Research Article

Maternal Depressive Symptomatology, Social Support, and Language Development of Bilingual Preschoolers From Low-Income Households

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Purpose: This study examined the impact of maternal depressive symptomatology and social support on the English and Spanish language growth of young bilingual children from low-income backgrounds. It was hypothesized that maternal depression would slow children's development in both languages but that social support would buffer the negative effect.

Method: Longitudinal data were collected from 83 mothers of Puerto Rican descent and their children who were attending Head Start preschool for 2 years. The effects of maternal depressive symptomatology and social support from family and friends on receptive vocabulary and oral comprehension development in both languages were examined.

Results: Growth curve modeling revealed that maternal depressive symptomatology negatively affected Spanish receptive vocabulary development only. Maternal depression did not affect children's English receptive vocabulary or their oral comprehension in either language. Social support was not related to maternal depressive symptomatology or child language.

Conclusions: These findings suggest that maternal depression is 1 risk factor that contributes to less robust primary language development of bilingual children from low-income households. Speech-language pathologists must (a) increase their awareness of maternal depression in order to provide families with appropriate mental health referrals and (b) consider their roles as supportive adults for children whose mothers may be depressed.

Children of Latino descent are the fastest growing demographic in U.S. public schools (Aud et al., 2012). Many are exposed to Spanish in the home. In fact, 80% of bilingual children enrolled in public school report Spanish to be the primary home language (Kindler, 2002), making Spanish the most common language other than English to which children are exposed (Batlova & McHugh, 2010). The high percentage of Spanish-speaking children in preschool and elementary grades is expected to persist because Spanish is also the principal language of bilingual children attending Head Start preschool programs (Hulsey et al., 2011). Unfortunately, these children are at risk for future academic difficulties.

It has been well documented that Latino bilingual children living in the United States underperform their

monolingual peers in a variety of academic content areas (Duran & Weffer, 1992; Garcia & Miller, 2008; Reardon & Galindo, 2009). Nationally, Latino children score significantly lower than their English-only classmates on measures of language, literacy, and mathematics as they leave preschool and enter kindergarten (Moiduddin, Aikens, Tarullo, West, & Xue, 2012; Reardon & Galindo, 2009). The stark academic performance difference between these two populations endures throughout their educational experience: Latino students perform lower on measures of math and reading in fourth and eighth grades (Hemphill & Vanneman, 2011) and are more likely to drop out of high school than non-Latino students (Chapman, Laird, Ifill, & KewalRamani, 2011).

The educational disadvantage of Latino children is explained, in part, by differences in the amount of exposure to their two languages, which results in their differing abilities in each. A great proportion of Latino children live in homes where Spanish is the primary language, and many of these children do not speak English well (Capps et al., 2005). Yet, they attend English-only academic programs (García & Torres-Guevara, 2010), which require a strong foundation in English in order to participate. Depending on their amount

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of English exposure, bilingual children may require a substantial amount of time in order to achieve adequate levels of English proficiency necessary for favorable academic performance (e.g., Cummins, 1984). In addition, the generally low socioeconomic status (SES) of Latino children heightens their academic risk (Duran & Weffer, 1992). Thirty-four percent of Latino children live in households where the family income falls below the poverty line (Aud et al., 2012). Many of their mothers lack the required education for well-paying jobs: Nearly 30% of Latina women have less than a high school education (U.S. Department of Health and Social Services, 2011).

Language development is critical to the academic performance of these students (August & Shanahan, 2006). It has been shown that the oral language abilities, including vocabulary, of Spanish–English bilingual children from preschool age through the upper elementary grades are significantly related to initial and long-term reading outcomes (e.g., Dickinson, McCabe, Anastasopoulos, Peisner-Feinberg, & Poe, 2003; Dickinson, McCabe, Clark-Chiarelli, & Wolf, 2004; Miller et al., 2006). Literacy development, in turn, is related to their academic achievement (e.g., Genesee, Lindholm-Leary, Saunders, & Christian, 2005). It is important to note that the strong relationship between literacy development and language abilities exists both within and between bilingual children's two languages (Hammer, Lawrence, & Miccio, 2007). Therefore, the continued study of factors relevant to English and Spanish language development of young bilingual children is warranted in order to better address the academic difficulties faced by this population.

One factor that may influence language development in each of bilingual children's languages is the social–emotional context of the home environments. The context of general language acquisition is impacted by the relationships children have with their caregivers, which are affected by the distinct characteristics of the caregivers themselves (Bronfenbrenner, 1979, 2005). Specifically, the emotional health of the primary caregiver may enact an important effect on the communicative development of the bilingual child (Hammer, Miccio, & Rodriguez, 2004). Two factors that may affect the psychological well-being of children's caregivers include depression and social support (e.g., Ryff & Keyes, 1995). Broadening the field's understanding of these psychological factors will help to determine if the psychological environment of bilingual children from low-income homes is implicated in their educational achievement (González, 2001).

Depression, Social Support, and Child Language in Monolingual Populations

The current findings on the relationships among maternal depression, social support, and child language have come from research primarily on monolingual populations. Maternal depression in monolingual populations is linked to less than optimal child outcomes, including decreased cognitive performance, behavioral problems, and psychological disturbances (Cogill, Caplan, Alexandra,

Robson, & Kumar, 1986; Elgar, McGrath, Waschbusch, Stewart, & Curtis, 2004; Goodman et al., 2011; Hay et al., 2001; Herwig, Wirtz, & Bengel, 2004; Murray, 1992; Murray, Fiori-Cowley, Hooper, & Cooper, 1996; Petterson & Albers, 2001). Moreover, monolingual children of depressed mothers demonstrate decreased language abilities from early ages. Between ages 1 and 5 years, this group of children shows low language abilities overall and slower growth over time when compared to children whose mothers are not depressed (Brennan et al., 2000; Cox, Puckering, Pound, & Mills, 1987; Horwitz et al., 2003; Murray, 1992; National Institute of Child Health and Human Development [NICHD] Early Child Care Research Network, 1999; Pan, Rowe, Singer, & Snow, 2005). For example, Pan et al. (2005) found that children of depressed mothers had lower vocabulary growth trajectories than children of nondepressed mothers from 1 to 3 years of age. In fact, by age 3 years, children whose mothers were depressed produced 20 fewer words than their peers whose mothers were not depressed. In addition, the negative relationship between depression and language acquisition is magnified in situations of poverty (Murray, 1992).

The effect of maternal depression on child language may be explained by the interaction patterns shared by mothers and their children, which are thought to be less than ideal for child communication development. Overall, depressed mothers present fewer opportunities for child interaction (Gelfand and Teti, 1990; Stein et al., 2008). The infrequent interactions between depressed mothers and their children are often characterized as irritable and abrupt and have been found to lack rapid, consistent, and sensitive input (Cox et al., 1987; Downey & Coyne, 1990; Lovejoy, Graczyk, O'Hare, & Neuman, 2000; Murray et al., 1996; Roberts & Kaiser, 2011). These characteristics are contrary to responsive and repeated input widely thought to contribute to language acquisition. As a result, children whose mothers are depressed initiate verbal interactions less often than children of nondepressed mothers and speak less in general (Breznitz & Sherman, 1987; Cox et al., 1987). Without sufficient opportunities to build linguistic abilities, language development may be negatively impacted (Tomasello, 2003). Thus, in light of these findings, factors that may intervene in the relationship between maternal depression and language growth, such as maternal social support, warrant further exploration.

The effects of maternal depression on child language development may be reduced if the mother has adequate social support from family and friends (Adamakos et al., 1986; Burchinal, Folmer, & Bryant, 1996; Cohen & McKay, 1984; Herwig et al., 2004; Klebanov, Brooks-Gunn, & Duncan, 1994). Defined as the interpersonal provision of any number of tangible and emotional resources in response to stressful environments or situations, social support is thought to provide a buffer against the effects of stress (Cohen & McKay, 1984). Emotional resources can include providing mothers with a sense of belonging and solidarity in the face of adversity. Tangible resources may involve providing mothers with financial support or access to a

person with whom they can discuss life stressors. Increased social support from family and friends reduces stress and serves to improve maternal psychological well-being in turn (Herwig et al., 2004; Koeske, Daimon, & Koeske, 1990).

Maternal social support may also strengthen the interactional environment of the child. Indeed, young children of mothers reporting stronger social support receive greater amounts of academic and linguistic stimulation, more verbal praise, and less intrusive control as compared to children of mothers who are less satisfied with their social support networks (Burchinal et al., 1996; Jennings, Stagg, & Connors, 1991; Klebanov et al., 1994). It is important to note that this relationship between social support and improvements in mother-child interactions is most robust for low-income families (Cutrona & Troutman, 1986). Thus, social support is an important characteristic to investigate in any empirical study of the effects of maternal depression on child language. However, the relationships between this variable and maternal depression and child language have not been closely investigated for bilingual Latino children from low-income households.

Depression, Social Support, and Child Language in Bilingual Populations

The relationships among maternal depression, social support, and bilingual Latino children's language abilities require examination for two reasons: the complexity of language development in this population and the likelihood of increased exposure to depression in low-income Latino homes. First, language development of bilingual children is more complex than that of monolingual children given that these children are learning two languages rather than one. Accordingly, it is important to investigate the effects of maternal depression on both children's primary and secondary languages in order to determine if there are differential impacts on the developmental trajectory of each language. Early evidence of the negative effect of maternal depression on bilingual children's English expressive and receptive language abilities at 2 and 3 years of age has been uncovered (Horwitz et al., 2003; Stein et al., 2008). However, these studies did not investigate this relationship in children's primary languages. In addition, the authors found no published literature regarding the effects of maternal depression on bilingual children's language development beyond the toddler years. Therefore, more research is needed to understand the effect of maternal depression on bilingual children's growth in both languages in preschool in order to best understand the development of each of their two languages.

It stands to reason that the impact of social support on maternal depression and child language operates similarly for bilingual populations as has been shown for monolingual populations. Support from family and friends is strongly linked to the overall mental health of Latinos (Mulvaney-Day, Alegría, & Sribney, 2007). For example, higher degrees of support reduce maternal stress levels associated with depression in this population (Adamakos et al., 1986; Coyl, Roggman, & Newland, 2002; Planos,

Zayas, & Busch-Rossnagel, 1997). In addition, a small number of studies of depressed Latina mothers of children between the ages of 1 and 5 years from low-income households found that strengthened social support was related to characteristics of positive interactions (Contreras, Mangelsdorf, Rhodes, Diener, & Brunson, 1999; MacPhee, Fritz, & Miller-Hely, 1996; Planos et al., 1997). Mothers with greater social support showed improved engagement, greater frequency of verbal praise, and heightened sensitivity during mother-child interactions. These noted increases in positive parenting related to social support may then lead to improved child language abilities.

Second, it is well known that low SES is strongly linked to depression (Galea et al., 2007). Unfortunately, at least one in four Latinos in the United States lives in poverty (DeNavas-Walt, Proctor, & Smith, 2011), placing this population at a high risk for depression. Accordingly, Chung et al. (2003) found that 47% of Latino adults from low-income households met the clinical cutoff for depression as compared to 9% of the general population. Puerto Rican women, in particular, are most affected by depression (Alegría et al., 2007; Riolo, Nguyen, Greden, & King, 2005). Thus, it could be expected that Latino children from low-income households have an elevated likelihood of having a parent who is experiencing depression in the home.

Purpose of the Study

Therefore, the purpose of this study was twofold. The first objective was to examine the relationship between maternal depression and Puerto Rican preschool children's language development in both Spanish and English. It was hypothesized that maternal depressive symptomatology would negatively relate to the growth of bilingual children's Spanish and English receptive vocabulary and oral comprehension abilities over a 2-year time span. The second objective was to investigate the interaction between social support and maternal depression and its effects on preschool language development in each language. It was further postulated that social support would minimize any negative effect of maternal depressive symptomatology on child language growth.

When addressing these objectives, we examined children's language development in Spanish and English separately. The separate examination of each language assisted us in determining the differential impact of maternal depressive symptomatology and social support on development in Spanish and English. Currently, the study of Spanish and English as two systems is commonly accepted in developmental research on young Latino populations (e.g., Bohman, Bedore, Peña, Mendez-Perez, & Gillam, 2010; Hammer et al., 2012; Pérez, Tabors, & López, 2007; Parra, Hoff, & Core, 2011; Uccelli & Pérez, 2007). This perspective does not ignore research findings on the interactions between languages or on the interdependence of several language abilities (e.g., Gottardo & Mueller, 2009; Uccelli & Pérez, 2007) but rather acknowledges that the development of English and Spanish may follow differing trajectories. This is particularly true

when considering the fact that Spanish–English bilingual children can be highly variable in their degrees of proficiency and skills in each of their languages (Bedore et al., 2012). Other researchers have focused on the study of combined language functioning, considering the conceptual sum of language skills across English and Spanish (e.g., Marchman & Martínez-Sussmann, 2002; Pearson, Fernández, & Oller, 1993). This approach is critical for improving the field’s identification of language delay or impairment in this population (e.g., Bedore, Peña, Garcia, & Cortez, 2005; Gross, Buac, & Kaushanskaya, 2014). However, for the study of factors implicated in the development of language, bilingual children’s individual languages may be teased apart to identify evidence of differential effects of these factors on each language.

Method

Participants

Eighty-three mothers and their children participated in this study initially approved by the appropriate institutional review boards. The families were recruited from Head Start centers in urban areas of Pennsylvania for a larger longitudinal study that examined the language development of bilingual children in both English and Spanish. Mothers qualified for participation if they self-identified as Puerto Rican and spoke Spanish in the home. Their children were included for the study if they qualified to attend Head Start for 2 years. Participating children had no reported concerns about their speech, language, or hearing. All children passed a hearing screening.

Maternal demographic characteristics are provided in Table 1. At the beginning of the study, mothers averaged approximately 26 years of age ($SD = 5.16$; range = 19–48 years) and had completed an average of 11 years of schooling. Most mothers (82%) were born in the mainland United States. Approximately 18% of mothers identified Puerto Rico as their birthplace, reporting an average of 8 years of residence in the mainland United States. Regardless of their generational status, the majority of mothers (84%) self-rated their oral Spanish abilities as “good” or “very good.” Forty-eight percent of mothers were living with their children’s biological fathers. Half of all mothers were employed outside of the home.

Children had a mean age of 3 years and 7 months in the fall of their first year of Head Start ($SD = 4.0$ months; range = 36–54 months). Thirty-four were boys, and 52 were girls. The majority of the children (84%) were born in the continental United States, and the remainder were born in Puerto Rico. All children were exposed to Spanish from birth, and 55% were also exposed to English in the home prior to preschool enrollment. The average age that children were exposed to English was 1.86 years ($SD = 1.14$). Approximately one third (31%) of mothers self-reported that they used mostly or all Spanish with their children, whereas nearly 35% reported speaking an equal amount of Spanish and English. The remainder of mothers reported that they spoke more English than Spanish to their children. Children attended English-immersion classrooms where English was the primary language of instruction.

Measures

Background Questionnaire

To gather demographic information about the mothers and children, maternal Spanish proficiency, and language use in the home, a background questionnaire was designed on the basis of prior research from the National Institutes of Health–National Institute of Child Health and Human Development Developing English Literacy in Spanish Speakers (August, Kenyon, Malabonga, Caglarcan, & Tabors, 2002). Items pertinent to this study focused on the children’s and mothers’ ages and places of birth, mothers’ generational status, and the ages at which the children were first exposed to Spanish and English. In addition, an item specific to maternal language use asked mothers to indicate which language(s) were used when they spoke with their child. Five response options were provided: *all Spanish*, *more Spanish than English*, *equal amounts of Spanish and English*, *more English than Spanish*, and *all English*. An item specific to maternal Spanish proficiency asked mothers to rate their ability to speak Spanish on a 1 to 5 scale, ranging from *limited ability* to *very good (native-like)* ability.

Maternal Depressive Symptomatology

The Center for Epidemiologic Studies Depressive Scale (CES-D; Radloff, 1977) quantifies the number of depressive symptoms experienced by an individual. Available

Table 1. Maternal characteristics, expressed either as means and standard deviations or as percentages.

Maternal characteristic	<i>M</i>	<i>SD</i>	% of sample
Age (years)	25.99	5.16	
Education (years)	11.40	1.65	
Employed outside of home			50.6
Generational status			
First generation			18.8
Age of arrival to continental United States	19.86	3.39	
Total years in the continental United States	8.43	3.95	
Second generation			55.3
Third generation			22.4
Fourth generation			3.5

in English and Spanish, the CES-D is a 20-item self-report screening instrument that asks respondents to rate how they have felt and behaved in the past week. Items of the CES-D correspond to the following areas included in the diagnostic criteria for depression: depressive affect (e.g., "I felt sad"), somatic symptoms (e.g., "My sleep was restless"), positive affect (e.g., "I enjoyed life"), and interpersonal relations (e.g., "I felt that people dislike me"). Respondents provide a frequency rating for each item on a four-point scale, ranging from 0 (*rarely or none of the time; less than 1 day*) to 3 (*all of the time; 5–7 days*). The sum of item ratings is calculated, resulting in scores that range from 0 to 60. Higher scores on the measure suggest greater severity of depressive symptoms. A quotient score between 16 and 26 may indicate mild–moderate depressive symptomatology, and scores over 27 indicate possible major depressive symptomatology. This measure has been applied to female Puerto Rican populations in previous research studies (Potter, Rogler, & Mościcki, 1995; Ramos, 2005; Vera et al., 1991). The CES-D has been found to have good internal reliability with Puerto Rican populations (.87; Mahard, 1988).

Maternal Social Support

The Perceived Social Support from Family (PSS-Fa) and the Perceived Social Support from Friends (PSS-Fr) scales (Procidano & Heller, 1983) are survey measures that require respondents to qualify 20 statements concerning their feelings and experiences in relationships with family members or friends, respectively. On each item, respondents answer *yes*, *no*, or *I don't know*. A score of 1 is assigned to *yes*, and a 0 is assigned for *no* or *I don't know* responses. A sum score of 0 to 20 quantifies the extent to which the individual perceives family and friends fulfill his or her needs for support, information, and feedback. A score of 20 on each scale indicates maximum perceived social support. Both surveys are available in English and Spanish. The PSS-Fa and PSS-Fr have been utilized with populations of Puerto Rican women in previous research (Way & Greene, 2006; Way & Leadbeater, 1999). Good internal consistency of the Spanish versions of both scales has been reported: .86 for the PSS-Fa, and .82 for the PSS-Fr (Domínguez Espinosa, Salas Menotti, Contreras Bravo, & Procidano, 2011).

Child Receptive Vocabulary

The Test de Vocabulario en Imágenes Peabody (TVIP; Dunn, Lugo, Padilla, & Dunn, 1986) measures receptive vocabulary in Spanish. A standardized measure of Spanish vocabulary development, the TVIP can be administered to children between 2 and 17 years of age. The TVIP tests single-word comprehension by asking children to identify pictures of objects. Standardized on a population of monolingual Spanish-speaking children, authors of the measure reported internal consistency to be .93 across age ranges. Although it is an older measure, the TVIP was chosen because its authors report good internal consistency (.93), and its standardization sample included children from Puerto Rican households. The internal consistency of the TVIP when applied to study bilingual preschoolers in the United

States is also considered to be good, ranging from .69 to .84 in large-scale, longitudinal data sets (Tien & Burchinal, 2012).

The standardized Peabody Picture Vocabulary Test–III (PPVT-III; Dunn & Dunn, 1997) is designed to assess the English receptive vocabulary of individuals between the ages of 2 and 90 years. Similar to the TVIP, the PPVT-III assesses comprehension of single words that label objects. Although a fourth edition of the PPVT has been published (Dunn & Dunn, 2007), only the third edition of this measure was available for use at the time the data were collected. For bilingual preschoolers in the United States, the internal consistency of this measure is reported to range from .74 to .88 (Tien & Burchinal, 2012).

Child Oral Comprehension

The Auditory Comprehension subtest of the Spanish version of the Preschool Language Scale–Third Edition (SPLS-3; Zimmerman, Steiner, & Pond, 1992) assesses Spanish receptive language abilities. Updated fourth and fifth editions of the SPLS (Zimmerman, Steiner, & Pond, 2002, 2012) were not yet available for use at the time these data were collected. The standardized SPLS-3 was designed to assess the receptive and expressive language of children from birth through 6 years of age. The Auditory Comprehension subtest targets children's understanding of vocabulary and language structure as well as attention. Authors of the SPLS-3 report the internal consistency as ranging from .86 to .91.

Because the SPLS-3 was directly translated from the English edition (Restrepo & Silverman, 2001), there was a concern that the children would learn from one version to the other. This learning effect may have inflated children's scores in either language if both the Spanish SPLS and English PLS editions were administered to measure oral language comprehension. To avoid this possibility, the Receptive Language subtest of the Test of Early Language Development–Third Edition (TELD-3; Hresko, Reid, & Hammil, 1999) was administered. Appropriate for administration to children between 3 and 7 years of age, the Receptive Language subtest requires children to demonstrate understanding of instructions provided by the examiner or to identify pictures following an examiner prompt. This measure is designed for use with monolingual English speakers, and its authors report that the internal consistency is .91 with this population. Although the TELD-3 has an equivalent Spanish version (Ramos & Ramos, 2007), this measure was not published at the time of data collection.

Procedure

All procedures were approved through the Pennsylvania State University and Temple University Institutional Review Boards. Bilingual home visitors who were native speakers of Puerto Rican Spanish, were members of the participants' community, and were trained in the administration of all measures administered the background questionnaire, CES-D, PSS-Fa, and PSS-Fr during home visits with the mothers. Not all of the measures were administered at

each time point in order to minimize participant burden. The CES-D was completed each fall and spring of the children's 2 years in Head Start. The PSS-Fa and PSS-Fr were administered in the fall of each year. Data collectors read the questions or statements included in each measure aloud to the mothers in the language of the mothers' choosing, thereby limiting any possible difficulties related to low maternal literacy levels. Mothers' responses were recorded for later analyses.

Children's receptive language abilities were assessed in both Spanish and English in the fall and the spring of each of the children's 2 years of Head Start before entering kindergarten. Bilingual data collectors fluent in Puerto Rican Spanish and English and trained by the third author on standardized testing procedures administered the language measures in the children's Head Start centers. Spanish and English testing was completed on separate days, approximately a week apart, by different data collectors. Correct answers were accepted only in the language of administration. An average of 6 months separated fall and spring data collection time points.

Analysis

Analyses were conducted using SPSS Version 21.0 with maximum likelihood estimation (IBM SPSS Statistics for Mac, 2012). Raw scores were calculated for all language measures to provide an appropriate metric for estimating children's individual change in skills over time, as is conventionally used for developmental analyses (e.g., Campbell, Pungello, Miller-Johnson, Burchinal, & Ramey, 2001; Hammer et al., 2007). Visual inspection of the scatter plots of raw scores for each language measure resulted in detection of one outlier for Spanish receptive vocabulary. This child's score on the TVIP was greater than 4.5 *SDs* above the sample mean, and, therefore, her data were omitted from the analyses of the Spanish receptive vocabulary only. Following procedures outlined by Singer and Willett (2003), growth curve modeling was used to determine the effects of maternal depression and social support on children's vocabulary and oral comprehension abilities over four time points, beginning with the fall of their first year and ending with the spring of their second year of Head Start. Separate growth curve analyses were conducted to predict each outcome variable (i.e., Spanish receptive vocabulary, English receptive vocabulary, Spanish oral comprehension, English oral comprehension). Due to unpredicted school absences and household moves, which are commonplace in longitudinal research involving families of low SES backgrounds, the number of children on whom data were collected decreased from 83 in the fall of the first Head Start year to 68 in the spring of the second Head Start year. Growth curve modeling is advantageous to this type of study because it easily accommodates missing data as well as variations in measurement occasion. It further allows predictors to vary over time, thereby capturing the chronicity of the mothers' depressive symptomatology (Singer & Willett, 2003).

Growth curve modeling occurred in three stages. The first two stages were preliminary analyses required for further model building. In the first stage, unconditional means models were constructed for each language outcome to determine the mean scores for all children across all time points. In the second stage, unconditional growth models were constructed by adding the effect of time (children's age) as a variable prior to adding the predictor variables in order to model the average 2-year growth trajectories for Spanish and English vocabulary and oral comprehension. The unit of time was constructed by centering age on the mean age in months at the first measurement occasion (45 months), allowing for a more interpretable intercept and accounting for the variability of child age at each time point. In other words, 45 months were subtracted from all children's ages across all time points to represent the average age of entry to Head Start for this particular sample. From this point forward, the variable representing time will be labeled "age." At this stage, all possible growth trajectories were also tested (i.e., linear, quadratic, cubic, and discontinuous), and the best-fitting models were identified.

In the third stage, conditional growth models were constructed by adding the time-varying predictors of maternal depressive symptomatology and social support to previous models. All of the predictors entered into each model were considered Level 1 variables. The best conditional growth model for each language outcome was a random intercept model with a fixed slope, which improved model convergence. Model fit for each outcome was determined by the lowest value of $-2 \log$ -likelihood (deviance) tested against a chi-square critical value.

In order to determine the relation between maternal depressive symptomatology and child language, mothers' categorization on the CES-D was entered as a predictor into conditional growth curve models to analyze its effect on children's initial scores and change over time on all four language outcome measures. The categorization of maternal depressive symptomatology was created by dichotomizing mothers' CES-D scores to indicate presence or absence of depressive symptomatology similar to analytical procedures used in previous investigations of maternal depression and child outcomes in low-income populations (e.g., Hubbs-Tait et al., 2002). The researcher-designated cutoff score of the CES-D of 16 (Radloff, 1977) was used to determine mothers' depressive symptomatology. This cutoff score has been validated as clinically meaningful for discriminating between depressed and nondepressed individuals from a variety of populations (e.g., Weissman, Sholomskas, Pottenger, Prusoff, & Locke, 1977), including individuals of Puerto Rican descent (Mahard, 1988), and it has been commonly applied to explore the impact of depression on myriad factors (e.g., Fredman, Magaziner, Hebel, Hawkes, & Zimmerman, 1999; Williams & Latkin, 2005). As such, scores of 16 or above were coded as 1 to indicate the presence of mild to major maternal depressive symptomatology. This variable was coded as a 1 or a 0 at each of the four time points in order to account for the chronicity of mothers' depressive symptoms.

Four parameter estimates were generated for this model: intercept, CES-D, age, and CES-D $\times$ Age. The intercept represents children's average score on each language outcome at the beginning of Head Start, holding all else constant. The parameter estimate named *CES-D* represents the effect of maternal depressive symptomatology on each language outcome score at the beginning of Head Start. The parameter estimate labeled *age* represents the growth trajectory of each language outcome during 2 years of Head Start, holding all else constant. The parameter estimate named *CES-D $\times$ Age* represents the effect of maternal depressive symptomatology on the growth trajectory of each language outcome.

In order to determine the relations among maternal social support and maternal depressive symptomatology, and child language outcomes, mothers' scores on the PSS-Fa and PSS-Fr were summed to create a social support composite variable (opportunity for a maximum of 40 points) that was added as a predictor into the conditional growth model centered on its grand mean. Four additional parameter estimates were generated in this growth curve model. Social support represents the main effect of social support on each language outcome score at the beginning of Head Start. CES-D $\times$ Social Support tested whether social support moderated the relationship between maternal depressive symptomatology and the initial language outcomes. Social Support $\times$ Age represents the effect of social support on the growth trajectory of each language outcome, holding all else constant. The three-way interaction (i.e., CES-D $\times$ Social Support $\times$ Age) tested whether social support moderated the relationship between maternal depressive symptomatology and language outcomes over time, after controlling for the main effects of maternal depressive symptomatology and social support.

It should be noted that separate growth curve models following the analytical procedure outlined here were completed with the inclusion of a variable to control for children's varied home exposure to Spanish and English. None of the models were significantly improved with this addition, and the results did not vary. Therefore, in order to report the most parsimonious models, the results of growth curve modeling reported next do not include this home language exposure variable.

Results

Descriptive Statistics

Table 2 presents the means and standard deviations of the CES-D and each of the social support scales at each time point for which the measures were administered. The mothers' CES-D means were between 19.90 and 21.94 over their children's 2 years of Head Start. These values fell well above the reported 13.95-point average CES-D score for Puerto Rican women (Potter et al., 1995). Of the mothers in this study, 50%–70% had CES-D scores that were greater than the clinically meaningful cutoff of 16 for depressive symptomatology at all time points. In fact, for the

Table 2. Summed scores of maternal depressive symptomatology and social support by time point.

Time point	<i>M</i>	<i>SD</i>
CES-D		
Head Start Year 1 Fall	21.94	9.27
Head Start Year 1 Spring	21.27	9.98
Head Start Year 2 Fall	21.49	10.65
Head Start Year 2 Spring	19.90	10.34
Social support		
From family		
Head Start Year 1 Fall	11.93	3.95
Head Start Year 2 Fall	12.62	3.53
From friends		
Head Start Year 1 Fall	10.45	4.56
Head Start Year 2 Fall	10.16	3.95
Composite		
Head Start Year 1 Fall	22.33	7.09
Head Start Year 2 Fall	22.76	5.36

Note. CES-D = Center for Epidemiologic Studies Depressive Scale (Radloff, 1977).

duration of the study, more than 26% of mothers reported depressive symptoms that corresponded to the range of major depressive symptomatology (i.e., greater than 27 points; Radloff, 1977).

Mothers' perceived social support scores from family and friends remained consistent between fall of their children's first and second years of preschool. Out of a total possible score of 40 points, composite scores on the social support measure averaged 22.33 (*SD* = 7.09) and 22.76 (*SD* = 5.36) in the fall of the children's first and second years of Head Start, respectively.

The means and standard deviations of the raw and standard scores of the TVIP, PPVT, and the oral comprehension subtests of the SPLS and TELD for each preschool time point are presented in Table 3. Although raw scores were used for analysis, standardized scores are also reported to offer comparison of the abilities of the bilingual children in this study to monolingual population norms. Descriptive results indicated that children's raw scores on all Spanish and English language measures increased over their 2 years of preschool. Standard scores for English vocabulary and oral comprehension also improved over time, as expected given children's increased exposure to English in their classrooms.

Maternal Depressive Symptomatology and Language Abilities

Results of the final conditional growth models are reported in Table 4. Table 4 includes the parameter estimates from the conditional growth models for each of the four language outcomes when CES-D was entered as a predictor. The intercept represents each language outcome score for a child of average age at the beginning of Head Start whose mother did not experience depressive symptomatology. Maternal depressive symptomatology was not found to significantly affect children's TVIP ($p = .052$), PPVT ($p = .177$),

Table 3. Raw and standard scores of child language measures by time point.

Time point	Raw scores		Standard scores	
	M	SD	M	SD
Spanish vocabulary (TVIP)				
Head Start Year 1 Fall	4.58	4.46	80.77	6.51
Head Start Year 1 Spring	6.49	6.86	77.61	10.66
Head Start Year 2 Fall	9.66	9.33	72.80	13.45
Head Start Year 2 Spring	10.90	11.55	70.82	15.55
English vocabulary (PPVT)				
Head Start Year 1 Fall	19.63	12.84	71.11	16.61
Head Start Year 1 Spring	24.34	14.53	73.32	16.47
Head Start Year 2 Fall	34.53	15.13	77.69	14.76
Head Start Year 2 Spring	47.03	15.20	84.22	12.58
Spanish oral comprehension (SPLS)				
Head Start Year 1 Fall	23.05	7.33	69.99	14.62
Head Start Year 1 Spring	26.92	9.61	73.42	17.52
Head Start Year 2 Fall	31.16	9.24	75.59	18.68
Head Start Year 2 Spring	32.91	8.67	71.62	14.89
English oral comprehension (TELD)				
Head Start Year 1 Fall	12.28	5.43	79.68	14.27
Head Start Year 1 Spring	15.62	6.87	82.80	18.46
Head Start Year 2 Fall	19.94	5.96	86.56	16.65
Head Start Year 2 Spring	22.75	5.30	90.35	17.73

Note. TVIP = Test de Vocabulario en Imágenes Peabody (Dunn et al., 1986); PPVT = Peabody Picture Vocabulary Test—III (Dunn & Dunn, 1997); SPLS = Preschool Language Scale—Third Edition, Spanish edition (Zimmerman et al., 1992); TELD = Test of Early Language Development—Third Edition (Hresko et al., 1999).

SPLS ($p = .422$), or TELD ($p = .356$) raw scores at the beginning of Head Start.

In Table 4, age represents the average growth in each of the outcome scores for a child of average age at the beginning of Head Start whose mother did not experience depressive symptomatology. Maternal depression was found to affect the growth of the TVIP only. The interaction of CES-D and age was significant and in the negative direction, $t(235.64) = -1.99$, $p = .047$. Specifically, children

of mothers who experience depressive symptomatology would have lower TVIP raw scores by 0.24 points for each 1-month increase in age. Therefore, if two children of average age at the beginning of Head Start are compared, the child whose mother scored above 16 on the CES-D at all four time points would score approximately 14.16 raw points on the TVIP by the end of 2 full calendar years, whereas the child's peer whose mother did not experience depressive symptomatology would achieve a higher raw score of approximately 17.66 at the end of Head Start. Maternal depressive symptomatology was not found to significantly affect the growth in raw scores for the PPVT ($p = .115$), SPLS ($p = .988$), or TELD ($p = .876$) over time.

Social Support, Maternal Depressive Symptomatology, and Language Abilities

The social support composite variable was added as a predictor into the conditional growth models to answer the second research question. The main effect of social support was not found to significantly affect TVIP ($p = .678$), PPVT ($p = .571$), SPLS ($p = .434$), or TELD ($p = .294$) raw scores at the beginning of Head Start. Furthermore, social support did not significantly impact the growth in raw scores for the TVIP ($p = .623$), PPVT ($p = .384$), SPLS ($p = .993$), or TELD ($p = .878$) over time. Furthermore, social support did not moderate the relationship between maternal depressive symptomatology and language growth over the 2 years in Head Start as indicated by the nonsignificant three-way interaction for the TVIP ($p = .082$). Because social support did not contribute to the overall model fit, it was not included in the final models as reported in Table 4.

Discussion

There were two purposes of this study. First, the relationship between maternal depressive symptomatology and language growth in Spanish and English for bilingual

Table 4. Results of final conditional growth models predicting language outcomes.

Model parameter	TVIP		PPVT		SPLS		TELD	
	Estimate (SE)	95% CI	Estimate (SE)	95% CI	Estimate (SE)	95% CI	Estimate (SE)	95% CI
Fixed effects								
Intercept	3.25* (1.17)	0.93, 5.57	21.00** (2.02)	17.02, 24.98	24.35** (1.23)	21.92, 26.77	12.55** (0.84)	10.90, 14.20
CES-D	2.42 (1.23)	-0.02, 4.86	-2.56 (1.89)	-6.29, 1.17	-1.12 (1.39)	-3.86, 1.62	0.80 (0.87)	-0.91, 2.51
Age	0.58** (0.10)	0.39, 0.78	1.48** (0.15)	1.18, 1.78	0.69** (0.12)	0.46, 0.92	0.62** (0.07)	0.48, 0.76
CES-D × Age	-0.24* (0.12)	-0.48, 0.003	0.29 (0.19)	-0.07, 0.66	-0.002 (0.14)	-0.27, 0.27	0.01 (0.09)	-0.16, 0.18
Random effects								
Within person	30.51** (3.09)		67.41** (6.89)		44.05** (4.45)		14.96** (1.53)	
Intercept	33.66** (6.78)		148.20** (27.31)		20.78** (5.47)		17.54** (3.60)	
Goodness of fit								
Deviance	1,817.55		2,116.02		1,890.74		1,652.26	

Note. The table displays parameter estimates with standard errors in parentheses. TVIP = Test de Vocabulario en Imágenes Peabody; PPVT = Peabody Picture Vocabulary Test—III; SPLS = Preschool Language Scale—Third Edition, Spanish edition; TELD = Test of Early Language Development—3; CI = confidence interval; CES-D = Center for Epidemiologic Studies Depressive Scale.

* $p < .05$. ** $p < .01$.

children from low-income households in the preschool years was examined. Second, the impact of social support on that relationship was investigated. Several important findings are discussed next.

Maternal Depressive Symptomatology

It is notable that the mothers reported high rates of depressive symptomatology throughout the children's preschool years. As indicated in Table 5, more than half of the mothers reported symptoms of depression that corresponded to possible mild–major depressive symptomatology during the children's 2 years in Head Start. In fact, more than a quarter of mothers had CES-D total scores that were in the range of major depressive symptomatology at each time point. These results coincide with previous research that has identified high rates of depression among Latina women who have low educational levels and limited economic resources (Alegria et al., 2007; Chung et al., 2003; Riolo et al., 2005). However, the mothers included in this study had higher average scores on the CES-D than have been reported for Puerto Rican women specifically (Potter et al., 1995). It can be speculated that some of these mothers were affected by factors that have been found to contribute to higher rates of depression among this population, including disrupted marital status, lower levels of English language proficiency, and fewer years living in the U.S. mainland (Alegria et al., 2007).

Maternal Depressive Symptomatology and Vocabulary

As hypothesized, children's receptive vocabulary growth in their primary language, Spanish, was significantly slowed by their mothers' depressive symptomatology. This finding was consistent with existing literature regarding the receptive vocabulary development of young monolingual English-speaking children and their depressed mothers (e.g., Brennan et al., 2000). It should be noted that although the relationship between maternal depressive symptomatology and Spanish vocabulary growth was significant, the overall effect of the relationship can be regarded as minimal over time. Although it is possible that mothers exhibiting depressive

symptomatology were providing their children with less than optimal language support (e.g., Lovejoy et al., 2000), causing a slight reduction in vocabulary growth, children of depressed mothers were not overwhelming disadvantaged by their mothers' depression.

Instead, the cumulative effect of environmental and demographic risk factors, in addition to maternal depression, faced by children living in poverty may be more impactful on vocabulary development than depression alone. Research has shown that language development is substantially affected by low SES prior to taking into account any additional risk experienced by the child (e.g., Hoff, 2003). As reported by Halle et al. (2009), each additional risk factor experienced by a child from a low-income household contributes to widening the disparity in cognitive development compared with nonimpoverished peers. Additionally, maternal depression has been found to compound the negative impacts of low SES on early developmental outcomes for monolingual children (Goodman et al., 2011; Kiernan & Huerta, 2008; Petterson & Albers, 2001). Taken together, these findings suggest that maternal depressive symptomatology may be one factor as part of a composite indicator of risk that requires further consideration when investigating the vocabulary development of bilingual children, specifically those living in poverty.

In terms of English vocabulary, children of mothers experiencing depressive symptoms performed no differently than their peers at initial Head Start entry or over time. This finding was contrary to our proposed hypothesis and also to the existing body of work that has identified lowered English language skills of bilingual children of depressed mothers (Horwitz et al., 2003; Stein et al., 2008). Consequently, factors external to the mother, such as the variability of exposure provided by conversational partners other than the mother, may be more important predictors of bilingual children's English vocabulary growth than the quality of mother–child interactions alone (Place & Hoff, 2011). Furthermore, the participating mothers were all native Spanish speakers, approximately two thirds of whom spoke to their children in Spanish at least half of the time. As proposed by Hoff (2013), English language development may be best supported by interactions with native English speakers rather than nonnative speakers.

It may also be that children's peers, teachers, and assistant teachers in their English language–dominant educational settings exert an important influence not captured in the current study (Hoff, 2006) above and beyond communicators in the children's home environment. It is important to note that all of the children who participated in this study were enrolled for 2 years in Head Start classrooms in which English was the language of instruction. These children's educational experiences may have led to differences from previous research findings showing a relationship between maternal depression and English vocabulary in younger populations who may not have been cared for outside of the home (Horwitz et al., 2003; Stein et al., 2008). Specifically, the relationships between young children identified to be at risk and their teachers have

Table 5. Percentage of mothers with Center for Epidemiologic Studies Depressive Scale scores indicating mild–major depressive symptomatology by time point.

Time point	% of sample
Head Start Preschool Year 1	
Fall	70.00
Spring	67.57
Head Start Preschool Year 2	
Fall	66.18
Spring	56.45

Note. Total scores between 16 and 26 may indicate mild–moderate depressive symptomatology; scores greater than 27 may indicate major depressive symptomatology.

previously been shown to offer a protective factor against academic difficulties (Hamre & Pianta, 2005). Perhaps the relationship between bilingual children of depressed mothers and their primarily English-speaking teachers buffered the negative effects of maternal depression on English language outcomes. In fact, for bilingual children specifically, teacher–child attachment has been shown to influence English language abilities more strongly than their attachment to their parents (Oades-Sese & Li, 2011). As the cultural definition of attachment relationships between Latino children and adults is thought to extend well beyond caregivers in the home, teachers may play a critical role in fostering children’s resiliency (Oades-Sese et al., 2013).

Maternal Depressive Symptomatology and Oral Comprehension

Maternal depressive symptomatology did not have an effect on the rate of growth of Spanish and English oral comprehension in the preschool years. It is unclear why children’s oral comprehension was unaffected by maternal depressive symptomatology when previous research on monolingual populations has found decreased performance in this linguistic domain for children of depressed mothers (e.g., NICHD Early Child Care Research Network, 1999). Again, the impact of additional communication partners in the children’s home and school environments must be considered (Hoff, 2006). This consideration is particularly important given that previous research revealing a relationship between maternal depression and oral comprehension development focused on very young participants likely not enrolled in educational programs. The additional language support offered by teachers and peers in schools may serve to override the disadvantageous impact of maternal depression on oral comprehension in both languages.

The Role of Social Support

Social support was not found to affect either maternal depressive symptomatology or children’s language abilities over time. This finding differed from our hypothesis, which was grounded in previous monolingual research linking decreases in the adverse impact of maternal depression on child language development for mothers with adequate social support from family and friends (e.g., Herwig et al., 2004). It should be noted that the social support scores reported by the mothers in our study were low on average. Unfortunately, Puerto Rican women living in the U.S. mainland generally report significantly reduced social support when compared to their peers still living on the island of Puerto Rico (Landale & Oropesa, 2001). Perhaps the social support these mothers received from family and friends in the U.S. mainland was not enough to sufficiently buffer the effects of maternal depression on child language abilities for this population.

Limitations and Future Directions

Two specific limitations of this study bear mentioning. First, the measures selected to assess language skills in

this particular population may reduce the generalizability of these findings. The TVIP and the SPLS-3 were the only measures available for assessing Spanish vocabulary and oral comprehension for the age range of participants at the time this study was conducted. Concerns have been expressed about the use of both measures with bilingual children because the TVIP and SPLS-3 were normalized with monolingual children (e.g., Kester & Peña, 2002; Restrepo & Silverman, 2001). However, Tien and Burchinal’s (2012) analysis of TVIP data gathered from four large-scale investigations of bilingual language development found reliability of this measure to fall in the good range when used with this population. Yet, it should be noted that neither the TVIP nor the SPLS-3 was used to classify the children in this study as typically developing or language impaired but rather to study factors that affected their language development. As such, speech-language pathologists are cautioned not to apply the scores reported here to clinical populations.

The second limitation of this study is that the interaction patterns between mothers and their children were not observed. Given that depressed mothers of monolingual English-speaking children have been found to provide less than optimal language stimulation to their young children (e.g., Lovejoy et al., 2000; Roberts & Kaiser, 2011), study of the interactions between bilingual children and their depressed mothers may be necessary to explain the particular behavioral or linguistic sources of reductions in Spanish vocabulary development.

Future research on maternal depression and bilingual language development should also take into account the experience of children whose mothers are chronically depressed and investigate possible differential effects due to the timing of depressive symptomatology. In a review of research linking maternal depression and language development in monolingual populations, Sohr-Preston and Scaramella (2006) found that the chronicity of maternal depression is most associated with unfavorable child cognitive and communication outcomes.

In addition, future investigations on the language development of bilingual children from low-income households should also include maternal depression as one variable among several that may compound the risk for weakened language abilities over time. As the current findings indicate, the impact of maternal depressive symptomatology alone may not significantly contribute to the language and literacy performance gap between bilingual English–Spanish-speaking preschoolers and their monolingual peers. However, the language development of bilingual children may suffer from the cumulative effect of living in a home with a depressed parent with simultaneous exposure to additional stressors associated with disadvantaged economic circumstances, such as limited material resources, household crowding, and inconsistent parental employment (Bradley & Corwyn, 2002). In fact, for young monolingual populations living in poverty, cumulative risk models including symptoms of maternal depression have been associated with decreased cognitive and communication outcomes

(Hooper, Burchinal, Roberts, Zeisel, & Neebe, 1998). The inclusion of cumulative risk models in the study of language development may be particularly important for children attending Head Start, because nearly 40% of these children have been found to experience three or more medical, demographic, or social factors that put early language development at risk (Stanton-Chapman, Chapman, Kaiser, & Hancock, 2004).

Finally, it bears mentioning that the findings in this study are specific to mothers and children with low-income Puerto Rican backgrounds living in urban areas in the U.S. mainland. The variations between Puerto Ricans and other Latino subgroups in language use, socioeconomic class, and immigration status, among other variables, may relate to differences in the effect of maternal depression on child language skills. Therefore, studies of maternal depression and bilingual language development should be extended to Latino subgroups with varied experiences, such as the Mexican population, which makes up the largest proportion of the U.S. Latino population (Ennis, Ríos-Vargas, & Albert, 2011). Future studies should also address the impact of maternal depression in populations that are not considered low-income populations.

Clinical Implications

These findings suggest that speech-language pathologists in pediatric settings serving low-income bilingual families should be aware of maternal depressive symptomatology. Although maternal depression did not play as prominent a role in primary language development as was expected in this study, research consistently shows that maternal depression is detrimental for long-term child mental, social, and physical health (e.g., Luoma et al., 2001). Therefore, practitioners must be prepared to refer mothers who evidence symptoms of depression to the appropriate medical or social work professionals. Referrals to address poor maternal psychological health are especially relevant to this population in light of the fact that Latino adults in poverty have poor access to healthcare overall, which worsens when depression is the issue at hand (Braveman, Cubbin, Egerter, Williams, & Pamuk, 2010; Stockdale, Lagomasino, Siddique, McGuire, & Miranda, 2008). Mothers who receive adequate mental health services to address their depression may, in turn, be better equipped to support children's language development at home.

Furthermore, speech-language pathologists should consider their possible role in reducing the detrimental effects of maternal depressive symptomatology on child language development by forging strong relationships with children from this population. Findings from this study implicate the importance of teachers in potentially buffering reductions in English language development for Latino children of depressed mothers. Speech-language pathologists may also serve this role as supportive adults for children affected by maternal depression by providing secure, healthy, and caring relationships within which language development (in both Spanish and English) can flourish and

child resiliency can be fostered. This recommendation takes into account the Latino cultural notion that children's attachments stretch beyond the relationship between the mother and child alone, including many adults who provide care to the child (Oades-Sese et al., 2013).

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