



Center for Early Care and Education Research Dual Language Learners

WORKING PAPER #2

Development of Infants and Toddlers Who Are Dual Language Learners

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The purpose of this working paper is to identify areas of empirical research knowledge and gaps in knowledge about the development of infants and toddlers who are dual language learners (DLLs). This information will inform the work of the Center for Early Care and Education Research, Dual Language Learners (CECER-DLL) on assessment and measurement as well as evidence-based practices. This paper builds on prior work of the CECER-DLL, which reviewed the literature on DLLs aged 0-5 in several domains, including cognitive, social-emotional, and language and literacy development; and early care and education (ECE) practices and measures. A common theme in those critical literature reviews was that much of the small but growing body of research on young DLLs has focused on preschool-aged children, and that more research is needed that focuses on infants and toddlers. This paper therefore draws upon the smaller body of empirical research on infants and toddlers who are DLLs, as well as research on non-DLL infants and toddlers to identify the gaps in knowledge and make recommendations for future research.

For the purposes of this paper, the target population of interest is children in the first three years of life (aged 0-36 months) who are or will be exposed to two languages by the time they enter school in the United States. Typically, these are children who are exposed during the first years of life to a language other than English either prior to or simultaneously while being ex-

posed to English. The first three years of life encompass tremendous developmental accomplishments, including the formation of attachment relationships; development of motor skills; the foundation for executive functioning skills to regulate behaviors; huge advances in detection, comprehension, and production of language; and many more. Children entering preschool at age 3 have already obtained vast knowledge about the language or languages to which they have been exposed and the family traditions and cultural values that guide their expected behaviors, and have developed relationships with household members and others, all influenced by their own temperament and inherited traits as well as their in-home and out-of-home experiences during these years.

Child demographics in the United States are affected by immigration patterns and associated with increasingly diverse cultural practices and language use. Because of continued immigration, a higher birth rate among immigrant families, limited English proficiency among some immigrants, and in some cases a deliberate choice to use the heritage language at home to help preserve ethnic identity, growing numbers of young children in the United States are exposed to non-English languages in their home environment. These children either begin to learn English simultaneously, or later, when they enter out-of-home child care, preschool, or kindergarten. Twenty-eight percent of the children enrolled in Head Start programs in 2009 spoke a language other than English at home (Aikens, Kopack Klein, Tarullo, & West, 2013), and 26% of children in Early Head Start

in 2009 came from homes in which a language other than English is spoken (Administration for Children and Families [ACF], 2013). Understanding the developmental trajectories and factors that influence development for the youngest DLLs will be important for the creation and implementation of appropriate policies and practices in the early years to promote healthy, optimal development.

Describing DLL Infants And Toddlers In The U.S.

The population of DLL infants and toddlers is a diverse group. Although much attention is often given to the subset of DLLs who come from Spanish-speaking homes and are of low income (arguably the largest group of U.S. DLLs: in Head Start, 84% are Spanish-speaking, and in EHS, 91% come from Spanish-speaking homes; ACF, 2013), the population is much more varied. The CECER-DLL has conducted data analysis of the Early Childhood Longitudinal Study – Birth cohort (ECLS-B) data set, a nationally-representative sample of infants recruited at birth, to identify the demographic characteristics of the young DLL population in the United States (Winsler, Burchinal, Tien, Peisner-Feinberg, Espinosa, Castro, et al., under review). This data analysis focused on children’s DLL status, immigration status, heritage country, maternal education, and household income. For this analysis, two home-language-use groups were identified as indicating DLL status: families in which only a non-English language is spoken, and families in which English and another language is spoken. DLL status varied quite a bit with other family characteristics, indicating that DLL children are a heterogeneous group with respect to many characteristics. For instance, maternal education and family income tended to be highest among families speaking English only (non-DLL families), and higher among DLL families who speak English than those who do not. However, additional variation is associated with ethnicity, with Hispanic groups on average being of lower SES than Asian heritage groups, and within ethnic groups, Cubans are higher than Mexicans, and Japanese are higher than Vietnamese, for instance.

Latino infants and toddlers (who are likely to be DLLs) are the fastest growing group of children in the United States, accounting for over 21% of all children in the U.S. under the age of three (Calderón, 2007). Most Latino infants and toddlers live in immigrant families (64%) and they are more likely to be linguistically isolated than families in which the parents are U.S. born. Latino infants and toddlers are also more likely to be in low-income families and to have mothers who did not complete high school than non-Latino white¹ children in the U.S. (Calderón, 2007).

An extensive report on the well-being of children from immigrant families was recently produced by Don Hernandez and Jeffrey Napierala (2012). The report compiled data across economic, health, education and community domains from multiple years of the Current Population Survey (CPS), National Assessment of Educational Progress (NAEP), Vital Statistics records, and National Health Surveys. Although the report does not address DLL infants and toddlers specifically, it states that among children from immigrant families, infants experience two significant health advantages over children from non-immigrant families. Children of immigrants are less likely to be born low-birthweight (7% of children of immigrants vs. 8.5% of children with U.S. born parents). An analysis of subgroups indicated, however, that this statistic varied depending on country of origin, with higher rates of low-birthweight births among immigrants from India, the Caribbean, and Africa and lower rates for mothers from Europe, Australia, Asia, and South and Central America (Hernandez & Napierala, 2012).

Despite the great diversity of language backgrounds for families speaking a language other than English in the home, the vast majority of DLL infants and toddlers come from a home where Spanish is spoken. In the nationally-representative ECLS-B dataset, data from the 9-month-old data collection show 81% of families have

¹ This report used the terms “Latino,” “White,” and “Black” as contrasting demographic groups without clearly defining the racial or ethnic definitions of each term. This is a common issue in research that groups “Latinos” or “Hispanics” together without discussing possible racial heterogeneity of this group.



English as a primary language, 14% speak primarily Spanish, and 5% had some other primary home language (Halle et al., 2009). Spanish-language dominance is especially true among the population receiving Early Head Start services. In 2009, 91% of DLL one-year-olds in Early Head Start were from Spanish-speaking homes (ACF, 2013). Among Early Head Start families with children who are DLLs, 10% of parents report they do not understand English at all, and an additional 47% do not understand English well (ACF, 2013). Similarly, in the school-age population, K-12 data show that 77% of students classified as Limited English Proficiency (LEP) are Spanish-speaking (Ballantyne, Sanderman, & McLaughlin, 2008).

It is clearly difficult to define the population of DLL infants and toddlers demographically, since they vary widely by socioeconomic and immigration characteristics and most data sets do not distinguish their samples by DLL status, let alone describe the variability that exists within DLL groups. Although the largest proportion of DLL infants and toddlers is Latino, lives in Spanish-speaking households, and is likely to live in a low-income family headed by one or more immigrant parents, it is important to keep in mind that there are also DLL infants and toddlers with a wide range of immigrant and socioeconomic experiences that play a role in their language, school-readiness, and social-emotional development. Policies targeting DLL infants and toddlers will most likely overlap with policies aimed at serving low-income Spanish speaking families and

may also overlap with policies focused on correlates of poverty more generally. Because low-income and language minority status tend to co-occur, understanding the relationship of language status to child outcome is often difficult, and identifying appropriate needs and services is important. Practitioners will find that low-income is often the most powerful risk factor that needs to be addressed, but may also find that this population is likely to experience some different patterns of risks and strengths than the overall low-income population. Be that as it may, programs specifically serving DLL infants and toddlers should avoid making assumptions about the linguistic and socioeconomic backgrounds of this heterogeneous population.

Family And Community Context Of DLL Infants And Toddlers

Dual-language learners in the U.S. not only experience a particular linguistic environment (exposure to a non-English language in the home) but are likely to have additional contextual experiences in their family and community. Family and community contexts provide both strengths and challenges that may influence the development of DLL children.

In the area of potential strengths, the Hernandez and Napierala (2012) report indicates that children with immigrant parents are more likely than those with U.S.-born parents to live in a two-parent family. This finding is also supported for low-income DLL infants and toddlers. The *Early Head Start Family and Child Experi-*

ences Survey (Baby FACES) found that 71% of DLL children in Early Head Start lived with two parents, and 37% of those couples were married, a rate that is higher than that for monolingual children in EHS (ACF, 2013). Within the low-income Early Head Start Research and Evaluation Study, immigrant mothers were more likely to be married, less likely to be depressed, and more likely to have larger family size than non-immigrant mothers (Mistry, Biesanz, Chien, Howes, & Benner, 2008).

With respect to the linguistic context of DLLs, it is necessary to consider the role of the child's native language in the broader community in which they reside and the specific language community in which the family lives, which may be different. Often, families speaking languages other than English may be linguistically isolated, or may live in a community in which their native language is widely spoken with business and community activities taking place in this language. However, even within a community in which the child's home language is prevalent, the language may not be valued within the mainstream culture.

A theoretical article by Sanchez (1999) addresses the importance of understanding the social and cultural contexts of linguistically diverse families receiving special education services. For linguistically diverse families, understanding the effects of existing power structures, and the larger community's valuing of the home language, helps explain decisions families make about services children receive. Becoming aware of individual families' particular resiliencies and strengths is important for understanding guiding beliefs and cultural themes and how they cope with life's difficulties. These patterns are much more complex and individualized than the sociodemographic categories with which many DLLs are labeled would lead one to believe.

Within the bilingual home, choices in the use of the native or the second language can communicate information to children about the relative importance of each language, as well as teach children different cultural information. Chen, Kennedy, and Zhou (2012) address this issue in a theoretical paper on the use of

emotion language in bilingual families. After reviewing literature showing that children learn about expression and regulation of emotion from parents' use of emotion language, they discuss literature about language shifts (from native language to second language, for instance) in the context of different emotionally-laden conversations. Evidence presented suggests that use of native language enhances expression of positive emotion, but that emotionally difficult communication can be more productive in the second language. These authors suggest more research is needed to understand better the links between language shifts and children's development of emotion understanding and regulation.

Together this information suggests that children's experiences of variation in usage of the native language and the majority language communicate cultural information to the child. These varied language contexts may affect children's learning about their family culture as well as the majority culture and the types of communication that are valued and expected in different social contexts. There is currently little empirical research in this area that explicitly deals with DLL infants and toddlers, but these theoretical viewpoints suggest a number of directions for needed research. In particular, there is need for a greater understanding of the types of cultural and linguistic diversity DLL infants and toddlers experience in their homes and communities and how these influence early learning and development.

Parenting practices and family functioning vary even within ethnically and socioeconomically homogeneous groups. In a rich multi-method longitudinal study of low-income Mexican American families participating in the Early Head Start Research and Evaluation Study, Howes, Wishard Guerra, & Zucker (2007) identified a set of cultural communities to describe this variation. Four different clusters of families were empirically identified, with unique patterns of household structure, connection to extended family members nearby or across the border, and the economic role of the mother within the family cluster. These researchers found that the four patterns of involvement in cultural communities were associated with different parenting practices and

child care use. Families less connected to extended family within the home or neighborhood were more likely to use formal child care than care by a relative, but also to keep their younger children at home cared for by a parent, and more likely to seek formal support from local agencies. Families living independent of an extended family cluster showed higher maternal warmth than those living with extended family in the home or connections to extended family across the border. This study revealed important heterogeneities in the cultural community participation of a group (low-income, Mexican American families living in a single urban city) that might otherwise be considered as a single cultural “address.”

Parenting practices that are culturally variable may affect children’s physical and cognitive development. Fuller and colleagues conducted a series of analyses of ECLS-B data looking at birth outcomes (premature birth, size for gestational age) and cognitive outcomes at 9 and 24 months of age for Hispanic infants. Specific comparisons of Mexican-heritage mothers (in comparison to non-Mexican Hispanics and non-Hispanic whites) and mothers whose home language is not English (compared with mothers whose home language was English) were made. Maternal practices affecting birth outcomes were the positive effects of low levels of tobacco and alcohol use associated with lower rates of poor birth outcomes for Mexican heritage mothers compared to white non-Hispanic mothers and Hispanic mothers whose primary language is not English (compared to non-Hispanic mothers). Maternal practices were associated with negative outcomes at 9 months: Mexican-heritage mothers showed less use of praise and less responsiveness than non-Hispanic mothers during a parent-child teaching task, and this was associated with lower cognitive scores at 9 months (Fuller, Bein, Bridges, Halfon, Jung, Rabe-Hesketh, & Kuo, 2010).

Further analyses extended these findings to 24 month olds. Slower rates of cognitive growth were found for Latino children than non-Hispanic white children, which were accounted for by the Latino mothers’ lower educational levels, lower rates of engagement in literacy activities with their children, and higher number of chil-

dren in the household (Fuller et al., 2009). The authors point out that Hispanic women, especially those who are less acculturated, engage in strong prenatal practices resulting in positive birth outcomes despite generally being lower-income and less-educated than European American mothers. However, after birth, these mothers may have less knowledge of practices to promote health and cognitive development, resulting in patterns of slower growth and declining health during the first year.

This pattern of positive outcomes in immigrant groups that are unexpected based on the groups’ disadvantaged socioeconomic characteristics has been referred to as the ‘immigrant paradox’ (e.g., Hernandez, Denton, Macartney & Blanchard, 2012). Such “paradoxical” findings have been documented in the areas of prenatal practices and birthweight, as well as other behavioral outcomes for children in less-acculturated or more recently-arrived immigrant families. The paradox is also noted in data in which later generations or more-acculturated immigrants show worse developmental outcomes, suggesting some risk associated with the cultural, linguistic and social transitions experienced by immigrants adjusting to life in the United States (Garcia Coll & Marks, 2012).

Findings indicating poorer developmental outcomes for children of immigrants following their strong prenatal and birth outcomes should not be interpreted to mean that Hispanic immigrant parents do not engage in positive parenting practices or place importance on supporting their children’s learning. In an evaluation of the Reach Out and Read (ROR) program, which provides books to children living in poverty, Billings (2009) conducted a study of low-income immigrant parent’s beliefs and practices about literacy. Results indicated that parents in both the ROR treatment and comparison groups strongly desired their children to learn to read in both Spanish and English. Although the intervention had an effect on the actual access to reading materials in both Spanish and English, there was no treatment effect on parent’s literacy goals for their children. In another area of research associating parenting practices and intervention programs, parents of DLL toddlers in Early Head Start were less likely than English-primary EHS



parents to report recent spanking of their child (6% of parents of DLLs versus 15% of English-primary families; ACF, 2013).

Together these findings suggest that DLL infants and toddlers may be advantaged by certain aspects of the immigrant paradox. Programs serving immigrant families with infants and toddlers can build on positive early health and parenting goals as they seek ways to prevent and decrease the disparities that tend to develop over the first few years of life. As families become more acculturated (such as by learning English and/or participating in intervention and support programs) attention should be paid to preserving the strengths that characterize the immigrant “paradox.”

Social-Emotional Development in DLL Infants and Toddlers

There is very little literature that examines socio-emotional development in U.S. populations where the primary language of the home is not English. Because of the importance of a developing child’s early socio-emotional experiences as a context for language development, this literature review uses existing older information based on primarily Euro-American middle class populations in combination with investigations of attachment in Latinos that utilize samples of *likely* DLL populations to stimulate thinking about this issue. It should be noted that no published studies with Asian populations were located. The research described below discusses three primary areas of socio-emotional

development: the developing attachment relationship, features of social competence, and early identity.

Attachment

It is within the emerging attachment relationship between the primary caregiver and infant that communicative competence develops (Sachs, 2005; Klann-Delius & Hofmeister, 1997). Attachment, defined as an affectionate tie between the infant and its primary caregiver (Ainsworth, Blehar, Waters, & Wall, 1978) develops within the framework of caregiver-infant interaction during the first year of life. Fundamental to attachment are patterns of behavioral exchanges exhibited by the caregiver and infant. These behavioral patterns are conceptualized in two general classifications – secure and insecure (Weinfield, Sroufe, Egeland, & Carlson, 2008). A secure attachment is viewed as optimal for development and is distinguished by maternal sensitivity consisting of awareness to infants’ signals, accurate interpretation of infants’ needs and appropriate and prompt responses. Insecure attachment is viewed as less optimal and develops in the context of such maternal behaviors as inconsistency or ignoring perceptions and inaccurate and inappropriate responses to infants’ signals. Mothers with a secure attachment display behaviors that include maternal verbal responsiveness to their infant (Bakermans-Kranenburg, vanIjzendoorn, & Juffers, 2003).

There is some evidence based on non-DLL populations that the quality of the infant’s early experiences, particularly with respect to the consequences of mother-

infant attachment, is associated with later measures of child competence including socio-emotional functioning (Gauvain, 2007; vanIjzendoorn, Schuengel, & Bakersman-Kranenburg, 1999). Early maternal responsiveness has been found to be related to early comprehension skills (Paavola, Kunnari, & Moilanen, 2005) as well as an infant's attainment of productive language milestones (Tamis-Le Monda, Bornstein, & Baumwell, 2001). It is in the relational context of attachment that infants begin to develop their language skills.

Although attachment is thought to be a universal phenomenon (Keller, 2008), the distribution of security of attachment has been found to be different for different ethnic and socio-cultural groups (Rothbaum, Weisz, Pott, Miyake, & Morelli, 2000; van IJzendoorn, & Sagi-Schwartz, 2008). Van IJzendoorn and Sagi-Schwartz (2008) have also speculated that the attributes of secure base behavior may vary in degree across different ethnic and cultural communities. However, because no studies have specifically related the language status of non-English speaking mother-infant dyads residing in the US to attachment, we can only glean a sense of its distribution and possible functioning by inferring from limited work involving immigrant populations where English is not the primary home language. Unfortunately, only older studies of Latino populations residing in the US were located that may inform the present discussion.

Previous research on attachment in Latino populations where many of the participating mothers spoke Spanish as their primary language presents a mixed picture. Two studies suggest that there is a greater proportion of insecure attachment in Latino populations compared with middle-income Euro-American samples (Fracasso, Busch-Rossnagel, & Fisher, 1994; Lieberman, Weston, & Pawl, 1991); however one study did not locate a difference (Scholmerich, Lamb, Leyender, & Fracasso, 1997). Based on these studies, the reason for the possible preponderance of insecure attachment in some Latino groups is unclear. Lieberman and colleagues (1991) suggest that the Latina mothers in their sample were under unusual stress due to their immigrant status and therefore found it difficult to be emotionally available to their

infants. More recently, results of data from the ECLS-B study suggest that Latinos and African-American children are less likely to have secure attachments when compared to Asians (Chernoff, Flanagan, McPhee, & Park, 2007) and toddlers from Spanish-speaking homes are 22% less likely to be securely attached than English-speaking toddlers (Halle et al., 2009). In a study of attachment in a Mexican origin population participating in Early Head Start, Howes and Wishard Guerra (2008) found that at 14 months infants whose families were characterized as having more social support had higher attachment security scores than families with less social support.

Although not focused on infant and toddlers, a study by Oades-Sese and Li (2011) did examine the relationship between attachment and language development in a sample of DLL children that may have relevance for early development. In a study linking the quality of the attachment relationship to later English and Spanish oral language skills, these researchers studied 469 low-income Latino preschool children and found that parent-child attachment related to English but not Spanish oral language outcome. In addition, the acculturation level of the parent related to their child's language outcome. Specifically, as parental acculturation increased, children's English language development increased.

Socialization practices influenced by language and culture may demonstrate differential outcome contingent on the caregiver's generational and acculturative status. Previous work by Ispa, Fine, Halgunseth, et al. (2004) found a relationship between intrusive parenting (later described as "directive" parenting, Ispa et al., 2013) and positive socioemotional outcome in a Latino population. However, Howes and Wishard Guerra (2008) found that for mothers whose own mothers were born in Mexico, intrusiveness related to secure attachment compared to mothers whose own mothers were born in the US, where intrusiveness was associated with insecure attachment. These different associations between intrusive/directive parenting and attachment by immigration generation highlight the importance of understanding acculturation and immigrant generational status in mother-infant

relationships for Latino populations. They also suggest that parenting behaviors associated with social-emotional development may depend upon cultural context and which language will receive more attention; more research is needed in this area.

In terms of the relationship between attachment and language development in U.S. populations where the primary language of the home is not English, we know very little. Many studies that include participants with the appropriate background characteristics do not focus on the examination of the role of the primary language as a distinguishing factor. Typically, samples that contain DLL groups are studied for other reasons such as low income or risk status, thus making it difficult to untangle the nature of the relationship between DLL status and child outcomes. The limited research cited above suggests that patterns of attachment and the pathways to secure attachment may vary for young children with different cultural and linguistic backgrounds. Not only will attention to home language and culture be important for future research, within group variability should be a consideration.

Social Competence

Although there is growing research focusing on the social competence of DLL preschool-aged children, there are few empirical studies of this topic that address the infant and toddler period. Halle and colleagues (2009) analyzed the ECLS-B to compare families speaking primarily English at home with families speaking primarily Spanish or primarily another language and found that toddlers whose home language was not English exhibited fewer positive behaviors than English-primary toddlers. An important question would be how language experiences may interact with family and cultural socialization to impact early development of social competence, emotional and behavioral regulation, and early peer interactions.

Howes, Wishard Guerra, and Zucker (2008) examined competence of peer interaction and complexity of social pretend play in a longitudinal study of low-income Mexican American children from age 14 months to 5

years. Although the researchers state that prior research indicates pretend play is found among young children cross-culturally, in this sample they reported very low frequency of pretend play. The authors raised concern that their findings may suggest particular risk for atypical peer relations and play related to lower levels of literacy and oral language development of Spanish-speaking children moving into formal schooling settings in the United States. Among a small group of children who did exhibit pretend play, their play skills were associated with more secure attachment with their mothers, and mothers who engaged in more expansive language interactions with them in the early years. Howes and colleagues note that mothers had varying views about their role in supporting children's language development, which may help explain variation in parenting behaviors.

The empirical data suggest that responsive parenting, quality language interactions, attachment security, and social competence are interrelated. To the extent that DLL infants and toddlers have parents whose immigration status, social support and socioeconomic circumstances place them at risk, social competence development may be negatively affected.

Ethnic identity

The importance of maintaining one's primary language for the development of a healthy ethnic identity has been stressed by a number of experts in bilingualism and early childhood education (Bialystok, 2001; Wong Fillmore 1991; Sanchez & Thorp, 1998). The now oft-referenced study by Wong Fillmore (1991) describing the psychological loss experienced by children and parents when they are no longer able to communicate, has far reaching implications for the socio-emotional development of DLLs. Loss of a child's primary language may damage communication in the family, thus reducing trust and understanding and feelings of parental control (Tseng & Fuligni, 2000).

Ethnic identity is a complex and dynamic construct that refers to a person's commitment towards and feelings of belonging to an ethnic group and is influenced by

individual differences and contextual constraints (Phinney, 1996). The study of ethnic identity is most often focused on adolescent populations since it is at this developmental period that issues of identity exploration arise (Erikson, 1968). Research that describes the relationship between a child's primary language in the formation of their ethnic identity in adolescence supports the notion that language maintenance contributes to positive psycho-social adjustment such as the quality of the parent-child relationship (Oh, & Fuligni, 2010; Phinney, Romero, Nava, & Huang, 2001).

Although the study of ethnic identity has focused to a large degree on adolescents, the rudiments of identity development are found in early childhood. The “looking glass self” phenomenon suggests that the developing child begins to see him- or herself through the reflected evaluations of individuals who matter to them (Tice & Wallace, 2003). How young children construct their sense of who they are is very much based on how parents assist them in forming a personal narrative about who they are. This narrative is communicated through language and is related to the increasing ability of the child to use and understand language (Harter, 2006). Nelson (2003) has posited the concept of the “social-cultural-linguistic” self as developing between the ages of 2 and 5. According to Nelson, the “cultural” self is shaped through social and language interaction that reflects cultural values and beliefs. It is primarily through parental socialization practices that children learn about their racial or ethnic backgrounds with parents tailoring information to their children's age level (Hughes, Rodriguez, Smith, et al., 2006). Embedded in language are cultural beliefs and values that connect a child to his or her cultural past through oral traditions, literary forms, music, history and customs conveyed in the primary language (Padilla, 1999).

Although young children are at the beginning of their personal journey of the self, language is an important socialization tool for helping them understand who they are in their environment. To the extent that language is a tool for social interaction, language plays a part in shaping ethnic identity. For young DLLs, understanding and using their primary language may enable them to access important information about their culture, which may, in turn, be linked to their developing sense of self. More longitudinal research in this area is needed to link early use of primary language to the developing self in a multi-cultural context.

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Cognitive Development in DLL Infants and Toddlers

The primary focus of research on language-minority children under age 5 has been on the school-readiness gaps evidenced for low income children that tend to be even wider for low income children who are DLLs. In the Halle et al. (2009) analysis of ECLS-B data, for instance, 9-month-old infants from non-English speaking families had lower cognitive assessment scores than those from English-primary homes, and this gap widened by 24 months. At 24 months, non-Spanish DLLs were four-tenths of a standard deviation behind English-speaking children, and Spanish-primary toddlers were seven-tenths of a standard deviation behind English-primary children. However, it is important to consider cognitive development more broadly in terms of the cognitive demands placed on children who are actively learning two languages, and the longer-term trajectories and impacts of bilingual development.

There is a convergence of evidence indicating enhanced cognitive skills for bilingual individuals relative to monolinguals. Barac and Bialystok (2011) reviewed extensive literature addressing cognitive correlates of bilingualism, concluding that being bilingual has either a neutral effect on cognitive skills (such as some measures of IQ), or a positive effect (such as cognitive skills related to executive functioning). A 2010 meta-analysis identified bilingual advantages in the areas of memory, selective attention, and metalinguistic awareness (Adesope, Lavin, Thompson & Ungerleider, 2010). Much of the research in this area has focused on school-age children through adults, with little attention to shorter-term correlates during the very early years. The research also generally focuses on individuals identified as bilingual, without attending closely to the process of dual-language development early in life (such as sequential versus simultaneous dual-language acquisition).

In a rare study of pre-verbal infants, use of a visual looking paradigm to test executive functioning illustrated greater skills among 7-month-olds who have been exposed daily to two languages in comparison to those exposed to a single language (Kovács & Mehler, 2009). This study suggests that early bilingual exposure affects infants' ability to inhibit pre-potent response (in this case to successfully inhibit a learned visual response when the reward system in the study had been switched) in a domain unrelated to language production – a visual response. This finding implies a cognitive advantage for simultaneous dual language learners as early as infancy.

Using a battery of cognitive tasks with 24-month old children, Poulin–Dubois, Blaye, Coutya, and Bialystok (2011) attempted to further explore the possible existence of cognitive advantage for very young dual-language learners. Results comparing cognitive performance of children with experience both hearing and speaking two languages with those speaking just one language were mixed. Consistent with the finding of Kovács and Mehler (2009) for infants, the bilingual toddlers showed higher scores on a Stroop task requiring inhibition of a dominant response pattern. However on other executive functioning tasks requiring delay of

response there was no difference between the bilingual and monolingual toddlers. Such inhibitory skills have been shown to be higher among bilingual preschoolers and older children.

Together, these results suggest that exposure to two language systems may provide children with practice from a very early age in attending to language differences and inhibiting responses related to the non-active language. Bilingual advantages in these skills transfer to other, non-linguistic domains. Further advantages in cognitive functioning may require more experience using two languages, therefore appearing later in development. This area of inquiry has not been extended to low-income populations, nor has variation in cognitive advantage for individuals with different pathways to bilingualism (such as acquiring a second language after early childhood versus simultaneously in early childhood) been examined. Clearly, these are areas of needed research in order to more-fully understand the cognitive development of DLL infants and toddlers.

Language and Literacy Development in DLL Infants and Toddlers

Empirical evidence about the language and literacy development of DLL infants and toddlers comes from several sources. Research on monolingual language development is useful for highlighting universal processes as well as domains in which a multilingual language environment may lead to varying pathways of dual-language development. Research from school-age children and adults who are bilingual help us to understand potential long-term outcomes of dual-language development.

Findings from studies of early language development in monolingual children and children who are dual language learners, together with findings from studies of adult bilinguals, make it clear that the first 3 years of life are the most important years for language acquisition. Newborn infants prefer to hear the language or languages their mother speaks, revealing that they have already started to learn the sound patterns of their language from speech heard in the womb (Byers-Heinlein, Burns, & Werker, 2010;



Mehler, Jusczyk, Lambertz, Halsted, Bertoncini, & Amiel-Tison, 1988). Before their first birthday, children's speech perception has been tuned by their language exposure, making them particularly good at hearing the sound contrasts their language or languages use—and diminishing their ability to hear contrasts their language or languages do not use (e.g., Kuhl, Stevens, Hayashi, Deguchi, Kiritani, & Iverson, 2006; Polka, Rvachew, & Mattock, 2007; Sebastián-Gallés, 2011; Werker & Tees, 1984). The bulk of language acquisition occurs during the first four years of life, and it is rare for any individual to achieve native-like proficiency in a language they first experience after the age of 4 years (Abrahamsson & Hyltenstam, 2009). In sum, language learning begins early, and languages learned earlier are learned more effectively.

There is a wealth of research evidence linking rich, responsive language experiences to early language development. During infancy, interactions with speakers are important for children to understand and produce words and sentences of the target language being learned. Hurtado, Marchman, and Fernald (2008) documented the link between caregiver talk and children's vocabulary knowledge and lexical processing among Spanish speaking toddlers. The quantity and quality of mothers' speech predicted children's vocabulary development and processing speed.

Findings from studies of school-aged dual language learners and adult bilinguals underscore the value of achieving proficiency in two languages for children in dual language

environments. Optimal developmental outcomes in multiple domains are made more likely for DLLs when they develop good skills in both of their languages during the first years of life. The English language skills DLLs have acquired prior to school entry predict their educational achievement through 8th grade (Han, 2012; Halle et al., 2012; Kieffer, 2012; and see Hoff, 2013). DLLs' skills in their families' heritage language are also related to long term socioemotional, cognitive, and academic outcomes (Bankston & Zhou, 1995; Bialystok & Herman, 1999; Kim & Chao, 2009; Oh & Fuligni, 2010; Tseng & Fuligni, 2000). Furthermore, high skill levels in both English and children's heritage language is a desired outcome for dual language learners because bilingualism confers cognitive advantages (e.g., Bialystok, 2005), and because bilingualism has economic value to the individual. Bilingualism is also a societal good, as a bilingually competent workforce is necessary for the U.S. to successfully participate in the global economy.

To promote strong bilingual development, we should be searching for ways to optimize the development of skills in two languages in the early years. A focus on English-only instruction is often the result of the goal of reducing school readiness gaps between English speakers and DLL's, but imperils some outcomes, such as strong heritage language skills. Conversely, a focus on heritage language only may imperil others, such as school-readiness skills in English. The question is how to provide support for DLL infants and toddlers so that they may best benefit from the bilingual advantage and minimize school readiness delays.

Findings from studies of bilingual development from 0 to 3 years show that children can begin learning two languages from birth. When children experience meaningful interaction in two languages from infancy, they begin to acquire two languages simultaneously (Albareda,-Castellot, Pons, & Sebastián-Gallés, 2011; Bosch & Sebastián-Gallés, 2003; Polka et al., 2007; Pearson, Fernandez, Lewedeg, & Oller, 1997; Pearson & Fernandez, 1994; Pearson, Fernandez, & Oller, 1993; Petitto et al., 2001; Sebastián-Gallés, 2011; Song, Tamis-LeMonda, Yoshikawa, Kahana-Kalman, & Wu, in press). The course of development in each language acquired by young bilingual children follows the same pattern as seen in monolingual development. As is the case for

in the other language in DLLs, nor does the predictive relation between vocabulary and grammar that is seen within languages hold across languages for DLLs (Conboy & Thal, 2006; Marchman et al., 2004; Parra et al., 2011). In sum, evidence suggests that children who are dual language learners in the years from 0 to 3 proceed simultaneously down two, largely independent paths in acquiring their two languages.

Because bilingually-developing children's language experience and language knowledge is distributed across two languages, their rate of development in each language tends to be slower than the rate of monolingual development—more so in their less-dominant language (Bialystok & Feng, 2011; Bialystok, Luk, Peets, & Yang,

2010; Gathercole & Thomas, 2009; Hoff, Core, Place, Rumiche, Señor, & Parra, 2012; Marchman, Fernald, & Hurtado, 2010; Vagh, Pan, & Mancilla-Martinez, 2009; Place & Hoff, 2011). Measures of DLLs' language knowledge combined across their two languages show that between 0 and 3 years, DLLs acquire lan-

Evidence from other countries suggests continued bilingual development depends on continued meaningful use of the heritage language and that communities are an important source of that opportunity (Thomas, Gathercole, & Thomas, in press).

monolingual children, bilingual children's first words in each language tend to be words that serve social functions, followed by nouns and then verbs. With increases in vocabulary size, the proportion of vocabulary that consist of social function words and nouns decreases and the proportion of vocabulary accounted for by verbs increases. In each of their languages, young bilinguals first speak in single word utterances, then combine content words (i.e., nouns and verbs) and begin to acquire the words and word endings that serve grammatical functions. In young bilinguals, the development of grammar in each language is related to vocabulary size in that language, as it is in monolingual development (Conboy & Thal, 2006; Marchman, Martinez-Sussman, & Dale, 2004; Parra, Hoff, & Core, 2011). Within the domains of vocabulary and grammar, level of development in one language is typically not related to level

language knowledge at a rate comparable to monolingual children (Marchman et al., 2004; Patterson & Pearson, 2004; Pearson et al., 1993; Pearson & Fernández, 1994).

Whether and when dual language learners catch up to monolingual levels in their single language skills appears to depend on the larger social context. In the U.S., a frequent outcome is for children to stall in their heritage language development as they increasingly participate in the larger English-speaking culture and to become essentially monolingual speakers of English (Hoff, 2013; Najafi, 2011; Pearson, 2007; Wong-Fillmore, 1991). There are children who successfully achieve bilingualism, but it is not guaranteed by early dual language exposure at home. Evidence from other countries suggests continued bilingual development depends on continued meaningful use of the heritage language and

that communities are an important source of that opportunity (Thomas, Gathercole, & Thomas, in press).

Findings from studies of DLLs from 0 to 3 years show that the pace of dual language development depends on the amount and quality of language input children receive. DLLs vary in the rate at which they acquire the languages they hear, and a substantial portion of that variability can be attributed to differences in their language learning experiences. The amount of exposure children have to each language is a strong predictor of their skill level in that language (Hoff et al., 2012; Marchman et al., 2004; Place & Hoff, 2011; Pearson, Fernandez, Lewedeg, & Oller, 1997). Because children in dual language environments often hear one language more than they hear the other, the rate at which DLLs acquire each of their languages often differs, and as a result, young DLLs are often more advanced in one of their languages than the other—often substantially so.

There are also indications that some forms of exposure are more beneficial to language development than others. Exposure to English used by native speakers is a unique predictor of English language development among toddler DLLs (Place & Hoff, 2011) and among older immigrant children (Paradis, 2011). Studies of preschool and school-aged DLLs supports the conclusion that the quality of input affects the value of input. Two studies have found that mothers' level of English proficiency is a predictor of DLLs' English language development (Hammer et al., in press; Paradis, 2011). One study of toddler DLLs found that hearing English from multiple speakers also confers a benefit on DLLs English language development, beyond the effect of amount of exposure (Place & Hoff, 2011). Dual language development will be best supported by exposure to high-quality, rich language spoken by native speakers of each language. It is not necessary, and indeed inadvisable, for caregivers to limit exposure to the heritage language in hopes of promoting second-language development. Ongoing high quality heritage language exposure will ultimately support bilingual development.

Early Care and Education (Out of Home Settings) of DLL Infants and Toddlers

Patterns of enrollment in out of home child care and early education are related to parental employment patterns, preferences for child care, and beliefs about the effects of early care on children's development. These will vary based on parents' socioeconomic status, cultural beliefs, and family structure. For infants and toddlers, use of formal center-based care is often constrained by low availability, high cost, and parents' preferences for less-institutional forms of care in the early months and years of life. For DLL infants and toddlers, experiences in non-parental care are an important context for language input, either in the heritage language or a source of exposure to the second language. Research on infant-toddler child care use and experiences that has not necessarily focused on DLL children provides insight into issues of child care usage and impacts that can be relevant for DLL infants and toddlers.

A research review by Adams, Tout, & Zaslow (2006) reported that children aged 0-2 years of age with an employed mother are in non-parental care at somewhat lower rates than preschool-aged children, but nevertheless a majority (over 60%) receives non-parental care. Patterns of child care use vary by family income: infants and toddlers in lower-income families are more likely than those in higher-income families to be cared for by relatives (32% to 26%), whereas center-based child care is accessed at higher rates by infants and toddlers from higher-income households (21% compared to 16%). Among low-income children aged 0-5, rates of center-based child care are substantially lower for Hispanic children (15%) than non-Hispanic white (25%) and non-Hispanic black children (42%).

For DLL infants and toddlers, experience of out-of-home care may have unique implications for language exposure—possibly providing a child's first contact with native speakers of English, or providing additional support of the home language, or both. In preliminary analyses of child care use among families in the Early Head Start Research and Evaluation Study, Fuligni, Wishard

Guerra, and Nelson (2013) found different patterns for Latino families based on the mother's self-reported English language proficiency. In general, these low-income Latino children whose mothers did not speak English had less exposure to non-parental child care in the first 36 months. They also started child care and particularly center-based care at later ages than Latino children with English-speaking mothers. However, these patterns also meant that they experienced fewer transitions in child care arrangements during the first three years of life.

Different results were found in secondary analyses of data from the Early Childhood Longitudinal Study, Birth Cohort (ECLS-B). Analysis of child care use at 9, 24 and 52 months in this nationally-representative sample suggested that children in English-only homes were as likely to be in any form of non-parental child care as children in homes where a non-English language was spoken (Espinosa, et al. under review) when accounting for socio-economic status, maternal immigration, and country of origin. In fact, 'Hispanic' children were more likely to be in child care at 9 and 24 months after controlling for other variables. These apparent contradictory findings suggest that the use of a language other than English at home per se does not define families' child-care choices. Rather, other variables such as country of origin, availability, cultural and linguistic consistency, and immigrant status might have much more influence in families' choices.

Parental preferences for their infants and toddlers tends to be for parental care (87% of parents of infants and 59% of parents of toddlers); center-based care is the preferred form of child care for less than 2% of parents of infants and 18% of parents of toddlers (Rose & Elicker, 2010). Minority ethnic groups have lower rates of preferring non-parental care for their infants than other groups, and families with higher incomes are more likely to prefer non-parental care than families with lower incomes (Rose & Elicker, 2010). Latino infants and toddlers are much less likely to attend formal child care settings, with 69% being cared for by parents or other relatives (Calderón, 2007).

Research specifically focusing on effects of early childhood care and education for DLL infants and toddlers has not been done. However, some findings from EHS evaluation are relevant. Parents of children enrolled in Early Head Start reported fewer neglectful parenting practices than parents of children who were not enrolled in this program and were observed to give their children higher quality assistance during a challenging task. Parents of DLL children in the EHS intervention group as compared to those in the control group gave their children higher quality of assistance during a challenging task ($ES=29.8$) (U.S. Department of Health and Human Services, 2002).

Although standards of quality for infant-toddler care have been created and are widely used, there is no systematic research focusing on distinct factors that would contribute to ECE quality for DLL infants and toddlers. In the absence of research on quality specifically defined for young DLLs, it is still useful to consider studies of ECE quality as conceived for the general, primarily monolingual, population. The findings on the availability of high quality care for DLL infants and toddlers are similar to those for infants and toddlers in general. Both groups are unlikely to experience high quality environments. In addition, the small percentage of young DLLs who are in standard high-quality environments may be experiencing care that is not necessarily high quality for them, if their particular language needs are not being met.

Empirical research on best practices specifically for DLL infants and toddlers has not been done, but some resources provide guidance. Zero to Three publishes *Caring for Infants and Toddlers in Groups: Developmentally Appropriate Practice* (2008), which describes basic components of high-quality infant and toddler care including guidelines for group size and child: adult ratio, appropriate elements of the environment, and provision of primary caregivers to provide continuity of care, foster development of secure attachment relationships, and meet individual children's needs. With respect to DLLs, it is suggested that in the absence of a caregiver with a similar language and cultural background, chil-

dren's family cultural practices should be supported and respected. Han and Thomas (2010) discuss the importance of understanding children's diverse cultural backgrounds in order to promote social competence. This is accomplished through self-reflection by caregiving staff, acquisition of knowledge about the child's culture, and commitment to culturally responsive caregiving. They note that:

Although it is necessary for children to acculturate some new sociocultural values and skills under certain conditions in order to gain cultural capital, their heritages must not be abandoned in the process. Importantly, children's overall growth and development is better supported when they are not pressured to disregard their cultural identity and pride for their cultures is not devalued. (Han & Thomas, 2010, p. 474)

Guidelines for caregivers of infants and toddlers have also been developed by Nemeth (2012), whose handbook provides information on serving culturally and linguistically diverse families, and supporting home culture and language in the infant-toddler child care setting while also promoting English language development.

Research on the effects of ECE quality on development of monolingual children suggests that the quality experienced by infants and toddlers tends to be lower than that for preschoolers (Burchinal, Kainz & Cai, 2011; CQO Study Team, 1995; NICHD ECCRN, 2000a; Whitebook, Howes & Phillips, 1989). This finding is particu-

larly important, since the effects of quality care (as measured for general population) on children's cognitive, language, and social development tend to be stronger for 2- and 3-year-olds than for 4-year-olds (Burchinal et al., 2011). Early care settings can be an important source of language-advancing input.

Longitudinal research has revealed several associations between the quality of child care for infants and toddlers and developmental outcomes. For African-American infants and toddlers, quality, teacher-child ratios, and teacher education have all been linked to cognitive and language development (Burchinal, Roberts, Riggins, Zeisel, Neebe, & Bryant, 2000). Research with more diverse samples of infants and toddlers in the United States and Canada has also shown that the quality of language interactions in infant and toddler child care is associated with verbal and cognitive development (Fowler, Ogston, Roberts-Fiati, & Swenson, 1997; NICHD Early Child Care Research Network, 2000b), and children exposed to higher quality language input in a preschool or early care setting have more advanced language skills (Dickinson & Porche, 2011; Huttenlocher, Vasilyeva, Cymerman, & Levine, 2002; Snow, Tabors, & Dickinson, 2001).

While there are not studies specifically of effects of out of home care on dual language learners, this literature on the relation of language experience in early care to language development in monolinguals illustrates the importance of out-of-home experience. The existing research provides compelling argument for ensuring access to high-quality out-of-home experiences for DLL



infants and toddlers, but also points to the need for additional research in this area that is specific to the experiences of DLL infants and toddlers. Whereas it seems clear that standard measures of environmental quality and language interaction are important dimensions of the child care experience for DLL infants and toddlers, questions still exist about what other dimensions of experience may also be critical for supporting the development of young DLLs. Research exploring the availability of speakers of heritage language in child care settings and the quality of language exposure in the heritage language is subject to the same limitations of selection bias as is most of child care research, but large-scale studies on such topics could help strengthen conclusions about the impacts of a variety of child care settings and language exposures for DLLs.

Conclusions and implications

The work reviewed in this paper suggests several primary conclusions regarding infants and toddlers who are dual language learners. First, as with all DLLs in the U.S., the population is a diverse one that cannot be easily studied as a single group. Sociodemographic characteristics vary with respect to relative advantage or disadvantage (such as poverty, parent education levels, family structure, and social or linguistic isolation). The majority of DLL infants and toddlers come from low-income Spanish-speaking families who may be well-served in existing programs to promote development and school readiness but may be more linguistically isolated than non-DLLs and need programs that take their linguistic and cultural needs into account. For instance, 63% of parents of DLLs in Head Start and 57% in Early Head Start report that they don't understand English well or at all (ACF, 2013). High quality early care and education programs like Early Head Start can provide exposure to both English and Spanish on a daily basis. 91% of DLLs in center-based EHS programs were exposed to adults speaking English and 81% received exposure to Spanish spoken by adults (ACF 2013). Furthermore, among all DLLs in EHS (not just those who are Spanish-speakers), 85% had access to adults who spoke their home language. While these statistics

seem positive for those receiving EHS services, attention is needed to populations who are either too isolated to receive such services or those who do not qualify based on income.

Second, DLL infants and toddlers are a group that has received little research attention, although we can make inferences from other bodies of work that may be directly or partially relevant. For instance, research on the zero-to-three age period in general provides strong evidence of the importance of this age period for brain development, language learning, attachment formation, cognitive development, and emotional development. The experiences of DLLs during this period will certainly have implications for all of these domains of development, with ongoing effects throughout life. Additionally, research on particular populations that don't fully map on to the DLL population can nevertheless provide insight: research on immigrant families in general, as well as on low-income families and families of ethnicities likely to speak languages other than English (such as Latinos) illustrate important risk factors as well as cultural strengths and diversity that should be considered when seeking to support the development of DLL infants and toddlers.

There are two main areas of research directly focusing on dual language learners: research on bilingual children's cognitive advantage that has not looked closely at socioeconomic factors or included low-income/low education populations, and research on low-income language minorities often not exposed to second language until entering formal schooling – research showing deficits in school readiness skills. These two lines of research present two different pictures of dual language development and correlated outcomes. General conclusions about dual-language development are therefore hindered by confounds in the research. Early disparities in school readiness skills (e.g. Halle et al., 2009) are likely driven by combinations of risk factors, with low-income and maternal education the strongest predictors of developmental risk. Understanding and disentangling the confound between DLL status and SES factors is clearly an important research need. At the same time,

existing research findings suggest that addressing multiple risk factors, such as supporting language and literacy development for parents, would help promote DLL children's development.

The last two decades of research on language acquisition support a usage-based account in which language development depends on language exposure, and that exposure can take place in and out of the home. The evidence suggests that the fundamental processes underlying language acquisition are the same whether children are acquiring one or two languages. Input matters in both cases. This convergence of research suggests that optimizing development of DLL infants and toddlers should include support of home cultural and linguistic practices as well as experiences to support strong development of English language and literacy skills.

Because language experience in the first 3 years of life lays the foundation for optimal language development, it is important that the early experiences of DLLs include meaningful interactions with proficient speakers of both their heritage language and English. For children whose parents are not proficient in English, out-of-home care may be a crucial source of English input, while rich language experience in the home language should also be supported. We need more research to identify how and when skills acquired in one language transfer to another language, but it is clear that children need high quality exposure to each language they are to acquire.

In terms of recommendations for future research, this review has illustrated many areas with little to no empirical data to answer questions about the developmental contexts and trajectories of DLL infants and toddlers. In particular, research on bilingual language development with diverse enough samples to isolate effects of SES from effects of DLL status would greatly enhance our understanding. Also, the heterogeneity of DLL samples across such variables as immigration and acculturative status require unpacking. Furthermore, there is a clear need for ongoing assessment of in-home

and out-of-home language use and exposure in longitudinal and large-scale studies. Existing large-scale studies could provide opportunities for re-analysis of data to the extent that variables relevant to DLL status and bilingual development are available. Also, there is an urgent need for assessment tools that are normed on bilingual children and are culturally and linguistically appropriate. Finally, trajectories of bilingual language development should be measured to increase our understanding of the acquisition of multiple languages, cross-linguistic transfer of skills, patterns of language shift as English may overtake the home language, and language loss when children's home language is not adequately supported in a society where another language is dominant. The complexity of the community context and sociocultural variables that impact development of DLLs will require additional specifically-designed large-scale studies.

It is clear that the demographic pattern in the United States is swiftly moving toward a preponderance of bilingual and multilingual citizens. The research and practice worlds have already recognized the importance of the earliest years in setting the stage for healthy development. This paper has identified particular areas of focus for researchers and practitioners alike in expanding our understanding and support of dual language learning infants and toddlers.

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About CECER-DLL

CECER-DLL is a national center that is building capacity for research with dual language learners (DLLs) ages birth through five years. CECER-DLL aims to improve the state of knowledge and measurement in early childhood research on DLLs, identify and advance research on best practices for early care and education programming, and develop and disseminate products to improve research on DLLs. CECER-DLL is a cooperative agreement between the Frank Porter Graham Child Development Institute at The University of North Carolina at Chapel Hill and the Office of Planning, Research, & Evaluation (OPRE) in the Administration for Children & Families (ACF), in collaboration with the Office of Head Start and the Office of Child Care.

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