence. When Tashi omitted significant details that were depicted in the picture book, Mother used direct evidentials to shift their orientation back to picture description in the storytelling world. In each of Tashi's responses to Mother, she mirrored Mother's evidential marking.

Example 5, continued

13 M *ⁿdi.ni.ta tɕʰi taŋ-zə**k**⃗*
then what happen-IE
Then what happened?

14 Tashi *ⁿdi.ni.ta balwa vod-soŋ-zə**k**⃗*
then frog go\PST-AUX-IE
Then the frog left.

15 M *ə (.) ⁿdi.kə.ta? ɕaji-kə tɕʰi ji-go-**k**ə*
oh (.) then child-ERG what do\PRS-PROG-DE
Oh? Then? What is the child doing?

16 *ɕaji-kə e-rik⃗ -zə**k**⃗*
child-ERG Q-see\PST-IE
Did the child see it?

17 Tashi *ma-rik͡ -zək͡*
NEG-see\PST-IE
(He) didn't see it.
[T Frog Story 6.21.2017]

In line 13, Mother framed the narrated events in the perfective aspect with the indirect evidential. In line 14, Tashi mirrored Mother's evidential configuration, explaining that the frog left. In line 15, Mother asked a descriptive question about the picture with the progressive direct evidential. In line 16, she followed with a question about the upcoming plot event, using the indirect evidential. In line 17, Tashi responded by reframing her mother's question into a negative assertion with the same evidential marking.

Example 5 demonstrates how the interlocutors' ongoing mutual orientation established distinctive frames that moved between the narrative events in the storytelling world and narrated events in the story-world. Mother's prompting questions shifted from reporting on immediate sensory input in the social situation of telling to describing a displaced, sequenced narrative. Mother's shifts in perspective responded to Tashi's ongoing contributions, as well as the cultural expectations of a narrative discourse genre. Mother therefore scaffolded Tashi's performance of a conventionalized narrative through her prompting questions. In so doing, she positioned Tashi as a novice narrator. Mother took on an active role in shaping the trajectory of Tashi's story-world, as well as the interactive setting of the storytelling world.

Collectively, examples 3–5 suggest that children tended to use evidentiality to prioritize their immediate experiences in the social situation of the story-telling world. Co-present adults' prompted children to advance a narrated plot sequence by displacing events in a past time and articulating their indirect knowledge of the narrated events. That is, adults attempted to guide children's narratives toward a conventionalized genre, which marks epistemic distance from the world of storytelling and focuses on characters' internal experiences. As Takada and Kawashima (2019, p. 216) found in a study of Japanese families' collaborative picture book reading, caregivers tended to shape toddlers' turns "according to the socioculturally structured script of the story." More specifically, caregivers guided toddlers to sustain plot sequences by associating events in the story-world with the immediate interactive setting. In Amdo Tibetan elicited narratives, adults similarly guided children toward the cultural expectations surrounding monologic narratives. Adults used prompting questions to encourage children to advance plot sequences instead of describing each picture, and to mark epistemic distance from narrated events in the story-world. These prompting questions suggest that adults were positioning children as novices. However, children's ability to respond to these cues hinged on their communicative competence in the pragmatics of evidentiality. Even though Amdo children did not tend to produce grammatical evidentiality in their spontaneous talk, their contingent responses as narrative co-tellers demonstrated their understanding of how to use this grammatical system to calibrate perspective marking. With their understanding of how evidentials mark shifts in knowledge between speaker and recipient, children were able to competently respond to adults' prompting questions, using evidentials to displace events into the story-world.

DISCUSSION

In the face of rapid social and economic change, Amdo Tibetan communities are grappling with anxieties about cultural and linguistic survival. These anxieties contribute to Amdo Tibetan caregivers' heightened focus on the everyday moral socialization of their young children through narrative. In Amdo Tibetan families, narratives for children aim to cultivate strong social bonds, along with Buddhist senses of compassion (Tib. *snying rje*) for all living beings. As a discourse genre, adults' narratives for children show preferences surrounding the use of certain grammatical features, especially evidentiality. Building on previous language socialization literature, which has demonstrated how patterned uses of grammatical features contribute to the socialization of emotion, this paper examined links between evidentiality and the verbal repertoires meant to cultivate a compassionate disposition. Despite the prominence of narrative and evidentiality in language input to children, Amdo Tibetan children's spontaneous language data included very few tokens of evidential markers. Looking exclusively at adults' language production to understand the links among narrative, patterned uses of grammatical perspective marking, and cultural values would present a partial understanding of how children come to acquire this distinctive communicative style. By putting diverse data sets into conversation with one another through a narrative elicitation task, this paper has shown how we can locate patterns in children's experiences of language across complementary settings of data collection, in a community where children's acquisition of their mother tongues is a point of particular concern. Using narrative elicitation as a tool in ethnography can reveal connections between the grammatical details of communicative routines, a community's cultural values, and how children are positioned as subjects or agents of socialization in certain discourse genres.

Interaction analysis of Amdo adults' elicited narratives showed cultural preferences surrounding perspective marking using evidentiality. Examples one and two demonstrated that, in monologic narratives, adult speakers clearly demarcated their indirect perspectives from the characters' direct sensory and experiential knowledge of the unfolding narrated events. Scholars examining adults' monologic narratives in diverse languages including Pastaza Quichua (Nuckolls, 2018), highland Quechua (Howard, 2018), and Central Tibetan (Ward, 2016; DeLancey, 2018) have found that strategies of perspective marking interface with cultural values surrounding morality. In the ethnographic context of Amdo Tibetan communities, this strategy of perspective marking aligns with caregivers' concerns over children's moral socialization. In narrative, adults use perspective marking to heighten their child audience's sensitivity to the internal states of others. This grammatical emphasis on others' sensory experiences provides a culturally-valued form of discipline, which teaches children to orient toward others' feeling states and recognize the epistemic boundaries of their personal experiences.

When approaching the narrative elicitation task, community members positioned adults as socializing agents. Adults crafted monologic narratives for an imagined child audience. In contrast, when the researcher positioned children as primary tellers, parents and co-present children collaborated as tellers of dialogic narratives. Interaction analysis of these elicited dialogic narratives found that: (1) children collaboratively coordinated a shared perspective by using evidentiality to focus attention on the social world of storytelling; and (2) adults' contributions to the narrative elicitation task provided a form of scaffolding that prompted children to advance plot sequences and produce the patterns of perspective marking that characterize monologic narratives. Specifically, in examples three and four, young children aligned their perspectives by co-constructing narrative event sequences focused in their immediate social interaction. Their uses of direct evidentiality responded to ongoing sensory input, including their visual access to the picture book and their co-present interlocutors. Young children responded to cues to displace events into the realm of the story, by shifting their uses of evidentiality to close or advance plot sequences. In example five, a mother prompted her daughter to move between the world of storytelling and the world of the story, by advancing the narrated events through a series of questions and answers. By mirroring her mother's use of the indirect evidential, the daughter approached grammatical conventions for depicting narrated events from within the story-world.

Previous crosslinguistic studies using Frog Story have found a tendency for younger children to interpret the elicitation task as picture description, but for people aged nine and above (including adults) to construct globally cohesive storylines (Berman and Slobin, 1994, p. 69). However, drawing on Berman's (2019) attention to the role that ideologies of age play in shaping children's verbal repertoires, we can call into question whether the differences in Amdo children's and adults' narrative repertoires may, in fact, result from aged identities rather than chronological age. Because children were not positioned as socializing agents with the authority to tell monologic narratives, their repertoires of evidentiality responded to the social setting of storytelling more clearly than those of adults'.

The dialogic narratives demonstrated Amdo children's sensitivity to the pragmatics of evidentiality in situated perspective marking. Children aligned their evidential configurations with their interlocutors' previous turns. These findings provide a window into children's communicative competence with a syntactic system that requires reflection on others' knowledge and appropriate displays of internal states. Previous crosslinguistic studies of evidentiality in interaction (Dwyer, 2000; Gipper, 2011; Gawne, 2013; San Roque, 2015) found that adult speakers calibrate evidential marking to the expectations of their conversational partners. Research on children's uses of these syntactically embedded and polysemous grammatical systems can help demonstrate how children respond to cultural norms surrounding sociality, even when their uses of these systems are restricted in spontaneous talk. For example, San Roque and Schieffelin (2018) examined uses of the semantically-related system of egophoric marking in Kaluli (Papua New Guinea) question-answer pairs. Their findings suggest that situated uses of egophoric marking may help socialize children into cultural beliefs surrounding epistemic authority, or who can say what about their own or others' experiences. Interaction analysis of Amdo children's narrative elicitation tasks shows that children coordinate their attention to sensory input and others' interactional cues when learning how to grammatically encode epistemic and emotional states.

Adults' and children's framings of the narrative elicitation task also provided evidence of how the cultural construction of aged subject positions may influence verbal repertoires. Because elicitation tasks result in less 'natural' speech (Klamer and Moro, 2020), an ethnographic attention to this methodology can provide insight into the broader cultural norms and communicative ideologies that influence who does or can produce a given repertoire. For example, de León (2009) found that, while Tzotzil Mayan children's spontaneous narratives used a rich repertoire of evidentiality characteristic of their community's narrative discourse genre, their elicited Frog Stories tended to lack evidential marking. Elements of the narrators' backgrounds, including years of schooling and the use of Spanish, were correlated with different repertoires of evidentiality in elicited Frog Stories (ibid, p. 187). These stark distinctions between spontaneous and elicited Tzotzil narratives demonstrate that a community's framing of elicitation tasks influences grammatical patterns in the resulting stories. By similarly examining Amdo Tibetan families' framings of a narrative elicitation task, this study revealed the cultural expectation that adults' monologic narratives should serve as a socializing tool for children. Children, in contrast, produced dialogic narratives that revealed their competencies in coordinating perspective marking through evidentiality, a skillset which was under-represented in spontaneous talk.

Approaching Frog Story elicitations as ethnography provides new possibilities for a method traditionally used in experimentation or larger-scale, cross-sectional analyses. In the discipline of Psychology, studies of children's language development have used narrative elicitation as a tool for building databases that facilitate comparison across age ranges, language communities, and social settings (Berman and Slobin, 1994; Stromqvist and Verhoeven, 2004). Picture book elicitation, in particular, has been used extensively in the crosslinguistic and age-graded study of language acquisition because it presents a consistent discourse activity based on a stable stimulus (Slobin, 1985; Bamberg, 1987, p. 21). Crosslinguistic research using traditional narrative elicitation methods has extended the study of children's cognitive and linguistic development to their social and cultural knowledge, addressing children's communicative competence in the grammatical particularities of their native language(s). When analyzing regularized, monologic narratives, however, children's social and cultural experiences of language must be documented outside of the narrative elicitation task, itself. With a basis of ethnographic knowledge, researchers using this approach have independently associated narrative style with cultural values (Wilkins, 1997; Bavin, 2004).

Approaching narrative elicitations as culturally situated activities is a method particularly well-suited to examining early childhood socialization in under-documented languages threatened by language shift. In minoritized languages communities, anxieties about language loss often intersect with child-rearing practices that emphasize moral socialization through language. At the same time, language ideologies that explicitly devalue specific features or codes (Hornberger, 2008), or position these in opposition to children's identities (Ochs, 1986; Meek, 2008; Berman, 2019) prevent children from demonstrating their full communicative competencies. These ideological facets of development intersect with children's changing grammatical knowledge. Features embedded in a language's syntax, such as Amdo Tibetan evidentiality, may *never* be fully represented in a child's spontaneous language use if language shift occurs rapidly in early childhood. In this context, elicitation tasks provide novel communicative settings that can reveal children's competencies in grammatical systems that are not represented in spontaneous data. Amdo Tibetan narrative elicitation tasks presented a possible pathway toward language continuity rather than shift, by demonstrating children's ability to use interactional cues to coordinate perspective marking with evidentiality. As the current generation of Amdo Tibetan children ages, whether or not they will follow this pathway toward reproducing a culturally valued communicative style, in light of considerable pressure to adopt the dominant language of Mandarin, remains an open question.

Expanded uses of narrative elicitation in language socialization research could provide further insight into possible strategies for language preservation. In the case of Amdo Tibetan, continued research could probe the boundaries of monologic narratives, as well as the extent to which this community's repertoires of evidentiality are affected by aged identities. For example, future narrative elicitation tasks could explicitly position children as sole tellers of monologic narratives, and prompt children to tell narratives to different audiences. Combined with ethnographic attention to spontaneous narratives, these methods could reveal potentialities to nourish the production of a wider range of grammatical systems, earlier in children's development. In communities experiencing language shift, it is only by expanding children's grammatical repertoires and domains of language use that we can work toward linguistic survival.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by New York University Institutional Review Board. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

AUTHOR CONTRIBUTIONS

The author confirms being the sole contributor of this work and has approved it for publication.

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Beyond Translation: Caregiver Collaboration in Adapting an Early Language Intervention

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Spanish-speaking families in the United States must often overcome multiple challenges to support their young children's early language development (e.g., language and cultural barriers, financial stress, limited learning resources, etc.). These challenges highlight the need for early language interventions tailored to the needs of Spanish-speaking families and developed in collaboration with them. For diverse populations, early language interventions which are both translated into the relevant language *and* culturally responsive are the most effective for improving child outcomes. However, few interventions meet both criteria, demonstrating a need for materials that are accessible across both language and culture. The current study describes the five-phase process of creating a linguistically and culturally relevant Spanish adaptation of Duet, an early language intervention. The adaptation of the Duet intervention modules involved multiple language experts, including Spanish-speaking developmental psychologists, a translation company, and Spanish-speaking caregivers of infants and toddlers. Fourteen caregivers were recruited to participate in two, 3-h focus groups. Input from caregivers was a particularly important step in the adaptation process, as caregivers hold knowledge about everyday experiences with their children. Through this process, the authors aim to shed light onto the importance of collaborating with the community and present a possible framework for others who are adapting interventions.

Keywords: language intervention, linguistically and culturally diverse, cultural adaptation, community based participatory reaserch, bilingual language acquisition

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INTRODUCTION

There is an urgent need to address issues of equity and diversity in research. Part of this process requires including more diverse populations to match the cultural, linguistic, racial, and ethnic heterogeneity in the United States (Roberts et al., 2020). Ethnic minority families adopt culture-specific parenting beliefs and engage in learning activities adapted to their ecological context (Melzi et al., 2019; Sperry et al., 2019). However, their unique strengths are often overlooked in the educational system and early interventions (Janes and Kermani, 2001), which frequently employ a "one-size-fits-all" mindset instead of using a within-group framework to develop family centered culturally responsive interventions that meet community needs (Melzi et al., 2019).

Yet the effective implementation of culturally responsive interventions is a challenge in the current education context. Education researchers strive for a system that values a whole child approach (Diamond, 2010; Darling-Hammond et al., 2020). However, the reality is that the current education system values a set of skills (i.e., language, literacy, math) that are important for children to gain in their own right, but narrowly construed under the pressure of high-stakes assessments (Berliner, 2011). Though specific goals may vary, and parents may have additional culturally specific goals (e.g., "bien educados"- or respectful, well-mannered children)- most parents across SES and cultural backgrounds in the United.States, want their children to do well in school to have better long-term career choices (Zeehandelaar and Winkler, 2013; Valant and Newark, 2017). A preponderance of research further demonstrates that early language skills are the best long-term predictors of later academic success (Bleses et al., 2016; Golinkoff et al., 2019; Pace et al., 2019). While there is much within-group variation, on average, children from under-resourced environments have lower-quality language interactions than their moderate- and higher-resourced peers (Huttenlocher et al., 2010; Golinkoff et al., 2019; Sperry et al., 2019). More specifically, children in Spanish-speaking households are disproportionately more likely to live in under-resourced homes, and thereby experience increased risk to their language development (Child Trends Databank, 2021; National Center for Children in Poverty, 2018) and later academic achievement (Reardon and Galindo, 2009). Thus, making it important for researchers to collaborate with within-group caregivers to determine the best ways to support early language development. The current study was designed to address the need for culturally responsive interventions within the larger educational context. It expands on Duet, a preventative early language intervention for caregivers from under-resourced environments. This study describes the steps taken to adapt Duet, originally available only in English, for use with predominantly Spanish-speaking caregivers.

When children engage in more frequent and higher-quality language interactions with caregivers they demonstrate better long-term academic outcomes (Storch and Whitehurst, 2002; Huttenlocher et al., 2010; Hirsh-Pasek et al., 2015; Pace et al., 2019). Although many studies focus on English-speaking families (Hirsh-Pasek et al., 2015; Masek et al., 2021), high-quality, early language interactions also support the communication skills of children from other cultural and linguistic backgrounds. Studies investigating Spanish-speaking mothers' use of more complex, elaborative language, found that it promoted children's narrative skills (Luo et al., 2014; Tamis-LeMonda et al., 2014; Hammer and Sawyer, 2016; Escobar et al., 2017). Additionally, more frequent back-and-forth conversations in caregiver–child dyads predicted language development in Spanish-speaking children (Adamson et al., 2021). Despite the importance of early communication experiences across backgrounds, questions remain, including: "How do researchers help caregivers create an environment with rich, high-quality early interactions?" and "How do researchers develop intervention materials that are linguistically and culturally responsive?"

Many caregiver-focused, English-language interventions have been developed in the United States (Roberts and Kaiser, 2011; Greenwood et al., 2020; Heidlage et al., 2020). However, few interventions are responsive to bilingual learners (Cycyk et al., 2020; Durán et al., 2016; Larson et al., 2020). Caregiver-implemented naturalistic communication interventions (CI-NCIs) aim to improve interactions that occur between caregivers and children in daily routines. CI-NCIs have been shown to improve children's language outcomes (Cycyk et al., 2020; Heidlage et al., 2020; Roberts and Kaiser, 2011). One meta-analysis found that CI-NCIs targeting play and routine interactions improved children's expressive vocabulary with larger effect sizes than interventions targeting only shared reading (i.e., g = 0.50 vs. g = 0.37) (Heidlage et al., 2020). In a recent review, Larson and colleagues (2020) found that interventions that were linguistically *and* culturally responsive were most effective at improving children's language skills. Presenting materials in the participants' native language rendered them linguistically responsive by demonstrating respect and support for children's communication skills. Similarly, culturally responsive interventions drew on participants' values, beliefs, practices, and experiences as resources (Larson et al., 2020). When caregivers deem intervention strategies to be socially important, they are more likely to implement them with their children (Janes and Kermani, 2001; Dunst et al., 2016; Hammer and Sawyer, 2016; Melzi et al., 2019). Examples of successful, strengths-based interventions included using children's drawings to spark conversations between children and parents (Ceasar and Nelson, 2014) and using food as a central theme for language and literacy activities (Levya and Skorb, 2017). These interventions also sought to support children's growth towards cultural goals held by caregivers and to maintain their ethnic identities while acquiring language and literacy skills needed for success in school (Melzi et al., 2019). Despite the importance of cultural and linguistic adaptation, few studies meet *both* criteria (Larson et al., 2020). To date, one study met both criteria and was a CI-NCI. However, it was targeted towards caregivers of preschoolers (Cycyk et al., 2020), demonstrating a need for linguistically and culturally responsive CI-NCIs that seek to support the youngest learners. To the authors' knowledge, this is the first study to linguistically *and* culturally adapt a CI-NCI for use with Spanish-speaking caregivers of infants and toddlers.

Although there is a clear need for linguistically and culturally responsive early language interventions, there is no set standard for adapting intervention materials. While models exist, guidelines are broad and flexible, resulting in varied levels of adaptation (Bernal et al., 1995; Rodriguez et al., 201l; Sangraula et al., 2020; Stirman et al., 2019). One relevant model is the Cultural Adaptation Process (CAP; Domenech Rodriguez and Wieling, 2005; Rodriguez et al., 2011). CAP has three phases which emphasize stakeholder collaboration, creating and testing an initial cultural adaptation, and revising the adaptation based on feedback. The CAP was intended to be used with the Ecological Validity Model (EVM; Bernal et al., 1995) which contains eight specific areas for consideration when adapting interventions for use with Hispanic families (see **Table 1**). Both models demonstrate the importance of involving the target population in the development, testing the materials with the

TABLE 1 | Duet 2.0 adaptation process.

	Duet phases			Cultural adaptation model (CAP) Domenech Rodriguez and Wieling (2005), Rodriguez et al. (2011)	Ecological validity model (EVM) Bernal et al. (1995)
	Duet team translation (1)	Translation company (2)	Duet team revisions (3)		
Phase 1: Initial translation of content	The English duet modules were translated into Spanish by a member of the duet team who is a native Spanish speaker. Two other Spanish-speaking duet team members independently reviewed and made edits to the initial translation. All three duet team translators came together as a group to reach consensus on the edits and create the initial duet team translation	The initial duet team translation was then sent to a translation company. The translation company used the initial duet team translation (in Spanish) to create a back translation (in English). The company also used the original duet modules (in English) to create a second forward translation (in Spanish)	The duet team reviewed all three translations: 1) the initial duet team translation, 2) the translation company's back translation in English, and 3) the translation company's forward translation in Spanish. Then the duet team created a version of the translation to share with the focus groups	Collaboration between intervention developer and cultural adaptation specialist/s (Phase 1)	Language—Translation of the intervention
Phase 2: Focus groups	Two focus groups were held with Spanish-speaking caregivers of children under the age of five from the community. The duet team presented caregivers with objects and phrases and asked caregivers about what they would say and what most Spanish-speakers would say The duet team also asked about the relevance and relatability of the duet modules to Spanish-speaking families. For specific questions see **Supplementary Material**				Metaphors—Ensuring that sayings and metaphors are accurately conveyed and aligned with target population's sayings Content—Making sure that the examples used align with experiences relevant to the target population Concepts—Verifying that the concepts introduced relevant to the culture of the target population
Phase 3: Revision of modules based on feedback and inclusion of culturally relevant examples	The duet team reviewed feedback from caregivers during the focus groups and revised modules. The duet team also added videos of Spanish-speaking caregivers interacting with their children into the adapted modules			Team tailors the intervention to the target population a priori (Phase 2)	
Phase 4: Pilot esting	The modules are currently being pilot tested with predominately Spanish-speaking caregivers of infants and toddlers and English-speaking control group caregivers Spanish-speaking caregivers will be matched with native Spanish-speaking interventionists. Caregivers' comfort with interventionists will also be measured with the coach-caregiver relationship inventory, adapted from the nurse-client relationship inventory Barnard (1998) The intervention will be evaluated by measuring whether there are differences in caregiver knowledge about language development, the quality of caregiver-child interactions, and children's language outcomes				Persons - matching participants to personnel who match their culture Goals—Ensuring the goals of the study align with positive cultural values
	Caregivers will be scheduled for three 2–3 h calls at baseline, 3-months and 6-months. After baseline data collection participants in the intervention will also have weekly calls with an interventionist over the course of 7 weeks. Data collection and intervention calls will be scheduled flexibly with caregivers around their schedules. Data collection calls can be broken up (e.g., two 1.5-h calls) and participants will be paired with an interventionist whose language and availability matches theirs. Throughout the intervention, interventionists will attend regular meetings with the research team to discuss progress with caregivers or identify needs for cultural and linguistic adaptations that did not arise in the focus groups			Team assess in field progress and makes adaptations/test and revise measures (Phase 2)	Context—Continually making sure that the adaptation meets the needs of the target population throughout the study
	Measures and methods used in the study are appropriate for use with the target population. For example, if children in the study are exposed to English and Spanish, then they will receive the age-appropriate forms of the MBCDI in English and Spanish to account for their combined vocabulary Fenson et al. (2000), Jackson-Maldonado et al. (2013)			Identification of measures that are appropriate for the target population (Phase 2)	Methods—Ensuring that the administration of the intervention align with the social expectations of the target population
Phase 5: Revision	The duet team will compile feedback from interventionists throughout the study and collect a caregiver satisfaction survey at the end of the intervention. These methods of feedback will be used to inform future iterations of the duet intervention			Revision of materials (Phase 3) Field testing of new materials (Phase 3) Decentering of materials for use with other populations (Phase 3) Plans for replication and further field testing (Phase 3)	

In Phase 1, the CAP states that a literature review on goals procedures and outcomes should be conducted, that the needs of the community should be assessed, and meeting with community leaders should occur. These steps were performed in the Duet Study prior to translation. The original Duet modules were created through a community-based participatory research project partnering with the Maternity Care Coalition to recruit participants (Luo et al., 2019). Most families who participated in its inception were Black/African American (41%) or Hispanic (46%). In the development of this initial project, 69% spoke English at home and 23% spoke Spanish, the remaining spoke both English and Spanish at home.

target population and the iterative nature of adaptation. The current study sought to create an adapted version of the Duet intervention modules that would be linguistically accurate and culturally responsive across the heterogenous, Spanish-speaking population. Where the other two models included "language" as a step for translation, this study took a deep dive into this aspect of adaptation and aimed to develop modules that would be intelligible across Spanish dialects (e.g., speakers from Puerto Rico, Colombia, etc.). This study discusses the implementation of these general frameworks and specific suggestions for adaptation within each broad category.

The original Duet modules are a set of early intervention videos created to improve the quality of early caregiver–child language interaction. The modules were created based on developmental science within a community-based participatory research (Shalowitz et al., 2009) framework. Researchers from the Duet team worked with the Maternity Care Coalition (MCC), a local home-visiting program, to identify evidence-based principles of early language interaction, co-construct the Duet goals, and build the modules. Caregivers from the community were also included in this initial step, 23% of whom spoke Spanish predominately (Luo et al., 2019). The modules focus on five key principles: General Awareness, Creating Opportunities, Conversational Duets, Scaffolding, and Harmonizing (see **Table 2**; Alper et al., under review[1]; Luo et al., 2019). The six video modules, ranging from 5–30 min each, are narrated by members of a cartoon family (i.e., a mother, father, grandmother, young son, and toddler) who share their own experiences around early language development. This narrative is supplemented by real-life videos of caregivers interacting with their children, to ensure that the modules are representative of the cultural community (Alper et al., under review[1]; Luo et al., 2019).

The original Duet modules were developed for families in under-resourced households who received home-visiting services in English. Results from the pilot study were promising (Alper et al., under review[1]; Luo et al., 2019). This study describes 1) the process of adapting the Duet modules for predominantly Spanish-speaking families and 2) specific recommendations for developing culturally responsive intervention materials.

METHODS

Five steps were outlined in the creation of an ecologically valid adaptation of the Duet intervention modules, the most important of which drew upon input from the target community. These steps focused on methods aligned with the CAP (Domenech-Rodriguez and Wieling, 2005; Rodriguez et al., 2011) and EVM guidelines (Bernal et al., 1995). See **Table 1** for detailed steps. The authors aimed to gain insight into caregivers' language use with their children and to gauge the cultural relevance of examples in the Duet modules. Merging these models and frameworks, the following five phases were developed in the adaptation of the Duet modules for use with predominantly Spanish-speaking participants: 1) Initial translation of the content 2) Focus group input and feedback 3) Revision of modules based on community feedback 4) Pilot testing 5) Revision.

Phase 1: Initial Translation of Content

The first phase involved direct translation of the Duet modules. This phase was important in making materials accessible to share with the target population (i.e., predominantly Spanish-speaking caregivers) for feedback. To achieve linguistic equivalence, several stakeholders reviewed the translations. The Duet team members involved in the translation process included a postdoctoral developmental psychologist, a graduate student studying developmental psychology, and a coordinator with a Bachelor of Science focusing on health and development. All three team members were fluent in Spanish, one was a native speaker, the other two held bachelor's degrees in Spanish language and had lived in Spanish-speaking communities. The Duet team members brought a perspective of content knowledge (i.e., early language development). A translation company provided expertise in Spanish language and grammar.

The English modules were first translated into Spanish by the native speaker on the Duet team. The other two Spanish-speaking team members independently reviewed and edited the initial translation. Then, the three Duet team translators came together to make suggestions and edits as a group. Next, these translated modules were sent to a translation company. The translation company created a back translation into English of the Duet team's Spanish translation. They also used the original English Duet modules to create a second forward Spanish translation.

The Duet team jointly reviewed all three versions of the modules, comparing the original English Duet modules to the company's back translation and the team's Spanish translation to the company's forward Spanish translation. If there were differences in translations among the versions, the team selected the translation deemed most intelligible to the majority of Spanish-speakers. During this phase, if there were words or phrases that the team was unable to come to a consensus on, they were flagged to be presented to caregiver focus groups. Likewise, words or phrases that might vary across different Spanish dialects were also catalogued to be presented at focus groups to obtain caregiver feedback. For example, some dialects use "bizcocho" for "cake" while others use "pastel." Since the Duet team was unable to come to a consensus as to which word was used most widely, the words were flagged to share with caregivers. The next phase in establishing linguistic and cultural equivalence was presenting portions of the updated translation to caregivers in focus groups.

Phase 2: Focus Group Input and Feedback

For phase 2, two three-hour-long focus groups were held in the greater Philadelphia area. Focus groups were conducted in Spanish and engaged caregivers interactively with the Duet materials. Caregivers were given questionnaires about their demographic information, language use, and perspectives on early language development. Fourteen Spanish-speaking caregivers were recruited through Duet's community partner,

[1]Alper, R. M., Luo, R., Mogul, M., Bakeman, R., Adamson, L., Masek, L., et al. (under Review). The Duet Project: An Exploratory Study of a Parent-Implemented Early Language Intervention for Families in Low-Income Households

TABLE 2 | Duet language intervention modules.

General awareness	Creating opportunities	Conversational duets	Scaffolding	Harmonizing
The general awareness module provides caregivers with broad knowledge of child language development	This module helps caregivers create and identify opportunities for communication during everyday activities	The conversational duets module emphasizes contingent, back and forth language interactions between caregiver and child	This module demonstrates how caregivers can provide just enough help to support child language development	The final module explains how all of the strategies can be used together

MCC. The Duet team shared flyers with MCC's home-visitors who then identified Spanish-speaking clients who had a child between 1 and 5 years of age. All participants identified as female and Hispanic and ranged in age from 25 to 39 years old (M = 30.57, SD = 4.74) (see **Table 3** for demographic information). All participants resided in households where the income fell below the 200% federal poverty threshold and all (except one who was pregnant) had at least one child under the age of five. All caregivers had a bachelor's degree or less. These demographic characteristics were similar to the intended participants for the Duet 2.0 intervention. All participants reported speaking Spanish "well" or "very well." Most participants reported primarily speaking Spanish at home (n = 11). Research conducted in this study was approved by the Temple University IRB (protocol number: 26195).

First Focus Group

During the first focus group, the Duet team presented pictures of objects and phrases that were flagged in the creation of the final translation draft (e.g., a picture of a cake). The team first asked participants to individually answer, "What word do you use?" and "What word do you think the majority of Spanish-speakers would use?". Participants were instructed to write down their answers to both questions and turn them in to the researchers. Once answers were turned in, caregivers discussed their responses as a group. This discussion allowed participants to consider other possible words that they may not have generated individually. After the discussion, participants were given an opportunity to change their answer to the second question (i.e., "What word do you think the majority of Spanish-speakers would use?") on a separate piece of paper.

This format was very engaging, as evidenced by all caregivers actively participating in the discussion. In asking the first question, "What word do you use?", the team sought to acknowledge each caregiver's experiences as a native speaker. By asking the second question, the Duet team aimed to both acknowledge each caregiver's own experiences as members of Spanish-speaking communities and to find consensus on words that were intelligible across dialects.

During this focus group, caregivers were also shown videos from the original Duet modules of parents interacting with their children. These videos occurred across a variety of daily life settings (e.g., toothbrushing, folding clothes, etc.). Caregivers were asked if these settings and interactions were similar to interactions they had with their own children. Parents were also encouraged to share other settings that they thought should be added to the modules.

Second Focus Group

In the second focus group, the Duet team read translations of short caregiver-child interactions that serve as examples in the modules. Caregivers were shown the module slides as Duet team members read a cartoon character's part. After each example, caregivers were asked, "Does the concept make sense?". Overall, caregivers reported that the examples from the modules (e.g., interactions during breakfast, in the grocery store, and with books, etc.) were relevant to their daily lives.

Caregivers were asked for feedback about words that young children would use or that a caregiver would use with a young child in Spanish [e.g., "Are the words that Ashley (the cartoon toddler) uses similar to words that your child uses or used at her age?"]. Caregivers who had children between the ages of 12 months and 5 years were specifically recruited to help answer these questions. Responses allowed researchers to determine the appropriateness of the Spanish words used by and with the toddler in the modules. This was important because in some cases, grammatical structures in one language are more difficult to acquire in the other. For example, in English "eat it" is more complex in Spanish "cómetelo" (Domínguez, 2003).

During both focus groups, caregivers were asked to give feedback about words, phrases, and content. The Duet team asked questions like, "Would you say this differently? If so, how?", "Are there any additional examples you would like us to make or add?" and "Are the Duet modules relevant to your daily life?" Outside of the translations provided, caregivers were

TABLE 3 | Focus Group Participants' Demographic Information.

	N
Ethnicity	
Hispanic	14
Gender	
Female	14
Speaks Spanish	
Well	3
Very well	11
Dialect	
Puerto rican	4
Dominican	3
Salvadorian	2
Mexican	5
Highest education	
High school	2
Some college but no degree	5
Associate degree	1
Bachelor's degree	5

encouraged to share any suggestions for translations that would better describe the idea or concept. Caregiver input informed the authors' word choices and culturally specific examples. For a detailed list of all focus group activities see **Supplementary Material**.

Phase 3: Revision of Modules Based on Feedback and Inclusion of Culturally Relevant Examples

During phase 3, the Duet team revised the modules by incorporating videos of Spanish-speaking caregivers interacting with their children and the feedback from the focus groups. Within the Duet modules, there are example videos of real caregivers interacting with their children in everyday activities. The team sought to ensure that the adapted modules contained cultural, ethnic, and linguistic content representative of the target audience. Thus, Spanish-speaking, caregiver-child dyads were recruited to film additional real-life interaction videos. Caregivers who wanted to participate in the videos were asked to interact with their children as they normally would. All caregivers who agreed to be filmed spoke in Spanish with their child/ren. Speaking in Spanish was not a requirement for participation; it was the language that caregivers chose to use with their children. Clips from these interaction videos were added to both the English modules (with English subtitles) and to the Spanish modules.

Data Aggregation

To determine which words to use, the Duet team counted the number of endorsements from the question, "What word do you think the majority of Spanish-speakers would use?" If a word was the most highly endorsed both before and after the discussion, that word was selected for use in the modules (see **Tables 4**, **5**). For example, if participants most frequently wrote the word "balón" for ball before *and* after the discussion, the word "balón" was used in the modules. If caregivers endorsed different words before and after the discussion, the two most highly endorsed words were discussed among the Duet team members. For example, if before the discussion, caregivers wrote the word "balón" most frequently, but after the discussion wrote "pelota," Spanish-speaking Duet team members reviewed the focus group recordings and came to a consensus on which word to use based on the discussion between the focus group participants and the research team. Finally, caregiver's votes from the phrases were tallied and the phrases that were most frequently endorsed were used in the Spanish modules.

Phase 4: Pilot Testing of Modules

The Duet team is currently in the process of phase four, testing whether the English and Spanish versions have similar effects on participants. To do so, English- and Spanish-speaking caregivers are being recruited to participate in the Duet 2.0 intervention, which will deliver the updated English and Spanish modules. Through the intervention, the team aims to improve caregiver knowledge about language development, the quality of caregiver-child interactions, and children's language outcomes. The intervention will be carried out over seven weeks. Each week, caregivers will watch a Duet module on their own time. After watching the video, caregivers will have a 30 to 60-min call with an assigned language interventionist at the caregiver's convenience. During the calls, the interventionist will discuss the module with the caregiver and guide them in incorporating the strategies into their daily lives.

This coaching model allows for flexibility in caregivers' schedules as well as in cultural beliefs and practices. Two of the three interventionists in the study are native Spanish-speakers. Interventionists have been rigorously trained about early language development, including language development for Dual Language Learning children. Trainings will also involve discussions about cultural practices and considerations. Data from the focus groups, namely, caregivers' perspectives and expectations about early language development, will also be used to inform interventionists' coaching practices. As the intervention progresses, interventionists will meet biweekly with the research team to share their experiences with coaching families. This community of practice will give interventionists an opportunity to share successes and discuss ways to better address the needs of the families they serve. It will also allow the research team to uncover any need for additional linguistic and cultural adaptations or considerations that were not revealed in the focus groups.

Phase 5: Revision

After the translated modules are implemented in the Duet 2.0 intervention, the authors will determine whether the English and Spanish versions of the modules have similar effects on participants. Although the input from caregivers in the focus group was integral in informing the adaptation of the modules, this is an iterative process. The feedback that is received from Spanish-speaking families after the intervention will be incorporated into future delivery of the Duet intervention modules.

DISCUSSION

The purpose of the current study was to adapt a CI-NCI for use with predominantly Spanish-speaking families and to create a set of guidelines to aid researchers in the cultural and linguistic adaptation of intervention materials. To that end, the current study describes the progress made towards adapting the early intervention modules using a five-phase model. These five steps include: 1) Initial translation of the content 2) Focus group input and feedback 3) Revision of modules based on community feedback 4) Pilot testing and 5) Revision. While many of the steps replicated previous models (Bernal et al., 1995; Domenech Rodriguez and Wieling, 2005), this study paid particular attention to the linguistic adaption as it was designed to be used across multiple dialects of Spanish.

Like previous studies involving CI-NCI adaptation (e.g., Cycyk et al., 2020), this study involved multiple, iterative steps. During the initial translation and focus group phases, the authors included experts in: 1) the content (i.e., the Duet team members), 2) the Spanish language (i.e., the translation

TABLE 4 | Results from objects portion of focus groups.

English words	Spanish words (frequency)			Final word choice
	What word would you use?	Pre-discussion: What word do you think that the majority of Spanish speakers use?	Post-discussion: What word do you think that the majority of Spanish speakers use?	
Stroller	Carriola (1), coche (6), coche de bebe (0), cochecito (1), stroller (0)	Carriola (6), coche (0), coche de bebe (1), cochecito (0), stroller (0)	Carriola (6), coche (2), coche de bebe (0), cochecito(0), stroller (0)	Carriola
Slippers	Pantuflas (7), chanclas and chancla (1), chinelas (0), chancletas de levantarse (0)	Pantuflas (5), chanclas and chancla (2), chinelas (0), chancletas de levantarse (0)	Pantuflas (7), chanclas and chancla (1), chinelas (0), chancletas de levantarse (0)	Pantuflas
Ball	Pelota (6), bola (2), balón (0), pelota de baloncesto (0)	Pelota (4), bola (1), balón (2), pelota de baloncesto (0)	Pelota (2), bola (0), balón (6), pelota de baloncesto (0)	Balón
Laundromat	Lavandería (7), laundry (1)	Lavandería (6), laundry (1)	Lavandería (8), laundry (0)	Lavandería
Snack	Refrigerio (1), merienda (7), snack (0)	Refrigerio (3), merienda (4), snack (0)	Refrigerio (1), merienda (7), snack (0)	Merienda
Bottle	Biberón (5), botella (0), pacha/pachita (2), tetero (0), bibi (1)	Biberón (3), botella (2), pacha/pachita (1), tetero (1), bibi (0)	Biberón (4), botella (2), pacha/pachita (1), tetero (0), bibi (1)	Biberón
Socks	Calcetines (3), medias (5)	Calcetines (6), medias (1)	Calcetines (6), medias (2)	Calcetines
Phone	Celular (5), teléfono (3), móvil (0)	Celular (4), teléfono (1), móvil (2)	Celular (6), teléfono (2), móvil (0)	Celular
Pot	Olla (7), caldero (1), cacerola (0)	Olla (2), caldero (4), cacerola (1)	Olla (3), caldero (3), cacerola (1)	Olla[a]
High-chair	Silla de comer (4), el comedor del bebe (0), silla para bebe para comer (1), silla para comer niño (1), silla de bebe para comer (2), silla comedor de bebe (0), silla de comer de bebe (0), silla para dar de comer al niño (0)	Silla de comer (3), el comedor del bebe (1), silla para bebe para comer (1), silla para comer niño (1), silla de bebe para comer (0), silla comedor de bebe (1), silla de comer de bebe (0), silla para dar de comer al niño (0)	Silla de comer (4), el comedor del bebe (1), silla para bebe para comer (0), silla para comer niño (0), silla de bebe para comer (0), silla comedor de bebe (0), silla de comer de bebe (1), silla para dar de comer al niño (1)	Silla de comer
Banana	Banana (2), banano (0), guineo (6), plátano (0)	Banana (3), banano (1), guineo (2), plátano (1)	Banana (4), banano (1), guineo (3), plátano (0)	Banana
Refrigerator	Nevera (6), refrigeradora (0), refrigerador (1), refri (1)	Nevera (1), refrigeradora (1), refrigerador (4), refri (1)	Nevera (4), refrigeradora (2), refrigerador (2), refri (0)	refrigerador[a]
Oatmeal	Avena (6), cereal de avena (1), cereal (1), cereal caliente (0)	Avena (3), cereal de avena (0), cereal (3), cereal caliente (1)	Avena (6), cereal de avena (0), cereal (1), cereal caliente (0)	Avena
Pony	Caballito (2), poni (3), potrico (2), potro (1), potrito (0)	Caballito (4), poni (0), potrico (1), potro (1), potrito (1)	Caballito (7), poni (0), potrico (0), potro (1), potrito (0)	Caballito
Tire	Goma (6), llanta (2), neumático (0), rueda (0)	Goma (0), llanta (2), neumático (5), rueda (0)	Goma (1), llanta (3), neumático (4), rueda (0)	Neumático
Hole	Hoyo (7), hueco (0), agujero (0), bache (1), roto (0)	Hoyo (3), hueco (0), agujero (3), bache (0), roto (1)	Hoyo (6), hueco (0), agujero (2), bache (0), roto (0)	Hoyo
Pants	Pantalón (8)	Pantalón (8)	Pantalón (8)	Pantalón
Turn on the faucet	Llave (4), pluma (3), grifo (0)	Llave (3), pluma (2), grifo (1)	Llave (4), pluma (2), grifo (1)	Llave
Jelly	Jalea (2), mermelada (6)	Jalea (4), mermelada (3)	Jalea (6), mermelada (2)	Jalea
Bus	Autobús (3), bus (1), guagua (4), camión (0)	Autobús (2), bus (2), guagua (3), camión (0)	Autobús (5), bus (2), guagua (1), camión (0)	Autobús
Cake	Pastel (2), bizcocho (6), tarta (0), queique (0), cake (0)	Pastel (4), bizcocho (0), tarta (2), queique (0), cake (1)	Pastel (6), bizcocho (2), tarta (0), queique (0), cake (0)	Pastel
Hat	Sombrero (6), gorro (2)	Sombrero (4), gorro (3)	Sombrero (8), gorro (0)	Sombrero

While childcare was provided at the focus groups, parents moved freely and occasionally checked on their children. Thus, during some of the voting, not all parents voted.
[a]*No consensus among participants, research team decided.*

company), and 3) the lived experience of raising Spanish-speaking children (i.e., the focus group caregivers). In phase 3, researchers aggregated the essential information caregivers provided about their experiences with language as Spanish-speakers and their experiences with their own children's language development. Caregivers' input informed language choices and the cultural appropriateness of interaction examples. Additionally, naturalistic caregiver-child interactions were included in the final version of the Duet modules to expand the linguistic, ethnic, and cultural diversity.

One strength of using CI-NCI models with culturally and linguistically diverse families, is that they do not aim to change routines or day-to-day activities (e.g., adding dialogic reading). They aim to change the *interactions* that happen during these routines (Cycyk et al., 2020). This model allows families to continue engaging in activities that they normally do (e.g., cooking dinner, doing chores, etc.) but asks them to consider ways to build upon those interactions. CI-NCIs thus encourage caregivers to continue their usual routines while supporting them in their communication practices.

The ongoing phases reflect the need for testing with the target community and the flexibility needed in the iterative adaptation process. In testing the new modules in their entirety with predominantly Spanish-speaking caregivers, the authors will better understand which aspects of the modules have been successfully adapted and what may need further revision. Through the outlined phases, this paper emphasizes the importance of collaborating with community stakeholders in

TABLE 5 | Examples of Results from verbs and Phrases Portion of Focus Groups.

English Verbs and phrases	Spanish words (frequency)	Final verbs and phrases choice
	"Which of these two would the majority of Spanish-speakers understand? (e.g., how many of you would say this, how many of you would say that) is there another verb or phrase you would use? "	
Verbs		
Crying, looking, smiles, **frowns**, noises, and pointing are all things ashley did to communicate before she ever talked	Fruncir el ceño (0), fruñir (0), fruñir las cejas (8)	Fruñir las cejas
He's **holding** a bat	Sosteniendo (5), agarrando (3)	Sosteniendo
Show me which one you want	Muéstrame (2), enséñame (4)	Enséñame
Grandma **pretends** to taste the soup	Finge (1), pretende (5), hacer creer (1)	Pretende
Look the cat's **walking** down the street	Caminando (8), andando (0)	Caminando
Sometimes, ashley doesn't **respond** to questions right away	Contesta (7), responde (0)	Contesta
How do you **tie** your shoe?	Amarras (8), atas (0), atas el cordón (0)	Amarras
That's monkey. He's **driving** the yellow digger	Manejando (6), conduciendo (0), guiando (0)	Manejando
I'm still not sure what ashley wants to **drink**, mom might need to give her just a little help	Tomar (0), beber (8)	Beber
Phrases		
Communication is everywhere, every day, and in all languages. It's important to create opportunities to communicate with your kids during **everyday activities**	Actividades del diario vivir (2), actividades cotidianas (0), actividades diarias (6)	Actividades diarias
A conversation is a duet, not a solo. Participating in the **back-and-forth conversation** helps kids learn to communicate	Conversaciones de ida y vuelta (2), intercambio de palabras (2), conversación de un lado a otro (1), conversación bidireccional (0), conversación de dos vías (0), conversación en dúo (0)	Conversaciones de ida y vuelta[a]
Do you want milk, the apple, or **both**?	Las dos (5), ambos (1)	Las dos
Mom you need to figure out what ashley really wants before she **makes a scene** in the store	Arme un escándalo (1), haga un berrinche (5)	Haga un berrinche
The back-and-forth conversation between Mom and ashley is what we call a "**conversational Duet**"	Dúo de conversación (5), dúo conversacional (0), dueto conversacional (0)	Dúo de conversación
Time to eat!	Hora (8), tiempo (0)	Hora
Follow your child's lead	Pasos (0), intereses (8)	Intereses
There are lots of reasons why giving just enough help is a good thing. My parents want ashley to feel like she can do things on her own and to help her not get frustrated	Ayuda necesaria (3), ayuda justa (0), ayuda suficiente (4)	Ayuda suficiente

While childcare was provided at the focus groups, parents moved freely and occasionally checked on their children. Thus, during some of the voting, not all parents voted.
[a]No consensus among participants, research team decided.

the adaptation process. In addition, it is important to consider culturally specific goals that caregivers have throughout the adaptation process. This is critical to ensure that children not only meet school system expectations but are also successful members of their own cultural communities (Melzi et al., 2019). As the current project moves forward, it will account for these cultural goals and draw upon family funds of knowledge (Gonzalez et al., 2005). This will be done through interventionist—caregiver calls, where interventionists will discuss culturally based activities that caregivers already engage in and additional objectives that caregivers might have for their children.

Adaptation Challenges

The authors set out to adapt the Duet intervention modules for use with predominantly Spanish-speaking caregivers. However, this population is extremely heterogeneous. Incorporating the diversity across dialects and cultures present in the Spanish-speaking world was one of the main challenges. Although the authors recognize that dialects differ within countries, the team made the choice to define dialects as country (or territory in the case of Puerto Rico) of origin. In doing so, the research team included caregivers from as many Spanish-speaking countries or territories as possible. Caregivers in this study represented four of the five most populous groups of Spanish-speaking countries/territories living within the United States (i.e., Mexican, Puerto Rican, Salvadoran, and Dominican, but not Cuban; Noe-Bustamante, 2019). These four groups comprise 79% of reported areas of origin in the United States (Noe-Bustamante, 2019).

Additionally, to limit over-sampling of one dialect, the researchers systematically asked participants to identify the word they themselves would use, and the word they believed most Spanish-speakers would understand. Although the speakers were only from a few countries/territories, they differentiated between words they used and words that a broader group of Spanish-speakers would recognize. This was evidenced by the differences in their responses to the two questions and in the resulting discussion.

Other limitations of this study include a small sample size and that all participating caregivers were mothers. Although a small number of caregivers participated in the focus groups this study plans to enroll more participants in the pilot study. Furthermore, all caregivers in the focus groups were mothers. This is a common limitation across developmental studies which often do not include fathers or other caregivers (Parent et al., 2017). However, while other secondary caregivers may be involved in children's lives, based on participation in the focus groups it may

be that mothers tend to be the primary caregivers in the target population.

CONCLUSION

The current study used a multi-perspective approach to create an adaptation of an early language intervention that was linguistically and culturally appropriate as well as a blueprint for researchers adapting intervention materials. The Duet team made use of their own expertise in the field of early language development, the translation company's mastery of the Spanish language, and caregiver's knowledge and life-experience to create modules that are accessible across multiple dialects of Spanish. While there is evidence that researchers translate materials into Spanish (Larson et al., 2020), there is a need to ensure that these materials are also ecologically valid. Despite this need, there are very few studies which describe the successful incorporation of families' perspectives into the multifaceted translation process. This study sought to describe successful strategies for incorporating caregivers' perspectives into an early intervention and to inspire researchers to develop both linguistically and culturally valid materials in the future.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by the Temple University's Human Research Protection Program (HRPP). The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

BR, RA, JJ, LM, RL, MM, RMG, and KH-P contributed to conception and design of the study. BR wrote the first draft of the manuscript. BR, RA, JJ, LM, RL, EB, and KH-P wrote sections of the manuscript. All authors contributed to manuscript revision, read, and approved the submitted version.

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SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/feduc.2021.660166/full#supplementary-material

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ORIGINAL RESEARCH
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Communicative Functions in Children Raised in Three Different Social Contexts in Colombia: The Key Issue of Joint Attention

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Children's sociocultural experiences vary around the world. Colombia is a South American country where the differences between socioeconomic statuses (SES) are huge. In this study, through the ECSP-E Scale, translated to Spanish and validated for linguistic and cultural equivalence, the development of three communicative functions was evaluated through an interactive sociopragmatic approach. The participants comprised 36 24-month-old children, raised in three different social contexts in Colombia, with the goal of comparing them across groups of SES. The lowest SES group sample subjects were representative of extreme poverty and members of an ethnic group, the Wayuú. Results for the communicative functions, namely social interaction (SI), joint attention (JA), and behavior regulation (BR), showed that the only function with no significant differences across SES was joint attention. This supports the hypothesis that the development of this function may be universal, in light of the fact that the Wayuú not only differed from other subjects in terms of their socioeconomic status but also in their culture. Higher SES was related to better social interaction, while Low SES was associated with better behavior regulation than their High SES peers. Consequently, results are discussed considering socioeconomic and cultural differences in the development of communication and social interactions, leading us to reexamine the paradigms, theories, and practices that are used when observing children raised in very poor environments.

Keywords: social interaction, joint attention, behavior regulation, socioeconomic contexts, Colombia

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INTRODUCTION

The child's first communications with his environment are evidently non-verbal and occur in the middle of interactive sequences with the adult (generally the mother). This interactive duo is essential for both language development and the child's socio-cognitive development (Bruner, 1983; Song et al., 2014; Tamis-LeMonda et al., 2014; Donelly and Kidd, 2021). Indeed, in terms of

early language development, some studies suggest that the response capacity of parents to the communicative behaviors of babies predicts the learning of words (Tamis-LeMonda et al., 2014). Likewise, the interactive relationship between the child and the adult facilitates learning of the first concepts, that provide the child with the referents on which he can map the first words, thus organizing and consolidating his knowledge (Song et al., 2014). In this sense, adults provide a scaffolding or support that facilitates and promotes children's learning and development.

The sociopragmatic approach of development, which includes the works of Bates et al. (1979), Bruner (1983), and those related to usage based theory of language acquisition (Tomasello, 2003) sustains that there is a continuity between prelinguistic and linguistic development in children: the expressive behaviors manifested by the child during the first year (e.g., facial expressions and gestures) are precursors to the lexicon that appears between the second and third year of life (Guidetti, 2002, 2005; Ozcalıskan and Goldin-Meadow, 2005; Callaghan et al., 2011; Cochet and Byrne, 2016; Cochet and Guidetti, 2018; Ger et al., 2018; Moreno and Guidetti, 2018). In particular, Bruner (1983) points out that this continuity is guaranteed through familiar formats or scenarios (standardized models of interaction), or routines (corresponding, for example, to repetitive games), in which the child can identify (and therefore make predictions) based on the regular elements of these scenarios that he already knows, and that the mother or the adult gradually enriches. In this context of interaction, the child also gradually focuses his attention on the variable elements of different situations and on the functions of communication. In other words, he learns the usefulness, purpose, and intentionality of the communicative exchange (Bruner, 1983).

COMMUNICATIVE FUNCTIONS IN THE CONTEXT OF THE SOCIOPRAGMATIC INTERACTIVE APPROACH

Three communicative functions contextualized in an interactive setting are available to the child during the first two years: Social Interaction (SI), where the intention of the child's exchange with the adult is to draw attention to himself, to approach, and to obtain physical or social contact (Bruner, 1983; Murray and Trevarthen, 1986; Trevarthen and Aitken Kenneth, 2001; Donelly and Kidd, 2021); Joint Attention (JA), where the intention of the exchange is to share the attention with the interlocutor, toward an object, a person, or a situation (Bruner, 1983; Kinard and Watson, 2015) and Behavior Regulation (BR), where the intention of the child's exchange is the modification of the behavior of the other, using the adult as an intermediary to obtain from him the help he needs (Bates et al., 1979) or the modification of his own behavior when the adult asks him to do so (Bruner, 1983).

From birth, the child is immersed in social situations in which he is an essential actor, and his intelligence is not only constructed during the relationships he establishes with objects but also with the people around him. Gergely and Csibra (2006) consider that the social environment of a baby is equipped to attract his attention and orient him toward what is important to learn through a communication system that facilitates the transmission of generic knowledge among individuals, as explained in the natural pedagogy theory.

The function of SI is built in these exchanges. In this way, to be successful in the cultural and social world in which he is born, the child must learn the uses of the artifacts, symbols, and social and institutional practices of his contexts. In other words, what makes the child a social and cultural being, similar to adults in the same context, is being able to actively share intentions and attention with other people in collaborative activities (Tomasello et al., 2005; Callaghan et al., 2011; Thommen, 2017; Donelly and Kidd, 2021).

According to sociopragmatic approaches, joint interaction is the basis for the development of the linguistic system (Bruner, 1983; Tomasello, 2003), and researchers have identified the period between 9 and 12 months, as an important stage in its emergence. It has been established that JA is developed around the first year, when children are already communicating with their parents about external objects (Bates et al., 1975, 1979; Bakeman and Adamson, 1984; Carpenter et al., 1998; Kinard and Watson, 2015; Mundy et al., 2016). The development of JA involves two things: on one hand, that children are aware of their environment and, on the other, that they perceive that others are part of the same environment. Carpenter et al. (1998), distinguish three main characteristics of *Joint Attention*. The first is *sharing attention* (appearing from 8 to 9 months) which refers to episodes in which both people focus their attention on the same object, and, during the episode, the baby spontaneously looks at the adult's face, and then returns to the object. The second characteristic is *directing attention* (around 9–10 months of age), where the child performs an action such as turning the head, pointing, or manipulating an object to retain or redirect the attention of the other person. Finally, *following attention* (from 8 months), where attention is redirected in response to actions such as the direction of the gaze or the pointing of the other person.

On the other hand, in BR the child sees the adult as an intermediary to achieve his goals. In this sense, he regulates the adult's behavior. In early development, he will do so through gestures, looks, or vocalizations. According to Bates et al. (1979), between 12 and 16 months the child can use the language of adults as an aid in the acquisition and use of gestural patterns. Thus, the child's understanding of words and gestural production would be related to pointing, a gesture whose objective would be to indicate to the other that he wants something. This linguistic information (in this case received from the adult) influences the gestural performance of the child who imitates some gestural models from adults. Bruner (1983) also relates the function of regulation with the emergence of the request in children (invitations, requests for objects, and requests for help in the actions that he will carry out). According to him, the complexity of the child's request to the adult implies a regulatory function in the sense that the child not only makes the request, but also controls how he wants it to be satisfied. Bruner adds that this requirement implies not only that the child learns to coordinate his own language with the action requirements of

the real world, but also that he learns to do so in culturally and socially accepted ways.

Additionally, as stated by Mundy et al. (2003) and Guidetti and Tourrette (1993/2017), children can play different roles during communicative interactions, namely initiates (*I*), answers (*A*), and maintains (M). Thus, respectively, for each communicative function, the following communicative behaviors can be observed: 3 roles for social interaction (*ISI*, *MSI*, and *ASI*), 3 roles for joint attention (*IJA*, *MJA*, and *AJA*), and 2 roles for behavior regulation (*IBR* and *ABR*).

Those communication functions, however, are not necessarily developed in the same manner across different populations around the world, as they could be affected by environmental constraints. To assess those variables (*SI, JA,* and *BR*), the diversity of the conditions and resources available in the children's surroundings should be taken into account (Keller and Otto, 2009; Callaghan et al., 2011; Salomo and Liszkowski, 2013; Fawcett and Liszkowski, 2015).

SOCIOECONOMIC CONTEXT AND COMMUNICATIVE FUNCTIONS

The socio-economic and cultural backgrounds of children are different around the world and have a substantive influence on language development (Salomo and Liszkowski, 2013; Fawcett and Liszkowski, 2015). Since this linguistic development is a process that is built on the scaffolding provided in the early years by communication functions, it could be inferred that the development of these functions may also be affected by these environments (Keller et al., 2004; Callaghan et al., 2011). However, there is a dearth of research in terms of evaluating this hypothesis, and the studies which are available tend to explore environmental impacts on language development, not on early communicative functions.

One aspect of the social environment that has been related to language development is SES, with findings that support the idea that there are differences across different SES groups, with low-income contexts mostly resulting in detrimental effects on language development. That is, individuals from privileged SES had better indicators related to the appearance of vocabulary. For example, Arriaga et al. (1998) compared linguistic skills through indicators such as size of expressive vocabulary, age of appearance of word combinations, and complexity of expressions. Those indicators were tested by contrasting low-income and middle-income young children matched samples. It was found that scores for the low-income group were strikingly lower on the three key indicators tested.

Similarly, Hoff (2003) showed that children's rates of productive vocabulary development deviate in relation to differences in language learning experiences derived from their family SES. This study compared two-year old children interacting with mothers from high and medium SES. The results showed a difference between these two groups of children in their productive vocabularies. This difference favored children with high SES whose vocabulary grew to a greater extent compared to the vocabulary of children with medium SES. This difference was explained by the mother's speech properties that were related to SES.

Additionally, according to Hart and Risley (1995), children living in poverty hear significantly fewer words than their richer peers. This was concluded on the basis of data from 42 American families of diverse socioeconomic origins through monthly hour-long conversations, from the time the children were seven months until the age of three. After following these families for four years, the researchers found that differences in parent-child interactions produced significant discrepancies among children from low-income and high-income families, not only in the children's knowledge, but also in their abilities and experiences. Follow-up studies showed that these differences in language and interaction experiences have long-lasting effects on a child's performance later in life.

Fernald et al. (2013) found that significant disparities in vocabulary and language processing efficiency were already evident at 18 months among infants from families with different SES and that at 24 months there was a 6-month gap in critical processing skills for language development between those infants. In a more recent study carried out with 347 Guatemalan children and adolescents, from 6 to 17 years of age, the results showed lower scores in language and attention with respect to the 41.5% of the sample who had a vulnerable background (they came from families with a low socioeconomic level or had had a high exposure to violence) (Ibáñez-Alfonso et al., 2021). According to Locke et al. (2002) and Ginsborg (2006), many low-income children already have a noticeable delay in the development of their language ability by the time they turn three years old. This suggests that more attention should be paid to the communication experiences of children during the first three years of life. To a lesser extent, early communicative experiences have also been related to the socioeconomic context (Tamis-LeMonda et al., 2014; Barbu et al., 2015; Hirsh-Pasek et al., 2015) and have been studied from a sociopragmatic perspective that deems social interaction as a central component in the development of communication and language (Donelly and Kidd, 2021).

Nowadays it is known that the development of socio-communication skills in children depends on socialization and childcare practices (Gaffan et al., 2010). Recently, more research has been conducted comparing children aged 0 to 3 years living in different socioeconomic contexts (Bornstein et al., 2015a,b). Especially in low-income countries, socialization and childcare practices are determined by social and economic conditions, as well as the working conditions of mothers and/or caregivers (Bornstein et al., 2015a,b).

Therefore, it could be expected that children who grow up in contexts with vast social differences would also show significant variation in the development of their social skills and communication functions. Studies linking the behavior regulation function and socioeconomic context from a pragmatic perspective are scarce. Those that are available tend to be associated with parenting practices and behavior problems, rather than with communication development. These studies are also carried out with children older than 3 years. For example, a study developed in Norway by Størksen et al. (2015)

supports the idea that children's behavior regulation may be influenced by their contexts and cultures, including their parents' socioeconomic status.

On the other hand, Pisani et al. (2018) conducted a study with 204 Brazilian mothers of children from 3 to 8 years old. The results revealed three latent parenting practices: emotional and behavioral regulation, communication, and positive discipline. Lower socioeconomic status was directly related to higher levels of internalization of child behavior problems and more negative parenting practices in the domains of positive communication and discipline. Although mothers' emotional and behavioral regulation was not related to socioeconomic status, it was a negative predictor of children's behavior problems. Overall, these studies show, on the one hand, that there is a relationship between socioeconomic status and behavior regulation, and on the other hand, that further research is needed concerning the regulation of behavior at an early age.

Moreover, studies that relate the socioeconomic context and joint attention function specifically in children under three years of age are also scarce. Gaffan et al. (2010) evaluated fifty-nine healthy babies who were filmed with their mothers and with a researcher at two, four, six, and nine months in face-to-face games and at six and nine months in games with toys. Specifically, the child attention request and the percentage of time in shared attention was evaluated. None of the demographic, cognitive, or psychiatric variables measured had a significant effect on joint attention for the nine-month children, alone or in combination with other variables, in line with previous studies that have reported weak and inconsistent associations for joint attention and other variables (Goldsmith and Rogoff, 1997; Carpenter et al., 1998, 2002; Mundy et al., 2003). It is becoming increasingly evident that joint attention appears to be a common core communicative skill that develops in children around the world (Callaghan et al., 2011; Liszkowski et al., 2012).

The innate and adaptive explanation of the origin of cognition and joint attention has been contrasted with the cultural explanation. Authors such as Callaghan et al. (2011) explain that the triadic interaction (joint attention) around objects among parents and their young children is not universal in all cultures during the first 2 years of life, at least not in the prototypical form or level at which it occurs and is typically characterized in the scientific literature. However, other studies have tacitly assumed the universality of co-attention processes in middle-class western parents and children, e.g., Bruner (1983) and Tomasello et al. (1999).

CULTURAL CONTEXT AND COMMUNICATIVE FUNCTIONS

Although research on the development of communicative experiences in early childhood has increased in recent years, these studies have mostly focused on exploring, for example, how communicative experiences are influenced by the cultural context (Liszkowski and Brown, 2007; Callaghan et al., 2011; Liszkowski, 2011). Referring particularly to the pointing gesture in children (one of the most characteristic indices of prelinguistic communication and which is key in the development of joint attention), Liszkowski et al. (2012) developed an investigation that compared 7 different cultures. The results of their study showed that the gesture of pointing emerged in all cultures within the same age range that had previously been established for American samples. Even the frequency of the baby's pointing did not differ between cultures. According to Liszkowski et al. (2012), these results refute previous research that had questioned the universality of prelinguistic communication skills, alluding to vast cultural differences in socialization practices and the role of social interaction in development. For example, in the case of joint attention, most studies agree that it develops in the same manner in all cultures (Liszkowski et al., 2012), and that it is in fact one of the vital cognitive and communicative functions developed by the human brain (Mundy, 2016; Nyström et al., 2019). These results, furthermore, bring into question the idea of whether the development of communicative functions could also be universal.

CORE HYPOTHESIS OF THIS WORK

This research, therefore, assumes that if a communicative function is universal, its development should not be affected by the social environment including SES; but, considering the previously mentioned studies, it can be argued that this could be the case for Joint Attention but not for Social Interaction and Behavior Regulation. This central idea constitutes the core hypothesis of this research. Therefore, as Social Interaction and Behavior Regulation seem to depend more on the context and care practices received by children in their first three years than Joint Attention, when examining these variables in samples with diverse SES, it is expected that the socioeconomic environment would influence the first two of them (SI and BR) but not the last one (JA). As known, it is with their parents or caregivers that the child normally establishes the first social interactions, but it is clear that, if the parents do not have the appropriate social and economic conditions, these interactions could be diminished or not stimulated in the child (Conger and Donnellan, 2007; Leventhal et al., 2015).

CONTEXTUALIZING THE RESEARCH HYPOTHESIS: THE DEVELOPMENT OF COMMUNICATIVE FUNCTIONS IN COLOMBIA

The foregoing discussion has particular salience in the context of countries with sharp inequalities and lack of social mobility, where the opportunities to exercise the acquired interactive skills are more limited. A suitable place to test the stated hypothesis is Colombia (more specifically the Caribbean coast). Colombia is characterized by a highly unequal society, where families live in very different socioeconomic conditions, ranging from very wealthy to very poor neighborhoods; and where the difference between the wealthy and the poor is very marked.

Efforts to measure and situate these differences have been made by several organizations, for example, according to the Organization for Economic Cooperation and Development (OECD, 2018), Colombia ranks 65 out of the 82 countries evaluated, where families need around 12 generations to change their SES. Indeed, when the results of the last Large Integrated Household Survey in Colombia (GEIH) are analyzed, the percentage of people classified as poor with respect to the national population is 35.7%, and the percentage of people classified as living in extreme poverty with respect to the total national population is 9.6% (DANE, 2021d). In the latest UNDP (2020), although Colombia is classified high in terms of the human development index (0.767), extreme social and economic distances were observed. For instance, the World Bank reported that Colombia's Gini coefficient was 0.53 in 2019. Further, according to a report by the Economic Commission for Latin America and the Caribbean (ECLAC), the level of extreme poverty in Colombia increased to 14.3% in 2020 due to the COVID-19 crisis.

Understanding Socioeconomic Strata in Colombia

To address the inequality gap, in 1994 the Colombian government approved the National Utilities Law (Ley 142 de 1994, Ley de servicios públicos. See art. 102) that allowed for the classification of households according to their housing conditions, with a tool known in the country as Socioeconomic Strata (*Estrato Socioeconómico*) (DANE, 2021a). Specifically, housing units were assigned a number from 1 to 6, to cluster them based on their physical and structural features and the conditions of the neighborhood where they were located. The goal of this classification is to tax utilities in such a way that more affluent households subsidize services for families in poverty. In this sense, low strata households receive benefits from the government in terms of reduced monthly bills.

In this classification, strata 1, 2, and 3, are the lowest, with 1 being very low and equal to extreme poverty, 2 being low, and 3 middle/low. These strata are assigned to housing units whose inhabitants are considered to be in situations of poverty, with houses that have structural problems such as lack of windows and walls, built using precarious materials (sand, clay, wattle, wooden frames, and pallets), that may lack access to public utilities (water, gas, and electricity), and that are located in neighborhoods with infrastructural problems, such as lack of pavements, no access to public transportation, and located on geologically unstable land (DANE, 2021c). Stratum 4 is considered a middle classification for the quality of housing conditions. Households in this stratum have access to public utilities and have adequate structural characteristics; they are located in urbanized neighborhoods and do not receive benefits from the government in their utility bills, however, they are not subjected to a higher tax rate to subsidize the lower strata. Lastly, strata 5 and 6 (middle/high and high, respectively) have the highest quality housing conditions, both structurally and locationally, being situated in safe neighborhoods that usually have access to parks, recreational centers, malls, and so on. Their residents are taxed highly, and their utility bills comprise both their consumption and an additional percentage that is charged to subsidize strata 1, 2, and 3 (DANE, 2021c).

Mapping SES and Socioeconomic Strata

Although income is often related to housing conditions, it is not straightforward to map SES to strata. This is because strata only consider structural, urbanistic, and construction features of households and do not take into account other indexes that are usually measured to assess overall quality of life in terms of SES, as SES determines ability to access goods, resources, services, and safety that are essential to human development, e.g., access to private schools, music classes, organized sport, and technology (Duncan et al., 2015). This represents a disparity between what is understood as poor in a developed country observed under the SES paradigm versus what can be considered as poor in Colombia under the strata paradigm. However, there is some common ground in both definitions, for example high SES and high strata neighborhoods are often safe and guarded. In contrast, low SES and low strata translate to living conditions with a shortage of resources to guarantee food security, housing and overall safety, and high levels of stress in the communities (Duncan et al., 2015). In this sense, and for the purpose of comparison, some equivalences to the classifications are identified to define SES levels in Colombia, considering strata or housing conditions, by the Colombian National Administrative Department of Statistics (DANE, 2021c). These are as follows: Very Low SES or extreme poverty (stratum 1), Low SES (strata 2 and 3), Middle SES (stratum 4), and High SES (strata 5 and 6). In this research the DANE equivalence is used to characterize the sample.

Extreme Poverty and Very Low SES in Colombia: The Case of the Wayuú Ethnic Group

Extreme poverty, Very Low SES, is usually observed in Colombian ethnic settlements. One of the most predominant ethnic groups on the Colombian Caribbean Coast is the Wayuú tribe. According to Ariza et al. (2017), the Wayuú are the largest indigenous group in the region and in Colombia, although other indigenous groups also inhabit the same region. Due to its climatic and topographic conditions, this region is considered a desert, empty, arid, and hostile territory. Access to public services is very limited and access to drinking water and basic sanitation are inadequate. As Russell et al. (2020) describe, "only about 12% of the Wayuú live in urban centers, the vast majority live in Wayuú communities that are generally rural, very dispersed, and difficult to access. Many live in small family group settlements, called *rancherías*, which may consist of only a few houses. [. . .] The houses are usually made of wood with clay plaster and contain dirt floors. Communities are often physically isolated, even from one another, with almost no paved roads or public transportation [. . .]." This study also found that all the Wayuú children (aged 0 to 5 years) met the criteria for either moderate and severe malnutrition, stunting, or underweight.

The Importance of Studying Communicative Functions Development in Context

Social communication skills are a key aspect of early childhood development. They influence not only the development of relational and affective competence (Gaffan et al., 2010) and social cognition (De Jaegher et al., 2010), but also the later development of language (Ozcalıskan and Goldin-Meadow, 2005; Callaghan et al., 2011; Ger et al., 2018). In this sense, it is considered that the environment may offer opportunities to exercise the interactive skills that are developed in the first two years of life and that provide a basis for all ensuing social and communication developments. But research has also shown that when the environment involves a range of negative exposures during early childhood that include situations such as abuse, stimuli deprivation, neglect, chronic poverty, among others forms of adversity (Burghy et al., 2012; Cohen et al., 2013), children have higher probabilities of developing physical and mental health problems, including cognitive, memory, attention, implicit and explicit learning processes and language development (McLaughlin et al., 2014; Heleniak et al., 2016; McGrath et al., 2017; McLaughlin and Sheridan, 2017). Thus, it could be argued that such populations as the ones described in Colombia, which exhibit high levels of social inequality, early childhood adversity, and even malnutrition could be subject to communicative skill deficits due to their disadvantageous conditions.

Testing the Core Hypothesis in Colombian Samples

As the results presented in the literature reviewed pose the question of whether different SES groups could possibly exhibit differential development in their communicative functions (*SI*, *JA*, and *BR*), this research focuses on testing communicative functions across different children samples from diverse SES, in Colombia, including children from a Wayuú settlement, as they represent an interesting testing ground for the hypothesis considering that not only do they have Very Low SES, but also differ from their peers in their ethnic and cultural backgrounds. To the best of our knowledge, this is the first research to directly assess this hypothesis in the Colombian context using the ECSP scale developed by Guidetti and Tourrette (1993/2017).

MATERIALS AND METHODS

Participants

This research takes place on the Colombian Caribbean Coast. The participants were 36 Colombian children (21 boys and 15 girls), 25 months old on average (*SD* = 3.99) and classified according to the SES of their families (see **Table 1**, detailing the mean age and SD of age per SES group as well as the gender distribution per subgroup). Their classification corresponds to their family's SES, in accordance with the DANE guidelines, as described in the section "Introduction." No statistically significant differences were found among SES groups' average age, this can also be observed from the overlapping confidence intervals. Sample subjects were selected from across several SES to have cases spanning representative social and economic distances, in consonance with the main concern of this work. After accounting for eligibility and exclusion criteria, the final sample of 36 subjects was distributed evenly, as follows: 12 Very Low SES, 12 Low SES, and 12 High SES. This reflects our research goal of screening and assessing for opposite and extreme SES differences (such as High vs. Low SES and Very Low SES), in concordance with similar research assessing SES, as presented in the Introduction subsection "Socioeconomic context and communicative functions."

TABLE 1 | Sample subjects average age (in months) and standard deviation by socioeconomic status (SES).

	Mean age	Standard deviation
Very Low SES *n* = 12 (9 boys, 3 girls)	23,25	4,41
Low SES *n* = 12 (6 boys, 6 girls)	25,91	2,79
High SES *n* = 12 (6 boys, 6 girls)	25,32	4,09
Total sample *n* = 36	24.83	3.99

Very Low SES children were selected from a rural Wayuú-only non-profit childcare center, as they exhibited both an extreme difference in SES from their High SES peers and also in ethnic/cultural differences. Broadly, being a member of an ethnic group does not necessarily translate into belonging to a particular SES group and *vice versa*. However, the Wayuú are remarkably marginalized in Colombia, and being a member of this ethnic group usually results in living in extremely impoverished housing conditions (stratum 1). For the purpose of this research, and according to Colombian law, the Wayuu sample is considered as Very Low SES (DANE, 2021b,c).

Materials

In this research the main tool used was the ECSP [the acronym for Echelle d'évaluation de la Communication Sociale Précoce – the standardized and adapted French version of the American Early Social Communication Scales (Seibert and Hogan, 1982), by Guidetti and Tourrette (1993/2017)]. The ECSP scale is one of the most promising tools currently available for the evaluation of early social communication in all its complexity. It consists of a methodological instruction manual that includes administration guidelines, instructions for evaluation and score and scale sheet usage, and a list of playful situations that allow interaction with the child and the toys or objects used by them.

The ECSP is of special interest because it allows for evaluating the development of communication from the first months of life (0–30 months) and assesses interactive and prelinguistic communication. Moreover, its reliability has been confirmed by studies with large samples and it clearly distinguishes between typical and atypical development. In France, it is the tool recommended by the National Health Authority and the French Federation of Psychiatry to evaluate communication in subjects

who are autistic or deaf. It is usually applied to children between 3 and 30 months, but since its upper limit of application is the point at which the child begins to combine words, it can also be used with older children who are atypical in development. This French scale has also been translated and validated into Italian (Molina et al., 2016).

For this work, the ECSP was translated from French to Spanish and adapted for the Colombian context (Moreno and Morán, ECSP-E, in prep.). To do so, a process of linguistic and cultural equivalence to Spanish was carried out. The linguistic equivalence process involved the following. First, a native bilingual (French-Spanish) Colombian researcher translated the instructions and the answer sheet (where the expected communicative behaviors of the child were to be recorded) from French to Spanish. Then a second independent researcher (bilingual French – Spanish) translated the Spanish version to French. Finally, the original version and the back-translated version were compared to identify and correct differences (Peña, 2007). To guarantee the process of cultural equivalence, native evaluators, who knew the local context and the conventional manners in place, were enrolled to validate the pertinence of the Spanish translation. In line with this rationale, storybooks and local nursery rhymes were adapted to the local context during the assessment.

The ECSP consists of 23 interactive and playful situations that allow for eliciting and observing 108 possible expected communicative behaviors indexed in three communicative functions (SI, JA, and BR) and arranged according to their developmental complexity from simple to complex. The design of the activities allows for evaluating several communicative functions at once, through a series of items. The scale includes 8 sets of items in which it is possible to obtain a score and an optimal level. These sets contain the grouping of expected communicative behaviors by communicative function (IS, JA, and BR), role played by the child (initiates I, answers A, and maintains M), and their developmental levels. Those levels are arranged hierarchically as follows: 1. simple, 2. complex, 3. conventional (3.0 conventional gestural and 3.5 conventional verbal), and 4.0 symbolic (see **Figure 1** below). Scores for each communication function can be mapped to developmental ages of children, so for typical children scores should also match their chronological age. Thus, for example, for each level, there will be 8 items that will include communicative behaviors for each function (SI, JA, and BR) and for the role played by the child in response to the interaction with the adult: (I), (M), and (A). In sum, at each level there will be 3 sets of items for social interaction (ISI, MSI, and ASI), 3 sets for joint attention (IJA, MJA, and AJA), and for behavior regulation there will be 2 sets of items (IBR and ABR). In this last function, the maintenance of behavior regulation is not evaluated.

Regarding the hierarchy, each optimal level can be interpreted in terms of development as follows:

1. simple: 0–2 months – This level represents the beginning of intentional activity in the child's interaction with others.
2. complex: 2–6 months – In this level the child begins to participate in social games and can differentiate people; however, he does not coordinate actions with objects or with others.
3. conventional: 7–24 months – This level marks a step-change in the communicative skills of the child; he learns gestural and verbal conventions, and learns how to use objects to draw attention to himself or to use the interlocutor to obtain something.

    3.0 Conventional gestural: 7–16 months – The child learns gestural conventions and uses them.
    3.5. Conventional verbal: 16–24 months – The child uses isolated words in the presence of objects (objects' names and action verbs) either to replace or to complement gestures. This level marks verbal progress in communication skill.
    Note: A child's placement in levels 3.0 and 3.5, although it represents a great step forward in his communication skills, also means that h is understanding of situations is still highly dependent on the context.

4 symbolic: 25–30 months – This level represents the emergence of symbolic functions and marks decisive progress in the evolution of the child's communicative capabilities. The child is capable of anticipation and initiation, and this allows him to understand words out of context or with little context. The child combines words to maintain an interaction and to ask for or exchange information with others about his surroundings. Their social games are then transformed by incorporating the symbolic dimension (Guidetti and Tourrette, 1993/2017).

Procedures

Sample Subject Recruitment

To recruit sample subjects, invitation letters were sent to different non-profit early childhood care centers, as well as to private day care centers and directly to families from selected neighborhoods. Government non-profit early childhood care centers for low class citizens, that provide initial education, care, nutrition, and medical care for children under 5 years of age (Instituto Colombiano de Bienestar Familiar, ICBF, 2021) are in place in the country. On the other hand, middle- and high-class children receive nutrition and care mostly at their homes or attend private day care centers; so, invitations were sent to parents from all these diverse setups to obtain a sample representative of different childcare conditions present in the country for diverse SES.

The invitation letter explained the intent and scope of the study and the evaluation procedures and protocols to be followed during the evaluations of the children. 55 parents or caregivers agreed to participate in the study and were sent an informed consent form and a questionnaire eliciting information about the children and their developmental medical history (for example, pre, peri, and postnatal history, diagnosis of clinical and neurodevelopmental diseases), which allowed for the selection of 43 participants that met the following inclusion criteria: *(i)* that the children were between 17 and 24 months of age *(ii)* that they were in good health (confirmed by their parents, caregivers, or their pediatrician), and *(iii)* that their families were classified in

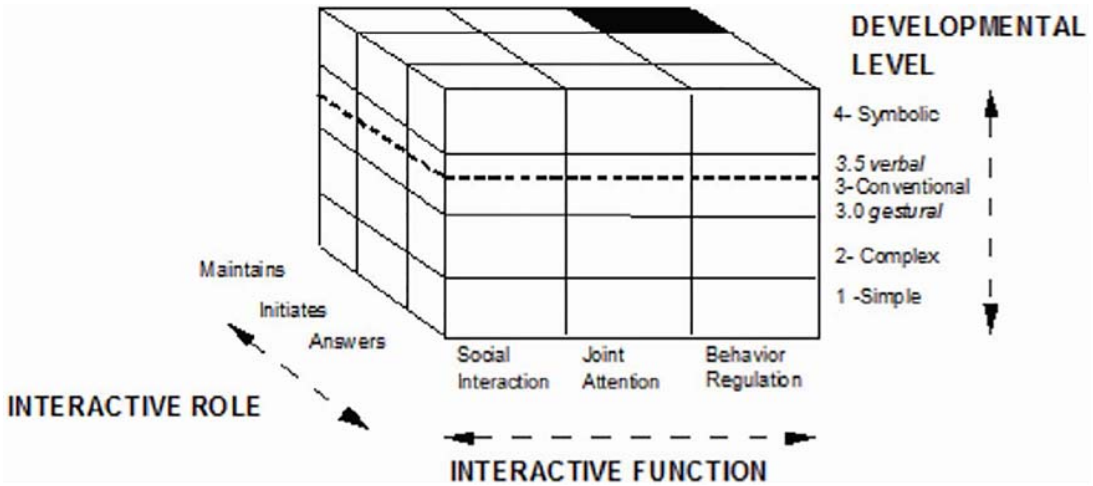

FIGURE 1 | ECSP's Developmental levels and interactive roles and communicative functions.

one of the three contrasting socioeconomic levels (very low, low, and high) of interest. Later, an appointment was scheduled to undertake the evaluation session. After the recording sessions, exclusion criteria were applied which lead to a total of 36 recorded sessions to be evaluated. Exclusion criteria for recordings are detailed in the next subsection *"Evaluation procedure."*

Evaluation Procedure

All selected children were individually evaluated during one approximately 40-min session that took place either at one of the non-profit early childhood care centers or at the University's Gesell chamber for sample subjects from private daycare centers or selected families. Evaluation rooms were isolated from outside noise and surrounding distractions and were also adapted in advance to resemble a game room as much as possible, so that the child felt safe to play with the evaluators, who were native psychologists trained in the application of the scale, and who always addressed the children in Spanish. All evaluations were recorded, for *a posteriori* evaluation and scoring, and performed in the presence of one parent or caregiver.

All sessions followed an evaluation protocol. First, the child entered the evaluation room accompanied by his parent or caregiver, who had previously been instructed not to intervene during the session. In the room there was also a person in charge of filming the session; they had also been instructed not to intervene. After the child had enough time to become familiar with his surroundings, a trained evaluator entered the room silently and greeted the child; this step, interactive situation #1, marked the beginning of the evaluation session. Interactive situations followed a specific order but were flexible enough that they could be adapted to the child's responses, as on occasion the child could exhibit communicative behaviors that changed the course of the planned progression. These could be used by the evaluator to hold the child's attention and take advantage of it to channel the direction of the session to guarantee the observation of behaviors of interest. Interactions were structured to follow a sequence from the evaluator's entrance, the introduction of social objects, mechanical or other attractive age-appropriate toys, puppets, and materials, such as stories, tales, picture books, singing, and nursery rhymes, to the evaluator parting after a total of 23 playful situations. However, if a child exhibited a behavior indicative of discomfort, the evaluation was concluded; such behaviors include for example consistent crying and overt tiredness. Those sessions were excluded from the analysis, as well as others that met the following exclusion criteria: bad quality sample recordings, behaviors not visible in the recordings after undertaking the evaluation session due to subject positioning.

Object introduction also followed a setting and presentation order. Toys were saved and put together in a closed box located at a safe distance that allowed the evaluator to oversee presenting the objects. The evaluator showed the toys to the children according to the situation and then stored them back in the box at the culmination of the staged situation, making way to proceed with the next situation and its respective objects. As the evaluation approach is based on an interactive paradigm, all playful situations used for testing are interactive and require the total investment of the evaluator in the activities while also engaging the children.

Data Treatment

Coding, processing, and data analysis of the resulting 36 recorded sessions, obtained after applying inclusion/exclusion criteria, were performed *a posteriori*. For each situation, all the communicative behaviors exhibited by the child were marked on an answer sheet. The answer sheet included the item number of the situation in the test, its level of development, and its content. The number of boxes marked for each item corresponds to the number of times the behavior is required for the item to be considered as achieved. The achievements are then transferred to the score sheet to assess the performance at developmental levels, in each of the 8 sets of the three communication functions and for the entire test.

The score was calculated based on 5 points per level (5 levels), which allows children to obtain a maximum of 25 points for

each series of items (8 series), which is equivalent to a total of 75 points maximum for the series of social interaction and joint attention items, 50 points for the series of behavior regulation items, and 200 points for the entire scale. Obtaining all the elements of the same level allows the child to accredit previous levels. Beyond that, each item obtained allows a credit for a certain number of points that varies depending on the number of items present in the level. The optimal level corresponds to the highest level in which an item was obtained for each series of items, for each communicative function, and for the test (Guidetti and Tourrette, 1993/2017).

In summary, scores for the child's development level were calculated through the following evaluation indexes:

- **Optimal level** in each series (it is the highest level where an item was obtained), for each scale, and for the whole test (the highest level among all the levels reached). Calculated for
    - Series of items per role per communication function (ISI, MSI, ASI, IJA, MJA, AJA, IBR, and ABR): from levels 1 to 4
    - Communicative function scale (SI, JA, and BR): from levels 1 to 4
    - Test as a whole: from levels 1 to 4
- **Score:** for each series of items, for each scale, and for the test as a whole, namely
    - Series of items per role per communication function (ISI, MSI, ASI, IJA, MJA, AJA, IBR, and ABR): From 1 to 25 for each one.
    - Communicative function scale (SI, JA, BR): from 1 to 75 for SI and JA, and 1 to 50 for BR
    - Test score as a whole: from 1 to 200

Finally, the scale manual indicates that the interpretations of the results can be analyzed in terms of developmental levels or scores, without the need to assign ages of communicative development, to establish a communicative profile of the children (Guidetti and Tourrette, 1993/2017). Development levels are not only used to identify if communicative milestones are reached, but also determine in detail where the child is at regarding the role in the interaction for each function and the total scale. In this sense, interpretation by levels will be used to evaluate the impact of the SES on the development of communicative functions in sample groups.

Intercoder Reliability

Researchers involved in this work were trained in ECSP coding, evaluation application, situation configuration, assessment, scoring, session recording, and the theoretical context of the ECSP. To guarantee intercoder reliability, videos were always observed by at least two teams of trained psychologists, who worked independently on coding using the answer sheet, thus double-coding. After coding and double-coding, the teams regrouped to reach consensus on their impressions. Protocol dictated that in the case of incongruencies, videos must be re-watched to verify and register a final agreement. After consensus, behaviors were graded on a score sheet, using a point system that allowed for computing the scores and optimal levels for items series by role, communicative function, and total test scores.

The coding was carried out using the answer sheet where observations corresponding to expected possible communicative behaviors were registered with 1 or 0, whether the communicative behavior had been exhibited or not by the child, respectively. Reliability was established by comparing coders' transcribed and encoded communicative behaviors displayed by 9 participants (25% of the sample, who were selected at random), resulting in 2277 binary observations. Following the recommendations of McHugh (2012), an intercoder percentage of agreement was computed and it was found to be suitably high, 85.59%.

Experimental Design

A between subject analysis design was developed for this work, considering SES as the independent study variable. Other variables such as age and gender were not considered in the scope of this research. Considering the small sample size and the small effect size of gender on score differences, this variable was not considered in this study. As for the ages, its potential effect on the results was minimized by recruiting sample subject children that were around the same average age. This is, to determine if SES was a differential factor in scores, and considering that, given the milestones of development, younger children normally score lower than older ones, children were selected trying to homogenize for age.

The SES variable was controlled in sample subjects by grouping participants in the three SES of interest, so that 12 children were assigned to each group, in the following categories: Very Low, Low, and High. Each participant was evaluated individually and for each case the procedure was consistent. Consequently, there was statistical independence between SES sample groups. Dependent variables of interest that were evaluated in this work are the child's communicative function (SI, JA, and BR), evaluated through indexes such as optimal level and score. Communication functions variables are described in this study, according to the ECSP scale (Guidetti and Tourrette, 1993/2017), as follows:

Social Interaction (SI)

Assesses the development of a child's abilities to interact with an adult and participate in playful exchanges with him. It is the interaction itself that is central and not the objects or events that sustain this interaction. These exchanges were not imperative or related to an adult's request. They take place in gestural and verbal social games, imitation games, or object-sharing games between the child and the adult.

Joint Attention (JA)

Assesses the development of a child's skills to establish shared attention on the same object, person, situation, or subject. Joint attention differs from social interaction in that it is the objects or situations that are subjected to attention and not the adult-child interaction. Furthermore, there is no intention to act on the object, only to look at it together. As this function develops, it may include an exchange of information about the properties and characteristics of the object or situation.

Behavioral Regulation (BR)

Assesses the development of the child's ability to modify or influence a behavior, either his own or that of the adult. This results from the fact that to access what he wants or needs, the child requires the help or cooperation of an adult. Attempts to regulate the behavior of his interlocutor are often imperative or didactic in nature, can be (but are not necessarily) prohibitions as they are executed firmly but not harshly. In the first levels of development (see **Figure 1**), this series of items assesses the child's ability to guide and inhibit his actions based on external indications, as well as the growing awareness of the child that his behavior is controlled by forces external to him. At the highest levels of development (see **Figure 1**), what varies is the breadth of the gestural and contextual cues that the child needs to understand the verbal instructions of adults (Guidetti and Tourrette, 1993/2017).

Data Analysis

For data analysis, total raw scores resulting from the tabulation of the items related to joint attention, behavior regulation, and social interaction were considered. Total raw scores and levels for each function by role of the child in the interaction (initiation, maintenance, and answer) and by optimal level of development were analyzed. Once the data collection was completed, they were tabulated and analyzed through descriptive and inferential (categorial and non-parametric) statistics using the SPSS software package (version 22, IBM statistics).

RESULTS

In this section, the results of statistical analysis are presented concerning the assessment of dependent variables used in this study. Scores and optimal levels were measured for items series by role, communicative function, and total test scores. Developmental communicative levels are ordinal variables that allow establishing profiles for children's communicative skills, while scores have measurements across a continuous scale that allow for deeper non-parametric comparisons of the tested items.

Considering the small sample size and that the scores were not normally distributed, the Kruskal-Wallis H test was selected for non-parametric analysis. This method is appropriate for more than two independent groups and is capable of assessing statistically significant differences between them. The effect size over paired groups that tested significantly different was calculated through a *post hoc* test. Hereafter, the following conventions are used: ***M*** for mean, ***SD*** for standard deviation, ***MR*** for middle range, X^2 for chi square, ***Me*** for median, and ***p*** for p-value.

Descriptive Statistics

General Descriptive Statistics for Raw Scores

The main descriptive statistics for all score measurements are presented in **Table 2**. This table shows the mean of the item series raw scores per communicative function obtained by the participants, the standard deviation, the value of the range (difference between the largest and smallest values of the scores), skewness, and kurtosis. As stated before, the score was calculated based on 5 points per level (5 levels), which allows children to obtain a maximum of 25 points for each series of items (8 series), which is equivalent to a total of 75 maximum points for the series of social interaction and joint attention items, 50 points for the series of behavior regulation items, and 200 points for the entire scale.

It can be observed from the skewness and kurtosis values in **Table 2** that the data were not normally distributed, thus necessitating the use of a non-parametric method of inferential analysis.

Non-parametric Analysis

Socioeconomic Status and Communicative Functions

In this section, results for the Kruskall-Wallis test are shown for the three communicative functions measured though raw scores: *SI*, *JA*, and *BR*, between the groups of interest (very low SES, low SES, and high SES), see **Table 3**.

Kruskall-Wallis results allow validating statistically significant differences among groups. **Table 3** shows that the null hypothesis of no significant difference could only be rejected with respect to SI, and not for JA or for BR. In this function, a *post hoc* Mann-Whitney test showed that the differences were found particularly between the Very Low SES group and the High SES group ($p = 0.004$); and between the Very Low SES group and Low SES group ($p = 0.016$). There were no differences between the Low and High SES groups ($p = 0.628$). Similarly, the paired groups Very Low SES and Low SES, and Very Low SES and High SES were further validated as significantly different when accounting for the Total Score (TS) using a *post hoc* Mann-Whitney ($p = 0.042$ and $p = 0.013$, respectively).

Socioeconomic Status and Child Roles per Communicative Function

Given that children can play three roles in the situations of interaction with the adult (answers, initiates, and maintains) in the three communicative functions (except for Behavior Regulation, where the child can only play two roles: answers

TABLE 2 | Descriptive statistics.

	M	*SD*	Range value	Skewness	Kurtosis
SI	25.150	21.753	69.42	0.688	−0.804
JA	38.115	15.647	69.67	−0.017	0.134
BR	20.798	13.131	43.75	−0.392	−1.039
ASI	11.326	9.180	25.00	0.211	−1.550
ISI	7.458	7.338	21.67	1.124	−0.431
MSI	6.365	9.327	25.00	1.144	−0.529
AJA	15.638	4.702	23.00	−2.007	5.558
IJA	9.004	7.198	25.00	0.800	0.018
MJA	13.472	6.151	23.33	−0.373	−0.640
ABR	9.444	8.652	25.00	0.143	−1.597
IBR	11.354	6.277	25.00	−0.035	−0.568

Item series scores per communicative functions (SI, social interaction; JA, joint attention; BR, Behavior regulation); Interactive role [Answers (A), initiates (I), maintains (M)].

TABLE 3 | Kruskal-Wallis statistics for communicative functions in Social Interaction (SI), Joint Attention (JA), Behavior Regulation (BR), and Total Score (TS) by socioeconomic status (SES).

	Kruskal-Wallis Test				
	SES	***n* = 36 (12*3 SES)**	X^2	***p***	***MR***
SI			9.575	0.008*	
	Very Low				10.92
	Low				21.25
	High				23.33
JA			3.001	0.223	
	Very Low				-
	Low				-
	High				-
BR			5.594	0.061	
	Very Low				-
	Low				-
	High				-
TS			6.955	0.031*	
	Very low				12.04
	Low				20.79
	High				22.67

*$p < 0.05$.

and initiates), a second analysis detailing items series by role per communicative function was carried out, as shown in **Table 4**.

As seen in **Table 4**, significant differences were found between the three groups in the series Answer to Social Interaction (ASI) and Answer to Behavior Regulation (ABR). A *post hoc* Mann-Whitney test showed that the differences were found for the ASI series between the Very Low SES group and Low SES group ($p = 0.042$); and Very Low SES and the High SES group ($p = 0.002$). For the ABR series, differences were also found between the Very Low SES and the High groups ($p = 0.008$); and between Very Low SES and Low SES groups ($p = 0.006$). It is important to recall that in the first general analysis carried out on the three communicative functions **(Table 3)**, the results did not show significant differences between the groups with respect to the Behavior Regulation function ($p = 0.061$), however, this second detailed analysis by series of items evidenced that the groups differ in terms of the response to behavior regulation as shown in **Table 4** and also that results for ASI and ABR series showed significant differences between the Very Low SES group and the other two groups (Low SES and High SES). These last two did not show significant differences between each other.

Socioeconomic Status and Communication Development Levels

A third analysis was carried out to assess differences between the groups (Very Low SES, Low SES, and High SES) in terms of the level of development in communicative functions. These levels, as explained in the section "Materials section," and shown in **Figure 1**, correspond to simple (level 1), complex (level 2), conventional gestural (level 3.0), conventional verbal (level 3.5), and symbolic (level 4). **Table 5** presents results of the non-parametric Kruskall-Wallis tests for levels of development by communicative function. Therein, no significant differences are discernable between the socioeconomic groups in terms of the level of development for the communicative functions of SI and BR, but not for the level of development of JA. A *post hoc* Mann-Whitney test showed that the differences were found particularly between the Very Low SES group and the High SES group ($p = 0.001$) for the level of development in social interaction. On the other hand, for the level of development in the regulation of behavior, significant differences were found between the Very Low SES and Low SES groups ($p = 0.004$).

Regarding the level of development of social interaction as a communicative function, children in the lowest context (Very low SES) obtained the lowest level of development: level 3.0, conventional gestural, with respect to their peers in Low

TABLE 4 | Kruskal-Wallis statistics for series of items of Joint Attention (JA), Social Interaction (SI), and Behavior Regulation (BR), according to interactive role of child: A (answers); I (initiates) and M (maintains), by socioeconomic status (SES).

	Kruskal-Wallis Test				
	SES	***n* = 36 (12*3 SES)**	X^2	***p***	***MR***
ASI			10.125	0.006*	
	Very Low				11.13
	Low				19.83
	High				24.54
ISI			5.686	0.058	
	Very Low				13.42
	Low				18.58
	High				23.50
MSI					
	Very Low		3.701	0.157	14.96
	Low				22.75
	High				17.79
AJA					
	Very Low		2.626	0.269	14.63
	Low				9.71
	High				21.17
IJA			1.591	0.451	
	Very Low				15.88
	Low				18.38
	High				21.25
MJA			2.877	0.237	
	Very Low				14.38
	Low				20.04
	High				21.08
ABR					
	Very Low		9.706	0.008*	11.00
	Low				22.46
	High				22.04
IBR					
	Very Low		1.068	0.586	16.29
	Low				18.71
	High				20.50

*$p < 0.05$.

TABLE 5 | Kruskal-Wallis statistics for optimal level of development by communicative function (SIL, social interaction level; JAL, joint attention level; BRL, behavior regulation level) and Final optimal Level (FOL) by socioeconomic status (SES).

		Kruskal-Wallis				
	SES	***n* = 36 (12*3 SES)**	X^2	*P*	M_e	*MR*
SIL			11.357	0.003*		
	Very Low				3.0	11.25
	Low				3.5	19.88
	High				4	25.17
JAL			4.259	0.019		
	Very Low					-
	Low					-
	High					-
BRL						
	Very Low		8.815	0.007*	2	12.29
	Low				4	23.96
	High				3.5	19.25
FOL						
	Very Low		10.059	0.007*	3.5	11.50
	Low				4	20.75
	High				4	23.25

*$p < 0.05$.

SES and High SES groups, who were located at levels 3.5 and 4, respectively.

With respect to the communicative function of behavior regulation, it is important to highlight that the Low SES group obtained the highest level of development (level 4, symbolic level); this was the only situation in which the High SES group did not score the highest level. Statistically significant differences were found between the Very Low and Low SES groups, with a *post hoc* Mann-Whitney *p*-value = 0.004.

Finally, **Table 5** shows that significant differences for the Final Optimal Level, FOL (which includes the three communicative functions), among different social groups ($p = 0.007$) were found through the Kruskall-Wallis test. A *post hoc* Mann-Whitney test showed that differences were found particularly between the Very Low SES group and the High SES group ($p = 0.003$) and between the Very Low SES and Low SES groups ($p = 0.018$).

DISCUSSION

The goal of this study was to investigate the influence of the socioeconomic context on the development of communication and language in young children. In particular, this study examined the level of development of three communicative functions: SI, JA, and BR. As far as we know, this is the first study to explore the development of these early communication skills in children who live in different social contexts in Colombia; also, using a scale that specifically measures this development and is based on sociopragmatic approach of development whose core is the interaction.

Three main findings were obtained. First, social context, in terms of SES, influences the level of development of two early communication functions: Social Interaction and Behavior Regulation. Second, it was found that Joint Attention was not influenced by SES. This result is in fact very reassuring as this function is key both in the development of communication and language and social cognition. Third, for functions with statistically significant differences, the Very Low SES sample group always had the lower rank of development optimal level, however, the Low SES sample group did not display delays in their optimal level results. Each of these findings will be discussed in detail in the following subsections.

SES and Development Optimal Level for Social Interaction and Behavior Regulation

The initial key finding of this study was that the socioeconomic context mainly influences the level of development of two of the three early communicative functions studied: SI and BR. Regarding the level of development of social interaction as a communicative function, children in the lowest socioeconomic context (Very low SES) obtained the lowest level of development with respect to their peers in the Low SES and High SES groups, who were at the highest levels of development in these two skills. This suggests that social distances between Very Low and Low SES may be bigger than previously thought. Indeed, for a highly unequal society such as the Colombian, SES scales may not be linear, and the context in which children are raised has an influence on the development of early communicative interactions. In line with the reviewed literature, these results show that early care and socialization practices in low-income countries are shaped by social and economic conditions. This is important because according to sociocultural theories of development, social understanding and social interaction skills are developed from the beginning of life (Werner and Kaplan, 1963; Carpendale and Lewis, 2004). If we consider that in a country like Colombia, children from birth are already in a situation of social inequality, these results could be more understandable, thus, indicating that inequality could possibly translate into unequal social skills.

Results are also aligned with those of Conger and Donnellan (2007) and Leventhal et al. (2015), regarding children's early social interactions and the detrimental effects that the lack appropriate social and economic conditions can have on them, including diminished stimulation and interaction. Studies have shown that these conditions, typical of severe or persistent impoverishment, in fact, increase stress levels in caregivers, due to the daily struggles these caregivers have to face to secure household resources and to try to cope with life in a deteriorated environment or in dangerous circumstances, but that manifests in children not receiving effective care, thus affecting not only their cognitive but also social development, as explained by Bornstein and Lanslord (2010) and Brito and Noble (2014).

The results further reassert the importance of the initial care of the child in their cognitive and social-communicative development. Nowadays, it is evident that social interaction

depends as much on the care the child receives, as on the caregivers' conditions. However, for this care to be effective in terms of social development it must have the form of what has been called "*nurturing care*", that includes, for example, the quality, quantity, and adequacy of the child's nutrition and illness care, attachment and socialization, safety and protection from threats, and, above all, interactions that are emotionally supportive. We hold that this type of care influences interaction and early social communication, which is consistent with the attempt made by Urke et al. (2018) to measure the concept of "*nurturing care*" in Colombia, that resulted in a correlation between mothers' quality of nurturing care and their maternal resources derived from SES, such as her level of education, household assets, among others.

On the other hand, as very specific cultural practices are related to the age at which children acquire socio-communicative skills in the early years Callaghan et al. (2011), it could be conjectured that the significant differences found in the social interactions between the different socioeconomic groups could be explained by the different explicit socio-communicative practices taught by the adults in each social group. For example, during the administration of the scale to children of the lowest SES level, the Wayuú, we realized that when interactive games were proposed, the majority of these children looked at the adults who accompanied them, seeking their approval to proceed while this was not the case for the other children, who tended to be more independent from their parents while playing with the evaluator. This finding possibly reveals differences in their childcare practices.

Although both Very Low SES (Wayuú) and Low SES children attend childcare facilities, those attended by Wayuú children are directed and designed to guarantee the preservation of their customs and cultural practices that favor traditionalism and hierarchy, where authority has more social weight, even in communication with others. Although we might think that this is a common feature in the development of children in the second year of life, when the results were analyzed by the roles played by children in social interaction, significant differences were found in their response to social interaction (ASI), and this was their lowest indicator. To validate this conjecture, it would be worth assessing the familiarity of children with the proposed games and objects, to eliminate this as a possible factor weighting in the children's response.

Additionally, regarding the development optimal level for behavior regulation function, differences were also found according to the socioeconomic context. Children in the Very low SES group obtained the lowest level of development with respect to their peers in the Low social and High SES groups. Our findings also show that children in the Low SES group did exhibit an optimal developmental level for the BR communicative function that was even higher than their High SES peers, challenging the idea that the higher the SES, the better the scores. This could be thought of as contrary to the results of Pisani et al. (2018) wherein lower socioeconomic status was correlated with higher levels of child behavior problems, however, their research did not study specifically *Behavior Regulation* as a communicative function under a sociopragmatic interactive perspective, as in our work. It could be argued that our results reveal a gap in BR communicative function research that needs to be addressed.

This gap is a direct consequence of the fact that most of the literature that studies that link behavior regulation and SES mostly focus on emotional regulation, parenting practices and behavior problems, in children older than 3 years old (Flouri et al., 2014; Pisani et al., 2018; Quetsch et al., 2018), and not so much on communicative and language development in interactive settings. Additional research in early childhood development could reveal the actual weight factors such as parental practices in the child's behavior regulation communicative function.

In summary, from the above it follows that it could be potentially revealing and interesting to further study the regulation of behavior in children before the age of three, as it is becoming more evident that children need to engage with others to learn how to manage their behaviors at these ages, especially since it is only after three years of age that the child expresses more intelligible verbal language. In other words, their regulation will also depend on the adult's response to their requests. Our study showed that precisely the difference in emotional regulation was more noticeable in the Very Low and Low SES groups and for the sub-items that measure the response to behavior regulation (ABR), with the Very Low SES group evidenced ability to initiate of behavior regulation (IBR) but showing low scores at answering to BR (see results in **Table 4**). These differences in ABR may be related to the way adults teach how to answer to regulation of behavior and not necessarily to lack on initiation. In fact, in this series of items even the Wayuú children did not have low scores. As behavior regulation skills are learned during the three first years of life and determine the competence level in this function, allowing children to achieve psychosocial adaptation, early behavior regulation teaching programs must include caregivers.

The scale used to assess the communicative development of children in this research is based on Fisher's neo-Piagetian mode (Fischer, 1980) that includes not only sensorimotor knowledge as described by Piaget (1963), but also knowledge related to language and communication development. Unlike Piaget's theory, Fisher's theory attributes a key role to the environment in the appearance and organization of knowledge. The environment would then offer opportunities to exercise a skill or to exercise it in a particular way. In this sense, the interactive skills that are developed in the first two years of life provide a foundation for all subsequent social and communication development. If delays in social-communicative development can be identified early in life and changes can be made in the way the social environment interacts with the child, timely interventions can effectively facilitate social development (Mundy et al., 2003).

SES and Development Optimal Level for Joint Attention

A second key finding in this research was that the socioeconomic context did not have a significant effect on the development of Joint Attention as we had hypothesized in this study. Based on the cultural studies of Liszkowski et al. (2012) that had supported

the idea of universality of joint attention (measured through the gestures of pointing in 7 cultures), we also proposed in this study, the universality of joint attention based in the SES. We assumed that the SES would not exert any influence on the level of development of joint attention, and in fact, we did not find significant differences between the groups.

We consider that this result was key in our study for two fundamental reasons. First, this communicative function was the only one that did not show significant differences between the groups; let us remember that significant differences between groups (the very low and high for the SI and between very Low and Low for the regulation of behavior) were notable for the social interaction and the regulation of behavior. Second, this communicative function has been one of the most studied and has been considered key for the development of language, pointing out its importance through the hypothesis of language continuity.

This idea of linguistic continuity of language has been questioned by some authors who argue that the assumption that joint attention is a necessary and sufficient precursor to vocabulary learning is not universally supported (Akhtar and Gernsbacher, 2007). Although this study presents interesting criticisms, especially for the measurement of joint attention (it is only evaluated in the visual modality), it is clarified that the idea in its criticisms is not to challenge the correlation between joint attention and the development of vocabulary, but to critically examine the generality of that correlation and to confront the assumption that the relationship between joint attention and vocabulary development is causal. Although the objective of our study was not to search for causal correlations, it is based on the studies of Bruner (1983) and the usage-based theory of language acquisition, proposed by Tomasello (2003), who defends the idea of continuity of language and the use of a functional or pragmatic approach for understanding communicative development. However, we support Akhtar's idea that future joint attention studies should not only consider visual indices for their evaluation.

On the other hand, the idea of universality can also be supported from an evolutionary perspective. Tomasello et al. (2005) showed that although some non-human primates understand more about intentional action and perceptions than previously believed (and this is also true, to some extent, in children with autism, Thommen et al., 2016), only human children engage socially and culturally with others. In other words, these studies show that understanding the intentional actions and perceptions of others is not enough by itself to produce human-like social and cultural activities, it requires shared intentionality. The hypothesis defended by these researchers is that only human beings are biologically adapted to participate in collaborative activities that involve shared objectives and socially coordinated action plans (joint intentions). In this sense, the usage-based theory of language acquisition is also compatible with interactionist perspectives on the development of language where individuals are actors of their intentions, these intentions being visible and interpretable from an early age (Guellai and Streri, 2011).

Studies relating socioeconomic context to language development have almost always found differences in context and a negative effect especially in children living in low-income areas (Arriaga et al., 1998; Hoff, 2003). De los Reyes et al. (2016) looked at 629 children (0–5 years) living in low-income rural areas in northern Colombia and suggested that impoverished social contexts do offer opportunities that favor the development of the social domain but restrict the development of the cognitive domain. Our study is consistent with the results of De los Reyes et al. (2016) regarding the effect of the socioeconomic context on the communicative functions of social interaction and behavior regulation; however, it differs in that there is no effect of this context on the specific level of joint attention.

Our results seem to point more toward studies that admit universal mechanisms in the origin of joint attention, in children of 2 years. However, we studied the socioeconomic context and not explicitly culture and although these two concepts are related, when studying language development, care must be considered as suggested by Sabatier (2014) in his theoretical review on the contribution of cultural psychology to developmental modeling. We believe that our results are very valuable and consistent with some studies, but we also believe that future research should consider more sociocultural variables.

Finally, our results are based on a relatively small sample and as such there is ample scope for future research to consider larger samples and/or longitudinal methods. Such research could help determine whether joint attention is universal or if it is universal practices in child upbringing that may be responsible for the equal development of joint attention around the world.

Low SES and Development of Communicative Functions

Finally, we want to highlight one last result. We found that the low SES group always obtained the expected level of development in all communicative functions, and even for behavior regulation they obtained the highest optimal level with respect to their peers in the high SES group. This suggests that the minimum required guaranteed resources and interactions necessary for an individual to develop an average skill performance may not be that high after all, and also challenges the idea that the highest SES group always obtained the highest scores. We consider that this result contradicts the idea that unequivocally SES level and scores are directly and almost causally related, which may be wrongly inferred from studies such as those presented in the theoretical background review of this research. Although evidence for a high correlation between SES and language development is undeniable, perhaps future studies should further analyze these kinds of results in the light of other variables that could factor in the overall performance.

In our study, children with low SES attended governmental non-profit early childcare facilities named "ICBF Child Development Centers (CDI)." These centers, as explained, provide low-income children under 5 years of age with initial education, care, and nutrition, within the framework of Comprehensive and Differential Care. These centers implement pedagogical, qualified care and nutrition practices, as well as take

steps to promote health, protection, and participation rights, which allow for the integral development of children. Results for this group allow us to deduce that these experiences are positive in children and could have influenced their performance in the evaluation. In addition, recent studies developed in Colombia to evaluate these childcare programs have shown both the effectiveness of these centers, as well as the positive influence on parents who educate and regulate the behavior of their children in proper ways (Urke et al., 2018; Lopez-Avila, 2019). In line with these ideas, the fact that the High SES children obtained a lower score in the level of development of behavior regulation with respect to the Low SES group could also be explained by the fact that these children are cared for by babysitters and most are homeschooled with parents who work and are not around most of the time. When children attend these childcare centers, they share with other children and may have more opportunities to learn to be communicatively competent.

We found that the level of development of social interaction and behavior regulation communication skills is always lower in the most socially vulnerable social context (Very Low SES). This last result does not seem to bring anything new, as previously indicated in most studies, being born, and growing up in environments of poverty and extreme poverty constitutes a very high risk for the development of the child in all their dimensions, especially in terms of cognitive and language development. However, we believe that at least for the evaluated sample, the poorest (that is, the group of children belonging to the Very Low SES, the Wayuú) did not differ from the others in terms of joint attention. Although it is true that group selection and assessment has merit on itself focusing exclusively on SES differences, it is also true that by these children belonging to an indigenous community with extreme poverty levels and a culture that is different from non-members of their tribe, any supporting evidence for the inexistence of significant differences in joint attention for this group would be indicative of the assertiveness of the hypothesis that JA development is in fact universal, as Wayuú differ vastly from their peers not only terms of SES and but also in their cultural background.

Only limited literature exists in terms of evaluating this hypothesis, and what is available tends to focus on how the environment impacts on language development, not on early communicative functions. If delays in social-communicative development can be identified early in life and changes can be made in the way the social environment interacts with the child, an intervention could effectively facilitate social development (Mundy et al., 2003). Such interventions need to be properly strategized, and to do so, it is necessary to understand which variables can be subjected to changes that will positively address conditions that translate into an overall improvement in children's prelinguistic communicative functions scaffold.

One Final Thought

In this work, the communicative functions of 24-month-old children were assessed through a cross-sectional study. However, results indicate the need to undertake further research involving a variety of factors, such as parents' educational level, parental occupation, time spent by parents/caregivers on interacting with children, parental and caregiving practices, communicative context of children, location, and even ethnic differences, to assess communication skills in children through longitudinal studies. An important step forward from our findings, that address the cultural aspect by pondering the impact of the socioeconomic context that differentiates these children, would be an in-depth study into the influence of sociocultural experiences on the development of communication and language.

As known, in Latin American countries SES marks the way in which children develop culturally. However, we believe that our study can contribute to developmental psychology in terms of reflecting on both the universalities as well as the particularities of children's development around the world. As Koller and Araujo De Morais (2018) argue, referring to Latin America, "the emphasis on the strategies used to overcome adversity and face daily challenges would constitute a new paradigm in the study of human development" (p. 87). In this way, we can incorporate more positive and less dire perspectives into studies of children's communication and language development.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by the Ethics committee of the Universidad del Norte in Colombia (registration number 185-28-02-2019). Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

AUTHOR CONTRIBUTIONS

MM and MG made a key contribution to design the study, analyze, interpret, and discuss the data. MM wrote the manuscript. MG and ET made a key contribution to the design and revision of the manuscript. EM made a key contribution in the collection and coding of the data. All authors contributed to the article and approved the submitted version.

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REVIEW
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Dismantling Persistent Deficit Narratives About the Language and Literacy of Culturally and Linguistically Minoritized Children and Youth: Counter-Possibilities

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Despite decades of efforts, deficit narratives regarding language development and use by children and students from historically marginalized backgrounds remain persistent in the United States. Examining selective literature, we discuss the ideologies that undergird two deficit narratives: the notion that some children have a "word gap" when compared to their White middle-class peers, and students must develop "academic language" to engage in rigorous content learning. The "word gap" concept came from a study wherein a group of young children in low-income families heard fewer words than those in middle-class families. It assumes that language can only be acquired in one way—vocabulary exchange from one parent to one child—and ignores decades of research on diverse pathways for language development. We highlight an alternative perspective that language development builds on children's experience with cultural practices and the harm on minoritized children by privileging a specific form of vocabulary acquisition. The second deficit narrative concerns "academic language," a concept championed by scholars aiming to address educational inequity. The construct runs the risk of undervaluing the potential of students from historically marginalized backgrounds to engage in learning using language that is "informal," nonconventional, or "non-native like." It also is sometimes used as a rationale to relegate students to special programs isolated from more rigorous academic discourse, thus ironically removing them from opportunities to develop the academic registers they are deemed to be missing. We explore alternative frameworks that shift the focus from linguistic features of academic talk and texts as prerequisites for academic work to the broad range of linguistic resources that students employ for academic purposes in the classroom. Finally, we turn to a positive approach to youths' language development and use: translanguaging by multilingual learners and their teachers. Translanguaging demonstrates the power of a resource-oriented perspective that values students' rich communicative repertoires and actively seeks to disrupt language hierarchies. We argue that this approach, however, must be considered in relation to the broader social context to meet its transformative aims. Together, our analysis suggests counter-possibilities to

dismantle deficit-oriented narratives and points to promising directions for research and practices to reduce inequity in education.

Keywords: assets-based approach, language development, socio-cultural practices, minoritized children and youth, word gap, academic language, translanguaging

Despite decades of efforts to dismantle deficit perspectives on culturally and linguistically minoritized students in United States education, and a wealth of literature that has provided evidence to counter these perspectives, deficit narratives regarding students' language development and language use remain persistent. Our goal in this paper is to focus on examples where deficit perspectives have taken hold, and to consider alternative approaches in those domains. We begin by contrasting deficit-based and strengths-based perspectives on language development and educational outcomes. We then consider the broader, and orthogonal, contrast between individual cognitive approaches to the study of language development versus more social-pragmatic contextual approaches. We explore three topics of studies where these different perspectives are particularly relevant.

Deficit views involve a narrow focus on what students do not have or cannot do, derived from a long-lived perspective that attributes the failure of individuals to internal or presumed deficiencies of their families and communities. Deficit lenses are typical of research that examines "gaps" of different kinds, positioning individuals, rather than structural inequities, as the subjects of scrutiny. Valencia (2010) describes this process as identifying differences between groups, labeling them as causes, and then creating interventions as remedies. A hallmark of deficit approaches is their tendency to propose unidimensional, commonly-understood constructs or metaphors to explain educational failure: "[b]ased on the 'law of parsimony,' deficit thinking *is a type of cognition that is a relatively simple and efficient form of attributing the 'cause' of human behavior*." (Valencia, 2010, p. 22, emphasis in original). By focusing narrowly on individuals, deficit thinking obscures structural factors, like school segregation, disinvestment, or tracking. This approach also ignores the potential harm done to minoritized populations by standards and curricula that ignore non-dominant disciplinary epistemologies, for example, the invention of mathematical "illiteracy" of Black students (Martin, 2019) or the "settled expectations" that restrict the content and form of the science valued and communicated in science education (Harris, 1995; Bang et al., 2012).

When deficit thinking is applied in classroom settings, the results often include segregation of students who are viewed as inferior, and arguments about the educability of certain groups of students that rely on pseudoscientific beliefs in cultural or genetic deficits. Further, deficit views often are embedded in what Bourdieu and Nice (1977) described as defense of the doxa, or the deep unquestioned assumptions of a society (see also Valencia, 2010; Valdés, 2017). A good case in point for unquestioned assumptions (or doxa) that support deficit thinking is the notion of coloniality (Quijano, 2000). Whereas coloniality is more fully described in a later section, it is important to introduce here the still-alive colonial idea that positions non-European people and cultural practices (which include language practices) as primitive and, therefore, deserving of their places within social hierarchies. These types of beliefs, which originated alongside colonial relationships of power, can remain unquestioned when we presume that students need to use privileged forms of English in order to engage with certain forms of intellectual work. As such, it is important to take issues of power and larger historical contexts into account when considering the role of cultural experience in language development as it manifests in educational settings.

In contrast, scholars have explored a range of alternatives to "blaming the victim" (Valencia, 2010, p. 19) for understanding and addressing persistent inequalities in educational outcomes. Some have put the focus on inequalities in educational *systems* and broader social and economic *structures*, such as Valencia (2010), who has argued for the importance of understanding how "racialized opportunity structures lead to racialized achievement patterns" (p. 21). Others have taken frameworks commonly used for explaining disadvantages facing racially and linguistically minoritized children and families to shine light on the unrecognized and undervalued resources that they possess. Yosso (2005), for example, reexamines the notion of social, cultural, and linguistic "capital"—often used to highlight what minoritized people are missing—to instead explore the "community cultural wealth" that they bring. Such resources include particular kinds of cultural, linguistic, and social capital not held by dominant populations, but also aspirational, navigational, and resistant capital. Individuals, according to Yosso (2005), have developed this wealth not in spite of but *because of* their familial, community, and cultural experiences navigating multilingual and intercultural contact as well as systems of oppression.

Another approach to avoiding deficit perspectives is using a cultural-historical framework in developmental and educational research. Gutiérrez and Rogoff (2003) argue that a cultural-historical approach can help researchers avoid the deficit thinking that treats culture as a static individual trait and cultural groups as homogeneous (see also Medin et al., 2010; Akhtar and Jaswal, 2013; Callanan and Waxman, 2013; Rogoff et al., 2017). This framework brings us to the contrast between individual cognitive approaches and social-pragmatic contextual approaches to the study of language development. Individual, cognitive approaches have dominated the field of language development at least since the rise of Chomsky's theory of syntax (e.g., Chomsky, 1959). Bruner (1983), Tomasello (1996, 2003), and others taking sociocultural and interactionist perspectives have argued, however, that it is not necessary to presume a genetic endowment to explain language. Instead, social and cognitive capacities such as infants' ability to infer intentions of others (e.g., Baldwin, 1993; Tomasello and Akhtar, 1995;

Akhtar et al., 2019) and to recognize communicative routines (e.g., Ninio and Bruner, 1978) can explain language learning without relying solely on innate structures. Social-pragmatic accounts of language learning have gained traction over the past 50 years, and yet individual cognitive accounts are still dominant. In second language and bilingual language development, similar debates have pitted individual structural theories against theories that forefront the social context of language learning (Firth and Wagner, 1997; Firth and Wagner, 2007; Lantolf and Thorne, 2006; Atkinson, 2011; Dixon et al., 2012). Hawkins (2019) outlines the fundamental shift associated with a sociocultural approach to language:

> From a sociocultural perspective, language does not stand alone; a language cannot be conceived as a codified set of structures, grammars, and lexical items. Rather, languages shift and change across context, users, places, and time ... language is entangled with other semiotic resources to convey meaning in virtually every communication, and how meanings are made (between people) in large part depends on cultural models of communication and cultural interpretations of semiotic resources (p. 15).

From a sociolinguistic perspective, van Lier and Walqui (2012) described the limitations of viewing language as "form" or "function" alone, arguing instead that language is an "inseparable part of all human action, intimately connected to all other forms of action, physical, social, and symbolic," and "thus an expression of agency, embodied and embedded in the environment" (p. 4). Linguistic form and function, in other words, are "subservient to action," and language itself "ceases to be an autonomous system, but is part of larger systems of meaning making" (van Lier and Walqui, 2012, p. 5). Others in the field of second language acquisition have criticized formalist and cognitivist theories (Ortega, 2009; Valdés et al., 2014), arguing to replace input and output models with a focus on language as "a communicative repertoire that is apprenticed in social practice" (Valdés et al., 2014, p. 21). Similar moves have occurred in literacy studies. Lea and Street (2006), for example, describe alternatives to what they called an individual, cognitive "study skills" approach that, they argue, privileges "surface features of language form" and views literacy as transferring "unproblematically from one context to another" (pp. 368–369). Alternatively, they propose an "academic literacies" approach privileging literacy *practices* within disciplines and larger academic settings (p. 368).

One advantage of more social approaches to the study of language is that seriously considering the context of language use makes it easier to highlight the strengths that language learners bring to the task. As such, the social-pragmatic accounts afford a research approach to recognizing cultural assets for language development in early childhood and facilitate the thinking of instructional practices as ways to foster these assets in the classroom setting. By examining what young children and school-aged youth are able to do with their linguistic resources, rather than comparing language to a presumed norm, researchers may more easily see the purposes of language use in particular cultural contexts and avoid deficit assumptions.

To dismantle the persistent deficit views of language development, in this article we explore selective literature in three topics—the word gap, academic language, and translanguaging—and offer our perspectives as researchers in education and developmental psychology regarding their role in both the construction of deficit discourses and the potential to dismantle such discourses. To be clear, the purpose of this paper is not to provide comprehensive reviews of each topic, which are available elsewhere (e.g., Cummins, 2000; DiCerbo et al., 2014; Poza, 2017), but to connect these three topics to elucidate why the deficit views have remained so powerful and to offer suggestions on how to move past this limiting framework. The cited work was chosen to highlight some gaps in the deficit views and to illustrate how the three topics may converge to support the alternative assets-based views. As a preview, we first discuss the dominant language ideologies that undergird current "word gap" and "academic language" narratives and propose theoretical and conceptual alternatives. We then turn to translanguaging by multilingual learners in classrooms, which we contend presents an alternative approach with potential to challenge linguistic hierarchies, but that can also unintentionally contribute to reifying such hierarchies. Finally, we close with a discussion on overarching issues, research gaps and potential developments in the field.

WORD GAP

The *30 million word gap* concept grew out of Hart and Risley's study (1995), which found that a group of young children in low-income families heard fewer words than a group of children in middle-class families. More than 25 years old, the study continues to have staying power in education and policy realms and to be cited as a cause for larger "achievement gaps" in low-income children (e.g., Golinkoff et al., 2019; Romeo et al., 2018; Rowe, 2018; Walker et al., 2020). The word gap is mentioned on the websites of the US Department of Health and Human Services and the National Association for the Education of Young Children, and has inspired interventions such as Providence Talks. Yet, in a recent attempt to replicate Hart and Risley's (1995) findings, Sperry et al. (2019) did not find a large "language gap" between low-income and middle-class children. The work by Sperry et al. (2019) has received sharp criticism (e.g., Golinkoff et al., 2019), suggesting that the word gap argument maintains a powerful hold (for an overview of the language gap debate see Kuchirko, 2019). Here we argue that the word gap narrative is emblematic of other deficit-oriented frameworks for understanding the role of language in development and education. The narrative also points to the lingering influence of research orientations and methodologies that have conceptualized language development as a process that occurs within the mind of the individual child, without attention to the sociohistorical and structural contexts in which the child is situated.

Proponents of the word gap concept are committed to young children's learning and believe that ameliorating the perceived gap will lead to educational equity. However, the word gap concept is rooted in a cognitive theory that positions language as an individual ability that develops through child-directed speech, can be measured in a decontextualized way, and can be compared across individuals, like body height and body weight. But even body height cannot be compared completely out of context. Individuals of the same height can be seen as unusual in one cultural community and well within the norm in another community. To continue the metaphor, the word gap concept acts as a "ruler" to define what is normal and implies this standard level of vocabulary exposure is necessary for academic achievement. We do not dispute that child-directed speech is important; however, the focus on vocabulary exposure and dyadic conversation reflects the dominant norm of language practices by White middle-class families and fails to capture the diversity of social practices around language across different communities (Ochs and Schieffelin, 1986; Lieven, 1994). Rowe (2018) argues that studies of the word gap *have* taken a sociocultural approach, in that they "stress the importance of children's early social and communicative experience for language development" (p. 122). The Emergentist Coalition Model (e.g., Hollich et al., 2000), for example, attempts to integrate the social-pragmatic approach into consideration by factoring in social cues such as eye gaze and pointing in word learning. However, the assumptions made in these accounts seem to contradict sociocultural perspectives, especially the view that the quality and quantity of parents' language "input" is the major determinant of children's vocabulary development, and that unpacking the reasons for this deficient input should be the basis for designing interventions.

A number of scholars have demonstrated, however, that although dyadic conversation is important, it is not equally emphasized in all cultures, and is not the only way for children to develop language (Sperry et al., 2019). Children's everyday experience with language involves a vast array of types of discourse (e.g., Heath, 1983; Miller and Fung, 2012), and children's engagement in types of talk depends on cultural practices. Everyday language experience can include personal storytelling, arguments, jokes and teasing, and other verbal and nonverbal forms of language socialization (e.g., Gaskins and Paradise, 2010; Miller, 2014; Rogoff, 2014), and children also learn language through overhearing speech (e.g., Akhtar, 2005; Shneidman et al., 2009).

Conceptual Critiques

Specifically, the original word gap argument assumed a singular pathway for early language development — vocabulary exchange from one parent to one child, restricting the observation and analysis of children's language experience to the word level and focusing on parental utterances that are directly addressed to the focal child (Hart and Risley, 1995). As such, subsequent research using this methodology ignores decades of research on how children learn a language in diverse contexts and leaves out discursive practices shown to be important for children's language development, rendering it a partial and biased framework of analysis.

Although dyadic conversation contributes to language development, and is perhaps the most relevant practice for White middle-income children, it is not the only way for children to develop language (Lieven, 1994). Children learn language in cultural settings where parents do not often address them directly (Ochs and Schieffelin, 1986). Even within the Western middle-class setting, observational studies have indicated that toddlers monitor third-party conversations when not directly engaged in the conversation (Dunn and Shatz, 1989). Children as young as 18 months old have been shown to learn words through overhearing when other cognitive demands are not too high (Floor and Akhtar, 2006). In a study on word learning, for example, 2.5-year-old children either were spoken to directly or overheard a conversation that included a label for a novel object or a novel verb. The children were able to learn novel labels and novel verbs by overhearing speech to others at the same rate as when being directly spoken to (Akhtar et al., 2001). Furthermore, when relating children's learning through overhearing to their social experience, Shneidman et al. (2009) found in their sample of 20-month-olds that the extent to which the toddlers picked up novel labels through overhearing was positively correlated with the number of hours that they spent with multiple adults or older children.

It is important to acknowledge that some studies of the word gap have distinguished between child-directed speech and overheard speech. For example, Weisleder and Fernald (2013) found, in a sample of low-SES Spanish-speaking United States families, that the frequency of child-directed speech to 19-month-old children predicted both children's vocabulary and the efficiency of their language processing at 24 months. In contrast, the number of overheard words did not predict children's language measures. This finding supports the claim that the number of words spoken to children may be important for children's word learning. And yet, contrary to the Hart and Risley (1995) argument, Weisleder and Fernald (2013) found a great deal of variability in the number of words spoken to children within their low-income sample, and this variability was not related to parents' education or SES.

In addition to the dominance of the individual cognitive perspective on language development, the persistence of the word gap narrative can be attributed to broader, raciolinguistic ideologies around language and power in the United States (Rosa and Flores, 2017). Focusing analysis on dyadic conversation and word quantity privileges White middle-class norms of speaking with children and disregards the linguistic strengths that children develop through other discursive and communicative practices in their communities. The word gap narrative also complements the values of meritocracy and capitalism by relating social class to individual success (Avineri et al., 2015). By side-lining poverty and educational inequity, and focusing on children's language learning as a deficit related to individuals, families, or communities, the word gap narrative presents itself as an alluring quick fix to educational injustice. The narrative has also informed current educational policies and curricular frameworks; for example, research on the word gap was

presented as part of the initial justification for the concept of "Developmentally Appropriate Practice" (or DAP) put forward by the National Association for the Education of Young Children (NAEYC), and researchers have argued that this affirmation of the word gap is likely to have powerful impact on educational practices with young children (Souto-Manning and Rabadi-Raol, 2018).[1]

Growing critiques of the word gap narrative represent more than merely a difference of interpretation. Instead, they clarify the harm that can be done to families by accepting an individual cognitive perspective on language development that positions marginalized children and their families as linguistically deficient. Using this approach to rectify inequity has resulted in ineffectual—or even harmful—interventions. For example, Adair et al. (2017) observed that teachers of 1st and 2nd grade Latinx children in Texas cited the word gap as evidence that their students were not able to engage in active learning. Without more vocabulary, the teachers argued, children needed to be quiet listeners, and children in their classrooms seemed to have accepted their teachers' view that learning must happen through keeping quiet and listening to the teacher. Adair et al. (2017) argued that the word gap causes harm by depriving students of dynamic and complex learning opportunities. In another critique, Morelli et al. (2018) argued that the intervention study undertaken by Weber et al. (2017) placed too much emphasis on talk and ignored indigenous ways of thinking.

Recognizing Strengths

The word gap argument narrowly focuses language development on the number of words heard by children in the mother-child dyadic context. However, children's everyday experience with language typically occurs at the discourse level across a wider array of contexts, as demonstrated by the wealth of evidence from research of language socialization (Ochs and Schieffelin, 1986; Gaskins and Paradise, 2010; Miller, 2014; Rogoff, 2014). For example, story-telling is a common oral practice found in diverse cultural communities (Heath, 1983; Miller et al., 2005). A crucially relevant body of work by Miller and others (e.g., Lin et al., 2012; Miller and Fung, 2012) detailed children's active participation in personal storytelling, a joint social practice that involves the child, caregivers, and siblings, and routinely occurs in family conversation across different cultural communities. Children participate in different roles depending on the values emphasized in their cultural community. For example, middle-class families in Taipei, Taiwan tend to engage their children in personal storytelling with the focal child serving as a bystander and a co-narrator (Lin et al., 2012). At the age of 2.5 years, children in Taipei, Taiwan actively listened and readily contributed to the narration of past events that frequently included their misdeeds for didactic purposes. From 2.5 to 4 years of age, children in Taipei gradually increased their contribution as a co-narrator while their role of a bystander remained prominent over time. As a comparison, children in the Longwood (pseudonym) neighborhood of Chicago, who were raised in a primarily European-American middle-class community, more frequently took and maintained the role of co-narrator, rather than bystander, across the age range. Although the Longwood children also sometimes took dual roles of co-narrator and bystander in personal storytelling, active listening was observed less frequently in their bystander role than was seen with the Taipei children. The stark contrast shown in this research (e.g., Lin et al., 2012; Miller and Fung, 2012) is linked to the underlying meaning system of cultural ideologies and principles that motivate, privilege, and maintain the unique language experiences available to children.

European-American children's everyday language experience can differ profoundly depending on their socio-economic class backgrounds, and these differences also transcend the number of words heard (e.g., Miller and Sperry, 1987; Miller, 1994; Wiley et al., 1998). For example, children of working-class families in the Daly Park (pseudonym) neighborhood of Chicago were immersed in everyday discursive practices in a host of ways different from the middle-class version of personal storytelling in the Longwood neighborhood. First, co-narration of personal stories was deeply valued by working-class families, which was observed much more frequently in Daly Park than in Longwood. Second, conflict episodes in which mothers contradicted children's different versions of a story tended to occur in a direct and matter-of-fact manner in the working-class families in Daly Park. The children participated in opposition exchanges that were often lengthy, standing up for themselves and defending the right to express their own views. In contrast, oppositional exchanges were almost non-existent in the personal storytelling in the middle-class families at Longwood; the right to tell the child's different version of story was readily given, and taken for granted (Wiley et al., 1998). These culturally unique ways to engage children in personal storytelling have been observed in European-American working-class families across different communities (Miller and Sperry, 1987; Cho and Miller, 2004) and in African-American working-class families as well (Corsaro et al., 2002).

The working-class version of personal storytelling showcases the linguistic strengths and narrative skills of children who are immersed in artful performances. In a striking set of examples provided by Miller et al. (2005), working-class parents in Daly Park shifted from the past tense to the historical present tense, fluidly built up punchlines, and deployed parallel constructions through artful storytelling in front of their 2- to 4-year-olds. Compared to their middle-class counterparts, these children also heard more verbs of emotion and attributions as a bystander or co-narrator in the telling and reconstruction of everyday negative experiences that the family encountered. The assets for language development by children from working-class families can only be recognized when researchers consider children's discursive experiences as valuable practices of a cultural group in their own right, rather than reducing them to a variable of income level.

These studies highlight how studying language as a social practice can make the linguistic strengths of children in

[1]In a promising move, NAEYC has recently revised their DAP position statements with the goal of better taking into account the social and cultural contexts of children's development.

minoritized communities visible. Focusing solely on dyadic conversations or on individual cognitive processes, however, can obscure these strengths and highlight language practices commonly associated with White middle-class parenting.

ACADEMIC LANGUAGE

Another idea that has had considerable purchase, particularly in educational research and practice, is the notion that elementary and secondary students from certain linguistic backgrounds are in need of special instruction in "academic language" because their current language practices deviate from those that some consider essential for academic success. This argument, using different terms (e.g., academic English and the language of schooling) and different constructs, has been advanced by psychologists, linguists, literacy scholars, and educational researchers (see Cummins, 2000; DiCerbo et al., 2014; Jensen and Thompson, 2020). Tellingly, dosages of "academic language" instruction are most often prescribed for (a) speakers of languages other than the main language of instruction in schools (e.g., "English Learners" in United States schools) and (b) speakers of non-dominant varieties of that same language of instruction (e.g., speakers of what linguists and educators have referred to as African American Vernacular English, Black English, or Black Language). Although important differences exist in the linguistic repertoire of students who grew up speaking more than one language (including English) since early childhood, those not exposed to significant amounts of English before entering school, and those who grew up speaking non-dominant varieties of English (Heath, 1983; Zentella, 1997), all these populations are subject to the argument that their language, no matter how nativelike or fully developed, is not the right kind for school. In the United States, for example, it has been argued that English learners may be developing quite a lot of English, but it is often "social", "informal", or "everyday" English, and not what is needed in school. In fact, this distinction between the linguistic features of "academic" language and those of its putatively non-academic counterpart have dominated both empirical research (see review by DiCerbo et al., 2014) and guidance for educational practitioners in the field of Teaching English to Speakers of Other Languages (Short et al., 2018). Similarly, the argument goes, speakers of stigmatized varieties of English such as Black English may be "native" monolingual speakers of English, but their dialect gets in the way of their academic success. Baker-Bell (2020), drawing on Alim and Smitherman (2012), argues that the notion of "academic language" is actually a proxy for White Mainstream English; indeed, decades of empirical research documents both the linguistic sophistication of Black English and its stigmatization in United States schools (see also Baugh, 2004; Green, 2004; Wolfram, 2004). Godley and Minnici (2008), in summing up this perspective, quoted a teacher's comments about one of their Black students as representative of this position: "Rajid can't do challenging work—just listen to the way he talks" (p. 30).

In this section, we briefly discuss the well-intentioned arguments that have been used to highlight the "academic language" vs. "everyday language" contrast and point out problems with this approach from the perspective of equitable learning opportunities for students from nondominant linguistic, cultural, and racial backgrounds. We then offer alternatives that recognize and build on the linguistic and intellectual assets that students from minoritized backgrounds already bring with them to academic settings, without diminishing the importance of students' expanding their linguistic repertoire to include language used by a variety of disciplinary audiences. As discussed earlier, sociocultural perspectives on language development and language use help to illuminate students' strengths, which often emanate directly from students' own background, including their family and community experiences and language practices, as well as the ways in which marginalized students can gain access to opportunities to develop more dominant discourses helpful for success in academic settings.

To be clear, the concept of academic language has been championed by scholars committed to addressing educational inequity. For example, Cummins (1981, 2000), an educational psychologist whose commitment to improving education for linguistically minoritized populations is undisputed, proposed the controversial but still-influential distinction between "basic interpersonal communication skills" (BICS) and "cognitive academic language proficiency" (CALP) out of concern that students from minority language backgrounds were being transitioned out of bilingual support programs too quickly or identified as having learning disabilities. Cummins (2000) argued that students' relatively rapid development of BICS in English masked their lack of competence in the more cognitively demanding and "decontextualized" CALP. English language proficiency tests which, according to Cummins, measured BICS but not CALP, were incorrectly indicating that students had mastered English, leading school officials to seek explanations other than English language proficiency, such as learning disabilities, for some students' lack of academic progress. In justifying his distinction, Cummins (2000) drew on a wide variety of language-related fields and constructs, from both monolingual and bilingual contexts, to argue for the validity of his distinction, including Vygotsky's distinction between spontaneous and scientific concepts (Vygotsky, 1962; Kozulin, 1998), Bruner's communicative and analytic competence (Bruner, 1975), and Snow's distinction between contextualized and decontextualized language (Snow et al., 1991). More recently, in an attempt to envision interventions to facilitate the language development of students who are developing additional languages as well as speakers of stigmatized varieties of English, scholars have attempted to articulate a number of linguistic dimensions that make oral and written language in school settings distinct from "everyday" language (e.g., DiCerbo et al., 2014; Lesaux et al., 2016; Uccelli and Phillips Galloway, 2017).

Depending on the context in which it is used, however, the focus on academic language as a set of linguistic features contrasting with everyday uses of language presents a number of problems, both conceptually and in terms of potentially deleterious impacts on the very students that those who have advanced the construct have been interested in serving. If either

teachers or assessment developers look only for students' acquisition or use of features of language that have been predetermined to be "academic" (i.e., different from language likely to be used in "everyday" settings), then students' contributions to the learning tasks at hand may be missed. As we will discuss throughout this section, such perspectives have "material consequences" for students from a range of nondominant linguistic and cultural backgrounds (Martínez and Mejía, 2020, p. 53; see also Baker-Bell, 2020), and alternative approaches are necessary to envision and enact more equitable learning opportunities.

Conceptual Critiques

Even some who themselves have catalogued linguistic features used in academic settings acknowledge constraints associated with this approach. For example, Snow and Uccelli (2009) reviewed the literature to compile an "inventory" of multiple dimensions marking some language as "more colloquial" and others as "more academic," but they also raised concerns about such lists:

> [D]ozens of traits have been identified that contrast with primary or colloquial language and that might function as markers of academic language, but it is unclear that any of them actually defines the phenomenon. Any of these traits might be present in casual spoken language: Is it their co-occurrence that defines some language as academic? Is it their frequency? . . . How does the list . . . help us with the tasks of assessment or instruction? (p. 121).

Marítnez and Mejía (2020) go further, arguing that academic language, rather than an "empirically observable set of linguistic features," is actually an "*idealized* notion of the kinds of language valued in schools" (p. 53, emphasis added). If, as Martínez and Mejía (2020) argue, "'[a]cademic language' is an idea," then it is worth interrogating that idea. Educators often confuse the notions of "dialect" and "register" (Ferguson, 1994), attempting to change students' home and community language practices (dialects) instead of working with them to expand their repertoire of language uses for particular audiences and purposes (registers).

Depending on how it is used, the construct of academic language can also conflate language and literacy, in that reading and writing on many English language proficiency tests measures academic achievement more than English language proficiency (Wiley, 1996; Brooks, 2020). Both researchers and educators also often confuse lists of linguistic features present in academic texts that students are expected to *read* with characteristics we would expect to see in language that students themselves *produce* to engage in academic work (Bunch and Martin, 2020). However, even instructors and scholars in higher education consistently use features of "informal" or "social" language in their academic work (Bamford and Bondi, 2005; Bunch, 2014); navigating higher education requires a wide range of oral and written language practices, including those closer to the "conversational" end of the spectrum (Biber et al., 2002). Approaches to academic language that focus only on linguistic features of academic texts also often conflate *text complexity* (features of the text itself) with *text difficulty*, i.e., the degree of challenge that individual readers may face accessing a particular text based on their own language proficiency, background knowledge, interest level, and support provided (Bunch et al., 2014; see also; Bernhardt, 2011). The conflation ignores the fact that even linguistically and structurally "simple" texts may be difficult without background knowledge, support, and a motivating reason to read, while the most "complex" texts may be accessible with background knowledge, support, and high levels of interest in reading (Bunch et al., 2014). Finally, with regard to linguistic complexity more generally, scholars have pointed out that (a) all language is *complex*, just in different ways; (b) all language is *contextualized*, again in different ways; and (c) all language is capable of doing *cognitively challenging* work (Bartolomé, 1998; MacSwan and Rolstad, 2003; Schleppegrell, 2004).

As is the case with the word gap discussed earlier, it can be argued that, despite the best intentions, some conceptions of academic language are rooted in deficit orientations that contribute to maintaining the dominance of White middle-class language ideologies (Baker-Bell, 2020). MacSwan (2020), for example, describes the purchase of "standard language ideology": "the view that the language variety of socio-economic elites is intrinsically more complex than other varieties" (p. 29). Similarly, Flores and Rosa (2015) argue that "discourses of appropriateness" invoke a "conceptualization of standardized linguistic practices as objective sets of linguistic forms" that are actually "raciolinguistic" ideological constructions that "conflate certain racialized bodies with linguistic deficiency unrelated to any objective linguistic practices" (p. 150). As Paris and Alim (2014) have suggested, it is worth asking what alternatives are available if "the goal of teaching and learning with youth of color was not ultimately to see how closely students could perform White middle-class norms but to explore, honor, extend, and problematize their heritage and community practices." We devote the rest of this section to exploring such alternatives.

Recognizing Strengths

As we argued in the introduction, one potential alternative to dominant approaches toward academic language is to shift away from viewing language as a set of *structures* toward a social *practice* or *action* (Valdés et al., 2014; van Lier and Walqui, 2012; see also; Lea and Street, 2006). Viewing language and literacy as social practices allows educators—and researchers—to recognize what students are able to do in academic settings using the wide range of language and other semiotic resources already available to them. Rather than asking "what are the features of academic language?" we might ask "what can students DO with language to engage in academic work?" (Bunch, 2014). Rather than focusing exclusively on the linguistic features of particular academic texts, it can be productive to examine the nature of the language practices that students are called upon to use to participate in the participant structures, transactions, genres, and other social practices common in classrooms (Bunch and Willett, 2013). For

example, Bunch (2006, 2009) explored the "transactions" that 7th grade students, most of whom identified as Latina or Latino, skillfully negotiated in the group work and whole-class structures, including delivering oral presentations to their peers while simultaneously addressing the teacher and responding to questions.

Even when focusing on language structures, however, a number of studies have demonstrated that students from linguistically and culturally marginalized backgrounds are able to engage in academic work using language that would not be considered "academic" according to many definitions of the construct. When focusing on the linguistic structure of students' utterances, Bunch (2006, 2014) found that students adapted the language used in conversations surrounding the academic tasks according to audience and purpose. During a discussion while interpreting political cartoons, small groups of 7th-grade students first used informal, interactive utterances to engage in a discussion about the cartoon, using what Bunch called the *language of ideas*. When preparing to present to their teacher and classmates, they shifted to the *language of display*, characterized by linguistic features more commonly used for communicating in academic presentations. For example, they clarified antecedents of pronouns and minimized interpersonal, informal discourse markers (e.g., "like" and "you know") for the larger group.

Bunch (2006, 2014) argued that these differences could not be explained simply as students' transitioning in their conversation from using "everyday" to "academic" language. That is, students using the language of display did not necessarily advance the academic work of the group, while some of the most important insights in the group's interpretation of the cartoon came from students using the language of ideas. In fact, the more informal language might have productively facilitated, rather than detracted from, the group's intellectual work, as students interacted more naturally as they discussed the key ideas. Thus, *both* the language of ideas *and* the language of display were critical for academic work in this setting, albeit in different ways. In short, students' intellectual contributions might have been missed using lenses focusing on the presence or absence of academic language.

Rodriguez-Mojica (2018) also challenged traditional notions of academic language, using a different approach to identify how students use the language of ideas. Drawing on the sociolinguistic notion of *speech acts* (Austin, 1975; Searle, 1976; Bachman, 1990; Flowerdew, 2013), defined as units of meaning-making that transcend grammatical structure or ideological notions of "standard" language, she explored language use among emergent bilinguals in Fourth Grade English Language Arts (ELA) classrooms. The research highlighted seven speech acts that were particularly relevant to academic ideas and tasks related to ELA speaking and listening standards: providing feedback, making requests for clarification, organizing peer talk and activities, indicating one is following along with the discussion, making supportive assertions, describing a partner's ideas, and attempting to save face following a mistake. Notably, Rodriguez-Mojica's analysis showed that even students classified at the lowest levels of English language development and ELA performance on state standardized tests were able to navigate a range of academic speech acts in English: These students "made academic comments, attempted to explain and describe, sought clarification, and posed and responded to questions all in English"; these accomplishments would have been missed by measuring English language proficiency "by how closely speech adheres to traditional notions of academic language" (pp. 57–58).

Beyond identifying ways of valuing the use of marginalized linguistic forms, we call for attention to the *disciplinary practices* that students are called upon at the heart of subject-area learning in schools and the ways in which students might leverage non-dominant linguistic and cultural practices to engage in these practices (Lee, 2001). Following Valdés et al. (2014), we conceive of disciplinary practices as encompassing the conceptual understandings, analytic skills, and language and literacy practices at the heart of the discipline. The focus on students' use of particular linguistic features often comes at the expense of recognizing what students are actually doing and learning, and talking about. Using disciplinary lenses can help illuminate how students from racially, culturally, and linguistically minoritized backgrounds successfully use language and literacy practices, including those they have expertise in from their homes and communities but that are often devalued in educational settings, to engage in key subject-area practices (e.g., Orellana, 2009; Martínez and Mejía, 2020).

Other scholars have explored how speakers of Black English (also referred to as African American Vernacular English, African American English, and Black Language) use linguistic and stylistic features associated with these varieties of English to engage in disciplinary work (Baker-Bell, 2020; Lee, 2004; Lee, 2007). Lee (2001), for example, highlighted how Black students' home and community language practices, including "language play" such as "signifying," are similar to the strategies valued in literary analysis. As Lee (2001) explained, one particular category of signifying is "playing the dozens," which takes the form of ritual insults often beginning with "your mother . . ." (see Percelay et al., 1994, p. 49). There is similarity between these linguistic practices and the inferences that students make when analyzing literary texts:

> Signifying always involves indirection and double entendre and invites participants to look beyond the surface meaning to subtle interpretations to be inferred. It is vivid in its use of metaphor and often involves satire, irony, and shifts in point of view. African American adolescents who routinely participate in such talk make tacit use of strategies for interpreting metaphors, symbols, irony, and satire (Lee, 2001, p. 100, p. 100).

In a high school classroom taught and researched by Lee (2001), students used a number of aspects of African-American Vernacular English to engage deeply, vigorously, and thoughtfully as they analyzed a novel at the focus of instruction: "the talk among the students is entirely in African-American English Vernacular, not simply in terms of vernacular syntax forms, but more importantly in terms of the

performance of the discourse. Students signify on one another, display body language for emphasis, and reflect a rhythm and prosody in their speech that is dramatic and culturally Black" (p. 108).

As the examples in ELA demonstrate, a focus on disciplinary practices will illuminate what students from non-dominant backgrounds can do to engage in academic work in ways that would be missed by focusing on linguistic features of academic language. Supporting evidence has been obtained in other subject areas as well, including mathematics (Moschkovich, 2007; Moschkovich, 2008; Moschkovich, 2015), science (Rosebery et al., 1992; Lee, Quinn, and Valdés, 2013), and history (De La Paz et al., 2016; Bunch and Martin, 2020). However, it is important to acknowledge that disciplines themselves are social, cultural, and ideological constructions (Medin and Bang, 2014). Lea and Street (2006), for example, argue that academic literacies must identify subject-based discourses and genres, but that it is also essential to critically examine the "institutional nature of what counts as knowledge in any particular academic context" (p. 269) including the role of epistemological and social processes, power relations, and social identities.

We conclude this section by pointing out how educators can bridge students' home language practices and the language more commonly used in academic settings, an idea that has been explored for many years with regard to monolingual English speakers (e.g., Heath, 1983). A disciplinary focus can help illuminate the ways in which educators can simultaneously recognize students' existing linguistic resources and create conditions under which students can expand that repertoire to include language practices commonly used in disciplinary communities. For example, using the Vygotskyian concept of *mediation*, Gibbons (2003) described how teachers and English language-learning students from low SES backgrounds in an Australian elementary science classroom collaborated to transform students' initial ways of talking about scientific phenomena into the "specialist discourse" of the curriculum. To illustrate, in a lesson on magnetism, students' language changed from experimenting in small groups ("Look, it's making them move. Those didn't stick"), to relating their experiences to their teacher and classmates ("We found out the pins stuck on the magnet") and finally writing reports about the experiment ("Our experiment showed that magnets attract some metals") (p. 252). Drawing on systemic functional views of language (Halliday, 1985; Halliday, 1993; Halliday and Hassan, 1985), Gibbons argued that specialist discourse can be understood as variation in register at one end of a "mode continuum": "The continuum reflects the process of formal education itself, as students are required to make shifts within an increasing number of fields and to move from personal, everyday ways of making meanings toward the socially shared and more written like discourses of specific disciplines" (p. 252).

It is crucial to point out that Gibbons is not arguing that students' everyday language is irrelevant or counterproductive to their learning. Rather, students' scientific understandings begin with their articulation of the phenomena using existing linguistic resources, which serve as a foundation on which students, with the teacher's guidance, learn to communicate with different audiences for different purposes. In this work, Gibbons explores a wide range of ways in which the teacher builds "linguistic bridges" between "learner language" and the target register, all of them beginning with students' own words (see also Gibbons, 2015).

Importantly, recognizing the value of students' existing language practices not only serves as a means for them to express their disciplinary understandings but also for teachers to present content to students. Brown and Ryoo (2008), for example, conducted an experiment with mostly Spanish-speaking 5th-grade students whose English language proficiency levels were not known. The students were provided an introduction to photosynthesis using "everyday" vocabulary (treatment group) or "scientific" vocabulary (control group). Students in the treatment group showed greater learning gains across all content measures on a post-instruction multiple-choice and short-answer test than the control group. Remarkably, the treatment group outperformed the control group on assessment questions that were asked in scientific language. Both groups, however, performed better when answering questions asked in everyday language than in scientific language. This research underscores the importance of recognizing the value of students' existing language and providing opportunities for students to bridge to greater facility in using scientific language.

TRANSLANGUAGING

So far, we have presented alternatives to two persistent deficit perspectives on the language practices of minoritized students, one that sees minoritized children as lacking words and another that views them as lacking the kind of language necessary for academic success. Our third section explores *translanguaging*, a sociocultural approach to understanding and leveraging multilingual communicative practices used by linguistically minoritized students. By valuing the range of cultural and linguistic resources students bring to the learning environment, designing instructional activities that intentionally build on those resources, and interrogating language hierarchies, we argue that translanguaging presents a potentially transformative approach to teaching in linguistically diverse classrooms. Unlike the word gap debate and many interpretations of academic language, translanguaging begins with what students *are* able to do—with the goal of both expanding their repertoires and actively challenging the language practices framed as necessary for academic success in educational contexts ranging from those serving young children (e.g. Gort and Sembiante, 2015; Bengochea and Gort, 2020) to higher education (e.g. Mazak and Carroll, 2016). Yet, as Poza (2017) pointed out, as principles of translanguaging are increasingly shaping pedagogy both in the United States and globally, transformation of power relationships through translanguaging is not inevitable. We suggest that an ecological orientation toward translanguaging in classrooms offers a nuanced approach to translanguaging for both

researchers and practitioners by illuminating how various layers of context—from the broadest sociopolitical dynamics to the more immediate relationships within an individual classroom—shape opportunities for language development.

Translanguaging, or *trawsieithu*, is generally attributed to Cen Williams (1994, 1996) in reference to a pedagogical practice that involved alternating English and Welsh for "input" (reading or listening) and "output" (speaking or writing) in bilingual classrooms as part of an effort to revitalize the minoritized Welsh language (Lewis et al., 2012). Colin Baker (2001) first provided an English translation of the term as *translanguaging*. In the United States, Ofelia García (2009) was largely responsible for popularizing the term, especially in contexts where students from immigrant and linguistically minoritized backgrounds use English and their home languages fluidly in the same classroom. For García (2009), translanguaging referred to the complex, dynamic, and discursive communicative practices in which bilinguals engage to make meaning. García and others, along with other language scholars, have since extended the concept of translanguaging as a pedagogical orientation within a range of multilingual instructional settings (García and Sylvan, 2011; García et al., 2012; Hornberger and Link, 2012; Sayer, 2013; García and Li, 2014; García et al., 2017). This literature positions translanguaging as a theoretical approach that views language as a unified linguistic repertoire that includes features associated with various "named" languages rather than two separate language systems (Otheguy et al., 2015; Otheguy et al., 2018), and as a pedagogical approach in which educators actively challenge dominant notions of languages as separate from one another and support students in leveraging their full linguistic repertoires (García and Kleyn, 2016; García et al., 2017). In practice, translanguaging strategies might encourage students to translate instructions or key concepts to their home or community languages, present ideas multilingually, or work collaboratively with peers leveraging all students' unique linguistic repertoires.

For many years, linguists and educational scholars have worked to dismantle deficit views of bilingualism, underscoring that theories of language, second language development, and bilingualism fundamentally shape instructional arrangements and opportunities for learning (Valdés et al., 2014; Kibler and Valdés, 2016). Although there are parallels in the translanguaging movement to the efforts to contest dominant academic language ideologies, translanguaging is somewhat distinctive in its explicit focus on multilingual practices. Research on bilingual language practices in classrooms in the United States expanded, at least in part, in response to growing racist sentiments and deficit orientations that positioned immigrant-origin students as "semi-lingual," or incompetent in both their home languages and English, particularly when they "mixed languages" (Martin-Jones, 1995; Skilton-Sylvester, 2003; Crawford, 2004).

Historically, linguists have used the term code-switching to refer to the use of multiple languages in conversation. Early studies of code-switching challenged conceptualizations that framed such use of languages as a result of limited mastery of one or both languages; using the tools of linguistics, researchers have demonstrated the systematicity and communicative function of code-switching (Blom and Gumperz, 1972; Poplack, 1980). Subsequent research on code-switching in classrooms more explicitly addressed the need to revisit theories of bilingualism and pedagogical practices that reinforce inequitable educational opportunities for linguistically minoritized students and the need to recognize the wealth of linguistic resources that students bring to their classrooms (Arthur and Martin, 2006; Sayer, 2008; Martínez, 2010). This research documented the pedagogical power of code-switching, demonstrating that when students have access to all of their linguistic resources, opportunities are widened for them to participate and engage in grade-level academic content.

Yet, in an era of increased globalization, scholars began to argue that the concept of code-switching failed to capture the complexity of multilingualism and the "superdiversity" (Vertovec, 2007) present within today's societies. As part of what has been described as the *multilingual turn* in applied linguistics (May, 2013; Ortega, 2013), numerous scholars have called for a theoretical perspective that individuals draw from a unitary linguistic repertoire that includes features associated with different "named" languages (Makoni and Pennycook, 2007; Makoni and Pennycook, 2012; Pennycook, 2010; García and Li, 2014; Otheguy et al., 2015; Otheguy et al., 2018). They argue that "named" languages such as English, Japanese, or Arabic are defined by social and political, rather than linguistic, boundaries; they underscore that seeing languages as bounded entities fails to capture the perspective of the language user (Otheguy et al., 2015); and they highlight the shortcomings of concepts such as "mother tongue" and "native speaker" (Makoni and Pennycook, 2007; Makoni and Pennycook, 2012).

This theoretical orientation toward language was accompanied by the call for an instructional approach that would actively draw on the entire linguistic repertoires of students to facilitate both expansion of students' repertoires and engagement in content-area learning (García, 2009; Creese and Blackledge, 2010; García et al., 2017), and an explicitly critical view of the role of language ideologies in maintaining dominant power relations (García and Leiva, 2014; García and Li, 2014). It was out of these discussions that the concept of translanguaging gained traction (Poza, 2017). Notably, as scholars have pointed out, neither the practice nor the study of translanguaging is new (e.g., Canagarajah, 2011). For example, Leung and Valdés (2019) noted that for several decades, scholars have challenged the view that students' use of home languages in classrooms should be limited; instead, they have highlighted the value of translating texts and of teachers' use of students' home languages. Similarly, Poza (2017) points out that although the notion of translanguaging has become popular only recently, multilingual practices in classrooms have been studied for many years, particularly in parts of the world where multilingualism is widespread and celebrated.

Indeed, over the past decade, scholars have documented a range of positive outcomes associated with translanguaging in a variety of learning environments. For example, numerous studies have found that translanguaging in classrooms contributed to the expansion of students' communicative repertoires (Hornberger

and Link, 2012; Martin-Beltrán, 2014; Velasco and García, 2014; Poza, 2018), including academic literacy practices in English and increased metalinguistic awareness (García et al., 2012; Sayer, 2013; Palmer et al., 2014). Martin-Beltrán (2014), for example, explored the role of translanguaging in a high school "Language Ambassadors" program that served newcomer speakers of Spanish enrolled in ESL classes, bilingual heritage Spanish speakers, and students who spoke English at home and were studying Spanish at school. The students engaged in reciprocal ways of teaching and learning English and Spanish by analyzing each other's writing, often asking "what do you want to say?" and inviting their peers to respond in Spanish, English, or a mixture of both languages. Martin-Beltrán (2014) concluded that translanguaging facilitated meaning making by students, contributed to greater metalinguistic awareness, and allowed students to bridge discourses between home or everyday language and new language and literacy practices in classrooms. This orientation stands in contrast to the notion that students lack the "academic language" necessary for participation in complex classroom tasks.

Other studies found that translanguaging expanded students' access to curricular content, engaged students' prior knowledge, and led to greater participation (Creese and Blackledge, 2010; Allard, 2017; Garza, 2018; Garza and Arreguín-Anderson, 2018; Poza, 2018; Duarte, 2019). For example, Flores and García (2014) described translanguaging by teachers at the Pan American International High School in Queens, New York, which served recently arrived immigrant students who were speakers of Spanish. They described the case of how Ms. C, a Chilean-American English teacher who was a bilingual speaker of Spanish and English, incorporated translanguaging pedagogies into instruction by creating "Hip-Hop Monday," which consisted of analysis of two songs, one in Spanish and one in English, that explored issues of social justice related to United States Latinos or Latin America. After listening to both songs,

> [t]hey analyze the song with a critical socio-political as well as language/literary lens, using language practices that incorporate Spanish features as well as English features in order to provide a deep critical lens. They then translate a section of the song into English in writing using their full linguistic repertoire . . . They do so using dictionaries, asking each other questions, and always collaboratively in heterogeneous groups that consist of students at different levels of English proficiency (p. 248).

As a pedagogical approach, translanguaging underscores the flexibility of multilingualism, considering the use of racialized, dynamic, and fluid language practices as valuable for their own sake and for the purpose of expanding students' semiotic repertoires and facilitating content-area learning. Some studies have highlighted that translanguaging pedagogies leverage students' familiar language practices to access new practices in the language of instruction and those valued within particular disciplines (e.g., Probyn, 2019). For example, Poza (2018) found that 5th-grade students' translanguaging practices facilitated the development of numerous skills central to those valued in science learning, including the use of discipline-specific vocabulary and visual supports to navigate complex texts, as well as skills surrounding the categorization of objects. Others have underscored that beyond bridging students' existing language practices with those valued in schools, in order to be transformative, translanguaging pedagogies must be paired with a *translanguaging stance*, a philosophical orientation which "informs everything from the way we view students and their dynamic bilingual performances and cultural practices to the way we plan instruction and assessment" (García et al., 2017, p. 50). That is, the goal is to change what is valued by schools.

The potential to contest and transform dominant power relations in classrooms is central to translanguaging pedagogies. In addition to supporting the development of new language practices and facilitating content learning, scholars have found that translanguaging presents opportunities for students to examine their bilingual identities, interrogate linguistic inequality, and resist colonial ideologies (de los Ríos and Seltzer, 2017; Flores and García, 2014; García and Leiva, 2014; García and Li, 2014; García-Mateus and Palmer, 2017; Sayer, 2013). Taking a critical perspective, classroom spaces can be sites of either contesting or reinforcing dominant power structures. García et al. (2012) contend that translanguaging pedagogies allow for actively contesting those structures by opening up opportunities for racially and linguistically minoritized students to use all of their linguistic resources and access identities that have been constrained by linguistic hierarchies rooted in colonialism.

Conceptual Critiques

As research on translanguaging has proliferated, some scholars have expressed concerns about the potential for (mis) interpretations of translanguaging that can undermine the goal of addressing educational inequity at the heart of translanguaging pedagogical orientations. For example, MacSwan (2017) has argued that by rejecting the notion of separate languages, the concept of translanguaging undermines decades of research that documented the bilingual expertise involved in code-switching and explicitly focused on deconstructing deficit myths about bilingualism. It is further contended that rejection of concepts such as code-switching, and more fundamentally, the absence of linguistically distinguishable systems called "languages," is ultimately counterproductive to efforts to recognize and value students' multilingual linguistic expertise.

Other critics have noted that the multitude of interpretations of translanguaging make it difficult to identify a consistent theoretical orientation, language practice, or pedagogical practice associated with the concept. Specifically, research sometimes misses the emphasis on contesting dominant language ideologies with the goal of transforming power relations that is central to the concept. In a comprehensive review of empirical studies, theoretical essays, literature reviews, textbooks, and practitioner guides on translanguaging, Poza (2017) found that although a majority of them emphasized social justice orientations, those primarily concerned with classroom practice tended to define translanguaging without

including contestation of linguistic and racial hierarchies. In other words, materials on translanguaging that are most likely to be accessible to K-12 teachers tended to ignore the connections among students' language practices, coloniality, and systemic inequality.

A third concern relates to interpretations of translanguaging as expanding educational opportunities for all students, regardless of the broader sociopolitical context or instructional setting. While acknowledging the valuable contributions of translanguaging research, Leung and Valdés (2019) suggested that sweeping interpretations of translanguaging have the potential to further marginalize linguistically minoritized students if those interpretations limit students' opportunities to develop the dominant societal language. Allard (2017), who examined the role of translanguaging in ESL and sheltered science classes for adolescent recent immigrants, expressed similar concerns. While the teachers' translanguaging supported the students' comprehension and facilitated greater participation, translanguaging among teachers who were not experienced users of their students' home language (Spanish) ended up curtailing students' opportunities for learning. Similarly, in the context of a high school program for recent immigrant students, Lang (2019) found that the English Language Development teacher's narrow conceptualization of translanguaging as a means to avoid discomfort inadvertently undermined the goal of expanding students' bilingualism. Notably, students in both Allard's and Lang's studies expressed concern that teachers' translanguaging resulted in fewer opportunities for them to participate in English language practices and meet their critical long-term goal of learning English.

A number of scholars have pointed out that as a result of dominant language ideologies rooted in monolingualism, most content assessments of students developing bilingualism reflect only a fraction of what those students are capable of doing (Shohamy, 2011). Embedded within concerns about the potential for translanguaging pedagogies to reify marginalization is apprehension about alignment between translanguaging in classrooms and the assessment of linguistically marginalized students—particularly given the monolingual ideologies often entrenched in high stakes assignments and exams (Taylor and Snoddon, 2013). Canagarajah (2011) points out that even teachers who allow or encourage translanguaging as students negotiate meaning verbally often do not allow the practice in writing, "which they consider a more formal activity where students' performance is assessed" (p. 7). This calls for the need to explore the possibilities for translanguaging theories to inform assessment (e.g., Lopez et al., 2016; Schissel et al., 2018). García and Lin (2016) argue for a "strong" version of translanguaging theory that challenges the notion of languages as separate entities, yet they also acknowledge the material impacts associated with access to particular language practices. They underscore that more just and accurate assessments would take into account what students can communicate and achieve utilizing their entire linguistic repertoire rather than with a single language. Ultimately, they contend that a combination of multiple approaches is necessary: "On the one hand, educators must continue to allocate separate spaces for the named languages, although softening the boundaries between them. On the other hand, they must provide instructional space where translanguaging is nurtured and used critically and creatively without speakers having to select and suppress different linguistic features of their own repertoire" (García and Lin, 2016, p. 11). As Li and Lin (2019) pointed out, translanguaging pedagogies will not solve broader issues of racism, classism, and a legacy of colonialism; yet they present a powerful opportunity to challenge linguistic hierarchies by reframing students' and teachers' views of students' rich semiotic repertoires, and to facilitate meaningful engagement in the joint construction of meaning.

DISCUSSION

This review aims to highlight the threads that connect three areas of research that are not typically considered together. Focusing on early language development, the word gap narrative privileges certain ways of talking to young children and certain ways of learning that are commonly observed in Western, educated, industrialized, rich, and democratic (WEIRD) societies (Henrich et al., 2010). By focusing the research of language development on the number of words spoken to children in one-on-one speech without examining recurrent discursive practices, it obscures the rich linguistic and communicative assets being developed in early childhood situated in minoritized communities. Well-intended interventions, aiming at promoting equity but designed based on a deficit view, could be harmful by discounting cultural differences and undermining the development of culturally unique assets for language development. As children enter school, the notion of academic language, conceived as an intention to promote academic success, may further undermine their learning in classroom settings. Academic language refers to a category of language deemed necessary for school success. However, as we pointed out, defining such a category is conceptually problematic. In addition, placing too much focus on the *form* of students' language, instead of the *content* of their ideas and their ability to communicate those ideas, hides what students can do and may exclude them from deep learning opportunities. A focus on disciplinary practices, rather than language forms, has been proposed as an alternative. Following this rationale, we described translanguaging as a transformative approach with the potential to subvert language hierarchies and highlight students' linguistic strengths. In the final section below, we discuss issues that underlie the deficit approach to studying language development, suggest promising directions for research, and specify implications for educational practices.

Overarching Issues

The research reviewed in this paper converges to demonstrate how dominant language ideologies influence persistent deficit narratives of language development and language use by minoritized children and students. Moreover, underlying these ideologies are historical roots and structural issues that are crucial to consider in future research and field development. For

example, all the well-intended interventions would be in vain without taking into account the historical and structural backdrop of colonialism. Coloniality presents globalization as a process of social stratification based on race and capitalism as they relate to labor. *Race*—which is "co-naturalized" with language (Rosa and Flores, 2017)—emerged as categories for conquered and conquering peoples to explain external, mental, and cultural differences (Quijano, 2000). For this reason, the dismantling of deficit views is inherently an anti-colonial project. If historical contexts and colonial relations of power are not explicitly and consistently considered, educators run the risk of reproducing the same social hierarchies produced in the past.

The critiques we raised in the three areas of research consistently point to issues of language ideology that have been with us for a long time. For example, the assumption that particular, prescribed forms of English are required for academic and intellectual endeavors positions alternative ways of using English and languages other than English as inadequate to the task. These assumptions are carried over from their historical roots into modern language ideologies. For example, English was promoted as a "language of salvation and progress" (Shahjahan, 2013; as cited in Hsu, 2015) during colonial times. Campaigns to promote the dominance of English have taken a variety of forms, including "Americanization" projects in the American Southwest and Puerto Rico, "Benevolent Assimilation" efforts in the Philippines, and efforts to force Native Americans to learn English under the philosophy of "Kill the Indian, save the man" (Hsu, 2015; Hsu, 2017). By considering the dominance of English and the influence of the colonial past, we can begin to see how they conspire to reproduce the same kinds of colonial relationships along racial and linguistic lines that foster the promotion of eliminating the word gap and teaching academic language for minoritized children. As Hsu (2015) notes, these histories are "explicitly included" in teacher education and TESOL programs because they promote the dominance of English for its utility in seeking certain economic and social goals (p. 141). Unfortunately, well-intentioned programs might promote the utility of English while simultaneously denigrating the language practices of students and their communities. According to Quijano (2000), an element of Western European modern rationality was that non-European people and things belong to the past. In this way, non-European expressions of language and culture are viewed as inferior and positioned as primitive.

Promising Approaches to Research

Our analysis calls for research attention to study language as a sociocultural practice, as opposed to solely an individual cognitive process, to leverage the linguistic strengths of minoritized children, youth, and students. There is a dire need to consider the role of cultural experiences in research that attempts to make sense of individual variations in language development, rather than assuming a universal pathway in place. Taking into account children's everyday lived experiences situated in their cultural communities (Solórzano and Yosso, 2002; Miller, 2014; Rogoff, 2014; Rogoff, Dahl, and Callanan, 2018) can provide important insights into how learning is co-constructed by young learners and their social partners.

The cultural construction of language development and language use has been examined in the decades-long research on language socialization through cultural practices (e.g., Ochs and Schieffelin, 1986; Miller and Goodnow, 1995; Weisner, 2002). This research has specified diverse building blocks that contribute to the development and use of language by children from nondominant backgrounds, including those from low-income families and historically underserved communities. However, this research is rarely leveraged by research that aims to map individual differences to productive ways of supporting language development. This disconnection, as we alluded to in the Introduction, may stem from the predominantly cognitive-based approaches to studying language development. The field will benefit from stronger integration of the social-pragmatic contextual approaches into the research on individual differences, to identify the assets for learning that underlie these differences. These theory-bridging endeavors will also point the field to culturally sensitive recommendations for everyday practices in supporting children's learning and use of language at home and in school.

To dismantle dominant power relations while attending to the complex network of relationships that shape language development at home and in classrooms, researchers will need to broaden the scope of investigation beyond the individual level to consider interpersonal and cultural aspects of language development. On translanguaging, for example, Allard (2017) argued that researchers must situate the classrooms they are studying within broader policies, practices, and ideologies such that the outcomes of a particular pedagogy can be understood in terms of its relationship with other aspects of the environment, including (but not limited to) lived experience of students and teachers, patterns of student interactions in and out of school, language policies, language ideologies, history of migration to the area, and services available to immigrant students. Similarly, Creese and Blackledge (2010) argued that the best ways to build on students' skillful multilingual practices is contingent on the unique sociopolitical and sociohistorical context in which those practices occur. A research orientation that considers engagement in language practices beyond the classroom—the practices that teachers can draw on to engage students in the classroom—will facilitate the design of activities that are most likely to empower students.

Promising Approaches to Curriculum and Pedagogy

The consequences of language manifestations on school outcomes reflect a complex problem that exists in educational systems. Research and practice partnerships have potential for addressing the systemic issues, rather than identifying norms of language practices and applying them across cultural contexts. One way of removing the consequences in school outcomes is to allow for variation in how students communicate and to value multiple styles of communication in classrooms, for example, by way of strengths-based policy making (e.g., proposals set in motion by the Ann Arbor decision of 1979; see Smitherman, 1981).

How can students be encouraged to engage in academic work using their existing linguistic and other semiotic resources, as well as cultural and community knowledge base, while being apprenticed into other academic discourses that may serve them well in the future? Unfortunately, many remedies proposed for students who "lack" academic language may lead to the prescription of instruction that detracts from the language development desired by advocates of academic language. Rather than "curricularizing" language as a subject to be learned piece by piece (Valdés, 2018), the focus should be shifted toward ways to apprentice students into the language, literacy, and conceptual practices at the heart of intellectually engaging work (Walqui and van Lier, 2010; Valdés et al., 2014; Walqui and Bunch, 2019), recognizing the strength of students' language for its own sake and using that language to bridge to other disciplinary discourses (Lee, 2007). In doing so, students' home, community, and cultural language practices—along with the other linguistic resources they develop as they expand their repertoire to communicate with a wide variety of audiences—are recognized as valued resources for engaging in academic work. Such approaches to curriculum and pedagogy would present a powerful opportunity to challenge linguistic hierarchies by reframing students' and teachers' views of students' rich semiotic repertoires, and to facilitate meaningful engagement in the joint construction of meaning.

In a similar vein, we join language-socialization theorists to recommend that language learners should be supported to engage in intellectually rich content-area instruction while building language proficiency (Faltis and Valdés, 2016). The present analysis of the word gap, academic language, and translanguaging research makes it clear that the ill-founded gatekeeping notion—that children and students must learn more vocabulary or grow English proficiency before engaging in rigorous content-area learning—positions multilingual learners and speakers of minoritized varieties of English as lacking the means to engage such learning, resulting in inequitable practices in education. Robust professional development for pre-service and in-service K-12 teachers is therefore one of the key directions to mitigate the problem. Most teacher education programs continue to rely on theories and practices that are detrimental to students' developing bilingualism. Moreover, many teachers hold deficit views of language learners and feel unprepared to teach them (Faltis and Valdés, 2016; National Academies of Sciences, Engineering, and Medicine, 2018). Professional development that addresses these beliefs and supports teachers to recognize and embrace the linguistic strengths students bring to the classroom can potentially remedy the persistent inequitable outcomes experienced by language learners. By raising teachers' awareness of their values and beliefs and encouraging critical examination of teaching practices, teachers can recognize the strengths students bring to the classroom (National Academies of Sciences, Engineering, and Medicine, 2018; e.g., Hudicourt-Barnes, 2003; Jones Brayboy and Maughan, 2009) and support students with culturally sustaining pedagogies such as translanguaging. The violent histories associated with the imposition of English are important for teachers to understand so that they can better recognize their own positionality related to these histories regarding how languages other than English have been devalued (Hsu, 2017). Opportunities should be created and supported for teachers to reflect upon these histories and critically examine their teaching practices (National Academies of Sciences, Engineering, and Medicine, 2018) and to understand the connections between linguistic hierarchies and pedagogical practices. As we have highlighted in this paper, language learners require access to robust learning opportunities, rich with semiotic resources and invitations to use meaningful language (Tharp and Dalton, 2007).

CONCLUDING REMARKS

Although approaches to language learning that highlight deficits may be designed to help improve life for some children, we argue that they may instead cause harm by placing responsibility on the individual, family, and community and by ignoring structural, historical, and cultural reasons for children's varying academic achievement. This is evident in the word gap research which emphasizes the importance of direct communication with children but ignores other ways of learning a language. In order to gain a holistic perspective of children's language learning, it is crucial that researchers investigate beyond dyadic practices and look at diverse social practices in children's homes and communities. In school, we have suggested the need to amplify the curriculum by providing multiple alternatives in classroom activities for students to engage in learning, and leveraging the linguistic practices students bring to the classroom instead of focusing only on developing "academic language." Finally, we have suggested that educators support the strengths of their multilingual students by taking an ecological approach for students to practice translanguaging. Instead of a "one size fits all" approach to working with students with varying language backgrounds, lessons should be jointly constructed with students to amplify their skills while taking the unique social, cultural, and political contexts into consideration.

AUTHOR CONTRIBUTIONS

S-hW led the team in conceptualizing, drafting, revising, and completing the paper. The Introduction section was written primarily by MC, S-hW, SH, and GB; the word gap section by S-hW, SB, MC, and SRM; the academic language section by GB; the translanguaging section by NL; and the discussion section by S-hW, SH, SB, and SRM. All authors contributed to the revisions of the full manuscript, with S-hW bringing it to final completion.

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Chinese American Immigrant Parents' Socialization of Emotions in Bilingual Bicultural Preschool Children

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The purpose of this study was to examine Cantonese-speaking Chinese American immigrant parents' socialization of emotions in bilingual bicultural preschool children, using a combination of a parent questionnaire and parent language samples from emotion-elicited storytelling tasks. Sixteen Cantonese-speaking parents and their children participated in this study. Children were sequential bilinguals who were exposed to Cantonese (L1) at home since birth, and then learned English (L2) at school. The Chinese parent questionnaire examined parents' emotion talk in the home, as well as the child's dual language background and language distribution. Parents' language samples in Cantonese were collected from three parent-child storytelling tasks that each elicited a different type of negative emotion (sad, angry, scared). Results from the parent questionnaire and the parent language samples were analyzed using quantitative and qualitative methods. In the parent questionnaire, correlation analysis revealed that parents' use of guilt emotions was not associated with any of the other emotion words, suggesting that parents may not talk about guilt as frequently as the other emotions. Results from the parents' language samples showed no significant differences between parents' number of emotion words and emotion explanations across the storytelling tasks, suggesting that parents used negative emotion words similarly across all three books. Further qualitative analysis between the parent questionnaire and the language samples revealed patterns in the way parents use Chinese emotion words with their children. Findings illustrate how the combined use of a parent questionnaire and parent language samples offer complementary information to provide a more comprehensive understanding about Chinese American immigrant parents' socialization of emotions.

Keywords: bilingualism, emotion, immigrants, sociocultural, Chinese

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INTRODUCTION

One of the earliest contexts in which children first learn emotion words is through parent-child interactions in the home environment. Parental emotion-related socialization behaviors (ERSBs), including labeling and discussion of emotions, shape how children experience, understand, or express emotions (Eisenberg et al., 1998). Many cultural, social, and language factors could influence parents' socialization of emotions with their children in the home (e.g., Keltner and Haidt, 1999; van Kleef et al., 2016). For instance, cross-cultural studies have shown that media, magazines,

and books tend to display culturally appropriate emotion behaviors (e.g., facial expressions, tone, body language) (Tsai et al., 2007; Wege et al., 2014), social practices in high vs. low arousal activities reflect differences in emotional intensity preferences (Tsai, 2007; Lim, 2016), and differences in the emotion lexicon across languages suggest varied emotional experiences and perspectives (Wong and Tsai, 2007; Pavlenko, 2008). This is especially important for immigrant children or children from immigrant families in the United States who are exposed to their home language (L1) (e.g., Cantonese, Spanish, Japanese) since birth and later learn English (L2) in a school setting. Despite increasing literature on the important role parents have in children's emotion language development, there are relatively fewer studies that examine parents' socialization of emotions in bilingual bicultural children in the home environment.

Many newly arrived immigrant families may live in urban areas (e.g., Chinatown) with a high concentration of culturally specific establishments such as grocery stores, restaurants, or community centers, and where the residents may predominantly speak different dialects of the same language or share a similar cultural background (Tsui, 2010). These communities are likely to help preserve and reinforce the home culture, language, and social practices, which may also contribute to how parents socialize emotions with their bilingual child in the home. Since bilingual bicultural children are first exposed to emotion words in a home language that is different from English and in a sociocultural context that is different from the mainstream American classroom setting, studying early parent socialization of emotions beginning in the home may reveal better ways to support bilingual children when they enter the classroom setting.

This study examined Chinese American immigrant parents' emotion talk in bilingual bicultural preschool children who were exposed to Cantonese (L1) at home from birth and started to learn English (L2) in preschool. Parents' socialization of emotions with their children has been studied using parent questionnaires to collect developmental norms on emotion words (i.e., Ridgeway et al., 1985; Baron-Cohen et al., 2010), examine parent-child conversations related to emotions (Mazzone et al., 2017), and gather information about parents' beliefs about emotions (Halberstadt et al., 2013). Additionally, parent language sampling is an informative measure that could reveal how parents use emotion labels and explain emotions to their children in a more natural context (Cervantes and Callahan, 1998; Aznar and Tenebaum, 2013). Despite a growing number of tools and measures to assess emotion language skills in children, there are relatively few measures for bilingual children (Humphrey et al., 2011), and even fewer measures exist to evaluate parents' emotion talk in bilingual children in the home. The combined use of a parent questionnaire and parent language samples can gather information about the child's emotion language environment at home and capture parents' specific emotion words used with their child, potentially providing more comprehensive information regarding parents' socialization of emotions.

The main goal of this study was to examine parents' emotion talk with their child in the home language because it is the first language in which the child is exposed to emotion words. The second goal was to explore the use of a parent questionnaire and language samples to gather more holistic information about parents' emotion talk. A comprehensive understanding of bilingual bicultural children's emotion language in the home environment has important implications for informing clinicians and educators about developing more culturally-linguistically appropriate therapy and teaching activities that align with what parents are already doing in the home to support their child's learning needs.

Parents' Emotion Talk in the Home Environment

One of the earliest contexts in which children are first exposed to emotion language is in their home environment through parent socialization. Eisenberg et al. (1998) identified three types of parental emotion-related socialization behaviors (ERSBs) that influence and promote children's emotion language skills, including parental reactions to children's emotions, discussion of emotions, and expression of emotions. Most of the research on parental ERSBs was predominantly done on White American monolingual English-speaking populations (e.g., Denham and Kochanoff, 2002; Eisenberg et al., 2005), and less is understood about the socialization of emotions in parents from minority cultural and language backgrounds. In the present study, we focus specifically on parents' discussion and expression of emotions in the home language with their bilingual bicultural preschool children.

Emotion understanding and expression are shaped by our interactions with other people within a social cultural context (e.g., Keltner and Haidt, 1999; van Kleef et al., 2016). Through engagement in and exposure to social and cultural practices, people gradually internalize their culture's notion of emotions (Tsai, 2007; Wege et al., 2014; Lim, 2016). Many studies have shown that social, cultural, and language factors influence parents' socialization of emotions in bilingual children in the home (see review in Halle et al., 2014). For example, greater exposure to and frequent use of the home language with parents can foster emotion understanding and well-being in bilingual Singapore preschool children (Sun et al., 2018; Sun, 2019). In another example, Aznar and Tenebaum (2013) found that in Spanish-English bilingual children maternal emotion talk, but not paternal, was related to children's emotion understanding, which was consistent with Spain's traditional gender-prescribed caregiver norms and expectations. Moreover, emotion words may vary across languages and cultures such that some emotion words used in one language may not have an equivalent translation in another language or may not evoke the same affective state in a different sociocultural context (Keltner and Haidt, 1999; Pavlenko, 2008). Therefore, cross-linguistic differences suggest different emotional experiences and perspectives in each language, which may in turn influence how parents talk about emotions with their children. Indeed, Chen et al. (2012) showed that in a multilingual family context, which language parents use in the home to talk about

emotions contributes to children's own emotion understanding, expression, and regulation of emotions in each language.

For many immigrant parents in the United States, they may continue to use the home language when communicating with their children and other family members in the home, which may influence how parents socialize emotions with their child. Many sequential bilingual children first learn emotion language in their home language with their parents at home, but then they transition to an English-speaking school environment and begin learning emotions in a second language with their peers and teachers. Unlike monolingual children, bilingual children may consequently experience a mismatch between the social, cultural, and language factors in the home context and those in a mainstream American English-speaking school context (e.g., Heath, 1982; Commins, 1989; Baker and Páez, 2018). Given the dual cultural and linguistic environments in which young bilingual children grow up, we would expect that parents' socialization of emotions is qualitatively different than that in parents of monolingual children.

Cultural Considerations of Emotions in Chinese American Immigrant Families

The current research focused on parents' socialization of emotions in Chinese American immigrant families whose children speak Cantonese as a home language and use English in a school context. Chinese American parents' unique exposure to different sets of values and social norms between the home and host culture may influence bilingual bicultural children's emotion understanding and expression (Tsai, 2007; Chentsova-Dutton and Tsai, 2010; Chen et al., 2015). Emotions are embedded in larger cultural institutions and social practices which shapes one's emotional expression, interpretation, and experiences (e.g., Keltner and Haidt, 1999). For example, a study examining emotion displays in preschool children's storybooks in Romania, Turkey, and the United States revealed cultural differences in how frequently powerful (e.g., anger) and powerless (e.g., sad) negative emotions are displayed, suggesting that children are exposed to culture-specific emotion norms and values. Similarly, we see differences in emotion display in Chinese and American societies. Differences in display of emotion intensity in media, magazines, and movies (e.g., open vs. closed smiles) and activity-seeking preferences (e.g., mountain biking vs. picnicking) reflect the society's value and use of high-arousal (e.g., excitement, enthusiasm) and low-arousal (e.g., peace, calm) emotion intensity words (Tsai, 2007; Lim, 2016).

Additionally, eastern countries like China value a collectivist society and place greater emphasis on behaviors that directly impact group harmony, while western countries like the United States value an individualistic society and encourage agency in one's emotions and ideas to promote autonomy (e.g., Wong and Tsai, 2007). Since guilt emotions play a significant role in signaling whether one has violated the moral standards and norms in their society (Lagattuta and Thompson, 2007), guilt is highly valued in collectivist societies (Yik, 2010). Several cross-cultural studies have documented cultural differences in guilt between western and eastern countries (e.g., Bedford, 2004; Wong and Tsai, 2007). Bedford (2004) interviewed adults in Taiwan and identified three main types of guilt words and their meanings: failure in one's personal responsibilities (*nei jiu*), moral transgression (*zui e gan*), and breaking a law or rule (*fan zui gan*). These subtypes of emotion words for guilt in Chinese refer to different behaviors and intensity levels that are indistinguishable in English (Bedford, 2004).

To date, there are no studies that directly examine Chinese parents' use of guilt emotion words with their child in the home context. However, one longitudinal study examined Chinese parents' socialization of shame with their preschool child from age 2.5–4 years old (Fung, 1999). Nine Taiwanese families living in Taiwan, who spoke Mandarin and Taiwanese, were systematically videotaped and observed in their homes every 3 months for 2 h each. A total of 140 h of videotaped family interactions were transcribed and coded for events of shame, including labeling shame ("shame on you"), gestures and body language related to shame, and idiomatic expressions for shame. Results showed an average rate of 2.5 events of shame per hour between parents and their child, and socialization of shame occurred as early as 2.5 years of age. Although shame and guilt are considered distinct emotions, they are both part of the self-conscious emotions' family (see Tangney et al., 1996). Findings from Fung (1999) may provide preliminary information on how Chinese parents socialize self-conscious emotions and whether this socialization pattern may be seen in guilt too. Exploring the frequency and use of emotion words, including self-conscious emotions like guilt, may contribute to our understanding of Chinese American immigrant parents' socialization of emotions in the home.

Even among negative valence emotion words (e.g., sad, angry, scared), there are cultural variations in the valuation, expression, and behavioral consequences of each type. Fivush and Wang (2005) studied mothers living in China and in the United States during a reminiscing story task with their 3-year-old child to examine whether there were cross-cultural differences in mothers' use of negative emotion words. They found that Chinese mothers discussed more angry emotions with their children, while American mothers discussed sadness more frequently. Their findings suggested that Chinese mothers may be concerned with helping their children learn appropriate reactions to and regulation of angry emotions to maintain social harmony (Fivush and Wang, 2005). In our study, parents are Chinese American immigrants whose children are bilingual and bicultural, and so given their unique dual sociocultural exposure, it is worth exploring parents' use of different types of emotion words, including negative emotion words.

Chinese American immigrant parents may show different socialization patterns with their child compared to Chinese mothers and American mothers, and that may be associated with different sets of social constructs and parents' cultural orientation (Tao et al., 2013; Chen et al., 2015; Curtis et al., 2020). Chinese American parents may be in the process of adapting to the mainstream American culture (acculturation) while maintaining practices and beliefs in their Chinese culture (enculturation) (Tao et al., 2013). Chen et al. (2015) examined Chinese American immigrant parents' orientation to Chinese

and American cultures and how often they express their emotions using self-reported questionnaires. They found that parents' orientation to Chinese culture such as Chinese media use (e.g., TV shows, movies) was negatively associated with emotional expressivity, whereas parents' American orientation, including English language proficiency and American media use, was associated with greater emotional expressivity. They conclude that varying levels of engagement in the host and home culture can result in differences in emotional expression. Their findings are consistent with other studies which suggest that even among Chinese American immigrant populations there is a lot of heterogeneity in the home environment, socioeconomic status, language background and proficiency, and parenting socialization behaviors as they relate to children's emotion outcomes (e.g., Han and Huang, 2010; Curtis et al., 2020). In our study, parents are Chinese American immigrants who speak Cantonese as the home language with limited English proficiency. Understanding the nuances in Chinese American immigrant families' cultural orientations is important in gaining a holistic understanding and making an informed interpretation of parents' emotion talk with their child.

Combined Use of a Parent Questionnaire and Parent Language Samples

In clinical and educational settings, parent questionnaires not only reliably estimate bilingual children's dual language skills (e.g., Paradis, 2010; Thordardottir, 2011; Cheung et al., 2019), but they also provide a functional perspective of the home environment that may not be captured in more narrow assessment measures (e.g., Gutierrez-Clellen and Kreiter, 2003; Ebert, 2017; Byers-Heinlein et al., 2018). Of particular interest in this study is the use of a parent questionnaire to examine parents' emotion talk in Cantonese-English bilingual children.

For bilingual children, the use of a parent questionnaire about emotions can serve dual purposes: not only can it collect information about their emotion language in the home environment, but it also puts the information into the larger context of the bilingual child's dual language and cultural profile (e.g., Halle et al., 2014). Indeed, several studies have used parent questionnaires as a broad measure to collect information on emotion language skills in Chinese-English bilingual children, as well as gather their demographic information and language history to support interpretation of the study findings (e.g., Sun et al., 2018; Sun, 2019). Sun et al. (2018) used parent and teacher questionnaires, along with standardized vocabulary and cognitive tests, to examine the relationship between bilingual language experience and social-emotional behavioral skills in 805 Singaporean preschool children. The parent questionnaire collected information about children's dual language exposure and use in the home, while the teacher questionnaire reported the children's social-emotional and behavioral strengths and difficulties in the classroom. They found that greater bilingual language proficiency, as reported on the parent questionnaire, was significantly related to better social-emotional and behavioral skills (Sun et al., 2018). Although parent questionnaires can collect information about children's emotion language experiences in the home, what emotion words parents use with their child and in which contexts may not be captured accurately or may not be captured at all. Therefore, it is possible that using more narrow measures such as parent language samples, elicited through a parent-child storytelling context, can collect more fine-grained information about bilingual children's emotion language input.

Many studies have used play activities and storytelling contexts to elicit emotion language and collect language samples from parents. Cervantes and Callahan (1998) examined 84 children (2–4 years old) and their mothers during mother-child play and storytelling activities and coded the number of emotion labels, causes, and explanations. Similar methodology of collecting parent language samples and coding emotions has been implemented on other languages, including Chinese (Wang et al., 2000) and Spanish (Aznar and Tenebaum, 2013), to examine cross-cultural differences in emotion language. For example, Wang et al. (2000) examined a total of 41 White-American and Chinese mothers living in Boston and Beijing, respectively, and their 3-year-old children during two mother-child conversations tasks: sharing memories and telling a story from a picture book. They coded mothers' affect statements and questions in their language samples and found gender differences, such that mothers of boys discussed more positive emotions when sharing memories, while mothers of girls made more comments on the story character's negative emotions. These findings suggest that parent language samples can reveal fine-grain information about children's exposure to types of emotion words from their parents in a more natural context. However, they did not collect the child's background information and emotion language skills in the home context. Language samples only present a snapshot of parents' emotion language use within a specific storytelling context, and they do not reveal a wider range of emotion words that parents may use at home—words that may have been identified in a broader measure such as a parent checklist or questionnaire.

Relevant to our study, Curtis et al. (2020) used a combination of parent language samples and parent questionnaires to examine the relationship between Chinese American immigrant parents' emotion talk and their school-age (6–9 years old) children's emotion skills ($n = 258$). While the parent language samples analyzed parents' use of emotion words, questions, and elaborations, the parent questionnaires focused on their child's emotion regulation and social emotional behavioral skills, but not the parents' emotion talk in the home. Results showed that parents' emotion talk from the language samples was associated with children's higher emotional regulation and socioemotional skills. In our study, the questionnaire collects information on parents' emotion talk in the home, as well as the children's distributed dual language input. Supplementing parents' language samples with parent questionnaires could provide more holistic information to understand bilingual bicultural children's early socialization of emotions in the home.

The Current Study

The purpose of this study was to examine Chinese American immigrant parents' socialization of emotions in children who are exposed to Cantonese (L1) at home and learn English (L2) at school, using a parent questionnaire and parent language samples to gather holistic information about bilingual bicultural children's home environment. Despite increasing attention to emotion language skills in young children, there are few measures for culturally-linguistically diverse groups of children (Humphrey et al., 2011). The use of both a parent questionnaire (broad measure) and parent language samples (narrow measure) has potential to advance our understanding of parents' emotion talk in bilingual bicultural children.

Building upon and adapting from existing parent questionnaires (e.g., Mazzone et al., 2017; Cheung et al., 2019), we implemented a Chinese parent questionnaire to broadly capture immigrant parents' socialization of emotions in the home environment. Additionally, following previous studies (e.g., Aznar and Tenebaum, 2013; Curtis et al., 2020), we implemented parent storytelling tasks and each book elicited a different type of negative emotion word (sad, angry, scared). Parent language that occurs during a storytelling context is more linguistically diverse and syntactically complex than parent language that occurs in play interactions (e.g., Demir-Lira et al., 2018). This study addressed the following research questions:

1. How do Chinese American immigrant parents socialize emotions as measured by a parent questionnaire (broad measure)?
2. How do Chinese American immigrant parents socialize emotions as measured by parent language samples (narrow measure)?
3. What does the combined use of the parent questionnaire and the language samples tell us about how parents use Chinese emotion words with their children?

Since the parents in our study are Chinese American immigrants, who immigrated from China and still use Chinese as their dominant language at home with their child, it is likely that parents' socialization of emotions would be similar to what we see in Chinese society (e.g., Keltner and Haidt, 1999; Tsai, 2007; Lim, 2016). We hypothesized that the parent questionnaire would show that parents may talk about certain emotion words more frequently than others. In particular, we anticipated that parents would talk about self-conscious emotions like guilt frequently with their child, as is seen in previous studies examining Chinese parents and adults (e.g., Fung, 1999; Bedford, 2004; Wong and Tsai, 2007). For the parent language samples, we hypothesized that parents may use more angry emotion words compared to the other types of negative emotion words because Chinese parents may be concerned with helping their child regulate anger to maintain social harmony (Fivush and Wang, 2005). Lastly, since parent questionnaires and language samples each provide different information about parents' emotion talk (e.g., Cervantes and Callahan, 1998; Sun et al., 2018; Sun, 2019; Curtis et al., 2020), we expected that the combined use of both may reveal patterns in which emotion words parents use with their children in different contexts.

TABLE 1 | Summary of children's demographic information and vocabulary scores.

	Mean	*SD*	Range
Age (in months)	49.20	6.60	40–60
Time in preschool (in months)	12.56	7.80	2–28
Picture identification Cantonese (% correct)	74.38	11.12	44–86
Picture identification English (% correct)	64.51	16.69	26–89
Picture naming Cantonese (% correct)	44.60	17.55	10–71
Picture naming English (% correct)	42.29	24.05	3–83

METHOD

Participants

A total of sixteen Chinese American immigrant parents and their Cantonese-English bilingual preschool children (mean = 4;1 years; *SD* = 0.55, range = 3;4–5;0 years,) were recruited though the Kai Ming Head Start preschools in San Francisco, California. Kai Ming Head Start is a non-profit, government-funded program which provides preschool services to children from low-income families based on the federal poverty guidelines. The children and families who participated in this study come from low socioeconomic backgrounds. Most parents reported having a high school education, three parents had a college education, and one parent had a primary school education. Parents were native Cantonese-speakers with limited English proficiency. Children were sequential bilinguals, who were exposed to Cantonese at birth (L1) and then started to learn English as a second language (L2) in the school setting. Parents did not report concerns with speech, language, hearing, or learning. **Table 1** summarizes the characteristics of this group of participants. The participants had attended the Head Start program for an average of 12.56 months (*SD* = 7.80, range = 2–28 months). Children's receptive and expressive vocabulary skills in Cantonese and in English were measured on two separate testing sessions using the Cantonese-English bilingual vocabulary test developed for this population. The order of the language was counter balanced. The scores from the Cantonese and English receptive and expressive vocabulary measures are consistent with previous studies (see Kan et al., 2020). There were no significant differences between children's Cantonese and English receptive and expressive vocabulary skills in our study.

Language Distribution in the Home

Parents reported the child's language background including which languages are used in the home and the amount of language input from each family member in the home. Each household varied in the number of family members. All the parents reported Cantonese as the primary language used in the home by all family members. All the parents who reported living with their grandmother and/or grandfather reported that the grandparents spoke 100% Cantonese. The majority of the mothers and fathers reported using 80–100% Cantonese. Only one set of parents reported using 80% English in the home. However, they also reported that both grandparents live in the home and only speak Cantonese, so it is likely the child is

exposed to more Cantonese than English in the home. Parents reported that the younger siblings spoke 100% Cantonese at home. However, the older siblings used an increasing amount of English in the home, ranging from 20 to 100% English.

Home Storytelling Activities

In addition to the child's demographic information and language distribution in the home, the first half of the questionnaire collected information on home storytelling activities to understand the context in which the child is exposed to emotion words. The questionnaire was adapted from a previous questionnaire about parent language input and home activities in Cantonese-English bilingual children (Cheung et al., 2019). Parents reported the hours spent on different story time activities (i.e., reading stories, telling stories, or watching shows) and the percentage of input in each language for each activity. See Appendix A in **Supplementary Material** for a sample of the questionnaire about storytelling activities. All the parents reported that they engaged in the following storytelling activities with their child: reading stories (with books), telling stories aloud (without books), and watching TV or movies. Although the majority of the participants reported that Cantonese was the primary language used during home activities, there was variation in the amount of L1 and L2 use across activities. Fifty to 62.50% of parents reported that they use 100% Cantonese when reading stories and telling stories aloud with their child. Watching TV or movies comprised the greatest amount of L2 by families.

Parent Questionnaire on Emotion Language Experiences

The second half of the questionnaire focused on the child's emotion language input in the home. Parents reported which language the parent and the child feel comfortable using when discussing emotions. Next, parents used a Likert rating scale to rate how frequently they explained and labeled emotions with their child in the past 2 weeks (e.g., 1–2 times, 3–4 times). For example, one question asked, "When my child asked me questions about someone being sad, we talked about why that person was sad." The Likert rating scale portion of the questionnaire was adapted from a previous questionnaire about parent-child conversations about emotions (Mazzone et al., 2017). See Appendix B in **Supplementary Material** for a sample of the questionnaire about the parent and child's emotion language choice and the Likert rating scale.

The questionnaire also included an emotion word checklist to identify the range of emotion words that parents use with their child. See Appendix C in **Supplementary Material** for the emotion checklist from the questionnaire. The checklist included five categories of emotions (i.e., Happy, Sad, Angry, Guilt, and Scared), and each category had 9–12 emotion words for parents to select. There was a total of 51 emotion words on the checklist for parents to choose from. Parents had the opportunity to add in additional emotion words that they use with their child in each category. Only two parents reported an additional emotion word in the angry category. However, neither word counted as an emotion word according to our coding criteria, and therefore were not included in the analysis. To date, there are no standardized norms on Cantonese-English bilingual children's emotion word development. Therefore, the emotion words in the checklist were selected based on previously normed data on the comprehension and production of emotion words in monolingual English-speaking children (i.e., Ridgeway et al., 1985; Baron-Cohen et al., 2010) and monolingual Chinese-speaking children (i.e., Li and Yu, 2015). Additionally, the emotion words were selected in consultation with a native Cantonese-speaking research assistant to ensure that the words were culturally, linguistically, and developmentally appropriate for this study's population.

Parent-Child Emotion Elicitation Storytelling Task

Three wordless picture books were used in this study: (1) "Alexander and the Terrible, Horrible, No Good, Very Bad Day" (Viorst and Cruz, 1977), (2) "There's a Witch Under the Stairs" (Smith, 1991), and (3) "Llama, Llama Misses Mama" (Dewdney, 2009). These books were selected because they have images that depict clear facial expressions that represent basic emotions, have a clear storyline even when the words were removed, and were not familiar to the parents in this study population. Each book elicited a different type of negative emotion word based on the storyline. The "Alexander and the Terrible, Horrible, No Good, Very Bad Day" book, which was about a young boy who was in a bad mood throughout the day, elicited angry emotions. The "There's a Witch Under the Stairs" book, which was about a young girl who attempts to get rid of a witch living under her stairs, elicited scared emotions. The "Llama, Llama Misses Mama" book, which was about a young llama's first day of preschool who is missing his mom, elicited sad emotions. We sought to examine Chinese American immigrant parents' socialization of different types of negative emotion words and whether they may use one type of negative emotion word more often than another within the story context. The books were modified by removing the words from the books and translating the title into Chinese characters. When modifying the books, we kept the three books similar in page length (18–25 pages), without compromising the story flow. All the books were printed on 8 $\frac{1}{2}$" × 11" standard paper size and placed in plastic protection sheets. Each page in the book provided the opportunity to elicit at least one emotion word.

Following the storytelling task, parents completed a brief emotion check measure in Cantonese to confirm that they recognized all the emotions in the storybooks. There were 26 test items in the emotion check measure. The test contained pictures of characters from each book expressing an emotion (e.g., happy, angry, etc.). Parents were asked to label the image with an emotion word. Synonyms of the emotion word were also considered correct (e.g., excited for happy). Scores $\geq$75% accuracy were considered passing. All the parents scored 75% or greater and passed.

Procedures

This study employed a cross-sectional design to examine parents' socialization of emotions in sequential Cantonese-English bilingual bicultural preschool children. Two measures

were used to examine parents' emotion talk: (1) a Chinese parent questionnaire on children's emotion language experiences (broad measure) and (2) a parent-child emotion elicitation storytelling task (narrow measure) in Cantonese. Individual testing sessions were conducted in a quiet room at the Kai Ming Head Start preschool site and lasted ∼90 min. Research assistants who conducted the testing were native speakers of Cantonese and fluent in English. First, parents completed the brief questionnaire in Chinese. The questionnaire took ∼10–12 min to complete. Next, parents participated in three emotion elicitation storytelling tasks with their child from wordless picture books. The books intended to elicit emotion words, but research assistants did not tell parents to use emotion words. Parents were asked to tell a story in Cantonese to their child the way they normally would at home. Parents were given several minutes to review the books before telling the story to their child. Parents were asked to tell a story to their child in Cantonese because it is their proficient language and because it is the first language in which the child is exposed to emotion words. Each book elicited a different type of negative emotion word (e.g., sad, anger, scared). Each story was ∼10–15 min long. Children were not required to say anything during the task. However, some of the children pointed to the pictures, asked questions, added comments, or responded to parents' questions during the storytelling task. Parents' stories were audio recorded for later transcription and coding analysis.

Language Sample Transcription

The audio files for each parent-child storytelling task were transcribed by trained research assistants who were native Cantonese-speakers and analyzed using the Systematic Analysis of Language Transcripts Software program (SALT; Miller and Iglesias, 2018). The Cantonese language sample transcription process followed guidelines developed by Klee et al. (2004) and is consistent with previous studies (see Kan et al., 2020). There are three main stages of the transcription process: (1) transcribing narrative recordings in Cantonese into Chinese characters, (2) converting the language samples into Romanized form, and (3) identifying compound words. Each Chinese character carries a specific meaning that can stand on its own or can be combined to create a compound word with a new meaning. For example, in the compound word 開心*hoi1sam1*, individually *hoi1* means "open" and *sam1* means "heart," but when combined *hoi1sam1* is the word, "happy." When identifying the compound words, we combined some of the single Chinese characters to create compound words.

Table 2 presents a summary description of parents' Mean Length Utterance (MLU), Number of Different Words (NDW), and Type Token Ratio (TTR) from their storytelling tasks. MLU was calculated by the total number of compound words and single Chinese characters divided by the total number of utterances in the language sample. NDW refers to the number of different words parents used in the storytelling task. TTR was calculated by the NDW divided by the total number of words that parents used in each storytelling task. There were no significant differences in NDW and TTR across books, indicating that all three books elicited similar number of different words from parents. However, parents produced significantly greater MLU in the book, "There's a Witch Under the Stairs" compared to the other two books ($F = 7.33$, $p < 0.01$), suggesting that this book may have offered more opportunities for descriptive sentences than the other ones.

TABLE 2 | Summary of parents' language measures (mean and standard deviation) in the storytelling tasks in Cantonese.

	Alexander book	Witch book	Llama book	$F_{(1, 15)}$
Mean Length Utterance	5.07 (0.49)	5.69 (1.09)	5.09 (0.62)	7.33**
Number of Different Words	154.94 (36.18)	140.63 (35.64)	162.25 (46.79)	1.73
Type Token Ratio	0.24 (0.50)	0.24 (0.04)	0.22 (0.08)	0.78

*$p < 0.05$, **$p < 0.01$.

Coding Emotion Words

The total number of emotion words and total number of different emotion words that parents used during each storytelling task were hand-coded in the language samples. In this study, emotion words were defined as those that directly refer to specific affective states (e.g., happy, angry) or processes (e.g., to worry, to rage), and typically fit in the sentence context, "I am…" or "I feel…" This definition for emotion words is based on the framework developed by Pavlenko (2008) and is consistent with the coding criteria used in other studies that examined Chinese emotion words (i.e., Lin and Yao, 2016; Ng et al., 2019). A trained native Cantonese-speaking research assistant coded the emotion words. To ensure reliability, the research assistant and the first author coded 6% of the language samples and reached 100% agreement. The two coders discussed what constituted as an emotion word based on the coding criteria. If there was confusion about what constituted an emotion word, we discussed it until we reached agreement. The total number of emotion words was calculated by adding the number of times the parent used an emotion word in the storytelling task.

Coding Emotion Explanations

Parents' emotion explanations during each storytelling task were also hand-coded in Cantonese language samples. Emotion explanations included statements that provided causal information about an emotion ("Llama feels sad because…" or "Alex was angry when his brothers…") or questions that asked about emotions ("Why does he feel sad?"). Emotion explanations were also coded if there were two consecutive events that were related but not linked with a causal conjunction ("Kiki is scared. The witch was under the stairs."). The coding criteria for emotion explanations was based on Bloom and Capatides (1987) and is consistent with the criteria used in previous studies (Cervantes and Callahan, 1998; Aznar and Tenebaum, 2013).

TABLE 3 | Average proportion of emotion words reported in each category in the emotion word checklist on the parent questionnaire.

	Mean	*SD*	Range
Happy	0.34	0.18	0.11–0.78
Angry	0.23	0.12	0–0.44
Scared	0.20	0.13	0–0.50
Sad	0.19	0.09	0.09–0.36
Guilt	0.15	0.10	0–0.30

TABLE 4 | Relationships among how frequently parents talk about emotions with their child.

	Sad	Happy	Angry	Scared	Guilty
Sad	–	–	–	–	–
Happy	0.60*	–	–	–	–
Angry	0.76**	0.77**	–	–	–
Scared	0.65**	0.56*	0.72**	–	–
Guilty	0.15	−0.12	0.06	0.41	–

*$p < 0.05$, **$p < 0.01$.

TABLE 5 | Parents' performance (mean and standard deviations) in the storytelling tasks in Cantonese.

	Alexander book	Witch book	Ilama book	$F_{(1, 15)}$
Total emotion words	8.56 (6.80)	8.13 (7.49)	11.31 (10.78)	1.03
Different emotion words	2.13 (1.09)	1.88 (1.41)	2.38 (1.63)	0.76
Emotion explanations	2.00 (3.27)	1.06 (1.61)	3.38 (5.5)	1.76

TABLE 6 | A 2 × 2 table comparing parents' responses on the questionnaire with their performance during the storytelling task.

		Responses on the parent questionnaire	
		Reported (%)	Did not report (%)
Performance on the storytelling task	**Used**	5.24	3.90
	Did not use	17.07	73.78

The table presents the average percentage of emotion words across participants.

RESULT

Parent Questionnaire on Emotion Language Experiences

Parents reported that Cantonese was the language that parents and their child felt most comfortable using when discussing emotions. For the emotion word checklist, parents selected which emotion words they use with their child. There were five emotion categories on the emotion checklist: happy, sad, angry, guilt, scared. Please see Appendix C in **Supplementary Material** for the complete list and number of emotion words in each category. **Table 3** presents the average proportion of emotion words that parents reported using with their child in each category. On average, the happy emotion category had the highest proportion of different emotion words reported by parents (34%), while the guilt emotion category had the lowest proportion of different emotion words (15%). Parents also rated how frequently they talked about certain emotion words with their child in the last 2 weeks. Pearson's correlation analysis was used to examine the relationships among the reported frequency in which parents talk about emotions with their child. Results showed that happy, angry, scared, and sad emotion words have a significant positive relationship with each of the other emotion words (see **Table 4**). However, guilt did not correlate with any of the other emotion words in terms of how frequently parents talk about that emotion word with their child.

Parent-Child Emotion Elicitation Storytelling Tasks

Table 5 summarizes parents' performance in the three storytelling tasks in Cantonese. Overall, there were no significant differences in the total number of emotion words [$F_{(1,15)} = 1.03$, $p > 0.05$], different emotion words [$F_{(1,15)} = 0.76$, $p > 0.05$], or emotion explanations [$F_{(1,15)} = 1.76$, $p > 0.05$] across the three books that each elicited a different negative emotion word. In the "Alexander and the Terrible, Horrible, No Good, Very Bad Day" storytelling task, parents used a mean of 8.56 ($SD = 6.80$) emotion words, 2.13 ($SD = 1.09$) different emotion words, and 2.00 ($SD = 3.27$) emotion explanations. In the "There's a Witch Under the Stairs" storytelling task, parents used a mean of 8.13 ($SD = 7.49$) emotion words, 1.88 ($SD = 1.41$) different emotion words, and 1.06 ($SD = 1.61$) emotion explanations. In the "Llama, Llama Misses Mama" storytelling task, parents used a mean of 11.31 ($SD = 10.78$) emotion words, 2.38 ($SD = 1.63$) different emotion words, and 3.38 ($SD = 5.5$) emotion explanations.

Comparing Information Between the Parent Questionnaire and Language Samples

In addition to examining the parent questionnaire and the parent language samples individually, our third research question examined whether comparing the two measures would reveal consistencies or differences in the emotion words parents used and reported. For example, did parents who reported using certain emotion words on the questionnaire checklist consistently use those emotion words in the story task? Are there certain emotion words that parents are not likely to report on a questionnaire, but will use when given the chance in a story context? Emotion words that were coded in the language samples were matched against those that parents selected on the questionnaire checklist. Simple likelihood ratio calculations comparing parents' responses on the questionnaire with their performance on the storytelling tasks are shown in **Table 6**. Additional qualitative analysis examined the types of emotion words parents frequently reported and used.

On the questionnaire checklist, parents selected an average of 11.13 ($SD = 5.00$) different emotion words out of the 51

available emotion words. During the storytelling task, 5.24% of parents consistently used the same emotion words they reported on the questionnaire. Those emotion words included *hoi1sam1* (happy), *m4hoi1sam1* (sad), *nau1* (mad), and *ging1* (scared). On average, 3.90% of parents used certain emotion words during the storytelling task but did not report those emotion words on the questionnaire. For example, parents often used the emotion word *faan4* (annoyed/bothered) but did not report this word on the questionnaire. We offer some excerpts from the language samples below to illustrate the words used in the story contexts. Additionally, 17.07% of parents reported emotion words on the questionnaire, but they did not use those emotion words during the storytelling task. For example, some parents reported on the questionnaire that they use emotion words such as *gik7hei3* (furious) or *soeng1sam1* (broken hearted), but they did not use them during the storytelling task. The remaining 73.78% of parents did not report using the emotion words on the questionnaire and did not use those emotion words in the storytelling task. Those emotion words included *geng1tsing1* (scared pale), *gik7sei2jan4* (angry to death), and *faai3lok6* (joy). We will explain possible reasons why parents may consistently use or not use emotion words in the discussion.

Reported on the Questionnaire and Used in the Story

Example 1: Ni1 loeng5 go3 siu2 pang4jau5 hai2 dou6 waan2 bo1 bo1. Hou2 *hoi1sam1*.
These two children here are playing ball. Very *happy*.

Example 2: Joeng4 joeng4, nei5 dzou6 mat7 je5 aa? Nei5 dzou6 mat7 *m4hoi1sam1* aa?
Llama llama, what are you doing? Why are you *sad (not happy)*?

Example 3: Jau2 hou2 *nau1* hai2 dou6. Jau2 m4 tung4 daa1di5 jau2 m4 tung4 maa1mi5 king1gai2.
And he's so *mad* here. And he's not talking to daddy or mommy.

Example 4: Mou4po4 soeng2 zuk keoi5 go3 goek8 goek8. Keoi5 hou2 *ging1*, hou2 *ging1*.
The witch wants to grab her feet feet. She is so *scared*, so *scared*.

Did Not Report on the Questionnaire but Used in the Story

Example 1: Keoi5 jau2 tok3 dzy5 go3 tau4 aa. Nei5 gok3dak7 keoi5 hai6 mei3 hou2 *faan*4 gam2 aa?
He is also holding his head. Don't you think he looks very *bothered*?

Example 2: D bat7 dou3 hou2 lyun3 ak. Gam2 keoi5 hai6 mei3 hou2 *faan4* aa? Dzing2 dou3 lyun3 tsai3 hai6 mei3 aa?
The pens are also a mess. And so he's *bothered* right? He made a mess, right?

DISCUSSION

The main goal of this study was to examine socialization of emotions in Chinese American immigrant parents of bilingual bicultural preschool children who are exposed to Cantonese (L1) at home since birth, and then learn English (L2) at school. We used a combination of a Chinese parent questionnaire (broad measure) and parents' Cantonese language samples (narrow measure) to gather more holistic information about parents' socialization of emotions in the home environment. The parent questionnaire and language samples were quantitatively and qualitatively analyzed. There were three main findings from the analyses. First, the Chinese parent questionnaire revealed that the parents in our study did not talk about guilt emotions with their children as often as they do with other emotions. Second, results from Cantonese language samples showed that the parents in our study used each type of negative emotion word with similar frequency in a storytelling context. Lastly, qualitative analysis of the parent questionnaire and the language samples revealed patterns in the ways parents report and use emotion words with their child. Findings illustrate how the parent questionnaire and parents' language samples each offer different information that could complement one another to provide a more comprehensive understanding about parents' emotion talk. These findings will be discussed in greater detail below.

Chinese American Immigrant Parents' Socialization of Guilt Emotions

Different types of guilt emotion words in the Chinese language and the value of guilt emotions in maintaining appropriate social functioning and behaviors contribute to socialization of guilt emotions in Chinese society and culture (e.g., Bedford, 2004; Wong and Tsai, 2007; Yik, 2010). Preliminary evidence from Chinese parents showed that parents engage in frequent interactions about self-conscious emotions like shame early in their child's development (i.e., Fung, 1999). Accordingly, it can be expected that the parents in our study, who immigrated from China and use Chinese as their dominant language, would also use many guilt emotion words and discuss guilt frequently with their child. However, the current study did not find such pattern in parents of bilingual bicultural Chinese-English children. In contrast, data from the Chinese parent questionnaire showed that guilt did not correlate with any of the other emotion words, indicating that parents do not talk about guilt as frequently as they do with other emotion words. Moreover, data on the emotion word checklist showed that parents reported using very few guilt words with their child compared to the other emotion words. There are several possible explanations for our findings.

First, our interpretation of the results is based on a narrow list of guilt emotion words in the parent questionnaire. The emotion checklist included ten guilt emotion words, which is a limited range of words for parents to choose from. It is possible that there are many more guilt emotion words that parents may use with their child, but they were not listed on the checklist or parents did not recall them to add to the checklist (also see Limitations and Future Directions). Moreover, although some of the negative emotion words on the checklist may have been related to guilt processes, they were categorized under other emotion categories. For example, the words *soeng1sam1* (broken hearted) or *faan4* (annoyed/bothered) were categorized under the Sad and Angry categories on the emotion checklist, respectively. This may be a potential reason for the paucity of guilt words that parents reported. Future studies could consider implementing an emotion checklist that includes guilt and guilt-related words. Additionally, our parents are Chinese American

immigrants living in America, while previous studies examined guilt and shame emotion words in Taiwanese adults and parents living in Taiwan (i.e., Fung, 1999; Bedford, 2004). Future studies are needed to examine a wider range of guilt emotion words in Chinese American immigrant families.

Another likely explanation is that guilt is part of the self-conscious emotion's family, which is considered a distinct category of emotions that may be learned and experienced differently compared to basic emotions (e.g., Happy, Sad, Angry) (Leary, 2004). Guilt requires a concept of the self to evaluate that one has failed to meet the appropriate or moral standards within a society (Lagattuta and Thompson, 2007; Wong and Tsai, 2007). Since guilt is a self-conscious emotion, it is harder to label in others compared to basic emotions, and so parents may have fewer opportunities to use it with their child. Moreover, the questionnaire only asks parents to recall the past 2 weeks. Parents may not have had many opportunities to explain and label guilt emotion words with their child in the past 2 weeks compared to the other basic emotion words.

Lastly, a distinctive feature of guilt is that it develops later than basic emotions (Tracy and Robins, 2004). Our findings provide only a snapshot of parents' socialization of guilt emotions in early child development. This pattern is likely to change as children get older and develop greater self-concept. Indeed, a study by Ferguson et al. (1991), examining children between seven to 12 years old, found that younger children's understanding of guilt relies on others' reactions more than older children. The children in our study are even younger (i.e., preschool age) and may not have developed the self-awareness and self-evaluation skills yet to fully understand guilt emotions. In turn, it is possible that parents may be more likely to discuss guilt emotions with their children later when they have developed these skills and it is developmentally appropriate. Future studies should examine parents use of guilt emotion words across a much broader age range. Additionally, although parents may not be using many guilt emotion words at this early stage of development, it is possible that parents may be using other types of emotion words that could still inform children about guilt without using guilt emotion words. Future studies should examine parents use of emotion-related words that describe actions related to guilt (e.g., stealing, cheating, lying) and emotion-laden words that evoke a guilty feeling (e.g., jail, failure, punishment) (Pavlenko, 2008).

Parents' Use of Negative Emotion Words in a Story Context

Our study also examined parents' socialization of different types of negative emotion words that were used in the Cantonese language samples. Each wordless picture book intended to elicit different types of negative emotion words: (1) "Alexander and the Terrible, Horrible, No Good, Very Bad Day" elicited anger, frustration, and annoyance; (2) "There's a Witch Under the Stairs" elicited fear and worry, and (3) "Llama, Llama Misses Mama" elicited sadness and nervousness. We sought to understand whether parents used one type of negative emotion word more often than the others within its story context. Anger is considered disruptive to maintaining group harmony and interpersonal relationships, and so Chinese parents are likely to explain anger more to help their child self-regulate (Wang, 2003; Fivush and Wang, 2005). Therefore, we expected that in the "Alexander and the Terrible, Horrible, No Good, Very Bad Day" book, parents would use more emotion words, emotion explanations, and different emotion words compared to the other books, especially since the main character's bad mood affected others in the story too. In contrast with findings in previous studies (e.g., Fivush and Wang, 2005), parents in this study used emotion words similarly across all three books, even though each elicited different types of negative emotions. The parents in our study are Chinese American immigrants raising bilingual bicultural children in the United States, which is different from previous studies (e.g., Fivush and Wang, 2005) that examined Chinese parents living in and raising their children in China. Chinese immigrant parents are adapting to the host culture and learning English (acculturation) while maintaining the home language and culture (enculturation) (e.g., Tao et al., 2013). Our parents may be orienting to both American and Chinese cultures as they socialize emotions with their children, and this may involve other factors in the home such as English and Cantonese language use, family members, and storytelling activities.

Another possible explanation is that parents may be more likely to use those emotion words similarly with their child when presented with the story contexts and visuals for different negative emotions. Previous work showed that emotion words were less likely to evoke a mental image and access contextual information compared to concrete words (e.g., animal, balloon) (Altarriba et al., 1999; Altarriba and Bauer, 2004), suggesting that parents may have fewer opportunities to use emotion words. Indeed, Fivush and Wang (2005) simply asked parents to recall an emotional event and discuss it with their child, which may be challenging for parents to use emotion words when there are no visuals or structured context to support them. Our study, however, presented a storytelling context along with images to facilitate parents' use of emotion words. Our findings highlight the need to examine the ways in which negative emotion words are embedded in different contexts and the acculturation and enculturation of Chinese American immigrants, which may contribute to how parents socialize emotions with their child.

Complementary Use of a Chinese Parent Questionnaire and Cantonese Language Samples

Another important question in this study is what do the similarities and differences between the parent questionnaire (broad measure) and the parent language samples (narrow measure) tell us about how parents use Cantonese emotion words with their children. Qualitative analysis of the individual emotion words across these two measures yielded interesting patterns in the ways parents report and use emotion words. The words that parents consistently reported and used were basic emotion words including *hoi1sam1* (happy), *m4hoi1sam1* (not happy, sad), *nau1* (angry), and *ging1* (scared). A characteristic feature of basic emotions is that they have clearly identifiable and distinguishable facial expressions (i.e., Ekman, 1992, 1993), and so parents

accurately identified these facial expressions in the images and correctly labeled them while telling the story to their child. In contrast, there were many more emotion words that parents did not report and did not use in the storytelling tasks. Emotion differentiation refers to the ability to perceive and distinguish a full range of emotions and label these emotions using discreet words to describe different levels of intensity (e.g., Barrett, 2004, 2006). It is possible that our parents may have low emotional differentiation, or a limited range of words to describe emotions, and so they use the same words to describe a few emotional states with their child. A more likely explanation is that the children in our study are only preschool age (3–5 years), and so parents may be using only a few basic Cantonese emotion words that they would expect their child to understand at this age. Although there is normed data on the comprehension and production of these English equivalent emotion words in monolingual English-speaking children (i.e., Ridgeway et al., 1985; Baron-Cohen et al., 2010) and monolingual Chinese-speaking children (i.e., Li and Yu, 2015), we do not know the development of emotion words in children who learn both Cantonese and English. More research examining the emotion words that bilingual bicultural children are exposed to in the home may contribute to our understanding of emotion language development in this population.

Findings also showed that parents underestimate and overestimate using certain emotion words with their child, and this may depend on the contextual availability. Parents often used the word *faan4* (annoyed/bothered) in the "Alexander and the Terrible, Horrible, No Good, Very Bad Day" book, but they underreported this word on the questionnaire. Consistent with previous literature (e.g., Altarriba et al., 1999; Altarriba and Bauer, 2004), parents may not easily access the contextual information for emotion words, and so they may underestimate using some words on the questionnaire but may still use these emotion words when the contextual information is available to them. Interestingly, parents also overestimated using certain emotion words on the questionnaire and did not use them in the storytelling task. For example, *soeng1sam1* which means "broken hearted" is a high arousal, negative emotion words that would only be appropriate to use in highly specific contexts such as a passing of a family member or the ending of a long-term relationship. The images in the books and the storylines may not lend itself to elicit these kinds of high arousal specific emotion words. It is possible, however, that parents may still use these kinds of emotion words in the home environment if they have experienced these kinds of events in the past.

Limitations and Future Directions

There are several limitations to this study. A major limitation of this study is that we have a small sample size ($n = 16$). We cover a small and relatively homogenous group of Chinese American parents and bilingual bicultural children, and so this may not be representative of the entire population. While the findings in this study shed light on Chinese American immigrant parents' socialization of emotions, we need to be cautious when interpreting the findings. Future studies should look at large sample sizes to see if these results still hold.

A second limitation is the emotion word checklist in the Chinese parent questionnaire. The emotion words on the checklist were selected based on previous monolingual English and Chinese norms (i.e., Ridgeway et al., 1985; Baron-Cohen et al., 2010; Li and Yu, 2015), and they may not cover all the emotion words that Cantonese-English bilingual children know. In particular, the guilt emotion category on the checklist represents a narrow list of words that parents may use. There may be other emotion words that are related to guilt but were categorized under a different emotion category on the checklist. Future studies should consider examining other emotion words that are related to guilt for a more comprehensive understanding about how parents discuss guilt with their child in the home.

Additionally, our results that Chinese American parents may not talk about guilt emotion words as frequently as the other basic emotion words should be interpreted with caution. We only examined the relationship between parents and their child, which provides a limited perspective on parents' socialization of guilt emotions. Socialization of emotions involves telling stories around the child and with the child, modeling behaviors, interacting with other adults, conveying beliefs and ways of thinking and feeling, and through this process children begin to internalize emotion norms and expectations (e.g., Miller et al., 2012; Wang, 2013). Since guilt is highly valued in Chinese culture (e.g., Bedford, 2004; Wong and Tsai, 2007; Yik, 2010), it is possible that children may be exposed to guilt emotions through indirect means from other social interactions between parents or other adult family members with the child as a bystander. Future studies should examine other aspects of socialization beyond direct parent-child interactions, including conversations between parents and other family members in the home, to fully understand socialization of guilt in bilingual children in the home context.

A third limitation is that only parents completed the questionnaire which may provide one perspective of the child's exposure to emotion language in the home environment. Since many of the families in our study lived with their grandparents or additional family members, future studies could have other family members complete the questionnaire. This could potentially reveal whether grandparents use different emotion words with the child compared to the parents. Additionally, given that acculturation and enculturation contribute to parents' orientation to American and Chinese culture, future work should add a question about the parents' length of stay in the United States on the questionnaire.

Lastly, the emotion-elicited storytelling tasks only capture a snapshot of parents' use of emotion words from three books, and so we should be careful to generalize these findings. The storytelling task in our study provided a limited and structured context for parents to use different emotion words. Previous studies asked parents to recall an emotional event and discuss the memories with their children (i.e., Fivush and Wang, 2005), which may capture parents use of emotion words in a more open-ended context. Future studies should examine parents' use of emotion words across different tasks (e.g., storytelling, day-long recordings, memory recall, etc.) to capture more

accurately which types of emotion words parents use more often and in which contexts.

CONCLUSION AND IMPLICATIONS

The main goal of this study was to examine Chinese American immigrant parents' socialization of emotions in sequential bilingual children who are exposed to Cantonese (L1) at home and learn English (L2) at school. The second goal was to explore the use of both a Chinese parent questionnaire and parents' Cantonese language samples to gather more holistic information about parents' emotion talk in bilingual bicultural children's home environment. Results from the Chinese parent questionnaire revealed that the parents in our study did not talk about guilt emotions with their children as often as they do with other emotions. These results were surprising given what we know from the literature that guilt has an important role in social functioning in the Chinese culture, and that Chinese parents talk about self-conscious emotions like shame as early as 2.5 years of age (e.g., Fung, 1999; Bedford, 2004; Wong and Tsai, 2007; Yik, 2010). However, guilt emotions require a concept of the self that may not be developed at this age, and so parents may be less likely to use guilt emotion words at this time. Results from the Cantonese language samples showed that parents in our study used each type of negative emotion word with similar frequency in a story context. Again, these results were surprising since previous work showed that Chinese parents living in China discuss angry emotions more often to help their children self-regulate and maintain social harmony (Wang, 2003; Fivush and Wang, 2005). However, the parents in our study are Chinese American immigrants who are raising bilingual bicultural children in the United States, and so our parents' orientation and adaptation to both Chinese and American cultures may influence how they socialize emotions with their children.

Qualitative analysis of the parent questionnaire and the language samples revealed patterns in the ways parents report and use emotion words with their child. Parents consistently reported and used basic emotion words (happy, sad, angry, scared), possibly because basic emotions have an identifiable and distinguishable facial expression. However, there were many emotion words that parents neither reported nor used, which is likely because our children are young and there is a relatively small range of emotion words that parents would use with their child. Findings also showed that parents underestimate and overestimate using certain emotion words with their child, and this may depend on the contextual availability. Taken together, our findings illustrate how the combined use of the parent questionnaire and parents' language samples each offer different information that could complement one another to provide a more comprehensive understanding about parents' use of emotion words.

Although our findings are preliminary, our study raises awareness that Chinese American immigrant parents have unique and interdependent dual cultural experiences which may influence how they socialize emotions in the home with their bilingual bicultural child. A common assumption is that immigrant parents may adopt more Western practices the longer they live in the host culture; however, it may not be that straightforward. Chinese American immigrant parents may continue to preserve traditional Chinese values and socialize their child accordingly while immersed in the mainstream American culture (e.g., Wang, 2013). Immigrant parents' socialization practices are embedded in both Western and Chinese social contexts and may be influenced by cultural changes in each over time. The findings in our study raise more questions about parents' acculturation and enculturation processes and the dynamic nature of culture in shaping children's emotion language learning. It is important to note that immigrant parents' socialization of emotions can help bilingual bicultural children learn emotions in their home language, while they are also learning emotions in English, thereby increasing their opportunities to communicate emotions in more social contexts and maintain a positive social-emotional well-being.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by University of Colorado Boulder, Institutional Review Board. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

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SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyg.2021.642417/full#supplementary-material

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Entering Into the Story: Implications for Emergent Literacy

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In this article we explore the ways in which three young children from a non-mainstream cultural group created stories with the assistance of their caregivers and siblings in the social contexts of their homes. We assert that these children's oral narrations show us important dimensions of early experience with decontextualized content as practiced in their families that may offer suggestions for analysis of culturally sensitive experiences with literacy for all children. The dimensions we highlight are the *tangibility* of the elements around which the story is created, the *interlocutor support* children receive for beginning and continuing their stories, and the interaction between the storytelling process and the child's *self-interest*. These three dimensions illustrate how children "enter" into stories and storytelling and broaden our understanding for fostering culturally sustaining pedagogy within schools.

Keywords: oral narrative, emergent literacy, diverse families, language socialization, culturally sustaining pedagogy, early childhood, home-school transition

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INTRODUCTION

When she was 5 years old, the daughter of the authors went on a sign-writing spree. Signs appeared on her bedroom walls and door saying, "Please do not come in my room unless I say," and announcing that "Christmas is in 14 weeks" and "Halloween is in 6 weeks." She pointed to them with pride, referred to them frequently, and used literacy to communicate her own affective concerns to others. She did not choose to author her own stories in the model of Babar, Dr. Seuss, Madeline, or any of her many other beloved picture books. Rather, she routinely chose to use literacy as a tool to reflect her socioemotional world (including upcoming holidays, and importantly, an 11-year-old brother who had recently posted a sign on his bedroom door forbidding entrance to all 5-year-old females). Enabled through her past and present experiences with literacy, *and* by her emerging knowledge of the social world, she constantly experimented with bringing literacy into her everyday life by framing her self-interests as written words and posting them on the walls.

Public education has as its fundamental purpose teaching all children to read and write. For years, teachers and publishers have promoted books and traditional book reading events as the primary means for provoking children's interest in reading and writing and have encouraged parents to read to their children (e.g., Dickinson and Smith, 1994; Sénéchal et al., 1996; Whitehurst and Lonigan, 1998). However, Heath (1982), Philips (1983), Meier (2000), and Genishi and Dyson (2009) have pointed out the disconnections that exist for some groups of children, including, but not limited to, misunderstandings of the content of traditional emergent literacy practices and of the interactions within which classroom sharing time or book reading experiences occur (Michaels, 1981; Hicks, 1991).

As the opening example demonstrates, children from every cultural or socioeconomic background have their own self-interests that intersect with the societally promoted goal of having every school child learn to read and write. Unfortunately, these self-interests may not always parallel the instruction provided them in traditional school models. To remedy this discrepancy, we propose that it may be more productive to explore and build on what is *already* happening in the homes of children who come from diverse backgrounds. By adopting this stance, children's home experiences can be examined to inform us of the multiple pathways that children may follow toward the eventual goal of learning to read and write. This stance is more pragmatic than using a deficit paradigm approach (Connor and Craig, 2006), which assumes children are behind from the beginning.

We do not seek to dismiss the views of scholars such as Delpit (1988), who has argued that minoritized children should be taught the language of power in order to take full advantage of the social capital accrued by such instruction. Indeed, they should. Rather, we aim to suggest that *all* children should learn about other cultures and practices in *significant* classroom experiences that *engage* those practices (cf. Paris and Alim, 2014) in ways that perpetuate and foster cultural pluralism (Paris, 2012). When we observe how *all* children interact with language within the context of their family life, we may begin to take advantage of a larger array of "teachable moments" than would be available if we concentrated solely on one activity of reading books or the practices of one social group.

Nevertheless, we are sensitive to the vast array of cultural backgrounds represented by children within our schools. The diversity of experiences and practices brought to school by children necessitates the sort of "bottom-up" approach anticipated by the culturally sustaining pedagogy proposed by Paris and Alim (2014), an approach that recognizes and honors each child's abilities in turn. This more inclusive view requires us to understand the journey to literacy not as a single route but rather as a variety of pathways toward a shared destination. To navigate these pathways, we suggest looking not at landmarks that might be present on some roads but not on others (for example, early coaching of decoding skills or picture book reading), but rather at the universal motivations that are at the heart of each learner's desire to begin the journey. To identify these motivations, we begin with personal storytelling which occurs very broadly across cultures (Schieffelin, 1990) and may be a cultural universal (Miller, 1994). In addition, personal storytelling is also understood by researchers as a practice that has been shown to predict emergent literacy (Feagans and Haskins, 1986; Curenton, 2006; Gardner-Neblett and Iruka, 2015).

The goal of having all children learn to read and write is the destination on the map of primary schooling; emergent literacy methods are the means of getting to the destination. For example, it is understood that phonological awareness, print recognition, and use of decontextualized language are key points along the journey (Snow et al., 1998; Curenton and Justice, 2004; Poe et al., 2004; Rowe, 2019). Although there is no one starting point of the journey toward emergent literacy, it is generally assumed to begin within the child's language acquisition processes that occur within the context of family interaction (Roberts et al., 2005). To that end, although there are many objective features of language prerequisite to literacy, each of these features is learned in a very subjective social world. Wang et al. (2021) described how studying language as a social practice can make the linguistic strengths of children in minoritized communities visible, a point echoing the work of Miller who has consistently demonstrated that the narrative skills low-income children bring to the classroom may outstrip those of their middle-income counterparts (Miller et al., 2005; Miller and Sperry, 2012).

Children spend most of their young lives in the presence of their everyday caregivers and are immersed in the conversation that occurs there. Some of this conversation is about displaced events, which can be classified as either narrative or expository, and for that reason it is plausible to begin understanding the acquisition of literacy by the examination of narrativelike displaced-event talk. Narrative (as opposed to expository) displaced-event talk is probably the more common phenomenon within family conversations (Labov and Waletzky, 1967; Polanyi, 1989; Bruner, 1990). Children as young as 2 years of age engage in narrativelike displaced-event talk (Miller and Sperry, 1988; Sperry and Sperry, 1996).

Furthermore, personal storytelling has been linked to emergent literacy outcomes (Feagans and Haskins, 1986; Snow and Dickinson, 1990; Curenton, 2006; Gardner-Neblett and Iruka, 2015), largely through its role as a significant venue for the use and understanding of decontextualized language which predicts academic achievement (Rowe, 2012). The practice of storytelling capitalizes on children's ability to define their own experiences and stories, an entry point to their understanding of narrative development and their eventual emergent literacy (cf. Dyson, 1997; Genishi and Dyson, 2009). Adair (2014) discussed the importance of fostering childhood agency in the classroom to allow them the "time, space, and opportunities to experiment and discover" (p. 232). One potential opportunity for the synthesis of emergent literacy practices and childhood agency is offered by the study and use of various storytelling practices within the homes of diverse families.

In sum, we emphasize young children's oral language about topics displaced from the here and now because of its universality and because of its natural affinity with decontextualized language. Furthermore, it permits us a culturally focused view on the home language practices children bring to the classroom. Therefore, displaced-event narrative provides the potential for a useful resource for the construction of culturally sustaining classroom practices.

As we search for ways within early literacy instruction to connect it to our understanding of children as unique individuals, who come from particular cultural backgrounds and who exist at certain developmental levels, we must develop an awareness of children's everyday experiences and the ways in which they author "texts" everyday (Dyson, 1997, 2003). This awareness is of keen importance for it places the focus of our investigation on the child's lived experiences and not on our conceptualizations of storytelling practices. This focus is needed due to the likelihood of a home–school mismatch (Genishi and Dyson, 2009; Miller and Sperry, 2012) between literacy practices in the home and

expectations in the classroom for many poor children and children of color. For example, in the Abecedarian project in North Carolina, African American preschoolers told longer and more interesting stories than European Americanpreschoolers within their homes and communities, but they did not experience any benefit from that prowess in terms of emergent literacy outcomes measured within schooling contexts (Feagans and Haskins, 1986). This and other paradoxical results (e.g., Corsaro et al., 2002; Dyson and Smitherman, 2009) call us to question the extent to which the various storytelling practices within the homes of non-mainstream children coalesce with the prevailing norms of the classrooms that children attend. We assert that literacy acquisition will best occur around content that is intrinsically interesting to the child, and, that to the extent that early narrative is related to literacy development, the most frequent topics of narrative will provide the best lens through which to view this development.

We have been immersed in the language use and practices of one cultural group of African American families from the rural South in the United States since our early work describing the narrative practices within their homes (Sperry and Sperry, 1995, 1996, 2000). However, rather than focus on the uniqueness of these practices (that may or may not reflect current practices), we use the data to help illuminate storytelling that marks the child's agency and self-interest in the stories, and that may therefore provide a look into common features that comprise the narrations of all children as they enter the classroom, regardless of their cultural background. To accomplish this goal, we identified three narratives in which the caregivers followed the lead of the children. Accordingly, the stories represented the children's own interests, which was additionally confirmed by the large number of child-initiated morphemes and overall length of the displaced event-centered talk. Through our reiterative microanalysis of three fantasy narrations, three avenues of approach to the culturally constituted ways these children entered into their stories emerged: *tangibility* of reference, the *interlocutor support* the child receives while the story is told, and the evocation of *self-interest* as the teller invests in the narrative. While we only address the instantiation of these ways within one particular group of African American families living in the rural South of the United States, it is our hope that these analytical categories will provide a tool that will be useful for entering into the storytelling practices of children from other cultural backgrounds (cf. Ballenger, 1999).

Tangibility

Oral and written narratives are similar in that both refer to displaced events which have some quality of tangibility. For example, several studies have shown the efficacy of using specific experiences with picture books or informational books to help children create more complex stories (Pappas, 1993; Benson, 1997; Geist and Aldridge, 1999; Torr, 1999; Bavin, 2000). In a similar manner, the shared conversational practices within the cultural universal of personal storytelling (Miller, 1994) often consist of frequent caregiver contributions to jog the memories of very young children or to assist them in constructing the story in a culturally appropriate manner.

Some narrations use tangible props on occasion; for example, pretend play oral narratives specifically occur in the context of objects and agents who are transformed into other identities. Children's ability to construct imaginary events and to participate in pretend play appears to be enabled by the physical artifacts present in their immediate environment—a broomstick "becomes" a horse; a box "becomes" a car (Vygotsky, 1976). In this way, the difficulty of maintaining completely imagined representations seems to be made easier by the presence of tangible objects in the immediate context. In that manner, tangibility might also be provided by other physical elements in the child's environment such as a video or drawing, a storybook, a song or spoken poem, a familiar "story" often retold within the family, in combination with the gestures and stances of persons within the situated space (Goodwin, 2000). Any or all of these sources may be important in anchoring a narrative.

The topic of the narrative does not have to be anchored in the real world to achieve a sense of tangibility, however. Sperry and Sperry (2000) discussed how fantasy elements within the stories told by their African American participants may provide a type of zone of proximal development (Vygotsky, 1978) where caregivers granted young children wide latitude in talking about events that were understood by the caregivers to be impossible in the real world. In this manner, necessary elements of storytelling could be encouraged without requiring that each detail of the story be spatiotemporally accurate (a requirement that was strictly enforced within this community for stories of personal experience). In our following examination of the fantasy stories of three children from this community—Sebrina, Kendrick, and Stillman—we pay close attention to both the tangibility of the events as well as any physical elements involved in the social situation that help or hinder the children in their attempts to string together events to form a cohesive narrative.

Interlocutor Support

Both oral narrative and literacy events occur in real time within social settings. Storytelling is linked to emergent literacy via social interactions (Anderson et al., 1997). Beals and Snow (2002) looked at low-income families from the Boston area. They compared narratives told during family dinner time with narratives elicited by home visitors. The children were much more successful when narratives emerged organically from dinner time conversation as opposed to elicited conversations. Berman (1995) also found that Hebrew children ranging between ages 3 and 8 years search for collaborative conversations. Two-year-old children do not always tell stories to other kids, but they tell stories to adults because adults provide the prompts to start and continue the stories (Kuentay and Ervin-Tripp, 1997).

Family members provide support along with the models for how to tell a story (Mardell, 1996). Children learn from their mothers how to talk and what to talk about during joint conversational experiences (Miller and Sperry, 1987; Hudson, 1990). The way mothers interact with children corresponds to the children's current level of narrative skills (Wang, 2000; Minami, 2001; Cleveland and Reese, 2005). In a study of 10 children in Senegal, it was found that children's access to dialogue routines that precede storytelling relies on assistance from adults and older

siblings (Rabain-Jamin, 2001). Researchers agree that the 2-year-old child is unlikely to be able to fill in enough information for the story to exist as a narrated event in the absence of a knowledgeable interlocutor who participates with the child in the narration (Miller and Sperry, 1988; Nelson(ed.), 1989).

In sum, narrative making is a culturally constituted practice, imbued with the values, beliefs, and customs of the co-participants (Miller and Goodnow, 1995). Narrative practices are virtually inaccessible to incidental analysis due to their deep grounding in early, constant interaction between caregivers and children as they accomplish the "concrete routines of social life" (Schieffelin, 1990, p. 19, cf. Bourdieu, 1977). As such, any culturally sustaining pedagogy will demand significant effort in mining the richness of narrative practices each child brings to the classroom. With this in mind, we consider in this analysis how children, as individuals, manage their participation in producing their story, and how they manage their participation in the social event surrounding the story itself.

Self-Interest

Third, both oral narrative and literacy events tend to flourish in the presence of self-interest (Paley, 1990). Given that the children whose stories are analyzed in this study are very young (approximately 2½ years old), their ability to construct a story is mediated by the participation of siblings and adults. In each case, the child constructed a fantasy in the company of a female caregiver (mother or aunt), a same-sex sibling, and the female researcher. However, in the construction, there is variability in the control they exert in maintaining their version of events in the story. McCabe (1998) recorded accounts of her child's spontaneous productions. She concluded that although children needed others to create longer, more complex stories, her encouragement to continue or start a story only worked when it was what the child wanted. McCabe, like Paley (1990), suggested that stories are the manner in which children control and cope successfully with the reality of their lives.

Children need to control their creations because they must operate within the conventions that they have mastered (Crago, 1993); spontaneous creations require that children believe in their own solutions. Dyson (1991) studied eight students between kindergarten and third grade and found developmental differences in how much children controlled their imaginary stories and written worlds. Talk is needed as a tool in literacy development to cultivate imaginations. Often, we find ourselves trying to pry into children's stories and fantasies by saying, "Tell me more," or "What happened next?" However, children often start, stop, and extend the stories only if it is their own idea to do so. Children's invented stories are transformative and are a means of discovering the sense children make of their experiences (Fox, 1998).

In sum, we hypothesized that three elements—tangible reference, interlocutor support, and self-interest—are paramount in how children participate in and learn about oral narrative. Furthermore, to the extent that oral narrative predicts literacy outcomes (Feagans and Haskins, 1986; Snow and Dickinson, 1990; Rowe, 2012; Gardner-Neblett and Iruka, 2015), these elements may provide useful tools to examine and compare the narrative productions of both mainstream and non-mainstream children with the goal of fostering culturally sustaining pedagogical practices (Paris and Alim, 2014). We suggest that these three elements likely form the foundation of all children's stories, and therefore may provide an analytical prism to examine how all children "enter their stories" (cf. Ballenger, 1999). In studying the literacy development of Haitian preschoolers, Ballenger noticed that the children she worked with were eager to connect aspects of the stories she read to them to their own lives. During times when she read to the children, often the story reading had to be abandoned due to the children's excited elaborations on their own tangential connections to items or events in the stories—and then to each other's experiences. She referred to this intense identification with elements in the stories as "entering the story." Specifically, entering the story seems related to the motivation for children to do the hard work necessary to develop emergent literacy skills.

Young children might enter a story of others through inventing their own stories, pretending, or singing. At the same time, in older children, the ability to enter into the story likely becomes an intrinsic motivation for choosing reading as an activity (Ballenger, 1999). It is also likely that children learn about story structure as they imitate and elaborate different aspects of stories: protagonists and antagonists, features of the setting, certain kinds of problems, successful resolutions. When young children enter into stories of their own making, they are able to gain important practice in using the basic elements of a story that surely relates to the motivation children will later use to conquer the difficulty of decoding in order to read stories in school.

It is our intent to offer rich descriptions of three different fantasy narratives that three children told in conjunction with their family members that embody all three elements we describe: the tangibility of the new stories as referents which recall previously experienced personal narratives; the interlocutor support family members provide children as they co-construct stories; and most importantly, the self-interest demonstrated by these children as they connect with the characters and events of the stories.

MATERIALS AND METHODS

Research Setting

The community where these stories were collected was a geographically isolated, rurally dispersed community in the Black Belt region of the Deep South. The county within which the rural community was located was among the five poorest counties in one of the five poorest states in the United States. Historically, the data were collected between 1988 and 1990 (Sperry, 1991). The stories from this corpus have been analyzed numerous times (Sperry and Sperry, 1996, 2000; Miller et al., 2000, 2005; Miller and Sperry, 2012). While acknowledging that cultures are continually evolving, we suggest that, given our desire to consider analytical frameworks broad enough to offer insight into how all children enter into their stories, reiterative analysis of these narrations provides a useful resource for new insights for fostering culturally sustaining pedagogy (cf. Erickson, 2018). In

this suggestion, we maintain a tradition of other longitudinal corpora studies within child language and anthropological research with respect to the validity of archived data for current analysis (e.g., Vidich and Lyman, 1994; Hart and Risley, 1995; MacWhinney, 2000; Zeitlyn, 2000; Erickson, 2018; Sperry et al., 2019). This tradition acknowledges the time- and labor-intensive nature of ethnographic data collection, transcription, and the rigorous description of community practices it affords.

Participants

The participants were 14 African American families with 2-year-old children. All the families lived in the rural community. The socioeconomic status of the families varied, but the range itself was truncated. Some of the families were living in housing projects situated within small villages; some lived in houses and trailers on small farms carved out of the pine woods. The families also varied in terms of their household structure. The housing project families were all single mothers with their young children. The trailer families tended to be single mothers with children plus one or more young-adult relatives. The families who lived in houses tended to be associated with grandparents who were owners of the houses and who maintained an extended-family household that included their daughters and grandchildren. Only two of the 14 families were nuclear family households. Three of the families were biologically related to one another, but most of the families were socially acquainted with each other through the community.

Research Design and Procedures

The design of this study was descriptive in purpose, ethnographic in approach, and longitudinal in terms of data collection. The researcher established herself as being interested in how young children learn to talk. Visits to each family's home were made every 2 months as close as possible to the child's birthday anniversary. The camera was always directed at the target child, and the camera and tripod were moved to accompany the child unless the child entered private areas of the house. Approximately half of the data collection occurred outdoors. Data collection was maintained until the child turned 3½ years old.

For this analysis, we followed common procedures in qualitative methodology (Strauss and Corbin, 1990; Janesick, 1994). First, we decided on the research question: how might we approach oral storytelling within this community in a manner that is true to the unique cultural practices within the community while potentially remaining true to storytelling practices common to children from other communities? In other words, might we devise an analytical framework that allows us to understand the stories of diverse children in order to capitalize upon this understanding within a culturally sustaining pedagogy?

Verbatim transcripts of half-hour segments from 70 observations (approximately 6 per child) were coded for displaced-event episodes consisting of at least one event not in the here and now stated by the child and one other on-topic utterance by the child. Episodes were then categorized as exhibiting fictional or temporal displacement, resulting in nine different genres. The three largest genres within the corpus were fantasy narrations (22% of all narrations), past narrations (23% of all narrations), and pretend narrations (28% of all narrations). We discriminated fantasy from pretend play based on the improbability of the narrated events in fantasy ever taking place in actuality. In other words, fantasies were constructed solely from mental and verbal resources (c.f. Shatz, 1984). By contrast, pretend episodes were defined as involving direct transformations of household items, toys, or people.

We chose fantasy narrations for analysis for several reasons. Fantasy episodes were initiated more often by children, they tended to be longer in length, and they contained more unique child contributions than the other genres of narrative (Sperry and Sperry, 1996). In this community, they provided fertile ground for socialization of self (Sperry and Sperry, 1995) and gender (Sperry and Sperry, 1996). Finally, they may have provided an important zone of proximal development for the development of narrative skills in general (Sperry and Sperry, 2000).

The requirements for selecting the specific three cases revolved around axes of similarity (Stake, 2008), including similarity of genre (all three were fantasies), similarity of social setting (all three involved more than one family member), similarity in age of children (all three are between 2½ and 3 years of age), and similarity in elaborated narrative (all three involved multiple turns by the child). The fantasy narrations selected for analysis in this study were quite representative of other fantasy narrations in the corpus. For example, these narrations shared thematic and performative similarity with the remainder of the corpus, the majority of which were produced in a playful stance. Typically these narrations related events about deliciously scary fictional characters, some common across multiple American cultural groups (the bogey man), some adopted from current media (Freddy Krueger), some variations of common animals or familiar people, and some made up on the spur of the moment and given unique, phonetically compelling names (e.g., Nicoudini, Scordini). For this analysis, we immersed ourselves in the stories and examined them holistically with attention to the sociocultural contexts of narration. At each stage, design decisions regarding the research questions, literature review, and data analysis were adapted through constant comparison and triangulation procedures until the interpretations were credible in terms of the participants' lived experiences.

In presenting the talk of the children, their caregivers, and the researcher, we have organized the transcript into stanzas, defined as lines representing a topic, image, perspective, or theme (Gee, 1999). These stanzas are notated numerically, and each line—an idea unit recognizable through the stress placed on a particular word or phrase—is notated alphabetically. Speakers are indicated by one or two letters enclosed in parentheses. The contribution of the child to the stanza is indicated in bold font. Although we standardized phonology, we retained the words participants used and the order of those words in the utterances to honor the African American Vernacular dialect spoken by the families.

RESULTS

Sebrina and the Bogeyman

Sebrina (age 2 years, 8 months) was playing outside in front of the small house she called home with her 4-year-old sister Kay, her adult Aunt Sharon (who was visiting from her home nearby), and the researcher, Linda. It was Christmas time, and, as Sebrina fixed her doll's hair and dressed the doll, conversation lazily drifted across many topics appropriate to the season.

Aunt Sharon began to pose questions to Sebrina concerning Santa Claus's impending visit with his reindeer. Eventually, Aunt Sharon mentioned a large deer which had entered the family's yard earlier that day. Aunt Sharon interrupted her account of the deer to coax Sebrina to sing, "Rudolph, the Red-Nosed Reindeer," a song that was a favorite in the community daycare that Sebrina attended sporadically. Sebrina appeared reluctant, and Aunt Sharon warned:

1a (Sh) Oh, you ain't gonna sing. Santa Claus looking at you. See, that's why Santa Claus's deer came up in the yard to see what you was doing today.
1b (S) **No he didn't**. (hands behind her head, smiling)

After Sebrina's response to this fantasy scenario, Aunt Sharon continued to describe the deer's enormous size and their pet dog's reaction to it. This incident prompted Aunt Sharon to regale everyone with another story of a baby fawn that she and her brother had raised. At one point in the story, Aunt Sharon described how the baby deer would playfully butt various family members with its head. At last, Aunt Sharon related how the deer would interact with other visitors and commented that the deer "wasn't afraid of nobody." Glancing up at her aunt, Sebrina said:

2a (S) **I scared that boogie.** (Smiling) **I scared that boogie.**
2b (Sh) You did? And what did he do?
2c (K teasing) Eat her up.
2d (S) (Nodding) **Eat her up.**
2e (Sh) You scared that boogie bear away. Tell Kay. Didn't you run him down the road?
2f (S) **Yeah.**

Aunt Sharon continued trying to elicit a story, but Sebrina answered only yes or no through several sets of conversational turns. However, Sebrina's sister Kay then asked:

3a (K) Huh, Aunt Sharon, what that was, was in that well?
3b (S) **Boo—**
3c (Sh) That was the bogeyman. Ask Sebrina what it was. I ain't got to tell you. Ask Sebrina.
3d (K) What it was?
3e (S) (Looking at K) **It was in that tree.**
3f (K) It was in that tree?
3g (S) **He gonna get you.**
3h (Sh) Sebrina, tell her what the bogeyman do to you when he gets you. He takes bad little girls. What does he do? He takes them away.
3i (S nods)
3j (Sh) He won't bring 'em back home either, will he? (Pretending to be the bogeyman) "Oo-oh."

At this point, Sebrina seemed willing to participate in the emerging fantasy narrative about the bogeyman, as did her sister Kay who, feigning fear, said:

4a (K) What, what, okay, is that him? That him? That's him.
4b (S) (Standing up) **That boogie was right here. Standing right there**.
4c (K) That him? I heard something say, "Oo-oh." (Looking around nervously) What was that?
4d (S) (Looking at Kay) **Bogeyman.**
4e (Sh) You heard Sebrina. She's telling you what it was. He was out there scratching on her window one night trying to get in and get Sebrina, wasn't he, Sebrina?
4f (S) (looking around) **He wanted to get in Mama' door.**

At this point in the interchange, Sebrina seemed to become confused, and after a few more turns between Kay and Aunt Sharon, the fantasy topic was dropped.

Commentary

Tangibility

The story-telling event took place outside Sebrina's home, one of three small houses that faced a dirt courtyard in which some toys were scattered. Although these toys were a potential source for the creation of a story, in the social situation described above, Sebrina developed novel events about the bogeyman without the use of any physical artifacts.

In the preceding minutes before this episode, there was mention of the "bogeyman that was around the house the other day." Aunt Sharon led Sebrina through a version of this story. However, in the first telling Sebrina never originated any portion of the story, merely repeating utterances previously stated by Aunt Sharon or Kay. In the present story Sebrina chose to return to an old topic, taking on the role of narrator. Her abrupt change of conversation back to an earlier topic may have functioned both as a way for Sebrina to encapsulate the preceding conversation and as a catalyst for her to control the ensuing narrative. Regardless, it is clear from the outset that Sebrina was employing remembered elements within the new story. These elements recalled at times fictional and at times actual events; nevertheless, at the moment of Sebrina's entry into the conversation as narrator, the elements had no tangible support apart from the conversational context. Instead, her return to the previously told story, and her aunt's encouragement of this return, demonstrated one way in which her new contributions were scaffolded (Sperry and Sperry, 2000). Allowing retellings of recent stories may enable young children to marshal discourse elements as they practice narratives they could not have begun or completed on their own.

Interlocutor Support

After Sebrina initiated the exchange with Aunt Sharon by saying, "I scared that boogie" (2a), Aunt Sharon quickly intervened with questions that may have assisted Sebrina in developing her story. Perhaps because of the fragility of the story that Sebrina began

to construct, Aunt Sharon at times seemed to take control of the story to keep it going. However, in doing so, Aunt Sharon accomplished three tasks that scaffolded Sebrina's construction of the story. First, she modeled the kind of questions that older (3 to 5-year-old) children might ask in seeking to clarify important elements of stories that they hear. Second, the questions posed by Aunt Sharon in turn might have helped Sebrina bring complicating elements into her story—Aunt Sharon asked, "You did? And what did he do?" (2b). Third, by asking these questions, Aunt Sharon proposed directions of development for Sebrina's initial story ("You scared that boogie bear away. Tell Kay. Didn't you run him down the road?" 2e).

Indeed, Kay, who is 1 year older than Sebrina, also asked questions to define the situation surrounding the story. Through her questions, Kay provided Sebrina with an opportunity to take back control of her bogeyman story. With each of Kay's comments, Sebrina added another detail to the actions of the bogeyman—"It was in that tree" (3e), "He gonna get you" (3g), "That boogie was right here. Standing right there" (4b). Even while Kay directed most of her questions and comments toward Aunt Sharon, Sebrina brought the bogeyman closer and still closer to Kay until Aunt Sharon intervened again. In examining this interaction, Sebrina seemed to gain a sense of agency through recognizing her ability to affect how Kay interacted with her socially. This social interaction was both subtext and context for the story that Sebrina created.

Nevertheless, the most important interpersonal transactions in this episode occurred across all three participants. Sebrina's episode presented the listener with an extremely complex interlocking of scaffolding by Aunt Sharon and Kay. On the one hand, both Aunt Sharon and Kay scaffolded the output of Sebrina. However, Aunt Sharon concurrently scaffolded the efforts of Kay as she attempted on the one hand to assist Sebrina's contributions, and on the other hand to participate in the ongoing narration herself. At times, these complex scaffolding attempts crowded Sebrina out of the narrative construction, and her contributions to the narration seemed to be derailed. For example, early in the narrative, Kay interrupted Aunt Sharon's effort to add a complicating element to the narrative ("And what did he do?" 2b) by her teasing comment, "Eat her up" (2c). Although Sebrina confirmed Kay's remark in line 2d, Aunt Sharon effectively refuted Kay's comment by asserting that Sebrina should tell Kay that she had, ". . . run him down the road" (2e). Nevertheless, the outcome of this elaborate interchange was effectively to derail Sebrina's participation in the narrative momentarily as she appeared to become overwhelmed by the efforts of her aunt and sister and opted not to take sides in their ongoing competition to move the narrative along.

By contrast, Kay's participation at times bolstered Sebrina's efforts. Later in the episode, Aunt Sharon attempted to add interest to the story by pretending to be the bogeyman, making scary sounds. Kay immediately joined in the ruse, allying briefly with Aunt Sharon, as she turned to Sebrina to query, "Okay, is that him?" (4a). Her support of the play was made complete when she further stated, "That him" (4c), while feigning fear. This emotional support seemed all Sebrina needed in this case to pick up the narrative thread as she answered, "That boogie was right here. Standing right there" (4b).

It was not only the conversation of 4-year-old Kay that seemed to thwart Sebrina's storytelling occasionally. At times, Aunt Sharon's attempts at co-construction of the narrative threatened to silence Sebrina when her comments became excessively scary. For example, in the conversational turns immediately preceding the above interaction, the narrative almost came to a standstill when Aunt Sharon dwelled excessively on the fact that the bogeyman takes bad little girls away and will not bring them home (3h, 3j). This moment in the narrative truly brought to the foreground the importance of Kay's conspiratorial interaction with Sebrina.

Self-Interest

Sebrina suddenly became part of this story when Aunt Sharon intervened to alter the direction of the story—"He was out there scratching on her window one night trying to get in and get Sebrina, wasn't he, Sebrina?" (4e). In placing the bogeyman near to Sebrina, Aunt Sharon introduced a problem situation, to which Sebrina countered, "He wanted to get in Mama' door" (4f). By moving the bogeyman away from her window, Sebrina, in a sense, found a way to resolve the problem in this story. Even at 2 years of age, Sebrina was beginning to participate, with the help of others, in shaping stories. Although the number of Sebrina's responses was small, Sebrina accomplished multiple tasks in the exchange—she responded successfully to her aunt, and she interacted in novel ways with her sister. In this manner, she demonstrated her agency in the narrative process as she successfully initiated and retold her story about the bogeyman.

Kendrick and the Abominable Snowman

Kendrick (2 years, 8 months old) and his brother Rodrick (almost 4 years old) were watching a video of the classic Christmas cartoon, "Rudolph, the Red-Nosed Reindeer." In this episode, the video provided a wellspring from which flowed many oral narratives based on both past and fantasy events. For example, in the moments preceding the narrative presented here, the children's mother, after seeing a bird's nest on the video, related a story about an egg the boys had found the previous summer after it had fallen from its nest.

At one point, Kendrick moved toward the television set just as the Abominable Snowman reappeared on screen.

5a (M) Uh-oh. You better get back to your seat, fella.
5b (R) (Laughing as Kendrick runs back to the bench where he is sitting) He scared.
5c (K) (Shaking his head in denial) **Uh-oh. I got-. Him not gonna bite me.**
5d (M) Huh?
5e (R) (Laughing) He scar-, he scared Ken.
5f (M) Yeah.
5g (K) **I gon' pop that big head.**
5h (R) (Laughing).
5i (M) You gonna pop it? What you gonna pop it with?
5j (K) (Nodding in agreement) **On that big head.**

The Abominable Snowman disappeared from the screen. Watching intently for a while, Rodrick, and then Kendrick responded, **"Uh-oh."**

6a (M) Oh, where did he go?
6b (K) (Pointing at the TV) **What that monster? Him come out the yard?**
6c (M) Hm-mm, from behind a mountain.

At this point in the cartoon, the Snowman lumbered forward. Kendrick and Rodrick, watching intently, winced and screamed.

7a (R) What he trying to do?
7b (M) What's that in his mouth?
7c (K) **In that monst-? In that monster? In that monster? Oh, in that monster teeth?**
7d (M) Yeah, he got some teeth. You want him to bite you?
7e (K) (Shaking his head no) **In him mouth?"**
7f (M) Mm-hm.
7g (K) **And some food.**

Rodrick continued commenting on the story action taking place on the television.

8a (R) Uh-oh. Look. Watch him fall down in that water. Watch! (screaming).
8b (K) (Looking at his mother) **Watch that monster.**
8c (M) Hm?
8d (L) Where'd he go?
8e (K) **Uh-oh. He gonna get down and touch you.**
8f (M) (Laughs) That-.
8g (K) **He trying to get that man.**
8h (M) Mm-hm.
8i (R) He lying in snow.
8j (K) (Turning to look at R) **No. I gonna pop that in the head.**
8k (R) (Looking at K) Who?
8l (K) **That monster.**
8m (M) But what-. Kendrick, what you gonna pop it with?"
8n (K) **That bone.**
8o (M) Huh?
8p (K) **Mm, that toy.**
8q (M) You're gonna hit him with your toys?"
8r (K) (Shakes head "no")
8s (R) (Sitting up on arm of the sofa) Pop him!
8t (K) **Pop it. I gonna pop that monst-. I'm gonna pop that monster.** (Shaking head) **That monster not going away.**
8u (L) Hm-mm (agreeing with Kendrick who looks at L).
8v (R) That monster going down in that water and then he went back up.
8w (K) **What that monster?**

In 8u and 8v, the researcher and Rodrick constructed an explanation of the story line to help Kendrick understand what has happened.

9a **(K) I see it and pop it.**
9b (M) You gonna pop it?
9c **(K) I'm [g]on'.**

The boys and their mother continued talking while the story reached its denouement with the Abominable Snowman being pushed off the cliff.

10a (K) **I ain't gonna cry 'bout that monster.**
10b (M) You aren't?
10c (K) (Shaking head). **I gonna pop that monster real fast. I gonna run over that monster. I gonna get my toys.**

Commentary

Tangibility

Like Sebrina's aunt, Kendrick's mother participated in helping him to construct the story. However, unlike Sebrina, Kendrick had a tangible element around which his story was built—a television program playing on the screen. A sudden reappearance on the program of a monster redirected Kendrick's attention to the television, and his mother brought Kendrick into the story by coaching appropriate behavior ("Uh-oh. You better get back to your seat, fella" 5a). From that moment, Kendrick's attention and his words revolved both around what he was seeing on the program and around his mother's questions. For example, when his mother asked what is in the monster's mouth, Kendrick clarified by asking, "Oh, in that monster teeth?. . . In him mouth?" (7c, 7e). Paradoxically, it seems that the strong tangibility of the story also constrained Kendrick's ability to take control of it. It is not until the researcher asked Kendrick, "Where'd he go?" (8d) that Kendrick began to direct explicitly the action of the story ("He gonna get down and touch you . . . He trying to get that man" 8e, 8g). Until that point, Kendrick's main response to the threatening Snowman was that he's "gon' pop that big head" (5g, cf. 8j).

Interlocutor Support

At first glance, the interlocutor support provided within this episode seemed intertwined with the tangibility of the television show playing in the background. Kendrick's mother was preoccupied with making comments relevant to the television show that simultaneously directed his attention to elements of traditional story structure. For example, Mother commented on information pertinent to the setting with statements such as, "Oh, where did he go?" (6a); she commented on information pertinent to the conflict posed by this antagonist with statements such as, "What's that in his mouth?" (7b). Although Mother was asking questions about a fictional story, her concentration on elements derived from synchronous temporal activity was wholly consistent with a preference demonstrated by most mothers within the larger sample of this community from which these episodes are drawn. Mothers in general addressed over three times as many elicitations for temporal as for fictional information across the entire sample (Sperry, 1991). This determination to "get the facts straight" represented an important cultural value overall to these mothers while indexing significant aspects of narrative structure.

Kendrick's mother, however, deftly followed his conversational attempts to enter into the narrative. Shortly after the episode began, Kendrick remarked, "Him not gonna bite me" (5c), a belief certainly grounded in his willingness to return to the bench at

his mother's direction. Immediately after this remark, his brother teased, "He scar', he scared Ken" (5e, cf. 5b). Possibly in response to this tease, Kendrick commented, "I gon' pop that big head" (5g). Mother selectively chose this act of agency on the part of Kendrick to assist him in the development of the resolution to the conflict presented by the monster. She immediately asked, "What you gonna pop it with?" (5i). After not receiving a satisfactory answer (and a temporary diversion by action on the television), Mother returned to this question toward the end of the episode. At this point, Kendrick suggested possibilities for the tool to carry out his action—first a bone (8n), and then a toy (8p) which appeared on the television.

In contrast to Aunt Sharon, Kendrick's mother exerted more direct control over the conversational turns within this narrativelike episode. She subtly discouraged Rodrick's interference in the conversation at times in an effort to focus attention on Kendrick (who she knew was the target participant in the study). Possibly for that reason, Kendrick's contributions to the narrative seemed less compromised by the social interaction within the current context. Nevertheless, Rodrick's occasional interjections often scaffolded the narration in unpredictable and productive ways.

Self-Interest

Even while Kendrick was emotionally invested in keeping track of the Abominable Snowman as a part of the television program, he imagined his own one-on-one encounter with the monster. And, it was by popping the monster that Kendrick displayed agency. He proposed to pop the monster from the very beginning and maintained his resolve to do this throughout the episode. By comparison with Sebrina's wavering response to the bogeyman, Kendrick's display of agency appeared immediate and unswerving. Perhaps this adopted stance was due in some part to Kendrick's assurance that his compliance with his mother's direction to "get back to your seat, fella" (5a) put him on the right side of the law. His self-interest preserved, he felt confident in his sustained participation in the narrative.

His almost 4-year-old brother and his mama encouraged his fantasy by treating his motive as reasonable, if not always his means ("You're gonna hit him with your toys?" 8q). Nevertheless, he resolved to pop the monster and held fast to the solution of popping the monster on the head throughout a 3-min-long series of conversational twists and turns. He first suggested using a bone for hitting the monster, but when that suggestion was misunderstood, he nominated his toys. His mother criticized the idea of using his toys, and from that point forward Kendrick strengthened his resolve for quick and decisive action in the face of any threat: "I see it and pop it" (9a). A few minutes later once the Snowman has gone over the cliff, he recapitulated his plan: "I gonna pop that monster real fast. I gonna run over that monster. I gonna get my toys" (10c).

Perhaps the most interesting aspect of Kendrick's story was the way that he switched from observing and asking questions about the actions of the Snowman on the television program to imagining his own interaction with the monster. After his mother questioned his decision to pop the monster with his toys, Kendrick reiterated his statement about popping the monster; in doing so, he placed himself as a protagonist in a confrontation with the Snowman. However, he also continued to make comments about what was happening on the program, and asked questions of his mother ("That monster not going away" (8t); "What that monster?" (8w). In this way, he explicitly demonstrated the interplay between the narrated event and the event of narration (Bauman, 1986).

In conclusion, one is aware from the beginning of the episode that Kendrick displayed a conversational competence that was not present in Sebrina's narrations. The question arises whether this competence emerged from greater cognitive and linguistic skills, a heightened sense of socioemotional security, or a combination of both factors. The level of security was no doubt affected cognitively by the presence of two specific representational aids to Kendrick's participation. First, the television program was available for additional information pertinent to the story being told. Second, few information processing demands were placed on Kendrick's ability to narrate (cf. Shatz, 1984). This situation contrasted sharply with a narrative constrained in part by past memories (as in Sebrina's fantasy), and in part by fictional elements which were being co-constructed by adult interlocutors into whose mental worlds the child must enter (as in Aunt Sharon's version of what bogeymen do).

Stillman and the Wolf

Stillman (3 years, 2 months) and his mother were drawing pictures on the coffee table for Granny and Auntie's walls with paper and crayons provided by the researcher. Stillman's 10-month-old baby brother, Avis, had just awakened from a nap and was sleepily sitting on the sofa. While Stillman debated about which crayon to use and what to draw, his mother, who was drawing a dog, announced:

12a (M) Ooh. This gonna be a big old wolf. Yeah, a wolf baby.
12b (S) (Interrupts his search for a crayon to stand up and look at Mom's picture)
12c (M) This one of these prehistoric wolves.
12d (S) (pointing to her paper) **There go a wolf under there.**
12e (M) Yeah, I'ma try to make your brother a wolf.
12f (L) (to Avis)You're getting a wolf, Avis?
12g (S) (in a worried tone) **Uh-uh.**
12h (L) (to Avis, and going along with Mom's intent) I know you're going to be scared. I would be.
12i (M) (handing the drawing to Stillman) Here you go. Show Linda your wolf.
12j (L) (speaking to Stillman) Lemme see it. Oo-oh, I'm scared of that wolf. Are you scared of him?
12k (S) **Huh?**
12l (L) Look at those big teeth he has. See those big teeth that wolf has?
12m (S) (studying the drawing) **Wolf [is a] dog.**

At this point, Linda suggested drawing bars around the wolf to put it in a cage, presumably to contain its ferocity. Mom drew bars for a cage as she discussed locking it up, which prompted Stillman to ask:

13a (S) **Why?**
13b (M) Why we put the wolf in a cage? So he won't get out and get your little brother and you. When he tears the cage up, I'ma jump up and start running.
13c (S) **Huh? Ma, why? What put him in a cage for?**
13d (M) So he won't get you.
13e (S) (posturing somewhat) **Well, weh-, I ain't scared. That ain't no wolf. I ain't scared to see no wolf.**

Avis tears the drawing a bit. Stillman jumps up to stand over Avis in a somewhat threatening pose:

14a (S) (to Avis) **Wha' that!** (then Stillman sits down again)
14b (M) (holding up her drawing) That's a wolf in a cage.

Some discussion ensued about what Stillman wants to name the wolf.

15a (M) That's a wolf in a cage.
15b (S) **What wolf in a cage for?**
15c (M) What your wolf gonna be named?
15d (S) (Pointing to drawing) **Name, "Dog."**
15e (M) You're gonna name the wolf, "Dog?" (laughs) A wolf is a type of dog, isn't it?
15j (S) **I'm gon' go grab him over by Grandad, gra-grab him by the, by the tail comin back.**
15k (M) You gonna scare that man with the wolf?
15l (S) **Eh. I gonna cut that cage off.**
15m (M) You're gonna cut him out of the cage?
15n (S) **Eh. Then I bite him, gon' bite, him.**

Avis begins crinkling the paper. Mother chastises Avis gently. The crumpled paper falls to the floor out of the baby's reach. Stillman simultaneously contains his disappointment and tries to shame his brother**:**

16a (S) (to Avis) **Look! Mama made one wolf, look!** (looks down at the table, just glancing at Avis) **But Avis want it, all [of] it, and not quite big wolf.**

Stillman then lobbied to have his mother draw a new wolf for Avis, offering to get her a new piece of paper for the task.

17a (S) (to M) **I'ma get a piece.**

She ignored his request, and eventually the conversation turned to another topic.

Commentary

Tangibility

Perhaps the most salient aspect of this fantasy transaction is the wolf drawing at its center with its large sharp teeth, yellow eyes, long tail, and black cage bars. The drawing emerged from his mama's hand, and the paper containing the drawing was paper directly meant for Stillman's use. Mama drew more interest to their mutual coloring project by suggesting that the dog she began drawing was actually a big wolf. She immediately mitigated the fear she was inducing by saying it was a baby wolf; still, she then intensified it by using the low-frequency word "prehistoric." At first, the drawing was designated as a present for Avis, as Stillman's mother commented, "I'ma try to make your brother a wolf" (12e). This prospect worried Stillman who said, "Uh-uh" (12g). Meanwhile, the researcher, in the spirit of participant observation, aligned herself with mama's verbal play when she gently teased the baby, "I know you're going to be scared" (12h). When the drawing was finished, Stillman and his brother both handled the paper, and this handling served to demonstrate how the paper served both as signified and signifier throughout the episode. While the talk of fear and the eventual drawing of bars around the animal prompted the participants to spin a free-flowing discussion of the wolf, Stillman was immediately brought back to the tangible fragility of the paper when his infant brother crumpled the drawing to Stillman's dismay: "Wha' that!" (14a). Finally, when Avis has crumpled the drawing, Stillman demonstrated his mastery over the purely symbolic nature of the paper by simply saying he will go get another piece of paper (17a).

Interlocutor Support

An equally critical feature of the episode was the dialectical nature of Stillman's participation. From the outset, Stillman did not want to accept his mother's interpretation of the events. His unwillingness had two components, emotional and social. Stillman reacted to his mother's initial change of the emotionally pleasant dog to a more challenging drawing of a wolf by interrupting his drawing to join her (12b). He appeared at ease with his mother's change of the situation until the researcher referenced her fear of the wolf, asking Stillman if he was afraid of it, too (12j). Stillman refuted the threat posited by the researcher with his doubtful, "Huh?" (12k). Then he contradicted the researcher by stating that the wolf is actually a dog (12m).

To mollify the scene, the researcher suggested that Mom put bars around the wolf. Unfortunately, this change to the drawing appeared to induce an effect opposite to that intended. At this point, Stillman resignedly plopped on the sofa next to his mother, and plaintively asked, "Ma, why?" in two separate conversational turns (13a, 13c). At last, Stillman resolved his fear by denying he was afraid coupled with an assertion that the picture ". . . ain't no wolf" (13e). His denial was complete when his mother subsequently asked what he will name the wolf and he re-stated, "Name, 'Dog"' (15d). His mother confirmed his statement and reduced, whether inadvertently or deliberately, the level of threat posed by the wolf. Once Stillman's version of the topic was accepted, his original contributions to the narrative increased.

His mama's final alteration—adding the cage bars—set the stage for the majority of Stillman's talk in the episode. He questioned why his mama drew bars over the wolf in three separate queries (13a, 13c, 15b). His questions offered his mother the chance to structure a plausible fantasy event sequence: "Why we put the wolf in a cage? So he won't get out and get your little brother and you. When he tears the cage up, I'ma jump up and start running" (13b).

Despite his mother's proffered narrative sequence, the specific fantasy events that Stillman initiated were unique and novel. They were not modeled in the researcher's conversation, in the drawing, or in his mother's speech. However, each action he invented was tied to one of the visual features of the wolf drawing: the tail (15j), the cage (15l), and the teeth (15n). Stillman

used the visual references to weave a story line with himself as the protagonist–hero. Like Sebrina and Kendrick, at 3 years of age, Stillman was already well on his way toward being an accomplished oral narrator.

Self-Interest

Stillman's sense of agency extended beyond the events of the fantasy to the social circumstances surrounding the narration. From the beginning of the episode, he responded with concern to his mother's stated intention, "Yeah, I'ma try to make your brother a wolf" (12e). At first Stillman verbally expressed his opposition to her intention to give Avis the wolf picture: "Uh-uh" (12g). Although too young to lay claim to the drawing, the baby reached for the paper and when he tore a corner of it, his brother reacted with immediate alarm: "Wha' that!" (14a), he cried as he jumped up to stand over the baby. Although the immediate threat of losing the drawing had passed, when the baby reached again for the paper, Stillman first tried to distract him, "Look! Mama made one wolf, look!" (16a). Then he appeared to console himself about the inevitable loss: "But Avis want it, all [of] it, and not quite big wolf" (16a). Stillman made one last pitch to his mother to draw a new wolf. When she failed to respond, the entire wolf topic was finally dropped.

Like Sebrina, who enacted the bogeyman at one point, Stillman enjoyed the idea of the wolf his mama created. As Sebrina's aunt and Kendrick's mother both did, Stillman's mother entered the family into the fantasy (13b). With his narrated fantasy events, Stillman explicitly entered himself into the story: "I'm gon' go grab him" (15j), "I gonna cut that cage off" (15l), "then I bite him" (15n). Unlike Sebrina, however, who appeared to become frightened when her aunt suggests that the bogeyman "... was out there scratching on her window one night trying to get in and get Sebrina, wasn't he, Sebrina?" (4e), Stillman employed a tried and true solution of denial. He pronounced bravely, "Well, weh-, I ain't scared. That ain't no wolf. I ain't scared to see no wolf" (13e).

DISCUSSION

What can we learn from Kendrick, Sebrina, Stillman and all children who come from backgrounds where "traditional" book reading practices may not be a part of everyday life? In looking across the three situations we have highlighted here, several issues are apparent.

First, oral narrative blossomed around tangible entities in the young child's environment. These entities may be objects themselves, a situation that may be more analogous to pretend play than to the sorts of narrations we described here. However, the stories given above suggest that the tangibility of objects in the environment was often in a state of flux depending upon how the objects were used by the narration participants, and as such, elements of the imagination served to promote qualitatively different types of scaffolding within the narration (Sperry and Sperry, 2000). Although no physical artifacts were present in Sebrina's story, the well-rehearsed events and characters themselves took on a near-tangible nature. However, when the imagined began to merge with the narration of actual events, Sebrina appeared to become overwhelmed by the potential tangibility of the bogeyman. In the stories of both Kendrick and Stillman, tangible referents do exist for the antagonists in the narrations, but the nature of these referents embodied salient differences, which impacted their usage by the children. The television story in Kendrick's environment did not change with the whims of the narrative participants. Nevertheless, the cultural practice of encouraging fantasy narrations allowed Kendrick to place himself in the story without disturbing the fixed nature of its narrative. In contrast, Stillman's co-narrators were freely changing the tangible referent in his story: first, the dog became a wolf, and then the wolf was put behind the bars of a cage. Finally, the referent itself was destroyed by his baby brother when Avis crumpled the paper. Stillman's emotions vis-à-vis the referent likewise flowed freely as the tangible piece of paper changed throughout the episode.

Second, the participation of others (adults or children) in assisting children in telling their stories was a significant factor present across the three examples. To varying degrees, each adult took the role of question–asker, and attempted to help the child build on the story that was co-created, and it was this participation (along with the participation of siblings) that shaped how each child chose to construct their story. In Sebrina's case, Aunt Sharon's comments about the Bogeyman trying to get in Sebrina's window drew Sebrina in as a character in her own story. When Kendrick's mother questioned him about what he will use to pop the monster, this helped Kendrick to produce several possibilities. And, without the action of Stillman's mother drawing a wolf, Stillman would not have produced a story revolving around his ability to defeat the wolf.

As the participation of adults in the story shaped what Sebrina, Kendrick, and Stillman created, the presence and participation of their siblings sustained the storytelling event. In each case, the sibling's interaction with the child promoted expansion and longevity of the narrative conversation. This was perhaps most clearly apparent in Sebrina's story when Aunt Sharon enacted the bogeyman, drawing both girls into the conversation. This was also clear in Kendrick's case; his brother Rodrick helped Kendrick to enter the story when Rodrick first acted afraid of the monster. By maintaining attention to the events of the cartoon and commenting on these events, Rodrick perhaps encouraged Kendrick to maintain his attention to the program as well. And the presence of Stillman's baby brother surely made plausible Stillman's preoccupation with securing both the drawing and his mother's attention for himself.

The participation of others forces the child to deal with multiple perspectives, another characteristic of successful reading comprehension. Sebrina was alarmed when her Aunt Sharon suggested that the bogeyman scratched on her window one night. She had to act fast, in this case to counter that "he wanted to get in Mama' door." Kendrick was kept in the story by the involved participation of his mother and brother, and after multiple requests from both participants to say what object he would use to pop the monster, his brother helped him out by refocusing on the importance of just popping it. Stillman, more than the other two preschoolers, was forced to deal with others

adjusting the story line counter to his wishes. He safely named the wolf, "Dog," when others insisted it was a wolf. He had to defend the drawing from his baby brother's attempts to crinkle the paper. He struggled to defend his position that the wolf was a harmless dog, and finally succumbed to others' insistence that the wolf was a menace by grabbing its tail, cutting the cage off, biting it, and neutralizing it. This practice with adjusting to others' perspectives is surely helpful for learning to identify the multiple motives of story characters (Pellegrini et al., 1995).

Finally, in each case, the self-interest of the child moved directly to the foreground of the narratives analyzed. It should not be surprising that the toddlers wanted to talk about themselves. What is compelling about the narratives analyzed here is the particular direction that the self-interest of the child took in each case. All three narratives developed around themes of threats that needed to be conquered, and all three children in their own ways took on the threat in their specific situations. Sebrina, once she finally acknowledged the threat of the bogeyman, sought refuge from the threat by becoming part of the storytelling fabric itself, avoiding direct participation in the events of the story. One might say that she placed her bets in a safe alliance as co-narrator, effectively moving herself away from the scene of the action. On the other hand, Kendrick placed himself squarely within the confines of the story's action, establishing himself as the lone knight who would conquer the Abominable Snowman. Despite his mother's and brother's attempts to impugn his ability, he persisted with his plans to "pop" that monster. Lastly, Stillman represented an interesting counterpoint to the above two examples. His self-interest was threatened at the level of both the story event and the storytelling event; both the wolf and his brother Avis challenged Stillman's position of security. In the end, Stillman handled both evildoers with aplomb. On the one hand, he eliminated the threat within the story posed by the wolf when he announced, "I ain't scared to see no wolf." On the other hand, he dismissed the threat to the storytelling posed by Avis's damage to the paper drawing by non-chalantly asserting, "I'ma get a piece [of paper]."

In sum, all the episodes analyzed featured the toddler accepting a threatening situation as an obstacle around which to form goal-directed behavior. While in each case the resolution of the conflict took subtly different forms, it must be noted that each child had already mastered the basic structure of successful narration: the identification of a conflict, the establishment of goal-directed behavior to resolve the conflict, and the purposeful movement toward the realization of that goal.

In the end, we argue that the support provided by these three elements—tangibility, interlocutor support, and self-interest—provided both the cause and the means for these children to "enter" into the story. Furthermore, we assert that these three elements provide a generic point of reference with which narrative productions of young children from other cultural groups might be analyzed. Experiences in the classroom that provide for variable student control over each of these dimensions may successfully stimulate interest and effort. Whitehurst and Lonigan (1998) distinguished between outside–in and inside–out skills. This dichotomy proves useful in ascertaining the parameters of approaching literacy from a culturally sustaining perspective. The oral narrative dimensions we describe here—tangibility, interlocutor support, and self-interest—connect most directly to outside–in skills. With the supported proffered by these dimensions, all three children were able to muster the information necessary to develop an oral narrative storyline, an inside–out skill. In a similar manner, it is not hard to imagine that these same outside-in dimensions might ease the burden of learning the inside-out skills of letter, word, and sentence decoding.

Connections Between Home and Classroom

The participation of adults, the significant social interactions with other children, and the relative spontaneity and creativity involved in becoming part of one's own story make us think seriously about how the cases above may be important for practicing teachers to examine as they engage in a culturally sustaining pedagogy (Paris and Alim, 2014). These elements are already aspects of every classroom—can we bring them to bear even more explicitly on the emerging literacy of young children?

The answer, of course, is yes. First, tangibility can be varied along a continuum from video or film sequences and storybooks where characters, settings, and events are spelled out straightforwardly to posters and photographs to drawings created by children themselves. However, based on the cases presented in this essay, we propose that tangibility needs to be defined foremost from the perspective of the child. The typical mainstream school answer to whether or not a story can be changed is typically a resounding "No"; this attitude carries into the classroom as mainstream teachers interact in sometimes unfortunate ways with diverse children (Michaels, 1981; Genishi and Dyson, 2009; Corsaro and Rosier, 2019). The mainstream literate world seems to demand a "literal" interpretation. Literate adults view the printed page as unchangeable and the stories upon the printed page as unvarying. Furthermore, we aggressively socialize young children into this belief system. For example, we place high value on the accurate construction of oral narratives of personal experience, correcting small variations in sequence of events or insisting that all elements of the narration be truthful. In school book reading circles, we often encourage children to read stiffly in order to say each word accurately rather than encouraging children to read fluidly with errors. In storytime at bedtime, we support children's preferences to read the same story over and over again, reinforcing each time that there is one correct version of a particular tale. None of these examples represents a situation without merit toward attaining the goal of personal literacy. However, one reason why fantasy reference is more often child-initiated and child-sustained than past reference in the talk of these African American toddlers is because their families place such a high truth value on past talk, which [taking great care that their children do not become "storyliars" (Sperry, 1991)] acts to suppress young children's efforts (Sperry and Sperry, 1996). Obviously, care and concern for the method of progression from a verbal to a written world must be taken. The printed word is often an unforgiving taskmaster. Yet, the cases presented here highlight the potential natural connection

between the decontextualized world of personal oral narration and literacy, a connection that may be used beneficially within the school context.

Second, interlocutor support can be deliberately varied from highly structured interactions to innovative interactions, probably with the assistance of peers (Dyson, 1997). For beginning narrators, the interaction should probably be social. However, despite the social nature of each of these narratives, each child performed several functions in their telling, freely assuming the role of co-narrator and sharing the shifting authorship and perspective as the story progressed. We were reminded of Goffman's (1980) production formats. In his seminal description of footing, Goffman described the various positionalities a speaker may take when delivering a message (animator, author, and principal).

The children in this report were never simply the animator (sounding box) of their stories; neither were they ever solely the author as might be expected in a typical fictional account. In each of these three stories, the children inhabited various roles as they either retold or corresponded with their co-narrators. This complexity of performance stands in stark contrast to the monologic nature of the traditional elementary school sharing time where the espoused goal is for the child to serve as animator of a story fixed in time and reality. In addition, it cannot be assumed that the particular production format typified within these stories is shared cross-culturally. The interplay between diverse young narrators, socialized into different styles of production formats, and their mainstream teachers may be at the root of many discursive misunderstandings in the classroom. This possibility needs additional attention.

Finally, children's self-interest as demonstrated by their affective pull toward the material in their stories must be allowed to flourish. In giving young children varied opportunities to experience creativity with their stories as well as the stories of diverse others, it is inevitable that individual children will have social interactions with others that will expand their repertoire of possible story settings, complications, and resolutions. Adair (2014) defined agency in the classroom as "the ability to influence what and how something is learned in order to expand capabilities." In general, the fostering of agency in the classroom allows children to bring to school their own funds of knowledge (Gonzáles et al., 2005). Agency in language learning allows children the "time, space, and opportunities to experiment and discover" the various language resources around them (Adair, 2014, p. 232). When children are allowed to make use of these resources, they are repositioned as experts in what they already know (Comber, 2016), which in turn grants them license to take chances in learning something they do not. It is not as if these resources are not in abundance in the modern classroom. Dyson (2016) presented multiple vignettes of the ways children from diverse cultural backgrounds negotiate the making of their own stories in the classroom, at times meeting with success and at times not. We hope that providing strengths-based terminology for emergent literacy, such as the importance for young learners of self-interest, tangibility, and interlocutor support, might help teachers frame their approach accordingly (Michaels, 1981; Genishi and Dyson, 2009; Miller and Sperry, 2012; Corsaro and Rosier, 2019). It is critical to avoid classroom situations where diversity goes unacknowledged which, in the process, runs the risk of relegating literacy for all students from the crowning achievement of the American educational system to a problem to be fixed (Miller and Sahni, 2016).

CONCLUSION

When our son was 5½ years old, we moved to a new home several miles from the university where we both worked. The fastest route to and from work often took father and son past two institutions: a federal penitentiary and a home for troubled adolescents. Both facilities were situated on relatively large campuses and were quite imposing, intriguing to our son, and they called forth many questions. While attempting to find age-appropriate answers to his son's many questions, the father often found himself resorting to making very general statements about the "bad" reasons that might explain why the residents of these facilities were currently housed within their walls without going into too much detail about the structural violence that permeates our society and contributes to incarceration.

One day, the son responded particularly anxiously to his father's admonition about avoiding some particular "bad" behavior. The father will long remember the tearful anxiety of his son, however, as he sorted out the fact that the son thought that if he were "bad" he would have to reside in one of these institutions. Finally, the father, at an inept loss for words (while nevertheless finally realizing his responsibility for this scene), told his young son that while what was under discussion was indeed "bad," his action was not "bad-bad" like those of the residents of the neighboring institutions.

This scene of personal family lore is recounted here to make a point that we consider essential to the analysis within this paper. Despite our best attempts to analyze the syntactic or semantic elements of a narrative, or by extension the phonetic or whole-language approaches to literacy acquisition, they will all miss their mark unless we attend seriously to the unique ways in which an individual child enters into and alters the story itself. It is for this reason that we propose that the construct of entering into the narrative is essential for understanding how children learn to impart meaning through their own narratives as well as derive meaning from those of others, and it is absolutely essential to a culturally sustaining pedagogy.

Bourdieu has offered us the perfect explanation for why the mismatch between home and school practices can hinder the language and literacy development of non-mainstream children. When one habitus collides with another, as in the case of non-mainstream children encountering mainstream educational practices, each habitus seeks self-preservation of a sort, a condition Bourdieu (1977) likened to *hysteresis*, the tendency of any system to depend upon its history to manage the present moment. For this reason, the non-mainstream child and the mainstream educator must carefully negotiate their interactions to avoid the nature of the habitus to sustain and perpetuate itself.

Fortunately, both child and educator often bring to the situation a mutually aligned disposition, namely the

complementary desires to be educated and to educate. Corsaro and Rosier (2019) and Phelps and Sperry (2021) described how the African American mothers in their studies actively primed their children to prepare for school in material and emotional ways according to their understanding of the schooling context, stressing both the practical and moral value of academic pursuits. Melzi et al. (2020) demonstrated the willingness and desirability Latine families possess to engage in supplemental educational practices and school participation, and that these dispositions significantly impacted their children's emerging narrative skills.

Unfortunately, despite best intentions, all parties involved often find it difficult to negotiate the differences between mainstream and non-mainstream dispositions. For example, the priming events described by Corsaro and Rosier (2019) backfired despite the well-meaning intentions of Head Start teachers of color preparing their students for mainstream elementary school. The Head Start teachers focused on the interactional styles they saw as hampering their students based on their interpretations of the rigors of elementary school. Therefore, they insisted on single, correct answers to ambiguous problems that the children were often solving equally correctly with creative analysis of the problem itself. Furthermore, children's answers were deemed wrong when they were not expressed in complete sentences, a foregrounded requirement that obscured the meaning-making potential of the children's responses. In sum, their desire to prepare their students for the foreignness of the mainstream classroom created uncertainty and anxiety in their students that, in turn, silenced the children as they became increasingly unwilling to volunteer answers.

What strikes us is that these educators were well-acquainted with the manifest practices of mainstream schooling, but not with latent dispositions underlying these practices. Without the understanding of the "why" behind a practice, they focused on rigorous adherence to a classroom practice in the future. Similarly, teachers in the mainstream setting, unaware of the dispositions of children of color, are subject to hysteresis, taking for granted the dispositions of their own socialization. This process is also consistent with Bourdieu (1977) who suggested that the longest held dispositions are the most likely to be resistant to change.

We argue it is important that teachers learn to recognize when children begin experimenting with connections between the factual world and the fictional world through entering the stories of their own and others' making. We further argue that this recognition may be especially critical to facilitating the literacy development of students who come from backgrounds outside of mainstream culture. Within recent years, researchers have made a greater effort to understand what goes on in home and then bring that knowledge to the practice of teachers (Gonzáles et al., 2005). However, work on early literacy that *begins* in the homes of young children remains largely unaccomplished. Exposure to and analysis of stories such as these told by Kendrick, Sebrina, and Stillman bring forth the value of ethnographies of literacy that might be developmental in scope and pedagogical in focus. This analysis is only a small starting point; much work needs to be done to understand how children from other diverse backgrounds may employ the elements of tangibility, interlocutor support, and self-interest within their stories. Furthermore, the difficult work involved in engaging such an understanding in everyday teaching practices and curricula remains to be done. Nevertheless, to the extent that we "hear" the stories of these and other young children, we will become more effective in teaching them to read the stories of others and, eventually, to write their own individual stories. To the extent that we create familiar contexts of practice for all children, we will become more effective in helping children bridge the transition from listening and telling to reading and writing. In other words, we must become familiar with the lives of all children who enter our classrooms, and that familiarity comes at a price.

In this moment, there is emerging consensus that we as educators are aware of this price and are willing to pay it. But what are we buying? Are we buying simple prescriptions for parents to talk more to their children? Are we buying admonitions to surround non-mainstream children with more decontextualized talk? Unfortunately, these "fixes" remain grounded in the notion that non-mainstream practices are the problem and not the solution. We think the answer is, on the one hand, readily available, and, on the other hand, much more difficult than these current vogues for literacy advancement. Rather than finding simple "fixes" for non-mainstream children and their families, we as mainstream folks must do the work of learning about other cultures and practices in the same way as these non-mainstream actors are forced to do on a daily basis. We must immerse ourselves in the lives of others—we must enter into their story.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author/s.

ETHICS STATEMENT

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. Written informed consent to participate in the original study was secured from the participants' legal guardian/next of kin. All names are pseudonyms.

AUTHOR CONTRIBUTIONS

Both authors listed have made an equal, substantial, direct, and intellectual contribution to the work, and approved it for publication.

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Shared Multimodal Input Through Social Coordination: Infants With Monolingual and Bilingual Learning Experiences

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A growing number of children in the United States are exposed to multiple languages at home from birth. However, relatively little is known about the early process of word learning—how words are mapped to the referent in their child-centered learning experiences. The present study defined parental input operationally as the integrated and multimodal learning experiences as an infant engages with his/her parent in an interactive play session with objects. By using a head-mounted eye tracking device, we recorded visual scenes from the infant's point of view, along with the parent's social input with respect to gaze, labeling, and actions of object handling. Fifty-one infants and toddlers (aged 6–18 months) from an English monolingual or a diverse bilingual household were recruited to observe the early multimodal learning experiences in an object play session. Despite that monolingual parents spoke more and labeled more frequently relative to bilingual parents, infants from both language groups benefit from a comparable amount of socially coordinated experiences where parents name the object while the object is looked at by the infant. Also, a sequential path analysis reveals multiple social coordinated pathways that facilitate infant object looking. Specifically, young children's attention to the referent objects is directly influenced by parent's object handling. These findings point to the new approach to early language input and how multimodal learning experiences are coordinated socially for young children growing up with monolingual and bilingual learning contexts.

Keywords: head-mounted eye tracker, object play, bilingual culture, infant attention, multimodal input

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INTRODUCTION

Approximately one in four children in the United States is growing up in a multilingual learning context, where the child is exposed to multiple languages at home from birth (U.S. Census Bureau, 2015). Such a language background is often considered as one's individual characteristic (e.g., monolingual vs. bilingual) and linked to developmental consequences. The differential outcomes between monolingual and bilingual children have been documented across a variety of domains, including language outcomes (Allman, 2005; Hammer et al., 2007; Bialystok et al., 2010; Thordardottir, 2011; Hoff and Core, 2013; De Houwer et al., 2014, 2018; Hoff et al., 2014),

cognitive outcomes (Carlson and Meltzoff, 2008; Kovács and Mehler, 2009a; Bialystok and Craik, 2010; Hernández et al., 2010; Brito and Barr, 2014; Bialystok, 2015; Arredondo et al., 2017; D'Souza et al., 2020), and academic outcomes (Lindholm and Aclan, 1991; Kovelman et al., 2008; Rodríguez et al., 2014; Spitzer, 2016; Festman and Schwieter, 2019). Furthermore, the bilingual literature often focuses on children who are mature enough to demonstrate their use of multiple languages. While this research reveals a clear impact of learning multiple languages, we still do not know the origin of the observed differences—how hearing and learning multiple languages initially may differ from hearing and learning only one language.

Recent studies indicate that the impacts of infants being exposed to multiple languages emerge as early as 6 months of age (Kovács and Mehler, 2009a,b; Brito and Barr, 2014; Singh et al., 2015; Comishen et al., 2019; Arredondo et al., 2022). To separate and discriminate languages, infants who are simultaneously learning dual language from birth have shown advances in phonetic sensitivities and initiated differences in speech perception and word recognition skills (Werker and Byers-Heinlein, 2008; Werker et al., 2009; Sebastián-Gallés et al., 2012; Singh et al., 2018; Höhle et al., 2020; Kalashnikova and Carreiras, 2022). Other observational studies also provide detailed characteristics of *linguistic input* in early childhood and reveal the variations in the language learning context with respect to the amount of exposure in each language, the similarity between two languages, the speech type, parent's language proficiency, and so forth (De Houwer, 2007; Thordardottir, 2011; Ramírez-Esparza et al., 2014, 2017; De Houwer et al., 2018; Carbajal and Peperkamp, 2020; Orena et al., 2020).

However, the existing work has been limited to describing children's verbal input without characterizing the interactive learning experiences from the child's perspective. Language learning depends not only on the amount of verbal exposure in a specific language environment; acquiring a new word requires the child to pay attention to what the parent is referring to. Despite the prevalence of early dual-language exposure at home and its potential broad impacts on developmental milestones, surprisingly little research has been conducted on the foundations of bilingual language learning, *viz., the language learning processes* that an infant may face many uncertain referents when hearing a word that she/he does not yet know. The present study aims to characterize the child-centered perceptual experiences of how the heard words are linked to their visual perception in parent–child social interactions to fully capture the child-centered learning experiences.

As a first step toward understanding early child language experiences, the present study focuses on moment-to-moment multimodal experiences—looking and hearing—in an interactive social environment. Using head-mounted eye-tracking camera recordings, we examine differences and similarities in *multisensory input* between infants growing up in monolingual and multilingual home contexts. We specifically examine (1) parent's social input, (2) infant's looking behaviors, and (3) the social coordination between parent and infant during an object play as a function of language learning context (monolingual vs. bilingual home environments). In addition to the documented differences in the amount of parental verbal input, we also expect that infants from both monolingual and bilingual households may experience similar or different word–referent mapping moments, which may serve as the foundation for later word learning.

Bilingual Language Development

In the domain of language development, there is an established line of work focusing on language input—how daily bilingual exposure influences linguistic experiences (De Houwer, 2007; Rowe, 2012; Cartmill et al., 2013; Ramírez-Esparza et al., 2014, 2017; Carroll, 2017; De Houwer et al., 2018). Researchers typically use language diaries to record numerous conversations across a variety of contexts (e.g., Huttenlocher et al., 2010; Place and Hoff, 2011; Rowe, 2012; Gilkerson et al., 2017; Carbajal and Peperkamp, 2020) and/or count the number of words and assess the word types, sentence complexity, and contexts in which words and sentences are used by parental questionnaires (e.g., De Houwer, 2007, 2011; Scheele et al., 2010; Byers-Heinlein, 2013; Unsworth et al., 2019).

These rigorous studies of early linguistic experiences are often conducted in the context of complex sociocultural backgrounds in which families use dual or even triple languages at home. Children who are exposed to two languages from birth have been shown to learn fewer words in the dominant language and to have different growth trajectories of receptive and expressive vocabulary than their monolingual counterparts in preschool and school ages (Bialystok et al., 2010; Poulin-Dubois et al., 2013; Hoff et al., 2014; Hoff and Ribbot, 2017). The demonstrated variability in language growth in children from diverse language learning environments have been documented with and without consideration of socioeconomic status (SES; De Houwer, 2007; Cartmill et al., 2013; MacLeod et al., 2013; Gilkerson et al., 2017; Hoff and Ribbot, 2017; Ramírez-Esparza et al., 2017; Masek et al., 2021). Moreover, some argue that bilingual learning environments are often associated with relatively limited exposure in each language (e.g., De Houwer, 2007; Thordardottir, 2011; Hoff et al., 2012) as well as less diverse and sophisticated input (e.g., Rowe, 2012; Place and Hoff, 2016; Unsworth et al., 2019).

However, understanding word acquisition requires more than characterizing the linguistic input only. Learners may come with biases and intentions as children actively engage in their social world, and thus, they distort the regularities and carve the input systematically. Recent literature indicates the importance of quality learning from the child's perspective, and these studies focus on the social coordination generated by the child and the parent together, such as object labeling while seeing the object simultaneously (e.g., Yu and Smith, 2012; Pereira et al., 2014). Such coordinated experience predicts the child's later vocabulary learning more strongly than the amount of verbal input alone (Sun and Yoshida, 2018, 2019). The present study aims to precisely record word–referent mapping experiences to assess the quality of word learning at a new level.

Sociocultural Impacts on Bilingual Language Development

Language is an extension of sociocultural practices, and research has demonstrated that language development is impacted by one's sociocultural context (Tamis-LeMonda and Song, 2013; Kandhadai et al., 2014; Kramsch, 2014). One domain in which sociocultural practices impact early language development is the communicative pattern between the parent and the child (Tamis-LeMonda et al., 1992, 2013; Ramírez-Esparza et al., 2017). Parents from various sociocultural backgrounds may respond to their children differently in terms of the rate of utterances, the speech style (adult-directed vs. infant-directed), as well as the composition of language (noun vs. verb; Tardif, 1996; Shneidman and Goldin-Meadow, 2012; Tamis-LeMonda et al., 2013; Farran et al., 2016). While bilingual research often compares monolingual and bilingual groups within a specific cultural background (e.g., Barac and Bialystok, 2012), Tran et al. (2019) examined the effects of bilingualism across different countries and cultures (i.e., Vietnam, Argentina, and the United States) and revealed a consistent impact of bilingualism on children's attention and executive control. This finding points to the existence of unique characteristics of bilingual learning experiences that are shared across a variety of cultural backgrounds.

Scaling down from the macro sociocultural aspects of a specific cultural background, the individual child's language development begins in a *social context through immediate interaction with parents*. Parent scaffolding plays a key role in navigating infant attention toward the region of interests (ROIs, e.g., Butterworth and Cochran, 1980; Bakeman and Adamson, 1984; Tamis-LeMonda et al., 2014). For instance, infants appear to shift attention to the general direction of the caregiver's eye gaze from the age of 2 months (Butterworth and Cochran, 1980; Gredebäck et al., 2010; Simpson et al., 2020), and they subsequently exhibit precise gaze shifting to the targeted object around 1 year of age (Brooks and Meltzoff, 2002, 2005). The ability to successfully shift attention to the target of interest establishes the foundation of social learning and increases the learning efficiency that quickly maps the referent words to the seen objects (Baldwin, 1993; Yu and Smith, 2012; Tenenbaum et al., 2014). Developmental researchers have studied infant object looking with respect to several aspects of parental social references, including parent's gaze (Brooks and Meltzoff, 2002; Caron et al., 2002), verbal phrases and labels (Flom and Pick, 2003; Fulkerson and Haaf, 2003), hand actions (Yu and Smith, 2013, 2017; Deák et al., 2014; Burling and Yoshida, 2019), and the combined use of multimodal references by the parents (Gogate et al., 2006; Tamis-LeMonda et al., 2013; Deák et al., 2018; Suarez-Rivera et al., 2019). The diverse social inputs serve as the perceptual foundation of word learning and as a basis for establishing the social coordination between infants and parents that is essential for sharing a common focus of attention.

Multimodal Experiences for Language Learning

A fundamental process of early language acquisition involves multimodal learning experiences—children constantly hear words while *seeing* the referents, either the objects or the people that are relevant to the referents. This conjunction of sound and sight serves as a building block for the initial process of language learning—mapping a word to its meaning. The ability to form word–referent associations is universal across monolingual and bilingual environments (Byers-Heinlein et al., 2013). One line of research has focused on the visual side of word learning and has provided information about the infant's moment-to-moment gaze behaviors during the parent–infant object play. These studies indicate that there are powerful input structures in everyday experiences with parents that create developmentally appropriate attention-directing links between heard words and seen referents/objects (Gogate et al., 2006; Smith and Yu, 2008; Koterba and Iverson, 2009). Studies using head-mounted camera devices to record the infant centered views during object play found that infants often have a clear view of the object (Yoshida and Smith, 2008; Yoshida and Fausey, 2019), and such clear viewing of an object is often accompanied by parental references (e.g., Yu and Smith, 2017; Burling and Yoshida, 2019; Yu et al., 2019). When the parent names the object at those socially synchronized moments, infants are more likely to learn the name of the object (Gogate et al., 2006; Yu and Smith, 2012; Pereira et al., 2014; Yoshida and Fausey, 2019). These eye-tracking studies of child-centered input make it clear that not only the number of words that an infant hears during the interaction is important, but also the contingency between infant's visual experiences and appropriate linguistic input matters for effective word learning. However, all the existing evidence on early multimodal learning experiences was concluded from Caucasian, middle class, and monolingual families only. Yet the multimodal experience has not been explored in a dual-language learning context. Considering their differences in verbal input, attention processes, and various language learning trajectories in each language, it is essential to investigate whether bilingual children experience similar or different socially coordinated moments, as do their monolingual peers.

The present study examined the microstructure of multimodal learning experience in the infant's interactive object play with his/her parents and attempted to identify the similarities and differences between parent–child dyads having a monolingual versus a bilingual learning context at home. The present study focuses on (1) the parent's social input, as reflected in looking patterns as well as verbal input, (2) the infant's looking behaviors, and (3) the social coordination between parent and infant during the play session. We expected to see the documented differences in linguistic input, but we also anticipated that participants from both monolingual and bilingual backgrounds would exhibit similar or different word–referent mapping experiences according to the parent's input in the instances of social coordination.

MATERIALS AND METHODS

Participants

Fifty-one parent–infant dyads, which included 6- to 18-month-old infants and toddlers (Mean age = 11.1 months, SD = 3.9), were recruited from the Greater Houston area. An additional eight

dyads were recruited but not included due to incomplete data collection associated with infant fussiness, technical failure, or inadequate recording quality. All parent participants gave their informed consent for inclusion before they participated in the study. A small gift bundle, including a gift card, a museum family pass, an infant-sized t-shirt, and a stuffed animal, was provided to every parent–infant dyad. The study protocol was approved by the Institutional Review Board in the local research community. Parents completed the informed consent regarding their participation prior to the lab visit. The ethnic backgrounds represented were as follows: Caucasian (33%), Hispanic or Latino (27%); African American (8%); Asian (8%); two or more races (16%), and unidentified (8%). All the infants were full-term and typically developing with no speech/hearing/vision issues.

Considering the high level of linguistic diversity in the Greater Houston areas, we categorized the dyad's language learning environment into bilingual or monolingual groups according to the home language usage reported by parents. Infants were considered to live in a consistent bilingual language learning environment when (1) they were exposed to a dual-language home environment since birth, and (2) parents spent over 20% of the time using the minority language at home.

There were 22 dyads from English monolingual households (Mean age = 11.2 months, SD = 4.3) and 29 dyads from diverse bilingual households (Mean Age = 11.1 months, SD = 3.6). Infants in the bilingual group were exposed to English and other languages as follows: Spanish (19), Vietnamese (3), Chinese (2), German (1), Tamil (1), Krio (1), and unidentified (2). We compared the demographic variables between groups and found no significant differences in (1) infant's age [$t(41) = -0.06$, $p = 0.954$], (2) birth order ($p = 0.870$, Fisher's exact test), and (3) parental education level, $p = 0.37$ by Fisher's exact test. Find the detailed demographic distributions in the **Supplementary Material**.

Procedures

All the participating dyads completed an object play session in the lab with the same procedure. Participants were led to the experimental rooms and asked to sit across from each other at a $60 \times 60 \times 40$ cm table, which was used as a surface for jointly interacting with the objects. The experimenter helped both parent and infant put on the head-camera gears. After the research assistants completed the calibration procedure, the parent was provided with a container of attractive toys and instructed to freely play with the infant. The box consisted of eight toys: a bunny, a cookie, a cup, a car, a bear, a jar, a carrot, and a basket.

To structure the play session, parents were encouraged to freely use any of the toys as they played with their infant around the theme words. The target words included four nouns (i.e., bunny, car, cookie, and cup) and four verbs (i.e., open, put, eat, and drink). These words and objects were selected based on the infant's early learned words on the MacArthur Communicative Development Inventories (MCDI; Fenson et al., 2000). An audio instruction provided cues for parents as to which target word constructs the play. For the bilingual parents, we asked the parent's language preference prior to the play session and provided the instruction in languages other than English given their needs. Three of the bilingual parents chose the Spanish instruction and used Spanish target words throughout the play, whereas the rest of the sample followed the English instruction. The main goal of the play session was not to ask parents to teach or demonstrate the target words but to provide an interactive context in which parents and infants can jointly play with the objects together. Therefore, bilingual parents were encouraged to use the language they were most comfortable with or switch to using dual language and act naturally with their infants the same way they would at home. The play session consisted of eight 40-s-long trials, for a total of 5 min and 20 s.

Equipment

Watec (WAT-230A) miniature color cameras with supplementary eye trackers were used for recording the object play session. The head-mounted camera provides dynamic visual information from a first-person view (e.g., Yoshida and Smith, 2008; Smith et al., 2011; also see a review from Smith et al., 2015). This camera moves with the participant's head to indicate what is in the participant's view from moment to moment. Previous studies using similar head-mounted cameras compared head versus eye direction in toddlers and found a 90% correspondence between the directions of head movement and eye gazes (Yoshida and Smith, 2008).

In addition to the head-mounted camera system, an eye tracker was used to specify the focus of visual attention in each frame of the egocentric views. Correspondence between the images from the head-mounted camera and eye tracker was achieved using a manual calibration procedure. We used a 60×40 cm board with nine spatially distributed stickers. Before and after the play session, research assistants would point to each sticker using a salient, jingling fish toy to attract the infant's attention. The same calibration procedure was repeated for the parent as well. The location of eye gaze on the scenery image from the egocentric view was estimated by the Yarbus software. A minimum calibration correlation of 0.9 between the camera and the eye-tracker images was obtained.

Two additional digital video cameras and an audio recorder were mounted on the wall and the ceiling to capture an overall view of the scene in which the play session took place. All the videos were recorded at a rate of 30 frames per second and were synchronized by Adobe Premiere with the same sampling rate. On average, every parent–infant dyad had 8,653 frames (SD: 439) recorded during the play session and used for analysis. The inaccessible frames include eye blinks and interruptions due to camera adjustment and child fussiness.

Parental Questionnaires

After the play session, parents were asked to complete the MacArthur SES form and the MCDI checklist. The MacArthur SES form included demographic measures with respect to parental education level, occupation, family size and relationship, annual household income, health conditions, and so forth. In

addition, we added a series of questions to specify the participant's language status, including questions on (1) bilingualism (i.e., "Is your child exposed to a language other than English?"), (2) language type (i.e., "What language(s)?" and "By whom?"), (3) the age of acquisition ("Since what age (in months)?"), and (4) each language usage (i.e., "How many days per week?" and "How many hours per day?"). Bilingual's daily language exposure in L1 and L2 are summarized in **Table 1**.

In addition, parents completed the MCDI checklist of words and gestures, which has been widely used for assessing communication skills in infants and toddlers. Construct reliability and validity of the infant's form reached Cronbach's coefficient alpha of 0.97 and 0.90, respectively (Fenson et al., 2000). **Table 2** presents the infant's receptive and productive vocabulary by language groups. In specific, infants in both language groups had comparable numbers of phrases understood, words understood, and known target words before participating in the study.

Behavioral Annotation

Each dyad's videos, including the views from parent, infant, wall, and ceiling, were synchronized by Adobe Premiere and further imported into the Datavyu software. Two well-trained coders, blind to the purpose of the study, annotated the behavioral variables for each parent–infant dyad. **Table 3** presents all the annotated behaviors, including infant's and parent's looking pattern, parental referential input, and the coordinated attention between infant's object looking and multimodal social references by parents.

First, both the infant's and parent's looking patterns were annotated from their egocentric views captured by the head-mounted cameras. The number of frames was counted to estimate both the frequency and duration of an individual's attention with respect to four ROIs: (1) target object, (2) parent's face, (3) parent's hands, and (4) infant's hands. We chose these four ROIs because the social partner's face and hands are shown as the most visually accessible areas in the infant's point of views, according to observation studies using the head-camera devices (Yoshida and Smith, 2008; Yu and Smith, 2013; Deák et al., 2018).

Specifically, the following analyses primarily focused on the instances of infant object looking. Reliability was measured by randomly selecting 25% of the frames for each dyad and assessing inter-rater coding agreement for the infant's viewing behaviors. The inter-coder reliability of the infant's gaze was an average of 83%, as assessed by Cohen's kappa of 0.73 (ranging from 0.51 to 0.91). The obtained reliability rate falls into the reliability criteria applied in other eye-tracking studies (84% for Yoshida et al., 2020, 82–95% in Yu and Smith, 2017; 83% for Chang et al., 2016).

Moreover, parent's phrases and the use of target words were transcribed and counted. A total of 5,122 phrases were added in the following analyses. Of all the phrases, 22.8% of phrases in the bilingual sample ($N = 2,591$) were translated from other languages by research assistants who are fluent in the respective language. Bilingual parents' language usages and the number of translated phrases can be found in the **Supplementary Material**. The reliability was achieved by randomly selecting 25% of the total phrases by dyad and met the inter-coder agreement of 95% or above. Considering the majority of infants vocalized only during the play session, their verbal responses were excluded in the following analyses.

In addition to the parent's attention patterns and phrases, object manipulation was also annotated from one's egocentric views. The wall and ceiling views were also treated as supplementary references when the parent's object handling was not easily interpreted or not captured by the head-mounted cameras. Each of the parental references was manually annotated separately and then time-stamped together in correspondence with the timeline of the play session (see **Figure 1**).

TABLE 1 | Bilingual's daily language exposure in L1 and L2.

Variables	Mean	Standard deviation
The days per week in L1	6.9	0.4
The hours per day in L1	18.5	6.8
Age of acquisition in L1	0.6	1.3
The days per week in L2	6.3	1.3
The hours per day in L2	7.0	7.4
Age of acquisition in L2	2.2	3.6

Analytical Plan

Table 4 provides the summary statistics, by language groups, for various measures of parent and infant behaviors within ROIs. Considering the intercorrelation among the multiple dependent variables and potential variations among dyads, a series of multivariate analyses of variance with age and SES as covariates (MANCOVA) were selected. Instead of a separate univariate analysis on each dependent variable, MANCOVA reduces potential inflation on Type I error. SES accounted for both annual household income and parental highest degrees. Specifically, parents from the middle class met one of the following criteria, and the higher class met both criteria: (1) annual household income of $47,000 or greater (i.e., the median annual household income in Houston; U.S. Census Bureau, 2020), and (2) at least one parent with a bachelor's or higher degree. The dependent measures of the comparison models included (1) parent responsiveness in terms of looking patterns and verbal input, (2) infant's looking behaviors, and (3) the social coordination between parent and infant during the play session. For both parent's and infant's looking patterns, we measured the frequency and duration of gaze in each of the four target ROIs. Parental phrases were categorized into phrases with relevant or irrelevant labels, depending on whether any of the target words was used. The frequency of relevant labels was also counted independently.

As for social coordination, we examined four measures: (1) all phrase use while the infant looked at an object, (2) specific phrases containing the target label while the infant looked at the target object, (3) presence of an optimal naming moment, and (4) joint attention between the parent and infant toward the same target object. Optimal naming moment refers to an instance when parent object labeling occurs while the infant

TABLE 2 | Monolingual and bilingual infant's MCDI scores.

Measures	Monolingual mean (std)	Bilingual mean (std)	*t*-value	*p*-value
The number of words understand	64.5 *(78.5)*	39.1 *(29.4)*	1.35	0.191
The number of words understand and say	20.0 *(40.6)*	4.5 *(10.1)*	1.71	0.102
The number of phrases understand	12.4 *(10.1)*	11.4 *(8.5)*	0.36	0.724
The number of target words understand (total = 8)	3.1 (3.1)	2.5 (2.3)	0.61	0.543

The italics values refer to the standard deviation.

TABLE 3 | Definitions of behavioral measures.

Measures	Definition	Example
Parent's attention pattern	Gaze allocation on the four ROIs	Attention on child's face, parent's hands, child's hands, or target objects
Parent's phrases		
(1) All phrase use	Any phrase use during the play session	"Look at the bunny" "What is that?"
(2) Phrases containing relevant labels	Phrase containing at least one labels on any of the target object	"Do you like the **bear**?"
(3) Phrases containing irrelevant labels	Phrase containing with no relevant labels	"Yummy!" "Look at this." "Mira! (Look in Spanish)"
(4) Target labels	Eight target labels	Bunny, eat, cookie, car, bear, put, drink, open
Infant's attention pattern	Gaze allocation on the four ROIs	Attention on parent's face, parent's hands, child's hands, or target objects
All phrase use while the infant looked at an object	Any phrase when the infant looked at the target object	
Phrase containing the target label while the infant looked at the target object	Phrase containing at least one relevant label when the infant looked at the target object	
Optimal naming moment	Phrase containing at least one relevant label when the infant looked at the target object and over 70% of the object has been captured from the child's view	
Joint attention	Shared attention between parent and infant on the same target object	
Sustained attention	Infant attention on the target object and maintained over 2 s long	

is simultaneously looking at the target object, and over 70% of the object is captured by the infant's egocentric view. Joint attention here refers to the moment where the parent and infant both attended the same object. Both the dominance of the target object in the infant's visual field during the naming moment (Pereira et al., 2014; Slone et al., 2019) and joint attention (Markus et al., 2000; Morales et al., 2000) have been shown to predict the infant's effective sustained attention to a referent object and later word acquisition. The present study analyzed the potential language group differences by both the frequency and duration measures.

Given the substantial amount of data points expected per dyad, we also applied sequential path analysis to test the role of social input on guiding infant sustained attention to the referent items. The use of a large number of data points from a small number of dyads is consistent with previous studies considering multisensory systems using similar approaches and technologies for the study of parental references (e.g., Yu and Smith, 2012; Yoshida et al., 2020). Bootstrapping was used to randomly resample from the existing data points and to demonstrate the consistency of the estimates and model convergence.

RESULTS

Parent Responsiveness

Parent's Gaze Allocation

A series of MANCOVA with age and SES as covariates in both the measures of duration and frequency on the target behaviors were used to determine the effect of the language group. First, a MANCOVA in the duration of parent's attentional preference for each of the four ROIs found no effect of language group but a marginal age effect, $F(4, 40) = 0.20$, $p = 0.058$. The follow-up univariate analysis for each of the four ROIs, using a Bonferroni-adjusted alpha level of 0.0125, revealed a developmental change in the duration of attention on the infant's hands: parents took more time looking at the infant's hands as the infant became older, $F(1, 43) = 7.82$, $p = 0.008$. Similarly, another MANCOVA in the frequency of the four ROIs found a significant change by age, $F(4, 40) = 6.38$, $p < 0.001$. Specifically, parents had more frequency of attention to target objects, $F(1, 43) = 9.89$, $p = 0.003$, and to the infant's hands, $F(1, 43) = 8.89$, $p = 0.004$.

Verbal Input

Parental verbal input was analyzed as the number of phrases and target words used in the play session. First, parents in the monolingual group spoke more to their infants, as reflected in the duration ($t(49) = 3.08$, $p = 0.004$), as well as the frequency of phrases, $t(49) = 2.81$, $p = 0.007$. A MANCOVA with age and SES as covariates was performed to examine the difference between language groups on the duration of phrases, which were categorized by relevant or irrelevant labels. There was a significant effect of language group on phrases, $F(2, 42) = 3.45$, $p = 0.041$. The follow-up univariate analyses, using a Bonferroni-adjusted alpha level of 0.025, showed that parents in the monolingual group had longer phrases containing relevant labels, $F(1, 43) = 4.55$, $p = 0.039$, but the group difference was absent for phrase containing irrelevant labels, $F(1, 43) = 2.31$,

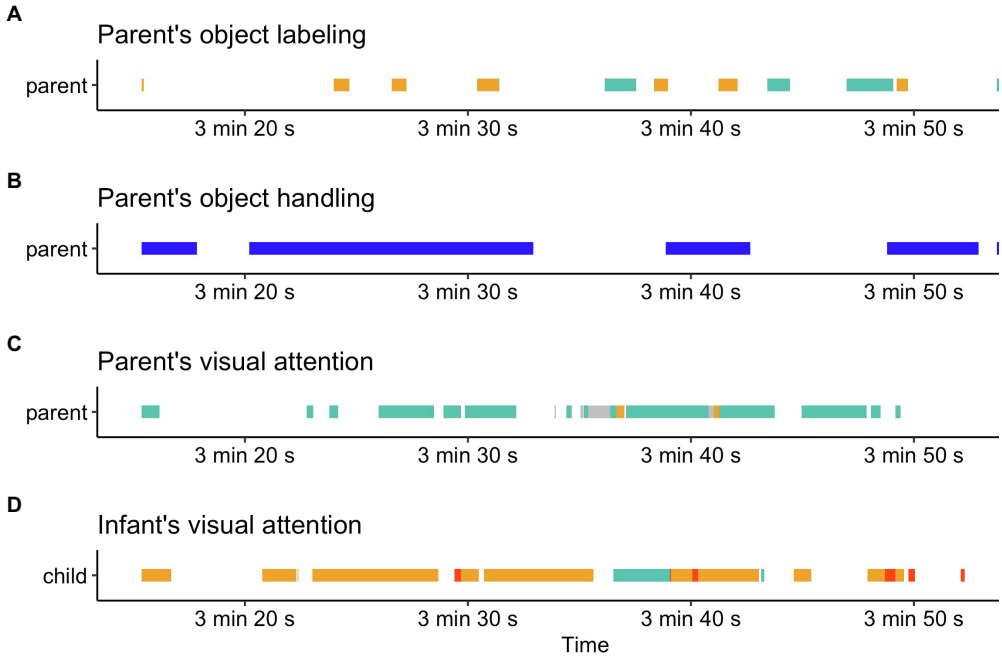

FIGURE 1 | The multimodal behavioral annotation of a video clip of a parent–infant play session.

$p = 0.136$ (see **Figure 2**). On the other hand, the MANCOVA model on the frequency of phrases showed no difference between language groups, $F(2, 42) = 2.80$, $p = 0.072$. In addition to parent's phrases, we found that parents in the monolingual group used more labels on the target objects than did parents in the bilingual group, $t(49) = 3.08$, $p = 0.003$. These findings indicate that parents in the monolingual group provided more relevant verbal input that corresponded to referent toy objects during the play session, but no difference was found for irrelevant verbal input.

Infant's Looking Behaviors

Corresponding to findings from previous head-camera studies, infants from both language groups spent the majority of the time looking at the target objects, which accounted for an average of 47.04% (SD = 17%) of the time during the play session (e.g., Yoshida and Smith, 2008; Yu and Smith, 2013, 2017). MANCOVA analyses with age and SES as covariates were performed on both measures of duration and frequency of infant attention toward the four ROIs. There was no significant effect of language group on infant attention as reflected in either frequency or duration. The model for frequency found a developmental change over time: the older infants had higher attention counts on the four ROIs overall, $F(4, 40) = 2.92$, $p = 0.032$. Follow-up univariate analysis showed that infants allocated significantly more attention to the parent's hands over time, $F(1, 43) = 7.28$, $p = 0.009$. Combined with the distribution of the parent's attention, these findings imply that social coordination between the parent and the infant is established primarily by attending to the action of parent object handling.

Social Coordination and Learning Pathways to Sustained Attention

Social coordination between parent responsiveness and infant attention was measured by four variables: (1) all phrase use while the infant looked at an object, (2) phrases containing the target label while the infant looked at the target object, (3) presence of an optimal naming moment, and (4) joint attention toward the same target object. The MANCOVA model for the frequency of the social coordination behaviors, with age and SES as covariates, indicated a significant language group effect: the monolingual cultural group had more social coordination overall, $F(4, 40) = 3.27$, $p = 0.021$. Follow-up analyses for each of the four types of social coordination showed that the monolingual group had more phrases use while the infant looked at the objects [$F(1, 43) = 12.79$, $p < 0.001$], more phrases containing labels for the infant-attended object [$F(1, 43) = 10.45$, $p = 0.002$], and more optimal naming moments, $F(1, 43) = 7.12$, $p = 0.011$. There were no group differences but a marginal age effect on the frequency of joint attention though, $F(1, 43) = 3.96$, $p = 0.053$.

Considering the frequency of the socially coordinated moments, especially the optimal naming moment, could be biased according to the transcription criteria (e.g., the length of the phrases, the frequency of the target words in phrases), we also examined the effect of language group in social coordination in terms of time duration. The MANCOVA model with age and SES as covariates showed no language group effect in the amounts of social coordination overall, $F(4, 40) = 1.71$, $p = 0.197$. In specific, Follow-up analyses for each of the four types of social coordination demonstrated that

TABLE 4 | Frequency and duration (s) of observed behaviors, averaged across infant participants within the bilingual and monolingual language groups.

Group comparisons	Measures	Bilingual mean (std)	Monolingual mean (std)	*t*-value	*p*-value
Parent object handling	Time duration	260.0 (*41.7*)	266.4 (*44.0*)	–0.53	*0.602*
	Frequency	86.6 (*36.7*)	80.9 (*22.0*)	0.70	*0.490*
Infant object handling	Time duration	188.8 (*89.6*)	177.7 (*97.7*)	0.42	*0.680*
	Frequency	61.2 (*44.6*)	44.2 (*26.5*)	1.69	0.097
Parent's look at the target objects	Time duration	66.4 (*41.0*)	71.6 (*41.8*)	–0.45	*0.658*
	Frequency	197.9 (*121.5*)	231.9 (*145.5*)	–0.89	*0.381*
Parent's look at the infant's face	Time duration	110.5 (*60.1*)	102.1 (*52.8*)	0.53	*0.596*
	Frequency	188.4 (*113.9*)	212.5 (*182.9*)	–0.54	*0.590*
Parent's look at the infant's hands	Time duration	22.5 (*17.3*)	19.8 (*12.6*)	0.63	*0.529*
	Frequency	95.1 (*80.6*)	86.0 (*52.8*)	0.48	*0.631*
Parent's look at their own hands	Time duration	12.8 (*11.7*)	12.6 (*11.8*)	0.05	*0.960*
	Frequency	56.5 (*52.3*)	69.2 (*78.9*)	–0.66	*0.516*
Infant's look at the target objects	Time duration	150.5 (*61.8*)	148.3 (*45.4*)	0.15	*0.884*
	Frequency	120.3 (*54.1*)	156.2 (*67.2*)	–2.05	***0.047***
Infant's look at the parent's face	Time duration	23.2 (*18.0*)	21.3 (*13.8*)	0.42	*0.675*
	Frequency	26.7 (*24.4*)	30.2 (*16.5*)	–0.62	*0.541*
Infant's look at their own hands	Time duration	2.6 (*4.1*)	1.6 (*2.9*)	0.94	*0.351*
	Frequency	6.7 (*8.0*)	6.9 (*12.5*)	–0.05	*0.964*
Infant's look at the parent's hands	Time duration	30.8 (*19.2*)	37.7 (*25.4*)	–1.08	*0.289*
	Frequency	66.8 (*38.8*)	88.3 (*47.7*)	–1.72	*0.092*
Parent's phrase	Time duration	132.8 (*53.2*)	181.4 (*57.7*)	–3.08	***0.004***
	Frequency	89.3 (*37.6*)	115.0 (*27.8*)	–2.81	***0.007***
Parent's phrase with relevant labels	Time duration	78.5 (*40.1*)	106.2 (*38.4*)	–2.50	***0.016***
	Frequency	51.3 (*26.3*)	66.5 (*21.0*)	–2.29	***0.026***
Parent's phrase with irrelevant labels	Time duration	54.4 (*34.2*)	75.2 (*42.8*)	–1.88	*0.068*
	Frequency	38.0 (*24.0*)	48.5 (*22.1*)	–1.62	*0.112*
The number of object labeling	Frequency	56.9 (*29.5*)	80.4 (*24.7*)	–3.09	***0.003***
Parent's phrase while the child looked at the target objects	Time duration	69.6 (*49.3*)	86.0 (*35.4*)	–1.38	*0.174*
	Frequency	81.5 (*38.4*)	128.2 (*51.4*)	–3.57	***0.001***
Parent's object labeling while the infant looked at the target object	Time duration	42.6 (*31.4*)	53.0 (*22.4*)	–1.38	*0.173*
	Frequency	50.0 (*28.8*)	75.8 (*25.3*)	–3.39	***0.001***
Optimal naming moment	Time duration	22.2 (*17.4*)	29.3 (*17.5*)	–1.43	*0.159*
	Frequency	26.2 (*17.2*)	42.5 (*24.2*)	–2.69	***0.011***
Joint attention toward the same object	Time duration	22.6 (*13.2*)	28.0 (*20.8*)	–1.07	*0.292*
	Frequency	70.0 (*53.8*)	84.5 (*62.3*)	–0.88	*0.386*
Infant sustained attention to the target object	Time duration	112.5 (*56.4*)	108.6 (*43.0*)	0.28	*0.782*
	Frequency	21.9 (*9.7*)	20.7 (*6.1*)	0.51	*0.612*

infants in both the monolingual and bilingual cultural groups had comparable amounts of time in attending to the referent object when parent talked [$F(1, 43) = 1.32$, $p = 0.256$], or when parent named the object simultaneously, [$F(1, 43) = 1.51$, $p = 0.226$]. Similarly, both monolingual and bilingual cultural groups experienced similar amounts of time in optimal naming moments [$F(1, 43) = 1.78$, $p = 0.189$] and in joint attention, $F(1, 43) = 1.10$, $p = 0.300$.

To fully characterize the various referent-driven pathways directing the infant's multimodal experience and contributing to the infant's sustained attention, a sequential path analysis was conducted. Sustained attention to the target object was defined as consistent gaze fixation over 2 s. The long fixation ensures that the infant has stable attention toward the referent item for further word learning. The left side of the sequential path includes three potential referential inputs from parent involvement during the play session: (1) object handling, (2) phrases, and (3) object looking. We added a multiple regression on each input variable, and its beta weights were also added as the path weight on the structural model shown in **Figure 3**. The sequential path analysis reveals two significant socially coordinated moments between parental input and infant attention across the language learning groups: (1) parent's phrase while infant looked at the object, and (2) parent's object handling while infant looked at the object. On the one hand, parental verbal input predicts infant sustained attention when the phrase contains the target label while the infant is simultaneously looking at the target object, $\beta = 0.72$, $Z = 2.79$, $p = 0.005$. On the other hand, parent object looking predicts joint attention between the parent and the infant on the target object ($\beta = 0.37$, $Z = 11.82$, $p < 0.001$), whereas joint attention does not contribute to infant sustained attention as expected, $\beta = 0.04$, $Z = 0.27$, $p = 0.787$. In addition, parent object handling also shows as a direct predictor of infant sustained attention, $\beta = 0.51$, $Z = 2.03$, $p = 0.043$.

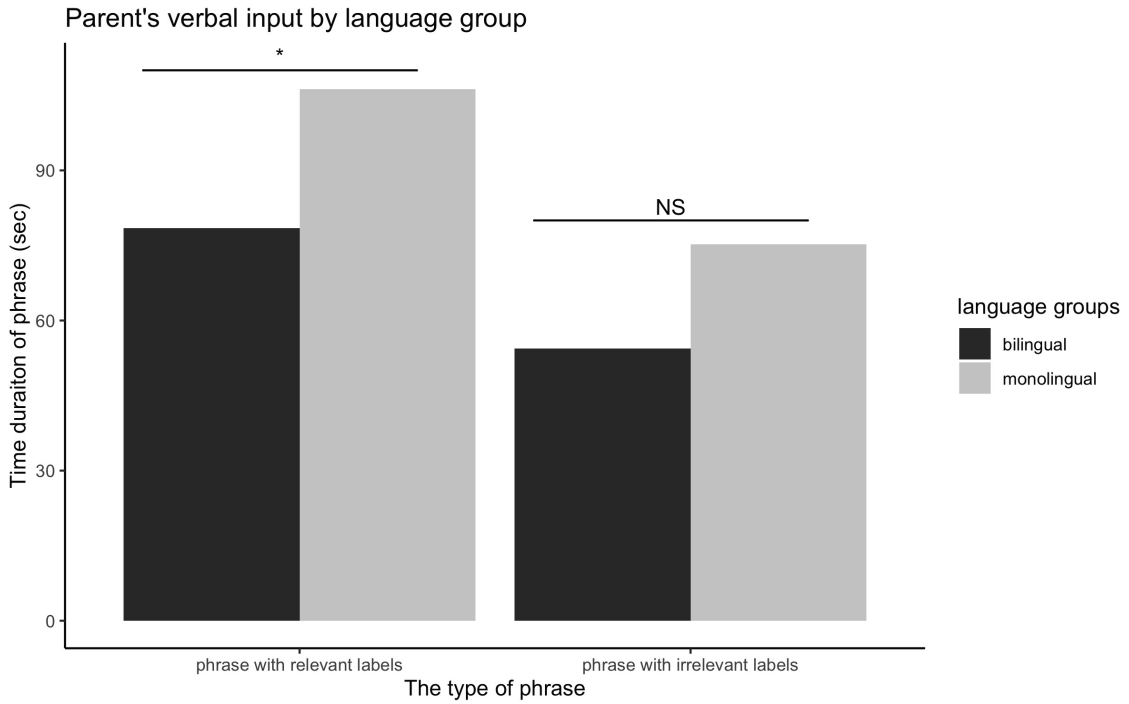

FIGURE 2 | The distribution of parent's verbal input by cultural groups.

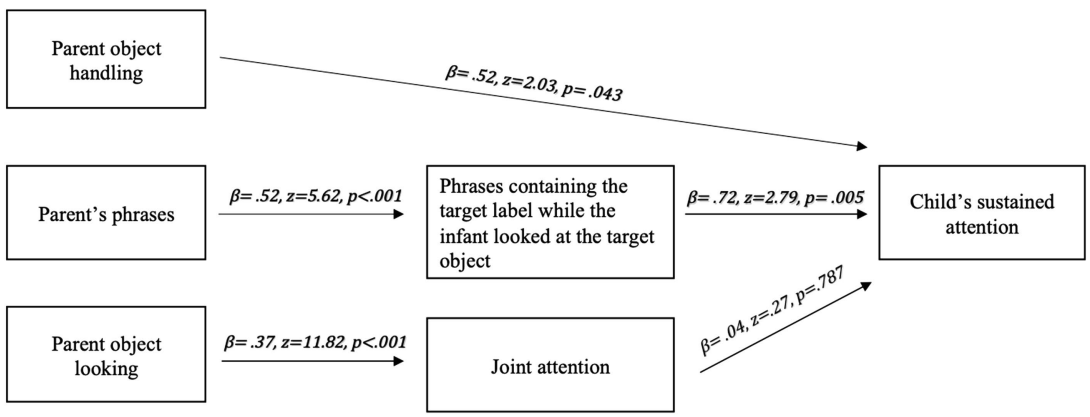

FIGURE 3 | The sequential path analysis of parental referential input on child's object looking through social coordination.

DISCUSSION

Children's language development has often been measured by speech input and language outcomes—what they hear in their social environment and what they can understand and produce (receptive and productive vocabularies). The literature on bilingual children's language development suggests the importance of the quantity and quality of linguistic input (Rowe, 2012; Hoff et al., 2014; Unsworth, 2016; Carroll, 2017; De Houwer et al., 2018) and reveals a close relationship between parent's verbal input and children's vocabulary outcomes (De Houwer, 2007, 2011; Cartmill et al., 2013; Hoff and Core, 2013; Sorenson Duncan and Paradis, 2020). However, we know relatively little about early language experiences as a series of socially coordinated events from the child's perspective. This is a critical gap in the literature given the increasing attention to the importance of multimodal language exposures that are created socially. The present study documents *dynamic multimodal experiences* that are supported by the parent's scaffolding in parent–infant interactions.

Three significant findings characterize the early multimodal experiences that are relevant to bilingual language development. First, we found reliable differences between monolingual and bilingual groups in the amount of parental linguistic input.

Based on the total number of phrases spoken, regardless of the specific languages used by the bilingual group, parents in the monolingual group spoke more and had more relevant labels for the referent items during the play session. This finding appears to echo the difference in the verbal input between children who are growing up from monolingual and bilingual households (Place and Hoff, 2011; Thordardottir, 2011; Hoff and Core, 2013; Hoff et al., 2014). These quantitative differences in language input are often discussed with respect to SES factors, which include parental education, annual household income, governmental assistance, and so forth (Scheele et al., 2010; Cartmill et al., 2013; Calvo and Bialystok, 2014; Hoff et al., 2018; Masek et al., 2021). Despite no language group difference being found on SES measures, we noticed that more monolingual parents in the present study had an annual income greater than $100,000 while bilingual parents had income within the range from $50,000 to $100,000 (see the distribution of annual household income in the **Supplementary Material**). Considering the variations between language groups and within the bilingual dyads, the present study added SES as a covariate in the analyses and yielded no SES effect on the target behaviors. Yet, caution is still needed in drawing conclusions about the causes of variations in parental verbal input. The further study aims to reach a larger sample size to systematically address these potential effects and fully capture the language experiences in diverse linguistic/sociocultural bilingual populations (e.g., across various countries and cultures).

What else might be the reason for the reduced verbal input in the bilingual group? There are two conjectures, one of which concerns a differential effect of the laboratory experience. Despite efforts to make the laboratory experience similar to typical interactive contexts as homes, the laboratory setting is novel, and the parent–infant linguistic interaction in the laboratory cannot be regarded as an exact replication of home interactions. Consequently, one may argue that the reduced linguistic experiences could be due to that "lab effect" (*viz.*, to be observed in the semi-structural lab environment). Perhaps this lab effect, such as the novelty of people in the lab, room arrangement, and atmosphere, influences participants in the bilingual group more than the monolingual group. Further, though we asked our participants to freely use their preferred language during their visits, including the play session, they may perceive an implicit pressure to prefer English outside of their homes, resulting in less speech in the recording.

Most of the observational findings in the literature on language learning are based on learning contexts in which parents use English only at home, but language learning is more dynamic and complex for young children growing up in bilingual environments. We do not have any means of assessing the suitability of the observation method for each language group, yet this is something we need to take into consideration when we draw conclusions about differences in verbal input. In future studies, researchers could ask parents to complete a survey for evaluating the degree to which the activities in the lab were comfortable to the parents and if their performance felt typical and natural.

The second conjecture about differences in verbal input is that quantitative measures alone might be misleading. Insufficient and unbalanced language input in L1 and L2 has often been speculated to be responsible for developmental and linguistic differences, and this assumption has led to an increasing effort to supplement young children's linguistic resources during preschool and elementary school periods (e.g., Winsler et al., 1999; Hammer et al., 2007; Collins, 2014). The present study, however, suggests that despite the less speech input, young children in the bilingual group are receiving similar amounts of optimal experiences that are well coordinated by parental scaffolding (in particular with duration measures), ensuring bilingual children have sufficient time mapping the heard words to the referent objects during their interaction with parents. The present findings show that infants from both monolingual and bilingual groups experienced a similar amount of joint attention—infant and parent sharing attention on the same target referent—that has been shown to promote language learning among young children in a monolingual environment (Markus et al., 2000; Morales et al., 2000; Akhtar and Gernsbacher, 2007). Although monolingual parents talked more and labeled the target items more frequently than the bilingual parents did, bilingual infants experienced comparable time in the coordinated moments during which parents timed their labeling of object names to coincide with the infant's attention to the referent object. This is interesting, given that bilingual language research has heavily relied on large-scale measures and parental self-reports on some properties of linguistic quantity (e.g., De Houwer, 2007, 2011; Scheele et al., 2010; Byers-Heinlein, 2013; MacLeod et al., 2013) while overlooking variations in input quality as well as language learning processes (see reviews on quantity and quality input from Hoff and Core, 2013 and Unsworth, 2016). The present findings suggest that the overall amount of verbal input may be comparatively reduced, depending on the specific linguistic context, but the referent-related qualitative input remains constant. This assumption is corroborated by other studies, indicating that the quality of early parent input is not restricted by SES (Cartmill et al., 2013; Anderson et al., 2021). The measures on the qualitative input open a new window onto language measurements assessing learning growth in bilingual research.

Besides the word and phrase counts of verbal input, the literature on bilingual language development also points out several qualitative aspects of the input and variability in how each language is used. For example, the relative frequency of input in each of the two languages, the amounts of available resources (e.g., home only or instruction/academic purposes), the exposure structure (one-person-one-language vs. one-person-multiple-languages), and other variations in the experience of each language may influence the learning trajectories (Place and Hoff, 2011; MacLeod et al., 2013; Hoff et al., 2014; Unsworth et al., 2019; Orena et al., 2020). In the present study, we found that parents in the bilingual group used one language only and seldom switched languages in the play session. Other evidence also indicates that bilingual parents have a very low rate of language mixing before the infant's age of 18 months (e.g., Meng and Miyamoto, 2012; Kremin

et al., 2021). In addition, a bilingual parent's language use might not be fully expressed in the limited time of the play session. Moreover, the bilingual families might employ a one-parent-one-language approach, in which case the infant would be exposed to another language only by other caregivers at home. Therefore, there is much room for sociocultural factors to explain the group difference in parental verbal input; additional studies of parent–infant interaction across different settings and social partners are necessary to identify those suspected factors.

The second major finding of the present study, in addition to the group difference in verbal input, is that parents support infant attention *via multimodal coordinated pathways* for both monolingual and bilingual groups. In our sequential path analysis of parental referential input, we observed social coordination that facilitates infant object looking. Specifically, the parent's object naming events support infant object looking *via* the coordinated moments when the infant experiences "seeing an object while hearing the object name," and parent object handling also supports infant attention to the referent object. Parent's object labeling and handling can support the infant's learning by helping the infant to recognize objects visually and to learn object characteristics, which may increase the likelihood of word–referent associations and promote further word learning (Gogate et al., 2006; Yu and Smith, 2012; Yu et al., 2019). Despite the fact that joint attention between the parent and the child toward the same object has been shown to predict the language, cognitive, and social development of monolingual children (e.g., Markus et al., 2000; Morales et al., 2000; Vaughan Van Hecke et al., 2007), we found the minimal impact of joint attention on infant's object looking in the present study. It is speculated that gaze following and the establishment of gaze sharing can be more challenging in the daily interactive context, where infants may experience more complex visual environments consisting of multiple and colorful distractors.

Other studies of the infant's visual input in the language development domain document the importance of social engagement and scaffolding in infant object looking, but most of those studies involve typically developing children in a monolingual culture in which parents use only English at home. The present study focuses on two different learning environments, English monolingual and diverse bilingual, and demonstrates important differences and similarities in the process through which infants find the referent of a name. Mapping names to referents is a core process of early language learning, that depends not only on linguistic input but also on how the verbal input is coordinated with perceptual experiences through social scaffolding. This line of work should be extended to a broader population whose learning contexts are different from those represented in the present study, and such initiatives have been taken. For example, in a similarly structured observational study using head-mounted camera devices, young children with Autism elicited an elevated level of parental responsiveness, such as parents looking at the infant's face more often than parents of typically developing children (Yoshida et al., 2020). This finding corroborates the social coordination of object looking events found in both language groups participating in the present study.

The third important finding is that infants in the bilingual group obtain the same duration of item-relevant attention opportunities—optimal naming moments and joint attention—despite the reduced verbal input. While this might be due to elevated parental effort, one may speculate that being exposed to two languages from birth influences the infant's speech perception and cognitive skills that underlie word learning (Kovács and Mehler, 2009a,b; Sebastián-Gallés et al., 2012; Brito and Barr, 2014; Comishen et al., 2019; Arredondo et al., 2022; Kalashnikova and Carreiras, 2022). Through persistent exposure to dual language and regularities specific to the contexts in which language is used, bilingual infants demonstrate enhanced flexibilities and sensitivities to the visual cues which help discriminate languages (Kovács and Mehler, 2009b; Sebastián-Gallés et al., 2012; Fort et al., 2018; Singh et al., 2018). For instance, infants from monolingual and bilingual environments show similar attention preference to a partner's eye gaze in the preverbal period, whereas bilingual infants initiate attention shifting earlier and become more sensitive to the partner's mouth movement, which has been demonstrated to be essential for word learning (Colunga et al., 2012; Pons et al., 2015; Tsang et al., 2018). Yow et al. (2017) also found that bilingual infants attend more to visual references, as indicated by eye gaze and pointing, in a fast-mapping task. In addition, other researchers have employed experimental methods to show advanced cognitive skills in bilingual infants even before word production (e.g., Kovács and Mehler, 2009a; D'Souza et al., 2020). Taken together, these findings suggest that bilingual environments, by themselves, may induce more attention shifting and a more concentrated focus of attention on specific stimuli or specific locations in experimental contexts. However, these differences in attentional behaviors are rarely reported in studies that are conducted in more naturalistic interactive environments. Attentional biases in bilingual children may shape parental responsiveness so as to generate a unique feedback loop that enhances the infant's sensitivity to social cues and learning. To test this conjecture, further bilingual studies should consider differences in visual gaze patterns and attentional flexibility in relation to parental scaffolding across different settings, such as homes and daycares.

There are limitations in the present study that need to be taken into consideration for future research. First, we recognized the variabilities within the collected bilingual sample that may influence the degrees of parent's engagements or the ways parents communicate with their infants. Infants growing up from various linguistic and sociocultural backgrounds may learn L1 and L2 at various growth rates, orient attention following parent's responsiveness differently, and eventually develop diverse cognitive competence (e.g., Barac and Bialystok, 2012; Tran et al., 2019; Masek et al., 2021). Our goal of the present study was to investigate the impacts of early bilingual learning experiences on moment-to-moment multimodal experiences—looking and hearing—in an interactive social context. To address the concerns on the potential lab effect, further studies will implement this free-viewing paradigm into

more naturalistic settings, such as home environment, and will systematically control cross-linguistic and cross-cultural variations to secure reliable homogeneous samples and validate the documented effect to broader bilingual populations.

Second, because children were recruited from a longitudinal research project, the age range (6–18 months) was relatively broad and included a transition period during which infants start to learn and produce words rapidly. Considering the dynamics of word acquisition and lexical development, parents might differ in the ways they respond, and the amounts of verbal input used (e.g., Soderstrom, 2007; Anderson et al., 2021). Given the limited sample size, we controlled for the infant's age when comparing the language group differences. Ideally, we would examine any developmental changes in parents' behaviors and infants' subsequent attentional patterns in the near future.

Furthermore, the present study categorized parent's verbal input according to their use of target words within phrases. In reality, parents may frequently use non-target words, such as "look," "what is that," and guide infant attention by pointing and/or through the use of gestures (Woodward and Guajardo, 2002; Deák et al., 2018). Further studies might benefit from a deeper analysis of the semantic content of parent verbal input and subtle ways in which it might guide infant attention and associated learning.

CONCLUSION

The present study views "bilingualism" through a sociocultural lens and defines direct *input* operationally as the integrated and multimodal experiences of young children from monolingual and bilingual learning contexts. The study shows how similar social scaffolding shapes moment-to-moment attention for infants who have had different language experiences. Regardless of the total amount of parental speech input (how many words the infant hears), infants with monolingual and bilingual exposure both benefit equally from a comparable duration of name–object associations. These findings add to the current literature by demonstrating that the benefits of everyday language experiences are determined not only by linguistic input but also by multimodal experiences—coordinated visual and linguistic experiences—for children growing up in either a monolingual or a bilingual home environment.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article are not publicly available due to confidentiality but are available from the corresponding author on reasonable request.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by IRB at University of Houston. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

AUTHOR CONTRIBUTIONS

LS and HY contributed to the study design and data collection. LS organized the database and performed the statistical analysis and wrote the first draft of the manuscript. HY wrote sections of the manuscript. LS, CG, and HY contributed to manuscript revision, read, and approved the submitted version.

SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: https://www.frontiersin.org/articles/10.3389/fpsyg.2022.745904/full#supplementary-material

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