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**Latina Mothers' Engagement in Children's Math Learning in the Early School Years:  
Conceptions of Math and Socialization Practices**

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### **Abstract**

This study addressed the important role that the home plays just prior to or at the start of formal schooling, in facilitating children's math learning. Although research on home influences is a burgeoning area, there has been limited research, particularly in math socialization, with Latino families, one of the fastest growing racial/ethnic groups in the U.S. Using a mixed-methods approach and data from 47 foreign-born Latina mothers of children in preschool through first grade, we examined mothers' socialization (beliefs and practices) of children's math skills and their conception of math (knowledge and attitudes). The present study combined two empirical traditions, one based on mainstream conceptualizations of parental involvement and one that builds from cultural approaches to math engagement. The results are pertinent for developing intervention programs to improve young Latino children's math skills that capitalize on the strengths found within children's homes and that address their challenges.

Keywords: Latina mothers, conceptions of math, socialization practices, fostering children's math development

### **Latina Mothers' Engagement in Children's Math Learning in the Early School Years: Conceptions of Math and Socialization Practices**

The increasing influx of Latinx children into the United States has generated a great deal of concern about their school success and adaptation. Latinxs currently comprise over one-fifth of U.S. school-aged children, but this is estimated to increase to about one-third in the near future (Murphey, Guzman, & Torres, 2014). Although Latinx-White achievement gaps have narrowed in recent years (Reardon & Portilla, 2016), there are still large and significant gaps that are evident by the start of kindergarten or even earlier (Author). Such early occurring gaps highlight the importance of understanding what experiences children have at home, particularly before and during the early years of schooling.

Research has demonstrated the associations between math interactions and the use of math language with math development (Gunderson & Levine, 2011). When young children participate in everyday activities involving math, such as cooking and shopping, they develop the building blocks for subsequent math learning (Williams, Tunks, Gonzalez-Carriendo, Faulkenberry, & Middlemiss, 2016). However, our knowledge of the educational experiences and support that Latinx parents provide for their children's math learning remains limited.

On the other hand, the well-documented social-emotional strengths displayed by young LatinoLatinx children (Author) are attributed to their positive home environment and parents' socialization practices (Author; Leidy, Guerra, & Toro, 2010). For example, pre-kindergarten teachers reported that Mexican-origin children of immigrant and native-born parents showed positive *school social skills*, conceptualized as "children's sociable, cooperation, and compliance behaviors in school" (Zucker & Howes, 2009, p. 503). Relatedly, the rate of social-emotional growth between 24 and 48 months of age among a nationally representative sample of children born in 2001 was similar for Mexican-origin, some of whom had immigrant mothers, and White

children (Guerrero et al., 2013). Does the strength that Latinx families show in fostering their children's social-emotional development translate into parental support for children's mathematical learning?

In this paper, we use a mixed-method approach to examine Latina mothers' perceptions of how they promote their children's math development in pre-kindergarten through first grade. We analyze mothers' beliefs and conceptualizations about math as well as their engagement in their children's learning. We focus on maternal role construction about math teaching at home, the strategies used to foster math learning, mothers as role models of engagement in math activities, and other family members' engagement in children's math learning. We further expand upon previous research by also examining mothers' cognitive (knowledge of math) and affective (attitudes, self-concept) conceptions of math (McLeod & McLeod, 2002), as both dimensions influence parents' own involvement in math (Muir, 2012) and the opportunities they provide for their children (Guberman, 2004).

Our theoretical framework draws from ecocultural approaches of human development (e.g., Weisner, 2002) and sociocultural learning theories (e.g., Vygotsky, 1978). Learning at home is conceptualized as a social practice that is co-constructed with other family members, mediated by cultural artifacts and parents' beliefs and attitudes, and situated in everyday activities (González, Andrade, Civil, & Moll, , 2001). Family processes are viewed as both culturally-situated and responsive to specific historical and local contexts (Gutiérrez & Rogoff, 2003). Diverse Latinx families may have culturally specific values and approaches to learning but, at the same time, they are evolving in response to the context in which they are embedded (García-Coll et al., 1996). Therefore, it is important to examine the home learning experiences of Latinx children.

### **Latinx Children' Home Learning Experiences**

Although children's development takes place in different contexts, the family is the most important setting in which development, particularly that of young children, occurs. Growing up in a cognitive stimulating home, with educational materials and activities and involved parents, has a positive impact on children's cognitive and academic outcomes (Blevins-Knabe, 2016; Ramani & Siegler, 2014).

While there is a confounding influence of socioeconomic status (Crosnoe & Turley, 2011), research on Latinx children is mixed regarding the extent to which their home experiences provide sufficient supportive opportunities for learning. Some studies have shown that Latinx parents talk less, use a more limited vocabulary, and read less frequently to their children than White parents (Raikes et al., 2006). Other research has found that Latinx children's spontaneous explorations of their environment are not encouraged because of parents' strict rules and limited encouragement of creativity (Gándara & Contreras, 2009). Research using traditional measures of involvement (e.g., volunteering in class, attending school conferences, reading with children, providing educational artifacts) has also reported lower levels of involvement at school and engagement in educational activities at home for immigrant and native-born Latinx parents than for White parents (Author; Cooper, Crosnoe, Suizzo, & Pituch, 2010).

In contrast, other studies document the learning support provided by Latinx parents. For instance, using a nationally representative sample of 9-month-old children born in the United States in 2001, Barrueco, López, and Miles (2007) examined differences in parenting practices across racial/ethnic groups. Latinx immigrant and native-born parents and White parents showed similar levels of daily singing, responsiveness to child's distress, and encouragement of cognitive and social-emotional development. Also, Latinx immigrant and native-born parents' involvement

at school was high when teachers purposefully invited Latinx parents to participate (Peña, 2000), when school personnel nurtured parents' trust and authentic engagement (Jiménez-Castellanos, Ochoa, & Olivos, 2016), or when culturally-relevant measures were used (McWayne, Melzi, Schick, Kennedy, & Mundt, 2013).

### **Latinx Parents' Engagement in Math Learning at Home**

Young children, regardless of race/ethnicity, are less exposed to and involved at home in math than literacy activities (LeFevre, Skwarchuk, Smith-Chant, Fast, Kamawar, & Bisanz 2009). For example, parents of infants talk very little about numbers, even when reading a counting book with their child (Goldstein, Cole, & Corder, 2016). Similar findings of limited engagement in math occurred with middle- and low-income parents (Saxe, Guberman, & Gearhart, 1987) and with a sample of low-income parents (Starkey, Klein, & Wakeley, 2004). Even when mothers are involved in both reading and math activities, they use more advanced strategies for teaching reading (Tamis-LeMonda et al., 2013). Some parents feel unsure about how to best foster math skills and, therefore, feel less comfortable participating in math activities with their children (Cannon & Ginsburg, 2008).

The limited research with Latinx parents, either immigrant or native-born, reports that they foster math skills primarily through daily living activities or parents' work-related activities. Civil and Andrade (2002) argued that Latinx children are exposed to math knowledge through their involvement in household chores such as cooking or helping their parents with their job-related responsibilities at restaurants or landscaping (see also Domínguez, 2011).

Based on available research on Latinx parental involvement (especially those studies employing "traditional measures"), it is not clear whether Latinxs display limited

involvement with math at home and if so, why. Low levels of involvement of Latinx parents may be related to their lack of formal mathematical knowledge or their insecurities about their ability to teach math (López & Donovan, 2009). They also may not realize the range of activities involving math and how to foster math skills in their children (Civil & Planas, 2010). Moreover, Latinx immigrant parents may conceptualize families and schools as two independent contexts of influence and therefore may view the teaching of academic skills as teachers' responsibilities, and, in turn, engage in less direct teaching (Suárez-Orozco, Suárez-Orozco, & Todorova, 2001). Such possibilities reinforce the importance of utilizing cultural lenses when examining Latinx parents' engagement in their children's learning.

### **Ecocultural Approaches and Sociocultural Lenses: Latinxs' Home Learning Environments**

Although the call for conceptualizing families as culturally-situated systems began over 30 years ago (García-Coll et al., 1996), only recently has a significant body of research using this approach emerged (Cabrera, Beeghly, & Eisenberg, 2012). At home, young children learn values, beliefs, norms, expected behaviors, and linguistic conventions that are specifically situated within their cultural frame of reference (Strauss & Quinn, 1997). These include familism (*familismo*), proper comportment (*bien educado*), and respectful interactions with adults (*respeto*) (Bridges et al., 2012). Latinx parents also teach their children the importance of education and schooling for getting ahead (Suárez-Orozco et al., 2008). Collectively, these cultural values have important implications for the ways that Latinx parents support their children's education and how this support is reflected in their daily practices (Fuller & García-Coll, 2010).

At the same time, family practices are constantly changing depending on families' needs, resources and competing demands (Arzubiaga, Artiles, King, & Harris-Murri, 2008). These

family practices are also embedded in larger social systems and therefore reflect *adaptive strategies* influenced by the interaction with these systems (García-Coll et al., 1996). In the case of Latinxs, especially Latinx immigrants, family practices are responsive to the new norms and expectations in the “new country” (Fuller & García-Coll, 2010). Thus, Latinx home learning reflects *varying* and *dynamic* cultural orientations that embraces aspects of families’ new and previous experiences and expectations (Aldoney & Cabrera, 2016). For example, besides valuing education as a way of “*getting ahead in life*,” learning English becomes an important value to be successful in school (Gándara & Contreras, 2009). Relatedly, parents are willing to embrace common U.S. educational practices, , such as active participation in school activities and learning at home (Delgado-Gaitan, 2004). The ecocultural lens helps us understand the dynamic nature of family practices and identifies important opportunities for expanding learning opportunities at home.

Complementing the ecocultural approach to human development, sociocultural learning theory helps us to better frame our understanding of Latinx children’s home learning experiences. According to this theory, learning occurs through interactions with others and with diverse cultural artifacts (Vygotsky, 1978). The family is a social setting in which children are actively involved in the creation of knowledge through cooperative exchanges with other, more experienced family members (Gutiérrez & Rogoff, 2003). When more knowledgeable relatives properly guide a child during numeracy-related activities, they can help facilitate mathematical learning that are just beyond the child’s current understanding but within her/his reach –that is, within the *zone of proximal development* (González, Andrade, Civil, & Moll, 2001).

Sociocultural theory also postulates that “mathematics at school” and “mathematics at home” are different *social practices* because their meaning depends on the setting where it is

embedded (Civil, Planas, & Quintos, 2012). Parents' knowledge of math as well as the tools and strategies they use to foster their children's learning at home could be different from what is taught at school and how is taught there (Abreu & Cline, 2005). Nevertheless, families have a diverse and valuable range of knowledge and practices that could facilitate children's higher-order learning if they are incorporated into the classroom as a resource to make meaningful connections with children's daily living experiences. As Moll, Amanti, Neff, and Gonzalez (1992) argued, children's learning experiences in the classroom could be enriched when their *funds of knowledge*, conceptualized as family sociocultural and economic knowledge and practices, are incorporated into instruction. In this way, "home knowledge" could facilitate the acquisition of "school-based knowledge" (González et al., 2001).

The present study takes a strength-based approach recognizing the opportunities available for learning math in young Latinx children's home and identifies potential mechanisms to further increase the home learning opportunities of Latinx children. We use data from 47 Latina mothers with diverse educational levels to understand the learning opportunities they afford to their children by examining their conceptions of math and the socialization of their children's math development. We further examine whether mothers' conceptions of math vary as a function of their education. To what extent are the learning opportunities that Latina mothers provide to their children related to their varying levels of education? We hypothesize that there is a positive association between mothers' conceptions of math and their math socialization practices with their educational level. Because of the relatively small sample size, our findings are exploratory; however, they are crucial building blocks for increasing our knowledge of the educational experiences of Latinx children.

## Methods

The Latina sample of mothers in this study comes from a larger, racially diverse study that examined the home-math learning environments of prekindergarten through first grade children conducted in the Baltimore-Washington Metropolitan area. The larger study examined mothers' conceptions of math and beliefs about children's development, mothers' involvement in their children's math learning, and children's engagement in math at home. Participants were recruited from preschools, Head Start centers, elementary schools, after-school programs, summer camps, churches, and community centers. We recruited children's primary care providers, which for the Latinx sample were their mothers. Because we were interested in obtaining a detailed and culturally grounded understanding of the home-math learning environment, we used a mixed methods approach, utilizing an instrument with open-ended and structured questions. We probed responses to all open-ended questions to capture in-depth information.

### **Participants**

The sample in this study was 47 immigrant mothers, self-identified as Latina (or Hispanic), of children who were enrolled in preschool through first grade. As Table 1 shows, the majority of the mothers came from Central America –mostly from El Salvador. About four-fifths of the sample had lived in the United States for more than five years and most were not schooled in this country. Thus, most of the mothers had an overall familiarity with the United States but limited direct exposure with the U.S. educational system. About two-thirds of the mothers worked, of those three-fourths were working part-time. About half of working mothers provided cleaning services.

Because the confounding nature of socioeconomic status when examining the educational environment of Latinx children is high (Crosnoe & Turley, 2011), the Latina mothers in this

sample were selected to be uniformly distributed across three major educational levels. About one-third of the sample did not finish high school, one-third were high school graduates, and one-third pursued higher education, including career and college tracks, (see Table 1).

Most of the mothers in the sample lived with the father of their child and about half lived in households with other adults, including relatives and non-relatives. About one-fourth of the mothers reported that only one child lived at home, and the remaining reported two or more children (12 focal children had older siblings between 7 and 10 years old). Almost all the mothers reported speaking Spanish at home most frequently but half of the sample spoke both, Spanish and English. In multi-children households, mothers commonly reported that adults would speak with the focal child in Spanish, but English was more frequently used among the siblings.

### **Data Collection**

All but five interviews were conducted between June 2013 and July 2016 using a questionnaire developed by our research team. The questionnaire was developed in English and then translated into Spanish using forward/backward translation procedures. The questionnaire was piloted utilizing *cognitive interviews* (a method to validate instruments that examines how and to what extent the intended audience understands, processes information, and responds to the questionnaire, Willis, 2015) with a sample of 12 Latina mothers whose demographic profile was consistent with our targeted participants. We also conducted two focus groups (15 Latina mothers total across the two groups) to verify mothers' understanding of the Spanish version of the instrument. Members of the research team were trained using exercises and role-playing.

Latinx Spanish-speaking members of our research team individually interviewed mothers in either Spanish or English, depending upon the mother's preference. All but two interviews

were conducted in Spanish. While it is difficult to know the level of participants' openness, mothers seemed enthusiastic about answering our questions, even when they felt uncertain about their knowledge of math. Interviewers were also trained to ease participants' negative feelings about math by showing empathy and making comments about how common it is to consider math difficult. Also, perhaps the fact that all interviewers were native-Spanish speakers and that the topic discussed was relatively non-threatening facilitated a good rapport.

The interviews, which took about 30 minutes, were audio-recorded, and the interviewer took field notes. Interviews were conducted at a convenient location for each mother. In most cases, they took place at home but in a few cases, they were conducted at a community center or school. During the interview, it was common that children played or other adults chatted nearby. In a few cases, mothers consulted with their children about a question. However, children's responses were not included in the analysis. Mothers received \$20 as a thank you.

## **Measures**

The questionnaire included four sections: demographic information, mothers' conceptions of math, mothers' socialization beliefs and practices, and children's math activities. We describe below only those questions pertinent for this study.

**Mothers' conceptions of math.** Mothers' conceptions were examined through cognitive and attitudinal questions.

***Cognitive dimension.*** Mothers' knowledge of math was measured by asking an open-ended question: "What is math?" Responses were coded as school-based and out-of-school definitions of math. School-based codes included: 1) basic content knowledge of numbers or counting, 2) basic content knowledge of calculations, 3) advanced content knowledge (i.e., problem-solving, algebra, geometry), and 4) other (i.e., learned at school). Out-of-school codes

included: 1) daily living and 2) important for future/to get ahead. Coding for school-based definitions was adapted from the National Council of Teachers of Math (NCTM, 2000) math content standards.

***Attitudes towards math.*** This construct was measured through two separate items, “How much do you enjoy math?” and “How good at math are you?” Possible ratings ranged from 1 (not at all/ not good at all) to 5 (very much/very good). Responses to the two questions were complemented by comments mothers shared while giving their ratings.

***Mothers' math socialization practices.*** This was examined with four constructs: Parental role construction for teaching math at home, strategies used to support math learning, family members' engagement in math learning, and mothers as role models of math engagement.

***Role construction.*** We used two closed-ended and one open-ended question to measure this construct. Mothers were asked, “How important is it that your child does math activities at home?” and “How important is it that you help your child with math?” Ratings could range from 1 (not very important) to 5 (very important). The third question was open-ended, “What is the best way to help your child learn math?” Responses were coded as 1) motivator (encourage), 2) monitor (supervise), 3) instructional supporter (explain content or practice with child), and 4) resource provider (provide math-educational artifacts) (see Cai, Moyer, & Wang, 1999).

***Strategies used to support math learning.*** To identify the strategies that mothers used to facilitate math learning at home, we reviewed the entire transcript. Eight codes emerged from mothers' responses: 1) being present; 2) watching TV; 3) engaging in verbal interactions; 4) playing; 5) engaging in daily living activities; 6) helping with math homework; 7) practicing; and 8) learning together.

***Family members' engagement in math learning process.*** We examined which family members contributed to fostering math learning by asking the following open-ended question: "With whom does the child do math at home?" Responses were coded as 1) mother; 2) father; 3) other adult (s); 4) older sibling or another child.

***Mothers as role models of math engagement.*** Mothers were asked the following two questions: "How often does your child see you doing math?" (1=never/almost never, 2=less than once a week, 3=once a week to several times a week, 4=everyday/almost every day), and "What math activities does your child sees you doing?" Responses to this open-ended question were coded as 1) household activities, 2) work-related, 3) child's homework, and 4) playing with child.

### **Data Preparation and Analysis**

**Data preparation.** Tapes were transcribed in their original language (in all but two cases Spanish) and then reviewed by the interviewer and another member of the research team, both of whom were fluent in Spanish and English. Interviews were translated into English and then back-translated and the two versions were compared. Any inconsistencies were resolved by discussion among the translators. Once inconsistencies were resolved, the transcribed interviews were analyzed. Quotes included in the paper were edited for clarity when needed, but we mostly maintained participants' voices and idioms. Because we are aware of a potential confounding effect of parents' education and child's school grade, this information is included within parentheses after each quote.

**Coding approach.** We used emic (inductive) and etic (deductive) perspectives (see Hatch, 2002). Based on our theoretical framework, we created *a priori* certain codes (etic approach; see Table 2 for descriptions of all the codes). For example, codes for mothers'

knowledge of math were adapted from the National Council of Teachers of Mathematics (NCTM; 2000) content standards (i.e., numbers and operations, problem-solving) and Civil and colleagues' daily living conceptions (Civil et al., 2012). Coding for mothers' approaches to math teaching was based on Cai et al.'s (1999) categorization of parents' roles in student mathematics learning in middle-school (i.e., motivator, monitor, resource provider, math content adviser, and math learning counselor). From an emic or insider perspective, we were particularly interested in understanding mothers' own interpretations of what they did and why. Thus, we also used "open coding," where we read the transcribed interviews and allowed the potential of the data to emerge. At this stage of the coding process, new codes, including "important for life", "teaching through daily living", and "TV", emerged. After defining the primary-codes, we then proceeded with "selective coding", in which codes from the first round of coding were revised in light of the specific objectives of the paper.

**Coding process and qualitative analysis.** The two Spanish-speaking members of the research team coded all 47 interviews. To guarantee high intercoder reliability, we first coded three interviews individually and then compared codes. When there was a discrepancy (which was infrequent), the two researchers discussed the meanings of the excerpts and the best code to use. Aiming at interpretative consistency, the two coders tested initial inter-coder reliability of these three interviews using Cohen's kappa. Kappas fell between .75 and 1.00 for all codes, which indicates good inter-coder agreement (Cohen, 1960). After achieving consensus and creating a framework to consolidate codes, the remaining 44 transcripts were coded separately and individually by each of the two researchers (thus, each interview was coded twice), incorporating additional codes that emerged from the data. During this coding phase (when we coded for patterns), the two coders met five additional times to review and re-confirm codes, to

respond to questions that arose during the coding process, and to discuss main findings. Multiple codes could be assigned to the same response. Qualitative data were analyzed with NVivo 11 software (QSR International, 2013).

**Quantitative data analysis.** Quantitative data were analyzed with descriptive statistics (mean, percentages, and standard deviations) using Stata 14 (StataCorp, 2015). Associations between key constructs and mothers' education (less than high school, high school graduate, more than high school) were conducted using Spearman's Rho correlations, which is the nonparametric version for ordinal variables of the Pearson's product-moment correlation. We also reported percentages for each of the three levels of education to have a better representation of the patterns of associations. Consistent with scholars who advocate for a more flexible criteria when setting criteria for *p*-values, especially in exploratory studies or those with a relatively small sample size (e.g., Schumm, Pratt, Hartenstein, Jenkins, & Johnson, 2013), *p*-values lower than 0.10 are considered statistically significant.

## Results

### Mothers' Conceptions of Math

**Mothers' knowledge of math.** Latina mothers in the sample reported school-based and out-of-school knowledge of math. Three-fourths of the mothers indicated a school-based understanding of math (77% of the sample, 36 mothers out of 47). Of those mothers who described school-based conceptions of math, most mothers' responses focused on basic math operations (92%, 33 out of 36 mothers). The most common responses were *numbers* or *counting* (69%, 25 mothers) or *calculations* –mostly *adding* and *subtracting* (47%, 17 mothers). Only about one-third (31%, 11 mothers) shared more complex or advanced content knowledge such as geometric shapes, time, equations, algebra, or measurement.

When asked what math is, one mother responded, “[Mathematics] is counting, the numbers” (Kindergarten; Mother: High school graduate). Another mother added, “I know very little about math.... Well, honestly, here [in the United States], I don’t know what math is. But, in our country [Guatemala], it’s nothing more than counting and adding...” (Kindergarten; Mother: Less than high school—6th grade).

About half of the sample (53%, 25 mothers) also described math utilizing out-of-school knowledge —emphasizing its use in daily living activities and its relevance to life and future opportunities. About three-fourths of mothers who reported out-of-school knowledge of math (76%, 19 out of 25 mothers) defined math as embedded in their daily living or everyday activities such as paying bills, cooking, or shopping. In the following excerpt, a mother described how math is interwoven in her daily living: “For me, math is very important because I use it every day of my life. I use it to divide my time, in the kitchen or in daily living, I always need to use math” (Kindergarten; Mother: High school graduate).

Over seventy percent of the mothers who reported out-of-school knowledge (72%, 18 mothers out of 25) considered math as very important for *life, future studies, or getting ahead*. One mother commented on the relevance of math for children’s daily living:

[Math] is the science that moves [everything]. Well, math is something very important for them [children], especially, when they are growing up. Because we [use math to] teach them how to take care of money, the amount that they should eat. Math is important. I don’t know how to explain it to you. (1<sup>st</sup> grade; Mother: High school graduate)

Another mother made it clear that advanced math knowledge was important for getting ahead in life,

I feel that [math] is a very important subject—in life as well as in studying. Otherwise, if you only know the basic—that is, one plus one— and you don't know all the other branches of math, then you could get cheated on, or other things like that. Therefore, I think math is very important; it is very necessary in life. (Kindergarten; Mother: BA degree)

**Mothers' attitudes towards math.** About half of the mothers reported that they enjoyed math much/very much (53%, 25 mothers), one-third (16 mothers) enjoyed math somewhat, the remainder (13%, 6 mothers) did not enjoy math (overall  $M=3.6$ ). A mother that enjoyed math mentioned,

I've always liked math because since I was a girl I was always good for math in school in that I always got the best grades [...] when I need to make a calculation or something I am fast. I don't need to have a pencil and paper, in my mind I already know how much it is. (Kindergarten; Mother: Less than high school—6th grade)

In contrast, a mother who did not enjoy math explained, "I almost never really liked math, although my kids love it. I liked more Spanish, Biology, Geography. I don't know why I don't love math [...] There was a time when I did like [math], maybe when I was in elementary school" (1<sup>st</sup> grade; Mother: High school graduate).

When asked what they liked the most about math or which math-related activities they liked the most, mothers mentioned calculations (e.g., addition, subtraction) or budgeting. Another mother mentioned, "I really like to subtract, multiply, but what I like the most is adding. I also like business; I have been doing business since I was eight" (Pre-Kindergarten; Mother: Less than high school—9<sup>th</sup> grade).

The extent to which mothers enjoy math was related to their perceived mathematical skills ( $r_s = .74, p < .001$ ). About two-fifths of the sample (43%, 20 mothers) considered themselves good or very good at math, while a similar number (40%, 19 mothers) described themselves only as “OK”. The remaining 17% (8 mothers) defined themselves as not good (overall  $M = 3.4$ ).

Although a significant proportion of mothers reported that they had good math skills, the skills they described were mostly basic math skills such as addition and subtraction. For example, a mother shared, “[If we are talking] about multiplying, subtracting, adding, I’m very good. Don’t ask me anything beyond that. [I am not good at] square roots, X, Y, and all those variables” (1st grade; Mother: High school graduate).

Some of the Latina mothers who did not consider themselves good at math explained that their limited math skills were related to their lack of formal schooling: “I do like mathematics; I like it a lot. I wish I could have learned more, but I was not taught more [in school].” (1st grade; Mother: Less than high school—6th grade). Another mother added, “I like [numbers], but I did not go to school. I did not learn [math]. We used to work in the fields. We went to the mountains to plant, harvest beans and corn” (Kindergarten; Mother: No formal schooling).

**Mothers’ conceptions of math and their education.** As we hypothesized, there were positive associations between mothers’ knowledge and attitudes towards math with their educational level (see Table 3). Not surprisingly, mothers who did not finish high school were less likely to report advanced school-based knowledge of math (6%, 1 mother) than mothers with additional education (27%, 4 mothers, high school graduates; 40%, 6 mothers, more than high school;  $r_s = .33, p = .02$ ). Similarly, mothers who did not finish high school were less likely to report out-of-school math conceptions, in general ( $r_s = .26, p = .07$ ), and daily living conceptions,

specifically ( $r_s = .25, p = .08$ ) than mothers with additional education. There were no significant differences in the frequency of reporting school-based basic knowledge of math ( $r_s = .08, p = .56$ ) or in considering math important for future ( $r_s = .09, p = .54$ ) across educational levels, as evident by the non-significant  $p$ -values.

Positive associations also existed between the two indicators of attitudes towards math and mothers' education. About 87% (13 mothers) of mothers with more than a high school education reported enjoying math or enjoying it very much, compared with only 40% and 35% (6 mothers for each of the two groups), respectively, of those with a high school degree or less ( $r_s = .39, p = .01$ ). Likewise, about two-thirds (67%, 10 mothers) of mothers with more than a high school education reported being good at math, compared with 27% (4 mothers) of high school graduates and 35% (6 mothers) of mothers who did not finish high school ( $r_s = .24, p = .10$ ).

### **Mothers' Math Socialization Practices**

**Mothers' role construction.** The overwhelming majority of mothers considered that the home and parents, in particular, have an important role to play in their children's math learning. More than four-fifths of the sample reported that it is important that children learn math at home (87%, 41 mothers; overall  $M=4.6$ ) and that it is important for mothers to help their children with math (94%, 44 mothers; overall  $M=4.8$ ). These positive findings were consistent across mothers' educational levels. As one mother stated when explaining the importance of doing math at home,

It is extremely important that [child] does math at home. With the help of a parent or brother, it is simply an additional step [to be ready] to school. So, when he is in school, and something is taught to him, he would already have some knowledge and the learning

[process] would be easier. It would facilitate his math learning experience. (1st grade;

Mother: High school graduate)

Another mother shared her positive feelings about helping her daughter learn math at home:

I like a lot [to help her with math] because in this way I share time with her. That's the most beautiful: To share time with your child at home and giving her time. She is a child now, but she will grow up. So, I give my daughter a lot of time. (Pre-Kindergarten;

Mother: Less than high school—9th grade)

When mothers were asked about the best way to help their children learn math, four key roles emerged. They are, in order of decreasing prevalence: Instructional supporter, resource provider, motivator, and monitor. Recall that multiple codes could be assigned to the same response. About half of mothers (55 %, 26 mothers) saw themselves as instructional supporters. Mothers explained that the best way to help their children learn math is by *teaching them*, *helping them when they don't understand something (like adding or subtracting)*, or *practicing with them*. For instance, one mother explained: "I have taught her to identify the numbers, from 1 to 5. When I don't have anything else to do, we use her notebook, and I teach her how to write the numbers, because she already knows how to count the numbers" (Kindergarten; Mother: High school graduate).

Another mother, while explaining how she supported her daughter's math learning, commented:

Giving her time, teaching her slowly, not punishing her, being patient. I hope that what I teach her is good so she would learn and be somebody. I want her to study so she will be

prepared to be somebody in life. Studying is the most important. (Kindergarten; Mother: High school graduate)

Forty-three percent of mothers (20 mothers) reported that they provide their children with educational artifacts such as puzzles, board games, or math workbooks. One mother, while describing an interaction with her daughter, commented: "She tells me: 'Mommy, buy me this book. Look it has numbers!' When she tells me it has numbers, I buy it because something worth investing in; it will be useful at home [to help her learn]" (Kindergarten; Mother: Some college).

A smaller proportion of the sample considered that their main role in their child's math learning was to motivate their child (23%, 11 mothers) or monitor school work (13%, 6 mothers). When explaining how she motivated her child to learn, a mother stated: "It is important to encourage him. Combining learning with fun activities, like going to the park. Also, he knows that he needs to do homework before playing. When he sees his friend playing [outside], he finishes his homework very fast." (First grade; Mother: Less than high school—No formal schooling). One mother explained her role as monitor of school work: "I need to push him to [do homework], 'Okay, let's do your math homework! And he'll do it!' He doesn't like to do things such as homework" (Kindergarten; Mother: Post-graduate).

**Mothers' strategies to foster math at home.** Latina mothers reported diverse strategies to foster their children's math learning. In decreasing order of prevalence, mothers used the following strategies: practicing, watching TV, engaging in daily living activities, playing, using math-talk or verbal interactions, being physically present, helping with homework, and learning together. The most commonly used strategy was practicing (49%, 23 mothers). For example, a mother explained: "It's very important that he practices often during the day—even with small things like counting fingers or showing him objects and that he

identifies them. It's very important you do that every day." (1st grade; Mother: High school graduate). Most of the practices that mothers mentioned centered around counting, adding, and/or subtracting different objects (i.e., fingers, toys, fruits/vegetables), saying or writing numbers.

Another commonly utilized strategy to help children learn math was watching TV (45%, 21 mothers). The following excerpt illustrates how TV shows were used as a tool to foster math learning:

We [mother and child] watch a program every day, from Monday through Friday. It's our favorite, it's from my country [Peru]. It's called "Esto es Guerra" [*This is War*]. [In this program], participants compete, and they count up their points. They have something similar to a dice, and they throw it up and say whichever number comes, they count. My son counts and then says: "Oh! They have ten points, and now they have ten more, so they have twenty!" (Kindergarten; Mother: BA degree)

Two other TV programs that mothers considered useful for fostering math skills were "Dora the Explorer" and "Go, Diego, Go!," which helped children learn numbers and shapes. While explaining why these programs were useful, a mother shared, "These programs teach things. They ask questions and then give a space of silence for answers. The boy answers, then they ask again. They teach him things that he can do, he repeats the answers, and he feels like he is learning" (Pre-Kindergarten; Mother: BA degree).

Three other strategies mothers used to foster their children's math skills were daily living activities (38%, 18 mothers), playing (37%, 17 mothers), and verbal interactions (32%, 15 mothers). Through daily living activities, mothers used artifacts commonly found at home to engage their children in meaningful learning. While commenting that sometimes she buys math

books to foster math learning, a mother shared: “We begin to count, also, not necessarily with books, when we are praying the [Chaplet of the Divine] Mercy. She begins to count the rosary beads, and she knows that she has to count 10 [‘Hail Mary’] beads and to say the prayer 10 times [one for each bead]” (Pre-Kindergarten; Mother: Some college).

Other mothers commented on how they help their children learn math while cooking or grocery shopping. The following excerpt illustrates the interactions that a mother and her son had when grocery shopping:

When I buy food and fruits, he comes and counts the fruits. He says, “mommy but if we’re going to eat 2 fruits, 2 each [family member], how many are we in the family? There is not enough for everybody, do we need to buy more?... That is what he does; he knows how to count, and he notices how many people are in the family and how many things I buy... And, if he realizes that we don’t have enough, for example, when there is only one orange, he says: “Look, mommy, there is only one. How do I share this with everybody? I will give one piece to everybody. How do I cut it so I could give one piece to each of us?” (Kindergarten; Mother: Less than high school—6th grade)

Less frequently, mothers reported talking with their children about math to facilitate learning. One mother shared the following conversation she had with her daughter:

I tell her [...] “let’s see, let’s add!” Or, I say I am— [I ask] “how old is your mom? how old?”, and she tells me: “Mommy, what is your number? How old is she?” and I tell her my age and I write it [the number that represents my age] down. She then begins to write it by herself. After, she wants to identify more numbers, and she writes them. In this way, she learns little by little. (Pre-Kindergarten; Mother: Less than high school—9th grade)

Another mother described her verbal interactions with her son throughout the day: “I feel

like he does [math] all day. When he is eating, “Look, mom! I have four!”. “Oh, my God! [in English]”, he says, “Twelve [in English] little fries!” So, he spends all day talking about math, counting his fingers” (Pre-Kindergarten; Mother: Less than high school—9th grade).

The three strategies mentioned the least were helping their children learn by being present (26%, 12 mothers), doing homework (23%, 11 mothers), or learning together (6%, 3 mothers). Embedded in the notion of being present was the importance of mothers sharing time with their children and giving them attention (*sitting with them while doing homework or putting yourself next to him/her*). A mother who explained why helping with homework was important mentioned:

[The best way to help my child learn math] is to teach him if he doesn't understand something. I always try to help him if he does not understand it. For example, if my son does not understand addition, I tell him to use his fingers. I will show him one finger on one hand and four in the other hand. Then, I will tell him ‘four plus one equals...’, ‘how many fingers do you have in total?’ (Kindergarten; Mother: Some college)

Although Latina mothers in this study mentioned a range of strategies for fostering math learning, on average, each mother reported using only two or three ( $M = 2.6$ ; Range= 0 to 5) strategies with their children, and 32% (15 mothers) reported only one. Moreover, mothers did not indicate taking a systematic approach to fostering math learning at home, as the strategies they mentioned were not cohesively integrated as part of a well-defined plan and did not reflect a specific method to foster math learning. But, as reflected in the following quote, there were a few exceptions. In this instance, a mother described the process that she and her husband followed to promote math learning at home:

We do it [participate in child' math activities] in different ways. I explain to him [child] how to do them [the activities]. At first, I leave him to work by himself. But his father or I are still on top of him, looking at what he [the child] is doing. Then, we explain to him, and give him some time to try to do the activities. But I am also there with him, helping him, [telling] how he has to do it, checking what he is doing and everything.

(Kindergarten; Mother: BA degree)

In addition, in most cases (64%, 30 mothers), mothers fostering math learning at home was reactive rather than proactive. Mothers typically responded either to their children's requests for help or followed suggestions from schools and teachers. As one mother stated:

I see that she does a lot that activity [observing and identifying shapes]. When it's a triangle, she even tells me [the word] in English; she doesn't say it in Spanish. [She says the words] circles, triangles, squares [in English]. She really likes identifying [shapes], even in pictures. She says "mommy, that looks like a square, like a triangle."

(Kindergarten; Mother: High school graduate)

Several of these mothers explained their child's engagement in math at home was because the school assigned homework. As one mother mentioned,

Well, I like it more when they [school teachers] give him a lot of problems to do; to do those types of problems make him thoughtful. And, I like that, that they give him things to think about. I feel like that it is an extra challenge (Pre-Kindergarten; Mother: Less than high school—9<sup>th</sup> grade)

**Who engage in children's math activities with them?** Mothers had a predominant role in supporting their children's math learning: 75% (35 mothers) said they helped their children learn math. When asked with whom the child did math activities, one mother responded, "Me!

I'm usually his teacher" (Kindergarten; Mother: Some college). Another mother said, "I always help her [with math activities], or sometimes my sister helps her when I am working"

(Kindergarten; Mother: BA degree). Fathers and older siblings were mentioned less frequently.

About one-third of mothers reported that their children did math at home with fathers or siblings/other children (34%, 16 mothers and 36%, 17 mothers, respectively). When explaining how the child's father participated in math activities with their daughter, a mother described,

When she [child] was learning the numbers from one to one hundred, her dad used to tell her: 'I will write [the numbers] from one to one hundred.' She responded, "I will write them from one to one hundred too, but I will beat you!" She wanted to beat him! Then when she finished and realized that she was ahead of her father, she got really happy.

(Kindergarten; Mother: BA degree)

When describing the role of siblings, a mother mentioned, "Sometimes [she is involved in math activities] with her sister... When her sister is doing her math homework, she [the child] is observing, learning. She [the child] tell her [older] sister that she also wants to learn"

(Kindergarten; Mother: Less than high school—9th grade).

**Mothers as role models of math engagement.** There was quite a bit of variability in how frequently mothers reported that their children saw them engage in math activities at home. About one-third responded that their children saw them engage in math activities every day or almost every day (30%, 14 mothers), and another third said about once to several times a week (32%, 15 mothers). The remaining mothers reported that their children saw them engage less frequently in math activities (26%, 12 mothers, less than once a week, 13%, 7 mothers, never or almost never did so).

When examining the type of math activities mothers engaged in, about half described participating in household finances (49%, 23 mothers; mostly *“paying bills or counting money”*) and chores (45%, 21 mothers; mostly *“shopping/going to the store or cooking”*). When describing her daughter's engagement in math activities, a mother explained:

OK, when I go to do laundry, she sees me counting quarters. Also, there are times when I tell her to count the quarters [that I need] for three loads of laundry, and then she separates them. Or, sometimes I write numbers to pay bills. Or, I tell her, “hey, give me three oranges!” and she brings them for me; or “give me two tomatoes!” She is always near me here in the kitchen and she helps me too. (1<sup>st</sup> grade; Mother: Some college)

Another mother shared the interaction that she had with her child while doing math activities,

When we go shopping, he says, “how much money do you have?” I tell him how much money I have. He then asks whether I have enough for toys. I tell him: “No! I only have this, and it's just enough for the food!” I show him that I only have ten or twenty dollars. (Kindergarten; Mother: Some college)

Other math activities that mothers reported were work-related (17%, 8 mothers), doing child's homework (13%, 6 mothers), or playing with child (9%, 4 mothers). One mother described her involvement in math at home as follows:

I am a businesswoman. I spend all my time looking at calculators, at my bills: how I am going to do [to pay them], what I am going to invest in. He always sees me doing math. He has even asked me, “mom, what are you doing?” [I say] “Oh! well, you know, son, we have to earn money and sell.” He also sees me dealing with our home budget. There

are always numbers involved. (Pre-Kindergarten; Mother: Less than high school—9<sup>th</sup> grade)

As previous quotes demonstrate, these mothers noted that their own engagement in math could be used as a learning opportunity for their children. These two mothers explicitly discussed how observing them engage in math activities, such as shopping or paying bills, was a learning opportunity for their children.

**Educational differences in math socialization practices.** In contrast to educationally related differences in mothers' math conceptions, there was only one statistically significant association in socialization practices —mothers as role models of math engagement (see Table 4). Mothers who did not finish high school were less likely to report that their child saw them doing math almost every day or every day (12%, 2 mothers) than those with more education (40%, 6 mothers, for high school graduates and for those with more than high school, respectively;  $r_s = .25$ ,  $p = .08$ ). There were no significant associations between mothers' education and other math socialization practices.

## Discussion

Improving the learning outcomes of young Latinx children is critical for their future academic and occupational opportunities. This study addressed the vital role that the home plays, particularly just prior to and at the start of formal schooling, in facilitating children's math learning. Although research on home influences is burgeoning (Blevins-Knabe, 2016), there has been limited research, especially in math socialization, with Latinx immigrant families—one of the fastest growing racial/ethnic groups in the U.S. (Murphey et al., 2014). The results from this study increase our knowledge of home-based math learning opportunities afforded to Latinx children. Our study was unique in its in-depth focus on Latina mothers' conceptions of math,

their role construction about math teaching at home, and the strategies they reported using. We examined mothers' beliefs and practices by situating them in a particular cultural context and recognizing that such beliefs and practices are dynamic and responsive to their surroundings (Gutiérrez & Rogoff, 2003). This is particularly relevant for immigrant parents who are socializing their children while balancing new expectations and requirements of unfamiliar institutions (Suárez-Orozco et al., 2008). Overall, the results demonstrated that Latina mothers, regardless of their education levels, use multiple socialization approaches to teach math and have diverse conceptions of math.

### **Conceptions of Math**

Consistent with socio-cultural learning theories and other empirical studies (Civil et al., 2012; Williams et al., 2016), mothers' conceptions of math included school-based definitions and out-of-school definitions. Three-fourths of the mothers in this study provided school-based conceptions —typically counting or basic math operations— and about half also provided out-of-school knowledge math definitions, including daily living conceptions. The focus on math as relevant for all aspects of life, as expressed by many mothers in this study, is consistent with the National Research Council's relatively new focus on teaching children the importance of math beyond just what is done in school (Kilpatrick, Swafford, & Findell, 2001). Mothers' emphasis on daily living as an important component of math could facilitate learning by using activities that are within children's zone of proximal development (Skwarchuk, Sowinski, & LeFevre, 2014). In fact, research has shown that this is positively associated with the frequency of children's engagement in math activities at home (Author).

Nevertheless, the descriptions given by the majority of mothers were not consistent with them having a broad basis of school-based math knowledge. Many mothers conceptualized math

as basic operations: numbers, counting, or calculations –mostly adding and subtracting. This finding could be an artifact of the way the data were gathered because math conceptualizations may not always be readily accessed. González et al. (2001) found that some family members struggled to recognize mathematical elements embedded in daily living activities. Given the relevance of math conceptions for fostering mothers' engagement in math at home, the scope of math activities they engage in, and/or the nature of interactions with their children, it is important to further understand explicit and implicit conceptions of math.

As research has demonstrated, Latinx parents can adapt to the expectations and practices of U.S. schools (Aldoney & Cabrera, 2016; Delgado-Gaitan, 2004). One area to build upon may be Latina immigrant mothers' perceptions of their math skills and their enjoyment of math. About half of mothers in this study reported enjoying math and thought they were good at math (within the context of their own skill levels). Although some Latina mothers have been successful in helping their children learn “school-math” through daily living activities (Domínguez, 2011), focusing on facilitating positive affect towards math will further empower mothers to be actively engaged in their children's learning. Fostering a positive affect is important because, as Maloney, Ramirez, Gunderson, Levine, and Beilock (2015) found in a study with first and second graders, mothers who were anxious about math interacted negatively with their children on math tasks.

### **Role Construction and Socialization Practices**

How mothers conceptualize their role in their children's development is an important component in whether and how they will be involved in their children's education (Walker, Ice, Hoover-Dempsey, & Sandler, 2011). Some researchers have argued that Latinx parents do not prioritize education and, therefore, do not socialize their children to be academically successful

(see Valencia & Black, 2002). Such a conclusion is inconsistent with our data: the Latina mothers in this study viewed providing their children with opportunities to engage in math activities at home and assisting them with acquiring math skills as very important components of their role as mothers. Indeed, most mothers reported that the family plays an active role in supporting their children's math learning; about one-third mentioned that their children engaged in math activities at home with their fathers or siblings. These findings are consistent with what we know from ethnographic studies (e.g., Williams et al., 2016).

Mothers also discussed various ways in which they supported their children's math learning at home and the strategies they used to facilitate such learning. The most commonly reported way that mothers said they supported their child's math learning was as an instructional supporter (teaching or practicing math content). This result shows that these Latina mothers not only shared *consejos* to facilitate their children's learning (Delgado-Gaitan, 2004) but also provided their children direct instruction.

A unique component of this study is that mothers reported the strategies they used to foster their children's math skills. Interestingly, practicing and watching television with their children were the two most commonly reported strategies. Practicing math content is probably consistent with what teachers already assign as math homework. Learning that these parents utilize television as a learning tool may open up new activities for teachers to build upon. And, as noted previously, over a third of the mothers utilized daily living activities as a source of fostering math skills in their children. We return to this point in the implications section.

Although mothers viewed their role as facilitating their children's math development, there were some limitations in what they reported doing. One, mothers did not seem to report a longer-term systematic plan for facilitating their children's learning. Having such a systematic

plan may be fundamental for children's math success (Huntsinger, Jose, & Luo, 2016). Two, although mothers mentioned strategies they used with their children to foster their learning, each mother reported only one or two strategies. This could be problematic if the children did not benefit from the initial strategy used. Three, many mothers did not report taking advantage of social learning opportunities, that is, watching what others do and imitating them. About two-thirds of mothers reported that their children saw them engage in math activities at least once a week. However, only a few discussed how children observing them engage in math activities could facilitate their learning. To increase mother's engagement in math learning, it may be critical to increase their awareness of social learning and its importance for learning.

Surprisingly, mothers' socialization was not related to their educational level except for mothers as role models of math engagement. More educated mothers reported that their children saw them doing math more frequently. No statistically significant differences were found in socialization beliefs, their perceived roles in math learning, or the strategies used.

### **Limitations and Future Research**

Our study had four major limitations. First, our results are based on mothers' reports from one-time interviews. We cannot know whether the reports reflect their typical practices but have no reason to doubt their claims. Moreover, because we did not observe how mothers and children interacted around math, we do not know the quality of their interactions. Conducting multiple observations in targeted situations that are authentic to the family's routine experiences would have allowed us to acquire a more nuanced understanding of the learning experiences of Latinx children. Future studies should take an ethnographic approach to increase our understanding of the cultural dimensions of Latinx children's home learning (LeCompte & Schensul, 2010). Such

an approach would also allow us to expand our understanding of the role that fathers and siblings play in helping young children learn math.

Second, although our sample included mothers from educationally diverse backgrounds, most of the mothers had not completed college. Such a restricted educational range is typical of Latinxs in the U.S. (Ryan & Bauman, 2016); however, it provided a limited representation of the math learning opportunities Latina mothers with advanced educational degrees share with their children. Additional studies with college-educated mothers are needed.

Third, socioeconomic status is a large confounding factor when examining Latinx children's home learning environments. It is then unclear whether ethnic/racial differences result from socioeconomic differences alone (Crosnoe & Turley, 2011) or from cultural and socioeconomic attributes (McWayne et al., 2013). As García-Coll and colleagues (1996) argued, the experiences and consequences of poverty is ethnically specific and, therefore, the effect of poverty on Latinx children's learning outcomes may be different from the experiences of other ethnic groups. Further research is needed to disentangle these issues.

Fourth, the focus on ethnicity assumes that individual members of the same ethnic group participate equivalently in the culture with which the group is associated. However, this probably is not the case (Gutiérrez & Rogoff, 2003). We need to examine Latinx parent's beliefs and practices while keeping in mind the dynamic nature of cultural groups and recognizing that Latinxs are not a monolithic cultural group (Arzubiaga et al., 2008). Despite these qualifications, these data provide important information about how these Latina mothers socialized their young children's math development.

### **Implications for Practice**

The findings from this study provide a critical foundation for developing math interventions that build upon the existing strengths within Latinx families and are responsive to their needs and sensitive to their cultural beliefs and practices. Children's learning in the classroom could be improved by utilizing children's cultural backgrounds and family and community assets. As Ladson-Billing (1995) argued, a culturally relevant pedagogical approach seeks to make school learning more meaningful, strengthen children's positive identity formation, and provide children with the tools needed to maintain the cultural manifestations of their families and communities. Such an approach is certainly relevant for math instruction because math learning opportunities can be enriched when classroom instruction includes children's funds of knowledge (Moll et al., 1992). Teachers could use children's sociocultural learning contexts –and some of the home practices identified in this study– as building blocks to improve their math learning (Civil et al., 2012). It is important that teachers first recognize Latinx homes as valued sources of knowledge, feel comfortable working with Latinx parents, and expand their knowledge of culturally responsive practices (Gay, 2010). Unfortunately, too many teachers still lack knowledge about how to teach math to diverse populations or what to do to facilitate parents' involvement at home (e.g., Ginsburg, Lee, & Boyd, 2008).

Results from this study also provide important information to bolster Latinx children's math development at home. Latina mothers could expand their school-based knowledge of math and further understand how it is embedded in their daily living activities. As we mentioned earlier, it also is important to foster mothers' confidence about math and the importance of helping their children learn math. This will enable parents to better assist their children and be stronger advocates for them at school (Civil & Planas, 2010).

Recent interventions to increase Latinx families' engagement in math have demonstrated encouraging results. These programs build upon family's strengths and establish effective parent/teacher partnerships. López and Donovan (2009) developed family-school partnerships around Family Math Nights that facilitated parents and children math interactions. O'Donnell and Kirkner (2014) described how the YMCA Family Involvement Project not only increased parental involvement but also lessened parental apprehension about school participation. Bower and Griffin (2011) reported how parent-teacher conferences and provision of supplemental resources (e.g., weekly newsletters with math activities to do at home) reinforced math development.

Thus, an important way to facilitate culturally responsive teaching and improve home support for math learning at home is through strengthening comprehensive family-school partnerships. When schools make explicit efforts to reach out to families and create truly welcoming environments (Epstein, 2010), misconceptions and misunderstandings between mainstream educational institutions and Latinx families are reduced (Author). These partnerships also allow teachers and other school personnel to develop cultural awareness and facilitate positive and trustful interactions with Latinx families and children. Unfortunately, many Latinx parents report limited efforts from the schools to facilitate their involvement and are concerned about teachers' negative attitudes (Delgado-Gaitan, 2004).

### **Conclusion**

Despite the challenges and constraints that many Latinx parents face, their commitment to improve their children's learning is a consistent finding in the literature (Arzubiaga et al., 2008; Cabrera et al., 2012). In this study, we used a mixed-methods approach to document Latina mothers' perceptions of how they promote their children's math development in the early

school years. We took a strength-based approach, recognizing the opportunities available for learning in young Latinx children's home, as well as identified potential mechanisms to further increase their math learning. The results are pertinent for optimizing family engagement in math, developing comprehensive interventions that facilitate culturally responsive teaching in the classroom, and strengthening comprehensive family-school partnerships.

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Table 1

*Demographic Characteristics of the Latino Sample (N=47 mothers)*

Variables		Frequency	%
<b>Child's Grade<sup>a</sup></b>	Prekindergarten	11	23.9
	Kindergarten	16	34.8
	First grade	19	41.3
<b>Mother's Country of birth</b>	El Salvador	23	48.9
	Mexico	9	19.1
	Guatemala	6	12.8
	Peru	5	10.6
	Honduras	2	4.3
	Ecuador or Colombia	2	4.3
<b>Mother's Years in the United States</b>	5 years or less	7	14.9
	6 to 10 years	16	34
	11 to 15 years	13	27.7
	More than 15 years	11	23.4
<b>Mother Attended U.S. schools</b>		9	19.1
<b>Mother's Employment</b>		31	66
	Full-time	14	29.8
	Part-time	17	36.2
<b>Mother's Occupation Type<sup>b</sup></b>	Cleaning	14	29.8
	Restaurant (cook, food preparation)	6	12.8
	Sales (from home or in store)	4	8.5
	Babysitting/caregiving	3	6.4
	Clerical work	3	6.4
	Construction	2	4.3
	Other (practicum, industrial laundry)	2	4.3
<b>Languages Spoken at Home</b>	English and Spanish	24	51.1
	Only Spanish	23	48.9
<b>Most Frequently Used at Home<sup>c</sup></b>	Spanish	43	93.5
	English	2	4.4
	Both	1	2.2
<b>Highest Education Level</b>	Less than High School	17	36.2
	High School Graduate	15	3.9
	Some College/ Vocational/Technical	10	21.2
	Associate Degree	2	4.3
	Bachelor Degree	3	6.4
<b>Family Structure at Home</b>	Father lives at home	37	78.72
	Other Adults (besides mother/ father)	26	55.3
	Only Child	14	29.8

*Note:*

a. One missing case; valid percentages reported.

b. Two missing cases; valid percentages reported. Mother could have more than one occupation.

c. One missing case; valid percentages reported.

Table 2

*Key Codes for Mothers' Responses*

<b><u>Construct</u></b>	<b><u>Primary Codes</u></b>
<b>Math Knowledge</b>	
1. School-based definitions	Basic content knowledge: numbers or counting Basic content knowledge: calculations (addition, subtraction, multiplication) Advanced content knowledge: problem-solving, algebra, geometry Other (i.e., learned at school, school-subject matter)
2. Out-of-school definitions	Daily living (i.e., use it for everything; use it every day; do bills and budgeting) Important (i.e., for future/get ahead; learning) Other (e.g., complicated)
<b>Mothers' Roles in Math Learning at Home</b>	Motivator Instructional supporter Monitor Resource provider
<b>Mothers' Strategies for Math Learning</b>	Being present Through daily living By playing By watching TV Math talk Practicing Helping with homework Learning together
<b>Who is Involved?</b>	Mother Father Siblings/other children Other adults
<b>Mothers as Role Models of Math Engagement</b>	Household activities (finances and chores) Work-related activities Child's homework Playing with child

Table 3

*Mothers' Conceptions of Math by their Educational Level (N=47)*

	% Less than High School (n=17)	% High School Graduate (n=15)	% More than High School (n=15)	Spearman Rho Correlations <sup>1</sup>
<b>Math knowledge (1=yes)</b>				
<i>School-based definitions</i>	70.59	80.00	80.00	0.09
Basic content knowledge	70.59	80.00	60.00	-0.09
Advanced content knowledge	5.88	26.67	40.00	0.33*
<i>Out-of-school definitions</i>	35.29	60.00	66.67	0.26+
Daily living	23.53	46.67	53.33	0.25+
Important	35.29	33.33	46.67	0.09
<b>Attitudes towards Math</b>				
<i>Enjoy Math</i>				
Not at all/Not much	17.65	13.33	6.67	0.39*
Somewhat	47.06	46.67	6.67	
Much/Very much	35.29	40.00	86.67	
<i>Good at math</i>				
Not good at all/Not good	23.53	13.33	13.33	0.24+
Ok	41.18	60.00	20.00	
Good/Very good	35.29	26.67	66.67	

*Note.* +  $p \leq .10$  \*  $p \leq .05$ .

1. Correlations between key constructs and mothers' education

Table 4

*Mothers' Math Socialization Practices by their Educational Level (N=47)*

	% Less than High School (n=17)	% High School Graduate (n=15)	% More than High School (n=15)	Spearman Rho Correlations <sup>2</sup>
<b>Mothers' role construction</b>				
Important that children learn math at home				-0.14
Somewhat or important	11.76	33.33	26.67	
Very important	88.24	66.67	73.33	
Important for mothers to help with math				0.23
Somewhat or important	17.65	13.33	00.00	
Very important	82.35	86.67	100.00	
<b>Role Type</b>				
Instructional supporter (1=yes)	52.94	66.67	46.67	-0.04
Resource provider	41.18	40.00	46.67	0.04
Motivator	23.53	20.00	26.67	0.03
Monitor	17.65	6.67	13.33	-0.06
<b>Mothers' strategies to foster math (1=yes)</b>				
Practicing	41.18	46.67	60.00	0.15
Watching TV	29.41	60.00	46.67	0.15
Engaging in daily living	23.53	46.67	46.67	0.20
Playing	23.53	40.00	46.67	0.20
Math talk	29.41	33.33	33.33	0.04
Being present	29.41	20.00	26.67	-0.03
Helping with homework	23.53	20.00	26.67	0.03
Learning together	0.00	6.67	13.33	0.23
<b>Who is engaged? (1=yes)</b>				
Mothers	70.59	73.33	80.00	0.09
Fathers	35.29	20.00	46.67	0.09
Sibling or other children	29.41	40.00	40.00	0.09
Other adult	0.00	13.33	13.33	0.20
<b>Mothers as role models of math engagement</b>				
Frequency of engagement				0.40*
Never/almost never	17.65	20.00	0.00	
Less than once a week	47.06	13.33	13.33	
Once to several times a week	23.53	26.67	46.67	
Almost everyday/everyday	11.76	40.00	40.00	
Type of activities children observed mothers engage in (1=yes)				
Household activities, chores	29.41	46.67	60.00	0.25+
Household activities, finances	41.18	53.33	53.33	0.10
Work-related	11.76	13.33	26.67	0.16
Child's homework	11.76	13.33	13.33	0.02
Playing with child	11.76	6.67	6.67	-0.08

Note. +  $p \leq .10$  \*  $p \leq .05$ .

2. Correlations between key constructs and mothers' education