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"It Takes a Village" to Support the Vocabulary Development of Children With Multiple Risk Factors

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Data from a nationally representative sample from Turkey (N = 1,017) were used to investigate the environmental factors that support the receptive vocabulary of 3-year-old children who differ in their developmental risk due to family low economic status and elevated maternal depressive symptoms. Children's vocabulary knowledge was strongly associated with language stimulation and learning materials in all families regardless of risk status. Maternal warmth and responsiveness supported vocabulary competence in families of low economic status only when maternal depressive symptoms were low. In families with the highest levels of risk, that is, with depression and economic distress jointly present, support by the extended family and neighbors for caring for the child protected children's vocabulary development against these adverse conditions. The empirical evidence on the positive contribution of extrafamilial support to young children's receptive vocabulary under adverse conditions allows an expansion of our current theorizing about influences on language development.

Keywords: receptive vocabulary, language development, social support, maternal depression, SES

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Notable individual differences in vocabulary knowledge are observed at the end of the first year of life (Fenson et al., 1994). These differences persist through early childhood (Rowe, Raudenbush, & Goldin-Meadow, 2012), and they predict later language skills, academic achievement, and general cognitive abilities (Lee, 2011; Rowe et al., 2012; Storch & Whitehurst, 2001). Vocabulary development has received ample attention from researchers but not adequately in samples speaking non-Indo-European languages and in samples that differ from Western European and North American samples. Therefore, it is worthwhile to study the salient characteristics of the interpersonal contexts that are associated with vocabulary development in understudied societies.

We present a framework where the factors that support early vocabulary development may differ depending on the family and maternal characteristics. Studies of unique and context-dependent influences of the characteristics of developmental ecologies on the cognitive development of young children are few, especially in contexts of social disadvantage (Lugo-Gil & Tamis-LeMonda, 2008). If there are multiple processes that support language development in early childhood, some of these processes may gain importance depending on the contextual circumstances (Bronfenbrenner, 1995). Our conceptual framework and empirical model allow for investigating this possibility.

In the present study, we focused on the intersection of two well-established risk factors for vocabulary development of children: economic hardship and maternal depressive symptoms (for brevity, hereafter referred to as *maternal depression*). We defined four groups of families: (a) low economic status and low maternal depressive symptoms (economic risk group), (b) low economic status and high maternal depression (economic and mental health risk group), (c) high economic status and low maternal depression (no-risk group), and (d) high economic status and high maternal

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depression (mental health risk group). Previous research in the United States (Stein et al., 2008) and in Europe (Kurstjens & Wolke, 2001) suggested that combined risks of maternal depression and economic hardship may be particularly detrimental for language development. Language development in early childhood may be especially vulnerable to maternal depression because mother-initiated engagement is needed to start and maintain mother–child verbal interactions during this developmental period (Albright & Tamis-LeMonda, 2002).

We investigated (a) whether maternal vocabulary knowledge and perceived support for caring for the child was associated with the proximal family ecology that supported vocabulary development, (b) whether maternal vocabulary knowledge and perceived support for caring for the child also directly predicted vocabulary knowledge, and, most importantly, (c) whether these associations significantly varied in the four groups of families defined by their risk status. The family ecological factors that were considered in this study as potentially supportive of vocabulary development were the degree of verbal stimulation of the child, the provision of learning materials to the child, and maternal warmth and responsiveness (see Figure 1 for the conceptual framework guiding the study). The brief review below describes the processes that may link each one of the predictors to the family ecological factors (the mediators in our model) and vocabulary development in early childhood.

Linkages Between Maternal and Child Vocabulary

The association of maternal verbal ability with a child's vocabulary may be partially genetically mediated (Rietveld, van Baal, Dolan, & Boomsma, 2000) and partially mediated by the language that the child is exposed to (Bornstein, Haynes, & Painter, 1998; Oxford & Spieker, 2006; Storch & Whitehurst, 2001). An early longitudinal study (Huttenlocher, Haight, Bryk, Seltzer, & Lyons, 1991), as well as subsequent studies of English-speaking and Spanish-speaking families (Hoff, 2006; Hurtado, Marchman, & Fernald, 2008; Song, Tamis-LeMonda, Yoshikawa, Kahana-Kalman, & Wu, 2012), provided strong evidence of the latter mediation. Further research on the distinct effects of the amount and the characteristics of speech on children's language development underscored the importance of diversity of words in maternal speech rather than her general talkativeness in predicting toddlers' vocabulary in low socioeconomic status families (Pan, Rowe, Singer, & Snow, 2005). In the current study, mediated as well as direct associations of maternal vocabulary knowledge with child's vocabulary knowledge were posited.

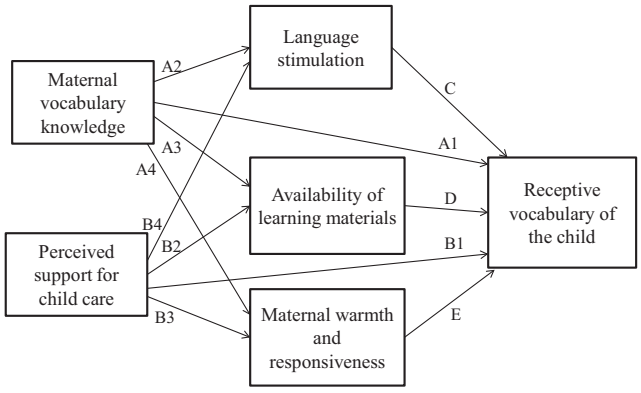

Figure 1. Conceptual framework and the multigroup path model estimated for the four risk groups defined by economic status and maternal depressive symptoms.

Support for the Mother and the Vocabulary Knowledge of Children

Recent studies suggested specific routes through which social support for the mothers could influence their children's developmental outcomes (Mrug & Windle, 2009). It was posited that the social fabric of the community operated through its association with the immediate family ecology of the child (Leventhal & Brooks-Gunn, 2003). In several studies, including longitudinal studies, social cohesion and social support in the community predicted children's vocabulary development indirectly through promoting positive and reducing negative parenting behaviors (Kohen, Leventhal, Dahinten, & McIntosh, 2008). The effects of social support on families were particularly strong for vulnerable families, such as minority families, families of low socioeconomic status (Odgers et al., 2009), or families experiencing high levels of stress (Kohen et al., 2008). Social support might be linked to vocabulary development of children by counteracting maternal disengagement and lack of language stimulation in conditions of low resources and high maternal stress. More directly, social support might provide interactive partners other than family members, enhancing the opportunities for linguistic stimulation of the child.

The Link Between Proximal Family Ecological Factors and the Vocabulary Knowledge of Children

Among many family proximal ecological factors that could be associated with children's vocabulary knowledge, we focused on (a) verbal stimulation by the mother, (b) maternal warmth and responsiveness, and (c) the provision of learning materials. The impact of amount and variety of maternal language input (Bornstein et al., 1998; Hoff, 2003; Huttenlocher et al. 1991; Oxford and Spieker, 2006; Pan et al. 2005) and of maternal warmth and responsiveness on child language outcomes was well established (Bornstein & Tamis-LeMonda, 1997). The effect of provision of learning materials on vocabulary was not studied as extensively; however, a home context with more cognitively stimulating objects might provide a more diversified environment to attach word meanings to. A diversified environment could provide opportunities for meaningful adult–child interactions during which a varied vocabulary could be used (Farver, Xu, Lonigan, & Eppe, 2013).

The link between these proximal factors and the vocabulary knowledge of children might vary in different family contexts. A few studies, including cross-cultural studies (Park, 2008), have investigated the extent to which the effects of parenting behaviors on cognitive and language development of children may vary by family characteristics. It appears that in environments that pose developmental risk, language development is more strongly predicted by the quality of mother–child interactions. In a longitudinal study of the association of the home environment with early vocabulary development in the United States, the effect of the

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quality of mother–child interaction on vocabulary development was larger in Hispanic than in other families (Bradley, Corwyn, Burchinal, McAdoo, & Garcia-Coll, 2001). In another study of adolescent mothers, the amount of language stimulation in the home environment was a significant predictor of verbal development in early childhood only if the mothers had low levels of verbal skill (Oxford & Spieker, 2006).

These studies did not provide conceptual explanations of the processes that operate in different social contexts. The present study investigated the reasons that may account for the socioeconomic differences in the linkages between various environmental factors and vocabulary knowledge.

Economic Status and the Vocabulary Knowledge of the Child

Economic status of the family has been established as a strong correlate of children's vocabulary skills (Duncan & Brooks-Gunn, 1997; Hoff, 2003). Vocabulary of children from families with low economic status develops at a slower pace than that of children from families with high economic status (Hart & Risley, 1995; Huttenlocher et al., 1991; Pan et al., 2005). This was also established in cultural minorities in the United States and in non-American and non-European samples (Fernald, Weber, Galasso, & Ratsifandrihamanana, 2011; Hurtado et al., 2008). A limited number of studies from the developing world confirmed socioeconomic status as a substantial predictor of vocabulary development even in societies where socioeconomic status is generally low (Fernald et al., 2011; Grantham-McGregor et al., 2007; Paxson & Schady, 2005).

Economic status of the family is expected to be linked to the vocabulary knowledge of the child because of its association with the characteristics of the mother–child interactions. The investment hypothesis and the stress hypothesis account for these processes (Duncan & Brooks-Gunn, 1997; Linver, Brooks-Gunn, & Kohen, 2002). Families with moderate to high levels of economic resources can invest more than families with limited economic resources in providing their children with a wide range of experiences and a variety of play and educational materials (Bradley & Corwyn, 2002). Limited economic resources may negatively influence language-enriching interactions in the home also through their influence on the level of stress in the family (Yeung, Linver, & Brooks-Gunn, 2002), especially if economic difficulties persist over several years (McLoyd, 1998; NICHD Early Child Care Research Network, 2005). Poverty may result in reduced quality of parenting, specifically in terms of sensitivity, warmth, and stimulation (Noel, Peterson, & Jesso, 2008; Paxson & Schady, 2005).

Research demonstrated that the link between economic status and family ecology was stronger in economically disadvantaged families than other families (Duncan & Brooks-Gunn, 2000; Mistry, Biesanz, Taylor, Burchinal, & Cox, 2004). It also indicated that nonfamily support systems had a more salient role in those families than in others (Kohen et al., 2008). In sum, low economic status is expected to be associated with (a) a reduction in the amount, quality, and diversity of linguistic input provided to the child; (b) a deterioration of the emotional context in which such verbal interactions occur; and (c) differences in the roles of family ecology and nonfamily support in predicting children's vocabulary development.

Maternal Depressive Symptoms and Vocabulary Knowledge of the Child

Depression in mothers is associated with delays in cognitive and language development of children in developed societies (Cicchetti, Rogosch, Toth, & Spagnola, 1997; NICHD Early Child Care Research Network, 1999) and in developing societies (Walker et al., 2007). Limited language stimulation is one of the likely mediators of this association (Breznitz & Sherman, 1987; Pound, Puckering, Cox, & Mills, 1988; Stein et al., 2008). A study of maternal depression in low-income mothers concluded that many supportive aspects of mother–child interactions (e.g., engagement, sensitivity, flexibility, mutuality) suffered when maternal depressive symptoms were high (Albright & Tamis-LeMonda, 2002).

The consequences of maternal depression are not expected to be similar in all families. A meta-analytic review of maternal depression and parenting behaviors (Lovejoy, Graczyk, O'Hare, & Neuman, 2000) and other studies in the United States (Stein et al., 2008) and elsewhere (Kurstjens & Wolke, 2001) found that depression did not lower supportive parenting behaviors unless the mother was concurrently experiencing economic stress. This body of evidence leads to two hypotheses: (a) Children who have mothers with elevated levels of depressive symptoms as well as families with limited economic resources may be at higher risk of vocabulary delays than children who have none or only one of these risk factors, and, more importantly, (b) in families with both of these risk factors, there may be distinct processes that predict children's vocabulary development. The current research focuses on this latter hypothesis, which has received little attention.

The Context of the Present Study

The current research used data from the study of Early Childhood Developmental Ecologies in Turkey (ECDET; Baydar, Küntay, Goksen, Yagmurlu, & Cemalcilar, 2010). Two aspects of the cultural context of this sample are particularly relevant: the nature of interpersonal relationships in Turkey and the wide range of economic well-being that is represented in this sample.

Turkish society rapidly transformed from a rural and agricultural society in the 1950s to an increasingly urban and industrial one in recent decades. However, cultural values, norms, and attitudes have not changed as rapidly as the economy, especially in the areas of interpersonal and family relations (Kağıtçıbaşı, 2007). Turkey is ranked halfway between individualistic and collectivistic cultures (37th out of 93 countries) on the dimension of individualism (Hofstede, Hofstede, & Minkov, 2010). This is a reflection of the dualism of simultaneously adopting core traditional values and Western norms (Mardin, 2006).

Collectivistic values in family relationships are characterized by a high degree of material and emotional interdependence. The Turkish family has been characterized as functionally extended, with much support and interaction among relatives who tend to live close to each other (Ataca, Kağıtçıbaşı, & Diri, 2005). These values also influence child-rearing practices. Children grow up in a culture of relatedness, where they frequently interact with a wide network of relatives (Kağıtçıbaşı, 2007). This may enhance the contribution of that network to the immediate developmental ecology of the child in a Turkish sample.

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The average level of economic well-being is lower in developing societies than in Anglo-American and European societies where most research on the effects of economic hardship on children has been conducted. For example, in 2011, the median disposable income in Turkey was $6,000, versus $31,000 in the United States (OECD, 2011). The relative poverty rate was 24% in Turkey and 17% in the United States, although the income inequality indicators in Turkey and the United States were similar (the Gini index was 43.2 for Turkey and 40.8 for the United States; World Bank, 2012). Thus, the present study offers the opportunity to investigate the links between family processes and vocabulary development in a sample from Turkey, where many families have limited economic resources but, at the same time, where there is a wide variation in the relative levels of economic well-being.

The Conceptual Model and Hypotheses of the Present Study

The ecologies that are most proximal to development in early childhood consist of the family, the immediate social context of the family, and the childcare provider or preschool. The proportion of children regularly attending nonmaternal care arrangements prior to age 5 is very low in Turkey (2% at 3 years of age in year 2007, according to the ECDET data). Thus, in Turkey, the individuals with whom children interact on a regular basis consist of the nuclear and the extended family members and the neighbors.

The model presented in Figure 1 focused on three dimensions of the within-family ecology that could support the vocabulary development of children and the factors that could be associated with them. We hypothesized that maternal vocabulary knowledge and level of support received by the mother for caring for the child would predict the receptive vocabulary knowledge of the child directly and indirectly through the characteristics of the family ecology.

The direct path from maternal vocabulary to child vocabulary (Path A1) could be partly due to a genetic link and partly because of the association of the maternal vocabulary knowledge with the variety of child-directed use of vocabulary. The direct link from support for caring for the child to the child's vocabulary (Path B1) was expected because, in the Turkish cultural context, a high level of support could involve direct interactions of extended family and community members with the child. In that context, the responsibilities for a child's socialization, including language socialization, could be shared among the members of the extended family and the community.

The indirect association of maternal and child vocabulary through language stimulation and maternal warmth/support (Paths A2–C and A4–E) could arise because maternal vocabulary knowledge could enhance the quality of the mother–child interactions. Maternal vocabulary was also an indicator of maternal education, and everything else being equal, mothers who had high levels of education were expected to have a preference to invest in learning materials in order to support the child's development (Path A3–D). The indirect association of support for caring for the child with child vocabulary (Paths B4–C, B2–D, and B3–E) could arise because, in the cultural context of the current study, support from the extended family and neighborhood could constitute important and dependable resources for the mother and therefore could substantially support her parenting practices.

The paths that predicted children's vocabulary knowledge were expected to vary across the four risk groups defined by the presence of economic risk and maternal mental health risk. Specifically, we expected that in families with economic risk, the effects of the quality of mother–child interactions (i.e., language stimulation and maternal warmth and responsiveness) on children's vocabulary knowledge (Paths C and E) would be stronger than in other families because child vocabulary would be more sensitive to differences in these resources when all other resources were scarce, and the lack of mother–child interactions could not be compensated by the availability of material goods and activities.

We also expected that the role of support for the mother in our model would be stronger in families with both economic and mental health risks than in other families. This was expected for both the direct (Path B1) and the indirect (Paths B2, B3, B4) role of support in predicting child vocabulary. We proposed that a direct association could emerge if the child directly interacted with the members of the community, such as in multiple caregiver situations where neighbors and extended family provided support for child care. In families without high levels of risk, support for child care might not contribute substantially to a child's already adequate ecology or already adequate exposure to language. Especially when maternal mental health was compromised and economic resources were low and unpredictable, neighborhood and extended family support could gain relative importance in elevating the quality of the child's developmental ecology. Furthermore, the benefits of support from the immediate community were expected to be evident in a sample from a relatively collectivistic culture, where such support was available.

Method

Participants

The participants in the ECDET were the members of a sample that was nationally representative of the 3-year-old population living in Turkey whose mothers were able to be interviewed in Turkish, the most common language spoken in Turkey. For seven families, the caregiver participant was the grandmother, who was the full-time care provider for the child. A total of 1,052 children and their mothers participated in ECDET from 24 communities in 19 provinces in 12 regions of Turkey in 2008. Among these, 1,017 (97%) who had complete data on economic status were included in the analyses presented here. All children were between 36 months and 47 months old at the time of the assessments (for sample characteristics, see Table 1). All protocols were conducted in the homes of the participants.

Measures

The measures used were based on maternal reports, assessments of the mothers, assessments of the children, and observational reports. All additive scale scores were rescaled to have a minimum of 0 and maximum of 100, to facilitate interpretation.

Outcome: Receptive language. The outcome of interest in the current research is the vocabulary knowledge of 3-year-old children. The Turkish Receptive Language Test (TRLT) was used to assess the receptive vocabulary knowledge (Berument & Guven, 2010). Participating children were asked to identify one of four

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Table 1
Descriptive Statistics for the Four Risk Groups of the Study Sample Defined by Family Economic Status and Maternal Level of Depressive Symptoms (SD in Parentheses)

	Economic status				
	Low		High		
Sample characteristic	Low depressive symptoms	High depressive symptoms	Low depressive symptoms	High depressive symptoms	Total
% male	56.2%	55.3%	55.3%	53.4%	55.4%
Mean age of the child (in months)	41.3 (3.5)	42.3 (3.8)	41.4 (3.7)	41.5 (3.5)	41.5 (3.7)
Mean age of the mother (in years)	29.6 (5.7)	30.1 (6.3)	30.5 (5.5)	30.2 (5.9)	30.1 (5.7)
Number of children in the household[a]					
1	16.2%	14.6%	36.8%	39.7%	28.4%
2	36.4%	37.4%	44.5%	42.2%	41.0%
3 or more	47.4%	47.9%	18.7%	18.1%	30.6%
% with an urban background[a]	34.7%	58.5%	63.8%	60.3%	54.3%
Years of maternal education[a]	4.3 (2.6)	3.9 (2.7)	7.7 (3.7)	6.3 (2.9)	6.1 (3.6)
Years of paternal education[a]	6.0 (2.5)	5.9 (2.7)	8.7 (3.6)	7.9 (3.0)	7.5 (3.4)
Mean score of maternal depressive symptoms[a]	5.8 (6.9)	43.7 (17.7)	6.5 (6.7)	41.0 (14.5)	14.7 (18.2)
N	297	123	481	116	1,017

[a] Comparisons with *F* tests (for means) or chi-square tests (for percentages) yielded $p < .01$.

pictures that correctly depicted the meaning of a word that was read aloud, similar to the widely used Peabody Picture Vocabulary Test (Dunn & Dunn, 1981). TRLT is an adaptive test. Due to concerns of practicality during home visits and of 3-year-old children's attention spans, the test was terminated when a child incorrectly responded to two thirds of the items at any age level higher than the chronological age of the child. Because the test was designed to be adaptive, the number of correctly responded items and the difficulty of those items needed to be jointly considered in scoring. A three-parameter logistic item response theory model was estimated. This model yielded latent vocabulary ability scores for the participants, providing a measure of receptive vocabulary skill regardless of the total number of items administered. Similar procedures are commonly used for scoring adaptive tests (e.g., Early Childhood Longitudinal Study; Andreassen & Fletcher, 2007). The estimated latent ability scores were age standardized by regressing them on linear and quadratic indicators of age in months and obtaining the residualized scores. The resulting receptive vocabulary ability scores were age-standardized *z* scores.

Predictors

The predictors of children's vocabulary knowledge that were considered in the present research consist of the economic well-being of the family, the mother's depressive symptoms, the mothers' vocabulary knowledge, the extent of support for caring for the child as perceived by the mother, the extent of stimulation that the child received for language development, the learning materials available to the child, and the warmth and responsiveness of the mother toward her child. All items of scales are listed in Part A of the online supplemental materials.

Economic status. The economic well-being of the family was assessed as a factor score ($\bar{X} = 0$, $SD = 1$) estimated from four measures: (a) an indicator of the material possessions of the family, (b) the maternal report of the monthly per-person expenditures of the family, (c) the value of the residence of the family reported by the mother in terms of actual or estimated monthly rent, and (d) the quality of the physical environment scale score from the Turkish adaptation of the Home Observation for Measurement of the Environment (HOME; Bradley & Caldwell, 1979).

The indicator of material possessions was constructed on the basis of ownership of 12 material possessions including basic durable goods such as a refrigerator and nonessential items that are indicative of further economic well-being such as a computer or a car. Per-person family expenditures of the household were computed by dividing the maternal report of total expenditures of the family by the number of members of the household as reported in the demographic questionnaire. The mothers were asked the actual monthly rent or, if they owned their home, the estimated monthly rent that they would have paid to rent their home. The quality of the physical environment scale came from the adapted HOME (HOME-TR; Baydar, Küntay, Goksen, Yagmurlu, & Cemalcilar, 2007) questionnaire. Interviewers rated the residence and its immediate surroundings using seven yes–no questions about its safety and the quality of the living spaces (for details, please see Part A of the online supplemental materials).

The factor score combining these four measures constituted the basis for grouping the families into low and high economic status. A factor score that was lower than 30% of a standard deviation below the mean value (−0.30) indicated low economic status. This cutoff resulted in 41.3% of the sample being classified as low economic status.[1]

In order to interpret the results for this study, it was important to understand the circumstances of the families classified as low versus high economic status. The poverty level defined by the Turkish government for the year 2013 was U.S. $1,350 annual per-person disposable income. This figure is very close to the reported median per-person expenditures in this sample. In this study, families identified as low economic status had a mean

[1] All analyses reported here were repeated with a cutoff score at 50% of a standard deviation below the mean. This sensitivity test indicated that the estimates were robust to changes in the cutoff score.

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annual per-person expenditure of U.S. $900, compared to U.S. $2,292 for families identified as high economic status (TURKSTAT, 2013). Sixty-five percent of the families did not pay rent because they lived in their own home, a home owned by an extended family member, or housing provided by their place of employment. Only 19% of the families of low economic status had credit cards, indicating weak ties to financial institutions, compared to 70% of high economic status families. Similarly, car ownership, computer ownership, and ability to afford a domestic vacation differed sharply between the families of low and high economic status (12% vs. 47%, 4% vs. 41%, and 3% vs. 51%, respectively).

Maternal vocabulary. The maternal vocabulary test (short version; Gulgoz, 2004) consisted of 24 items assessing the knowledge of words with relatively low frequencies of everyday usage. A word was read to the mother and she was asked to identify the synonym for it among four alternatives. Both the test item and the response choices were also shown to the mother printed on index cards. The participants had the option to declare that they did not know a particular word's meaning. An example item from the test is the Turkish word for *phase.* The choices for the synonyms are *universe, stage, status,* and *direction.* The total vocabulary score was the number of synonyms correctly identified.

Maternal depressive symptoms. Maternal depression was assessed by the depression subscale of the Brief Symptom Inventory (Derogatis, 1992), which includes six items rated on a 5-point Likert-type scale (see Part A of the online supplemental materials). The scale was shown to have a high internal consistency and validity for the Turkish population (Sahin & Durak, 1995). In the current study, mothers who scored 25 or more (i.e., 1 *SD* above the median) on a 0–100 scale ($M = 14.7$, $Mdn = 8.3$) were categorized as having elevated levels of depressive symptoms (24% of the mothers). High proportions of the mothers in this category experienced the common symptoms of depression *quite a bit* or *a lot*: 47.5% lonely, 60.1% sad, 43.1% hopeless, and 4.8% suicidal ideation.

Support for caring for the child. The ECDET respondents were asked about a variety of types of social support that they could be receiving. Those considered here were the perceived support from the extended family and from the neighbors. The focus was on support that was directly relevant for child care because it would be most likely to influence parenting behaviors. The internal consistency values for the neighbor support subscale (four items) and the extended family care subscale (three items) were .86 and .90, respectively. The two subscales were averaged so that there was not undue weight of neighborhood support over extended family items. The items of both subscales are given in Part A of the online supplemental materials.

Family ecology measures. The proximate predictors of vocabulary development of the child were three measures of the family ecology: the extent of language stimulation, the available learning materials, and the warmth/responsiveness of the mother. All three of these measures came from HOME-TR (Baydar et al., 2010; see also Part A of the online supplemental materials) and were reported by the mothers and the observers. Observers were trained by the authors and filled observational forms while visiting the family in their homes. The language stimulation subscale ($\alpha = .84$) consisted of eight items reported by the mother (one item) and the observer (seven items), the availability of learning materials ($\alpha = .91$) consisted of 12 items reported by the mother (two items) and the observer (10 items), and the subscale assessing the warmth and responsiveness of the mother ($\alpha = .82$) consisted of eight items reported by the observer.

Statistical Method

The direct associations of maternal vocabulary knowledge and the availability of support for caring for the child with children's vocabulary scores, as well as their indirect associations through the characteristics of the family ecology in four risk groups, were modeled using multigroup path models. This model allowed a statistical test of whether the estimated coefficients quantifying the strength of the associations differed across families in different risk groups. Starting from a model where all coefficients were unique to each risk group, a series of increasingly parsimonious nested models were tested by progressively equating the path coefficients across risk groups. This strategy is especially helpful when the coefficients of some but not all risk groups are hypothesized to be equal.

Results

The sample was distributed in the four risk groups considered in the present study as follows: 29% ($n = 297$) in the low economic status–low depression group, 12% ($n = 123$) in the low economic status–high depression group (i.e., the highest risk group), 47% ($n = 481$) in the high economic status–low depression group, and 11% ($n = 116$) in the high economic status–high depression group. Although the four groups differed in size, even the smallest group had adequate power to support the analyses presented here. The characteristics of the families in the four risk groups are presented in Table 1. Except for the sex of the child, the age of the child, and the age of the mother, all relevant characteristics of the sample significantly differed by risk status. The number of children was higher, $\chi^2(3, N = 1{,}017) = 124.9$, $p = .00$, the proportion of mothers with an urban background was lower, $\chi^2(1, N = 1{,}017) = 45.8$, $p = .00$, and parental levels of education were lower, $F(1, 1012) = 253.2$, $p = .00$, in families with low economic status than in families with high economic status.

The four risk groups differed strongly and significantly in all predictors of vocabulary development and receptive vocabulary scores, as indicated by the effect-size estimates of risk group membership in Table 2. However, pairwise comparisons revealed that some of these characteristics differed by both economic status and maternal depression, while others differed by only one of these risk factors. Children's vocabulary scores, the level of language stimulation provided to the child, and the availability of learning materials differed only by economic status, but not by maternal depression within a given economic status. On the other hand, perceived support for caring for the child differed only by maternal depression, but not by economic status.

As expected, maternal warmth was generally lower in families of low economic status than in families of high economic status. Surprisingly, maternal depression was associated with warmth and responsiveness only in families of high economic status, resulting in a level of warmth and responsiveness in the high economic status–high depression group that was not statistically different from the level of this attribute in the group with low economic status.

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Table 2
Mean Levels of All Variables in the Model Predicting Receptive Vocabulary for the Four Risk Groups Defined by Family Economic Status and Maternal Level of Depressive Symptoms

Predictor of receptive vocabulary	Low economic status		High economic status		Effect size (η^2)	Total
	Low depressive symptoms	High depressive symptoms	Low depressive symptoms	High depressive symptoms		
Maternal vocabulary score	6.0_a	6.2_a	10.7_b	8.9_c	0.18	8.6
Perceived support for child care	74.4_a	61.4_b	73.8_c	65.2_b	0.08	71.5
Language stimulation	57.2_a	63.7_a	82.4_b	79.0_b	0.18	72.4
Availability of learning materials	11.5_a	14.0_a	50.8_b	45.2_b	0.35	34.2
Maternal warmth and responsiveness	50.3_a	$57.2_{a,b}$	71.9_c	$64.4_{b,d}$	0.11	63.0
Age-standardized receptive vocabulary score of children	-0.54_a	-0.36_a	0.37_b	0.29_b	0.15	0.01
N	297	123	481	116		1,017

Note. The means were compared with *F* tests. Subscripts that are not shared indicate significant ($p < .05$) differences in post hoc tests with Bonferroni correction.

Table 3 presents the goodness of fit of the series of multigroup path models that were estimated. In Model I, each risk group had its own set of path coefficients. Each subsequent model was simpler, such that some of the path coefficients were equal across the risk groups. If data supported the simplified structure, the nested test was nonsignificant, and we proceeded to the next step. The results below pertain to Model VII, the best fitting and most parsimonious model.

The estimated coefficients (see Table 4; also see Part B of the online supplemental materials) clearly indicated that economic status and maternal depression moderated parts of the path model. First, we describe the patterns of association that were similar across the four risk groups. Next, we describe the differences.

Although the structure of associations that was represented by the path coefficients differed for the two groups of low economic status families, it was identical across the two groups of high economic status families regardless of maternal depression. Specifically, the direct effect of maternal vocabulary on children's vocabulary (Path A1) and its mediated effects through language stimulation (Paths A2–C), learning materials (Paths A3–D), and maternal warmth/responsiveness (Paths A4–E) were equal for all children of high economic status. The direct (Path B1) and indirect effects (through Paths B2, B3, B4) of support for caring for the child were nonsignificant for the children of high economic status, resulting in a rather simple model that resembled the models often estimated for Western European and Anglo-American samples (e.g., Bradley et al., 2001; Linver et al., 2002).

Data supported the equality of several path coefficients across all four risk groups. The direct effect of maternal vocabulary scores on children's receptive vocabulary scores (Path A1) was equal regardless of economic status or maternal depression. The average standardized direct coefficient was 0.11, depending on the standard deviation of the vocabulary scores in each group. The coefficients representing the association of support for caring for the child with language stimulation (Path B4) and with maternal warmth/responsiveness (Path B3) were nonsignificant for all risk groups.

There was also considerable similarity between the four risk groups in the paths describing the linkages between the family ecology and language development. The coefficients of two of the

Table 3
Goodness of Fit of Increasingly Parsimonious Nested Path Models Predicting Receptive Vocabulary for the Four Risk Groups Defined by Family Economic Status and Maternal Level of Depressive Symptoms

Description of model simplification	Likelihood ratio	*df*	Difference of likelihood ratio	Nested test *df*	Nested test *p*
I. Equality of all coefficients for the two groups of high economic status	9.3	11	9.3[a]	11	0.59
II. Equality of the coefficients of maternal vocabulary to child vocabulary and family ecology for the two groups of low economic status (Paths A1, A2, A3, A4)	15.5	15	6.2	4	0.19
III. Equality of the coefficients of language stimulation and learning materials on receptive vocabulary scores for the two groups of low economic status (Paths C, D)	19.3	17	3.8	2	0.15
IV. Equality of the coefficients of language stimulation and learning materials on receptive vocabulary scores for all four groups (Paths C, D)	22.1	19	2.9	2	0.24
V. Equality of the coefficients of maternal vocabulary on child receptive vocabulary scores for all four groups (Path A1)	22.2	20	0.2	1	0.89
VI. Equality of the coefficients of support for child care on the three measures of the family ecology for all groups except the highest risk group (Paths B2, B3, B4)	26.7	23	4.5	3	0.21
VII. Equality of the coefficients of support for child care on the receptive vocabulary scores for all groups except the highest risk group (Path B1)	27.5	24	0.8	1	0.35

Note. Path labels are from Figure 1.
[a] The first model was compared to the fully saturated model, which has a likelihood ratio of 0.

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Table 4
Results of the Most Parsimonious Path Model Predicting Receptive Vocabulary: Unstandardized and Standardized (in Parentheses) Coefficients

Paths	Low economic status		High economic status	
	Low depressive symptoms	High depressive symptoms	Low depressive symptoms	High depressive symptoms
Paths from maternal vocabulary knowledge to . . .				
Language stimulation (Path A2)	2.99** (0.40)	2.99** (0.38)	1.20** (0.32)	1.20** (0.28)
Learning materials (Path A3)	0.86** (0.20)	0.86** (0.22)	2.24** (0.38)	2.24** (0.42)
Maternal warmth/responsiveness (Path A4)	2.28** (0.31)	2.28** (0.28)	1.10** (0.24)	1.10** (0.20)
Receptive vocabulary score (Path A1)	0.02** (0.08)	0.02** (0.09)	0.02** (0.13)	0.02** (0.14)
Paths from perceived support for child care to . . .				
Language stimulation (Path B4)	0.06 (0.04)	0.16 (0.11)	0.06 (0.04)	0.06 (0.06)
Learning materials (Path B2)	−0.03 (−0.03)	0.15** (0.21)	−0.03 (−0.01)	−0.03 (−0.02)
Maternal warmth/responsiveness (Path B3)	−0.05 (−0.02)	−0.01 (−0.00)	−0.05 (−0.03)	−0.05 (−0.03)
Receptive vocabulary score (Path B1)	−0.00 (−0.03)	0.01* (0.22)	−0.00 (−0.03)	−0.00 (−0.04)
Paths from the three measures of family ecology to receptive vocabulary scores				
Language stimulation (Path C)	0.01** (0.28)	0.01** (0.31)	0.01** (0.22)	0.01** (0.26)
Learning materials (Path D)	0.01** (0.09)	0.01** (0.09)	0.01** (0.19)	0.01** (0.18)
Maternal warmth/responsiveness (Path E)	0.01** (0.21)	0.00 (0.02)	0.00 (0.01)	0.00 (0.02)

Note. Path labels are from Figure 1.
* $p < .05$. ** $p < .01$.

three measures of family ecology, namely, those of language stimulation (Path C) and the availability of learning materials (Path D), on children's receptive vocabulary scores were equal, positive, and significant regardless of the risk group (see the lower part of Table 4). The average standardized coefficients for language stimulation and learning materials were 0.28 and 0.14, respectively.

Despite these similarities, the results pointed to three important sources of differences in the path coefficients for the four risk groups: (a) differential association of maternal vocabulary with family ecology (Paths A2, A3, A4) in low versus high economic status, (b) differential association of support for caring for the child with children's vocabulary (Paths B1 and B2–D) in the highest risk group compared to all other groups, and (c) differential association of maternal warmth/responsiveness with children's vocabulary scores (Path E) in the low economic status group without the additional risk of maternal depression.

Although the direct association between maternal and child vocabulary was equal across all four groups, its mediated associations differed. Specifically, maternal vocabulary scores were more strongly associated with language stimulation (Path A2) and with warmth/responsiveness (Path A4) in families of low economic status than of high economic status. On the contrary, maternal vocabulary knowledge was more strongly associated with the provision of learning materials (Path A3) in the families of high economic status than of low economic status.

Regarding the second source of difference, the perceived support for caring for the child was positively associated with the learning materials (Path B2) only among the families of the highest risk group. Furthermore, in this group only, support for caring for the child had a direct positive and significant association with the receptive vocabulary scores of the children (Path B1), with a substantial standardized coefficient (0.22).

Regarding the third source of difference, maternal warmth/responsiveness was associated with children's receptive vocabulary (Path E) only in families of low economic status and low maternal depression (standardized coefficient = 0.21), but not in any other group.

The results of the path model underscored the protective role of two factors in the families of elevated risk compared to other families: (a) the stronger total positive coefficient of maternal vocabulary on child vocabulary due to a stronger mediation by language stimulation in families who were at economic risk and (b) the positive coefficient of perceived support for caring for the child only in families who had economic and mental health risk. This beneficial role of support for caring for the child is depicted in Figure 2. Children of families in the highest risk group whose mothers perceived support at a level 1 *SD* higher than the mean were predicted to have standardized vocabulary scores that were at the normative national mean. This predicted value surpassed the vocabulary development of children of similar economic status whose mothers were not depressed. Thus, support for child care truly acted as a protective factor.

Because of the apparent significance of perceived support for child care for the vocabulary outcome among children of the highest risk group, the analyses were repeated including a measure of mothers' perceived support from the fathers. This source of support had no statistically significant effects on the mediating measures of the family ecology or on children's vocabulary scores. The reasons for this may partly be the patriarchal cultural context of this study and the associated lack of expectation from the fathers for contributing to child care. Therefore, the role of the perceived support for child care in this model could not be attributed to the confounding association of this source of support with support from the father. These additional analyses validated the robustness of the current findings.

Discussion

This study examined the family and community factors that predicted receptive vocabulary knowledge in 3-year-old children in Turkey. It is one of the few recent studies on early language skills to examine a large and nationally representative sample from a non-Western population. We presented a model predicting vocabulary knowledge of children of families in four risk groups

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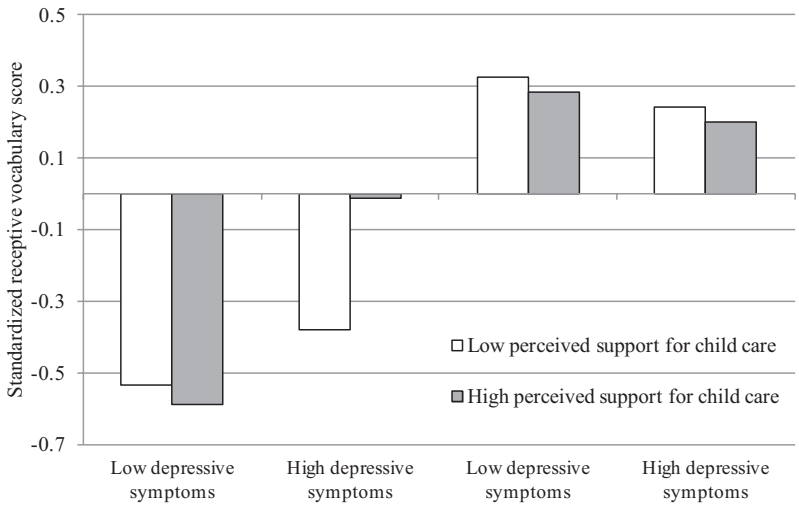

Figure 2. The predicted standardized receptive vocabulary scores of children with high versus low perceived support for child care in four risk groups of families: results of the most parsimonious path model. (Predicted means account for the differences in other variables in the path model.)

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defined by the presence of economic and maternal mental health risks. Maternal vocabulary and support for child care from the extended family and the neighborhood were the exogenous factors considered. The characteristics of the proximate family ecology (i.e., the amount of language stimulation, the availability of learning materials, and maternal warmth and responsiveness) could mediate the association of these exogenous factors with children's vocabulary development.

Several findings were important because of their contribution to our understanding of vocabulary development in early childhood generally. We found that many aspects of our mediational model did not vary across the four risk groups. The model was identical regardless of maternal mental health risk among the families of high economic status. Furthermore, the associations of the characteristics of the family ecology with children's vocabulary were identical for all risk groups with only one exception: maternal warmth and responsiveness was a significant predictor of child vocabulary only in low economic status families with no maternal mental health risk. In addition, the direct contribution of maternal vocabulary on child vocabulary was identical for all families, with an effect size similar to that found in previous studies (Magnuson, 2007). In sum, our study lends support to the unvarying nature of the contribution of language skills of the mother, language stimulation by the mother, and the availability of learning materials to children's receptive vocabulary.

The mediational paths of association of maternal vocabulary with child vocabulary were not identical across the four risk groups. Nevertheless, maternal vocabulary emerged as the most substantial contributor to child vocabulary, with an estimated total effect size of slightly under 0.30 for all four groups. Next, we discuss the components of our model that varied between the four risk groups.

The aspects of the family ecology that were strongly predicted by maternal vocabulary in high economic status families differed from those in low economic status families. In other words, the mediational associations suggested that high maternal vocabulary knowledge mobilized learning materials in families of high economic status but mobilized language stimulation and maternal warmth/responsiveness in families of low economic status. However, either way, it similarly supported a child's vocabulary development. One possible reason for the lack of a link between maternal vocabulary and some aspects of mother–child interactions in high economic status families may be the high level of maternal vocabulary skills in those families. It may be that above a certain threshold, marginal differences in maternal vocabulary do not predict enhanced mother–child interactions at this developmental stage. Oxford and Spieker (2006) had a similar finding.

Previous findings in Hispanic versus White families in the United States (Bradley et al., 2001) and a multinational review of evidence from many developing societies (Walker et al., 2007) suggest maternal responsiveness as a potential factor of resilience in developmental delays associated with poverty. On the other hand, these findings could also point to an increased risk associated with maternal depression in families of low economic status because maternal depression could suppress maternal–child interaction and maternal warmth and responsiveness, depriving at-risk children of a powerful resource for verbal development.

Finally, our findings suggest that extrafamilial support for child care may truly be acting as a protective factor for language development in families with co-occurring economic and psychological risk. The differential role of perceived extrafamilial support emerged even though the amount of perceived support did not vary by economic status, indicating strong extended family and community social networks in this sample regardless of economic status. In the highest risk group, maternal contributions to the developmental ecology were likely compromised due to elevated levels of depressive symptoms and economic hardship. In this risk group, the contribution of support for child care to children's vocabulary knowledge was large and positive, and its effect size matched that of maternal vocabulary (total effect size = 0.27).

The direct association of extrafamilial support with child vocabulary may arise due to the cumulative effects of child-directed

speech and language stimulation. It is possible that the vocabulary of the child benefits from verbal interactions with all adults who are engaged with the child. It may be speculated that multiple caregiver contexts also offer opportunities for observing and learning vocabulary from overheard conversations (Akhtar, 2005). In a society where a vast majority of 3-year-olds are cared for in their homes, noninstitutional support for child care may act as a buffer against maternal stress and disengagement by generating interactions necessary for word learning.

Our findings have some policy implications. First, maternal vocabulary emerges as an important resource for vocabulary development of all children, underscoring, once more, that maternal education is a sure way of investing in the language development of all children, regardless of economic status. When maternal vocabulary skills are high, mothers create and mobilize a variety of resources to invest in their children's vocabulary skills.

Second, the invariability of the processes that predict children's vocabulary in families of high economic status suggests that these families support vocabulary development similarly regardless of maternal depression. Note that in these families, maternal vocabulary benefited child vocabulary through the availability of learning materials rather than through supportive maternal–child interactions. The provision of learning materials to the child regardless of maternal mental health may shield children's vocabulary development from the negative repercussions of maternal depression. The policy question, then, is whether the provision of learning materials may also be a viable (and relatively low-cost) way of supporting the vocabulary development of children of low economic status who may or may not have added maternal mental health risk. Our findings supported this idea because, for families with both economic and maternal mental health risk, one of the mechanisms through which extrafamilial support for child care benefited children's vocabulary was through the provision of learning materials.

Third, our findings indicated that in families of low economic status, maternal warmth and responsiveness were associated with vocabulary only if the mothers were not depressed. This finding suggests that parenting training may be a viable intervention for not only socioemotional but also language development for this group. The lack of an association of maternal warmth/responsiveness with vocabulary development in families of high economic status may be due to limited variability of this resource in those families. It is also possible that warmth does not contribute any further to vocabulary development when other aspects of family ecology are supportive.

Fourth, our findings pointed to extrafamilial support for child care as an effective protective factor in families with economic and mental health risk that operated through direct and indirect routes. The implication of this finding is that organizing and mobilizing community networks or supporting naturally occurring support networks may be effective, at least in some cultural contexts.

The current study revealed the variations in cross-sectional associations of the characteristics of the family ecology with vocabulary knowledge in early childhood. As such, it is not able to support or question causal pathways. Future studies could focus on longitudinally tracking children's linguistic knowledge in situations where multiple risk factors coexist. Further insight into the trajectories of delay and acceleration in development of this important domain of cognition, as well as causal mechanisms that govern it, may be gained by linking these trajectories to changes in risk status.

In conclusion, this study contributes to our understanding of the diversity in early childhood ecologies that could support normative development of a foundational language skill. Although this is not a cross-cultural study, it presents findings from a nationally representative sample from Turkey, and the representative nature of its sample may allow qualitative comparisons with the established findings of comparable studies of Anglo-American and Western European samples. Economic risk in societies such as the context of the current study implies a deep and pervasive hardship in multiple domains because public goods and services are scarce and social welfare programs are inadequate (Fernald et al., 2011). Our findings that are consistent with the findings from the samples from developed societies suggest some cross-culturally valid associations of the characteristics of the family ecology with vocabulary development in early childhood. Our findings that are discrepant with the established literature demonstrate the value of studying children in diverse developmental contexts and exploring models that allow for the variability of developmental processes. This study allowed us to identify naturally occurring community support as a compensatory developmental resource for children at high risk.

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