

**PARENT TRAINING FOR IMMIGRANT LATINA MOTHERS: A
RANDOMIZED CONTROLLED TRIAL OF THE MADRES A MADRES
PROGRAM**

by

Ariel Ida Appelbaum Williamson

A thesis submitted to the Faculty of the University of Delaware in partial
fulfillment of the requirements for the degree of Master of Arts in Psychology

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ABSTRACT

The purpose of this study was to evaluate the efficacy of *Madres a Madres* (Mothers to Mothers), a newly developed parent training program designed for low-income immigrant Latina mothers and their children. *Promotoras*, or female lay community health workers of Latina background, delivered the Madres a Madres program in a home visitation format. A total of 194 mothers and 194 focal children (87 male, 107 female) ages 7 to 12 were randomized to the intervention (113 mother-child dyads) or wait-list control condition (81 mother-child dyads) over the three-year study period. Primary outcomes of interest were mother-reported parenting skills and deviant beliefs. Secondary outcomes were mother-reported child internalizing and externalizing behavior, as well as child-reported child deviant beliefs, aggressive behavior, and social competencies. Mother and child data collection occurred at pretest, 3-month posttest, and 9-month follow-up periods. Multilevel linear and non-linear growth models revealed increases in intervention mothers' parenting skills, marginal reductions in intervention mothers' deviant beliefs, and reductions in intervention children's internalizing behavior over the three time points, relative to the control condition. Findings are discussed in the context of future directions for research on the Madres a Madres program and on the implementation and dissemination of evidence-based parent training programs to low-income, culturally diverse families.

Chapter 1

INTRODUCTION

The purpose of the current study was to evaluate the efficacy of the *Madres a Madres* (Mothers to Mothers) parent training program on parenting skills, parent beliefs, and child behavior in a sample of low-income immigrant Latina mothers and their children ages 6 to 13. The program was developed specifically to build on previous empirical studies of culturally adapted parent training programs (e.g., Martinez & Eddy, 2005; McCabe & Yeh, 2009), and simultaneously to address the limitations and implementation challenges of applying empirically supported treatments (ESTs) to immigrant Latino families in the United States.

In this regard, cultural sensitivity requires attention not only to ethnic heritage but also to living conditions and contextual circumstances that are associated with ethnicity for specific subgroups (Lau, 2006). Relevant for the current study, the experiences of immigrant Latino families in the United States can be quite distinct from families of Latino heritage but of different generational status (Ku & Matani, 2001; Martinez & Eddy, 2005; Ortega et al., 2007; Pew Hispanic Center, 2011). These families, and particularly those who are recent immigrants, often face conditions such as extreme poverty, limited access to or underutilization of healthcare, high levels of community violence, fear of deportation, language barriers, social exclusion, and differences in parent-child acculturative status that can impact the generalizability and

feasibility of EST implementation (Guerra & Knox, 2008; Knox, Guerra, Williams, & Toro, 2011).

The Madres a Madres program is grounded in the parent training literature. Although there are several different types of family-based interventions for child behavior problems, parent-training programs are among the most effective, with decades of empirical support documented in meta-analytic inquiries, longitudinal studies, and other reviews (Brestan & Eyberg, 1998; Kaminski, Valle, Filene, & Boyle, 2008; Patterson, Forgatch & DeGarmo, 2010). For example, a recent comprehensive review of 23 treatments for child disruptive behavior problems found that only parent training could be rated as having a high degree of empirical support (Chorpita et al., 2011). Research has demonstrated that parent training can also reduce child internalizing problems (e.g., Webster-Stratton & Herman, 2008) as well as abusive parenting practices (Chaffin et al., 2004). Eyberg, Nelson, and Boggs (2008) examined outcome data from 28 randomized controlled trials (RCTs) of interventions for youth disruptive behavior problems, and identified 16 specific programs as ESTs. Six of these were parent training programs, including Parent-Child Interaction Therapy (PCIT; McNeil & Hembree-Kigin, 2010), The Incredible Years parent and child training series (IY; Webster-Stratton & Reid, 2010), and Parent Management Training—Oregon Model (PMTO; Forgatch & Patterson, 2010).

However, the majority of these programs have been developed for and evaluated with non-Latino White families (Eyberg et al., 2008; Forehand & Kotchick, 1996; Kumpfer, Alvarado, Smith, & Bellamy, 2002; Reid, Webster-Stratton, &

Beauchaine, 2001). In recent years, scholars have become increasingly interested in program effectiveness within specific populations, given concerns about the generalizability and transportability of ESTs to families of diverse cultural, linguistic, and ethnic backgrounds (Castro, Barrera, & Martinez, 2004; Lau, 2006). Indeed, recruitment, engagement, and retention of ethnic minority families can be difficult in family-based interventions that target beliefs of the majority culture (Hirachi, Catalano, & Hawkins, 1997; Kumpfer et al., 2002; Lau, Fung, Ho, Liu, & Gudiño, 2011). Differences in family values and issues of treatment acceptability with regard to parent training have also been found to limit the applicability of such programs to families of diverse ethnic backgrounds, and to Latino families in particular (Borrego, Ibanez, Spendlove, & Pemberton, 2007; Domenech-Rodríguez, Baumann, & Schwartz, 2011; McCabe, Yeh, Garland, Lau, & Chavez, 2005).

In response to these concerns, researchers have used different strategies for assessing and optimizing the cultural fit of parent training ESTs for Latino families. One strategy involves evaluating ESTs with limited superficial adaptations (e.g., translation to Spanish) in a diverse sample of families and testing whether ethnicity moderates intervention effects. Another approach focuses on adapting existing ESTs to match important cultural knowledge, beliefs, and practices, and evaluating program outcomes within Latino samples, while maintaining fidelity to the original protocol as much as possible. A third method, which guided the creation of the Madres program, is to develop and evaluate new interventions that build on critical components of

ESTs, but also incorporate local cultural knowledge regarding normative parenting practices, barriers to treatment, and challenges to implementation.

Ethnicity as a Moderator of Parent Training Program Effects

The majority of parent training program outcome studies with diverse samples have relatively small numbers of families within specific ethnic groups, precluding consideration of ethnicity as a moderator of treatment outcomes (Eyberg et al., 2008; McCart, Priester, Davies, & Azen, 2006). The few studies with larger samples have generally found effects to be robust across ethnic groups. For example, Chaffin et al. (2004) reported on a trial of PCIT for maltreating parents that showed no differences across outcomes for several ethnic groups.

A number of studies have also implemented the IY program with diverse populations. Reid, Webster-Stratton, and Beauchaine (2001) tested IY among Latino, African American, and Asian American families, with adapted video segments and trained native speakers translating the program to Spanish for Latino families. Reid et al. found high treatment satisfaction and no substantial differences in treatment effects or attrition rates across groups. In a RCT with Latino and non-Latino White families, Barrera et al. (2002) provided IY in Spanish with bilingual staff, and found reduced child behavior problems in both groups. Another study (Linares, Montalto, Li, & Oza, 2006), evaluated IY in a foster care setting using bilingual staff for Latino families, with comparable findings across ethnic groups. Still, relatively few studies have examined ethnicity as a moderator of parent training outcomes. Further, studies have rarely considered the generational status of participating parents and children (i.e.,

native born versus immigrant), or other critical features of culture and context that may impact program effectiveness.

Adaptations of Parent Training ESTs for Latino Families

Beyond modifications designed to address superficial, or *surface* level, participant characteristics, like native language, in order to facilitate uptake and generalizability, a more extensive approach to cultural adaptation involves changes in *deep structure* program characteristics. This type of adaptation addresses and modifies the intervention to be more consistent with the target group's cultural values or worldviews (Castro et al., 2004; Leidy, Guerra, & Toro, 2010a). For Latino families, research has shown that such values may include: *familismo*, the importance of familial obligation, support, and parental authority; *respeto*, or deference to figures of authority or elders; *personalismo*, an emphasis on the development of reciprocal interpersonal relationships; *simpatía*, the avoidance of interpersonal conflict through increased agreeableness; and *religiosidad*, or the influence of religion (typically Catholicism) on one's worldview (Grau, Azmita, & Quattlebaum, 2010; Mirabal-Colón & Vélez, 2006).

Researchers have made cultural adaptations at the deep structure level to several ESTs for parent training, such as PCIT and PMTO, and have tested these among Latino samples. In addition to integrating aspects of the Latino cultural values described above, PCIT and PMTO adaptations involved efforts to reduce stigmatization associated with mental health interventions and to address treatment acceptability and acculturation concerns. For instance, adaptations included calling

therapists “teachers” or coaches” to reduce stigma. Both programs contained modified behavioral strategies in accordance with parents’ level of acceptability, and the adapted PMTO added a module on parent-child acculturative differences (Martinez & Eddy, 2005; McCabe & Yeh, 2009). In general, adapted PCIT and PMTO have yielded better results than treatment as usual. However, the adapted version of PCIT, *Guiando a Niños Activos* (Guiding Active Children), was no different from standard PCIT for Mexican American families with regard to treatment acceptability and outcomes (McCabe & Yeh, 2009). Martinez and Eddy (2005) found that the adapted PMTO program, *Nuestras Familias, Andando Entre Culturas* (Our Families: Moving Between Cultures), produced superior effects compared to a wait-list control condition, although the program was less effective among immigrant-born youth.

It may be that broadly cast adaptations targeting Latino cultural values do not sufficiently capture the unique beliefs and values of immigrant populations in particular. New adaptations of existing programs are beginning to address this issue. Domenech Rodríguez, Baumann, and Schwartz (2011) have developed an adaptation of PMTO targeting immigrant Latino families called *Criando con Amor: Promoviendo Armonía y Superación* (CAPAS; Parenting with Love: Promoting Harmony and Getting Ahead), which focuses on the importance of *superación* (getting ahead) and *educación* (good behavior) (Zayas, Borrego, & Domenech Rodríguez, 2009). The developers made program modifications based on pilot and focus group work, and are currently evaluating the program in a RCT (Domenech Rodríguez et al., 2011).

Developing and Evaluating New Interventions for Immigrant Latino Families

Although it may be possible to modify existing EST protocols with some success to incorporate Latino cultural values, the conditions confronting recent immigrant Latino families in the United States are often so extreme that new models of intervention delivery and content must consider components that target specific issues of concern directly. For many immigrant Latino families, particularly those living in densely populated urban areas, these concerns include living in overcrowded housing, high violence neighborhoods, lack of insurance and access to healthcare, unfamiliarity with American schools and welfare services, language barriers, child parentification (reversal of power structure in the family), parent-child acculturative gaps, and fear of Immigration Control and Enforcement (ICE) raids and deportation (Guerra & Knox, 2008; Knox et al., 2011; Ku & Matani, 2001; Pew Hispanic Center, 2011).

Building on evidence-based approaches is also a feasible method for translating ESTs to diverse populations. However, the specific skills required for immigrant Latino parents in conjunction with feasible methods of implementation may require significant reformulations of ESTs, essentially resulting in new interventions that are tailored to this population. It is unlikely that programs will be effective if they do not address parents' immediate concerns and the skills needed to address these challenges, the latter of which may differ from those typically included in programs developed for less disadvantaged populations (Lau, 2006). As such, *Madres a Madres* was developed specifically to foster parenting skills with immigrant Latino families.

The Present Study

The development of the Madres a Madres program was part of an eight-year collaborative effort between a Southern California non-profit community organization serving Latino families, Latino Health Access (LHA), and the university-based Southern California Academic Center of Excellence on Youth Violence Prevention (ACE), funded by the Centers for Disease Control and Prevention (CDC).

In the initial phases of this partnership, the research team selected a previously evaluated evidence-based program, Families and Schools Together (FAST), as a “best fit” for the population that LHA served. The FAST program aims to empower and improve family connectedness in the home, community, and school settings (McDonald et al., 2006). However, although FAST had been previously found to reduce child aggression in a Mexican American sample, the ACE-LHA FAST trial with recent immigrant families had minimal effects on parents and children, and was not effective in preventing children’s aggressive behavior (Knox et al., 2011). Qualitative follow-up and implementation data from this study suggested that parents found the program useful and culturally appropriate, but that the program did not address key issues in their daily lives that were important for effective parenting. Families also had great difficulty traveling to the intervention site, and the cost for sustaining the FAST program beyond project funding was prohibitive (Guerra & Knox, 2008; Knox et al., 2011).

Consequently, the partnership sought to develop a preventive intervention focused specifically on integrating the parenting needs of this population with best

practices from the parent training literature, in an intervention format that could be easily implemented in the target low-income, immigrant communities. The Madres a Madres program emphasizes discrete components associated with greater effectiveness of parent training programs. These include behavior management skills, the promotion of parental warmth and involvement, efforts to strengthen the parent-child relationship, and the teaching or coaching of positive parent-child interactions (Dishion et al., 2008; Forgatch & Patterson, 2010; Kaminski et al., 2008; McNeil & Hembree-Kigin, 2010; Webster-Stratton & Reid, 2010). In response to the concerns of immigrant families, the program also included components on normative child development competencies and on skills that target parents need for managing their daily lives (e.g., how to maintain authority when children speak English and parents only speak Spanish).

Because existing parent training programs tend to emphasize discrete parenting skills independent of contextual conditions, the program drew from the literature on multicomponent interventions such as Multisystemic Therapy (Henggeler & Schaffer, 2010) and Multidimensional Treatment Foster Care (Smith & Chamberlain, 2010). These empirically-supported programs for youth behavior problems also promote empowerment and engagement of families and help them navigate community services (Eyberg et al., 2008; Henggeler & Sheidow, 2012; Leidy et al., 2010a). Madres a Madres similarly emphasizes connecting families with local community resources and teaching mothers to be effective advocates for their children.

The research team chose mothers as a primary target for intervention given data on normative parenting roles within the predominately Mexican families that LHA serves. To reduce the stigmatization that has been commonly found in relation to mental health care for Latinos (e.g., McCabe et al., 2005) and to increase the limited healthcare access faced by immigrant populations, the team designed the program for implementation in the home by immigrant Latina mothers trained as community health workers, or *promotoras*. Home visitation services have long been recognized as a method to access low-income and marginalized populations and to prevent child maltreatment or other health concerns in the United States (Sweet & Appelbaum, 2004). Promotor-based interventions are a promising and cost-effective strategy for delivering treatment to marginalized communities and disseminating evidence-based practices (Pérez & Martinez, 2009; Rotheram-Borus, Swendeman, & Chorpita, 2012).

In the present study, it was hypothesized that exposure to the Madres intervention would be associated with improvements in mothers' parenting skills and reductions in mothers' deviant beliefs. It was additionally hypothesized that secondary outcomes subsequent to intervention participation would be reductions in child internalizing and externalizing behavior and child deviant beliefs, and improvements in child social competencies.

Chapter 2

METHOD

Site and Design

The study was conducted in Santa Ana, CA, a large, urban city of approximately 55,000 residents, 96% of whom identify as of Latino origin. All data collection occurred between 2006 and 2009. The community partner, LHA, was primarily responsible for study recruitment, participant assessment, and the intervention implementation.

Participants were randomized at the individual level to either the intervention or the wait-list control condition. In order to provide services to as many families as possible while still maintaining the integrity of the RCT design, assignments were weighted: For every 10 families, a computerized randomization model assigned 6 families to the intervention condition and 4 families to the wait-list control condition. LHA project staff were blind to assignment and received lists with the condition assigned. Wait-list control families were given the option to participate in the intervention after they had completed all phases of the control condition. The number of participants in the study was based on estimates of the number of families that could be recruited into the program during the trial period and estimates of available funds for services.

Participants

A total of 194 mothers each with one focal child (87 male, 107 female) consented to participate in either the intervention (113 mother-child dyads) or wait-list control (81 mother-child dyads) conditions over the three-year study period. Mothers' average pretest age was 34.20 years ($SD = 5.98$, range = 22 – 50 years) and the average age of child participants was 9.47 years ($SD = 1.53$, range = 7 – 12 years). All mothers self-identified as immigrants and the majority reported Mexico as their country of origin (97.9%). Most child participants were born within the United States (73.2%) and were of Mexican heritage (97.9%). At pretest, mothers had lived in the United States for an average of 12.02 years ($SD = 5.57$). Families lived with an average of 7 people ($SD = 2.80$). Most mothers were married (56.6%). The sample was socioeconomically disadvantaged, with 63% of mothers reporting a total household income of less than \$15,000 per year, and all mothers reporting a total household income of less than \$50,000 per year.

Families were recruited to participate in the study using door-to-door and word-of-mouth methods, which are consistent with recruitment strategies that LHA has used in prior intervention evaluations (Knox et al., 2011). LHA promotoras knocked on the doors of apartments and homes located in the organization's catchment area, publicized the program to clients at the LHA site, and posted fliers advertising the study at LHA and in the community. Study inclusion criteria were that parents had to be of female gender with a child between the ages of 7 and 12, and could not be receiving concurrent mental health treatment. LHA had a longstanding

and positive relationship with the community recruited for this study, which likely produced a high hit rate for consenting participants of those approached for participation. Of the 240 parent participants approached for participation, 46 were ineligible, declined to participate, or failed to complete the necessary informed consent and pretest. Due to the lack of informed consent for this group, detailed information about nonparticipation is unavailable. However, according to promotoras' reports, reasons for declining were typically due to a lack of interest, lack of time for study participation over the required period, or not meeting inclusion criteria.

Of the 240 parent participants approached for participation in the study, 46 were ineligible, declined to participate, or failed to complete the necessary informed consent and pretest assessment. Reasons for declining included lack of interest or a lack of time. The remaining 194 mother-child dyads provided parental consent and child assent, in compliance with the overseeing Institutional Review Board (IRB). Figure 1 summarizes the recruitment and retention of participants through each phase of the study.

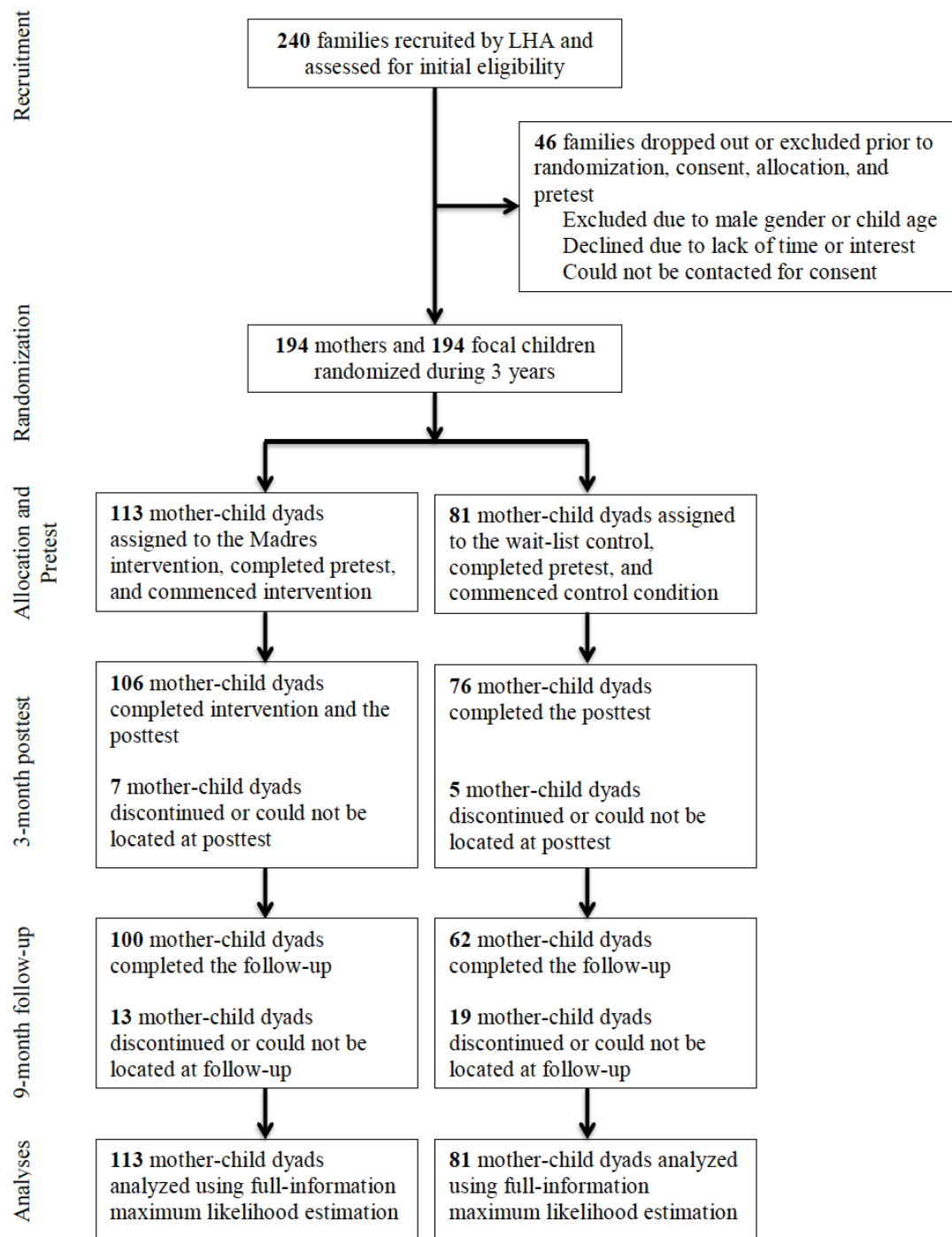


Figure 1

Diagram of Participant Flow Through Each Phase of the Study

Intervention

Madres a Madres Condition

The Madres a Madres program is a four-session intervention delivered individually to mothers in the home setting by promotoras (female community health workers). Each two-hour session consists of instruction in four core content areas: (1) normative child development and related social competencies, (2) positive parent-child interaction techniques, (3) positive behavioral management strategies, and (4) service navigation to support access to community resources. Mothers learn basic concepts about child cognitive, physical, and emotional milestones, as well as social skills that research has linked to positive developmental outcomes (e.g., problem-solving, self-efficacy, conscientiousness, etc., Guerra & Bradshaw, 2008). The intervention emphasizes these concepts as a method to promote mothers' developmentally appropriate expectations for child behavior. Adapted from PCIT (McNeil & Hembree-Kigin, 2010), promotoras teach mothers how to increase positive interactions with their children through the use of a set of skills during a designated interaction period, called *15 Minutos Mágicos*, or 15 Magic Minutes that mothers spend engaged in specialized communication or playtime with their children. Skills include following the child's lead, using behavioral descriptions while engaging with the child, reflecting what the child says, and providing the child with specific praise (e.g., "Good job playing so carefully with your toys."). During each session, promotoras teach or review these skills, coach mothers in session, and then assign the mothers homework to engage in the 15 Magic Minutes 3 to 4 times per week. Positive

behavioral management strategies are derived from PMTO (Forgatch & Patterson, 2010), and involve teaching the mother to ignore minor misbehavior, to discuss rules with the child, and to implement a system of consequences (*1-2-3 Consecuencias/ 1-2-3 Consequences*) in cases of un-ignorable misbehavior. Consequences might include time-out or a contingency management system, depending on the mother-child dyad. Finally, promotoras provide mothers with relevant information about community resources (e.g., housing or food programs; after-school care).

A number of visual materials, video segments, and worksheets are used to teach mothers the above intervention content. For example, promotoras use video segments and role-plays to deliver content related to the 15 Magic Minutes and the behavioral management strategies. Materials were designed specifically for use with Spanish-speaking mothers with low levels of literacy. The related program activities often integrate familiar community-specific content, such as the popular bingo-type game played in Mexico called *La Lotteria*. Table 1 summarizes the structure, components, and activities for each session.

Table 1

Overview of the Madres a Madres program sessions

Session	Structure and Components	Teaching Activities
1	1: Identify the focal child 2: Build rapport with the mother 3: Introduce The Path of Hope 4: Develop the mother's Personal Parenting Record (PPR) 5: Introduce the idea of the "mother in charge" 6: Teach mother about child brain development 7: Introduce and practice positive parent-child interactions	The Path of Hope <i>(El Camino de Esperanza)</i> Green Folder (<i>Carpeta Verde</i>): completion of PPR 15 Magic Minutes (<i>15 Minutos Mágicos</i>) video segment and role play
2	1: Review session 1 concepts 2: Teach mother about child developmental stages 3: Teach mother about skills/competencies related to child successful outcomes 4: Review PPR 5: Practice positive parent-child interactions	The Path of Hope Green Folder: PPR 15 Magic Minutes practice
3	1: Continue to build promotora-parent rapport 2: Problem-solve parent-child interaction homework 3: Review The Path of Hope 4: Complete parenting skills worksheet 5: Teach parenting skills and positive discipline practices (1-2-3 Consequences)	The Path of Hope Green Folder: parenting skills 1-2-3 Consequences (<i>1-2-3 Consecuencias</i>) video segment
4	1: Continue to build rapport with mothers 2: Review The Path of Hope parenting skills 3: Continue to practice 15 Magic Minutes 4: Continue to practice 1-2-3 Consequences 5: Discuss barriers to continuing these techniques and to accessing community care 6: Wrap up	The Path of Hope 15 Magic Minutes practice and 1-2-3 Consequences practice

The Madres program sessions are organized around *El Camino de Esperanza* (The Path of Hope; Figure 2), a visual discussion tool or a “talking map” that orients mothers to the four core intervention components. Mothers each have a *Carpeta Verde*, or personal Green Folder, which holds their Personal Parenting Record (PPR), among other program worksheets and materials. The PPR serves as a strategic plan for parenting goals related to management of the focal child’s behavior. Promotoras and mothers work conjointly to develop the PPR during the first session, and use the PPR throughout the intervention to monitor parenting goals and problem-solve any issues that arise.

The Madres program uses promotoras as “coaches” rather than “experts.” There is also a focus on *familismo*, or the importance of family involvement, as well as *personalismo*, in that promotoras are encouraged to spend time building rapport with mothers and supportively connecting them with ancillary services and other mothers in the community. Mothers in the Madres program are invited to take part in monthly meetings called *Cafecitas* or *Quermes*, that are designed to bring mothers from the same neighborhood together to provide opportunities for social connection, support, and mobilization around the needs of families in the community.

Intervention participants in the current study were involved in the Madres program on a bi-weekly basis, so that the four sessions occurred over a two-month period. In the case of scheduling difficulties, mothers were able to schedule with up to three weeks between sessions. All sessions were completed within a period of three months following the pretest assessment.

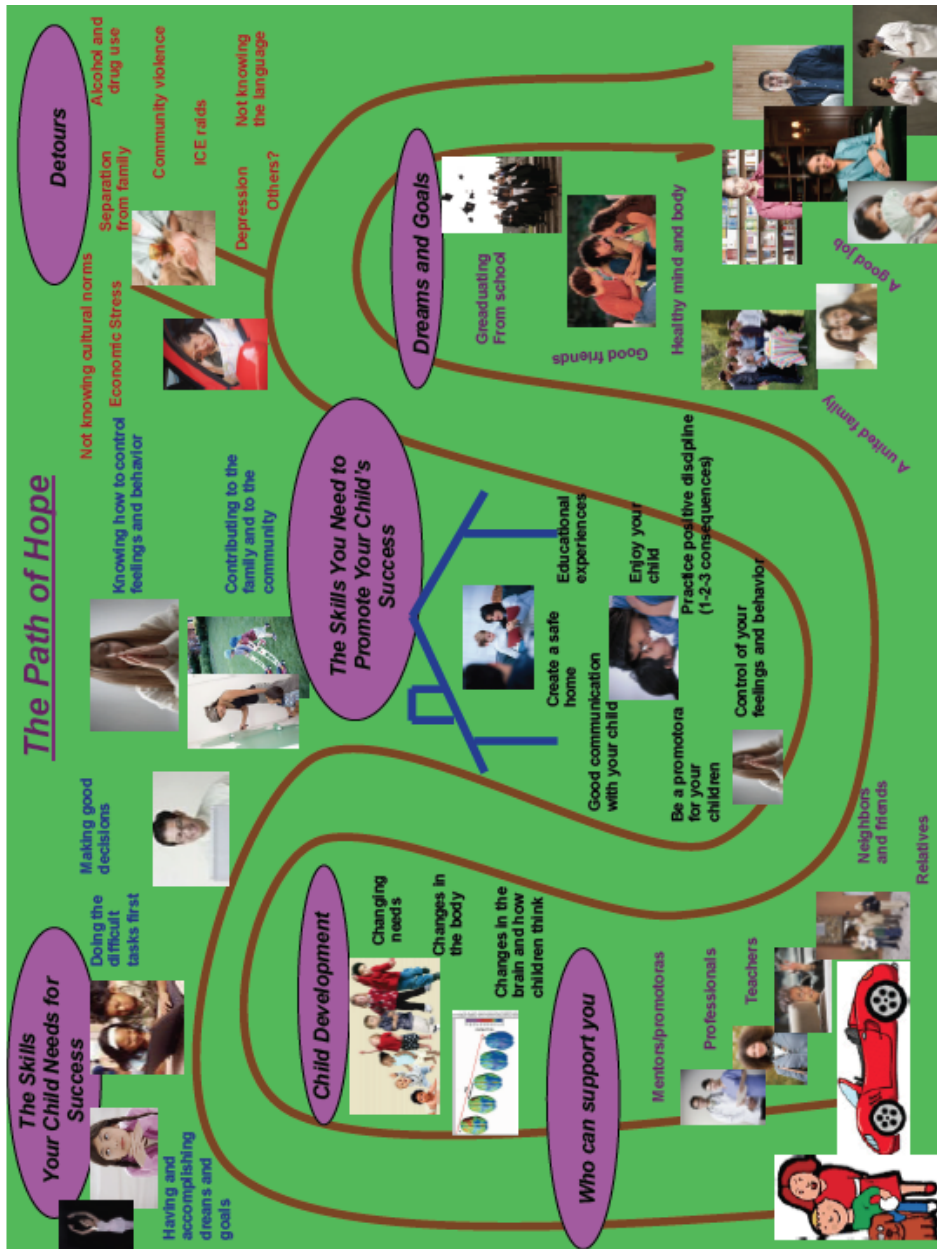


Figure 2

Path of Hope Talking Map Translated to English

Wait-List Control Condition

Participants on the waiting list did not have any form of planned contact with the project team during each phase of the study, except for when arranging the date and time of the pretest, posttest, and follow-up assessments. Following this period, participants were offered the Madres a Madres program. A total of 36 mothers opted to participate in the intervention and subsequently ceased to be part of the study.

Treatment Delivery and Fidelity

Promotoras were females of Latino heritage who worked at LHA as community health workers at the time of study recruitment. Each promotora maintained a caseload of six families at one time. The ACE-LHA team trained promotoras to implement the Madres program. Training occurred over a five-day period, and focused on teaching core intervention content, including behavioral management and parent-child interactions, role-play techniques, assessment of family needs, and rapport-building strategies.

To optimize treatment fidelity, intervention materials included flipbooks with scripts and bulleted key points to use as a guide throughout the sessions. Promotoras received intensive weekly supervision by licensed mental health professionals (psychologists and social workers) who were of similar ethnic and cultural background. Supervision involved training on additional topics related to parenting and personal or community-level needs identified by mother intervention participants. Because promotoras were typically from the same community as intervention mothers and, as such, were dealing with similar contextual stressors, supervision included a

focus on the needs of the promotoras that were implementing the program. Finally, non-scheduled visits were conducted at random by supervisors to observe actual practices during intervention sessions; each promotora had at least two random visits per intervention cycle.

Assessment

Procedure

Participants were assessed with the following measures at pretest, posttest (3 months after pretest), and follow-up (9 months after pretest) periods. A demographics questionnaire was also included at the pretest assessment. Trained LHA staff who were blind to the condition assignment conducted all the assessments in families' homes via paper and pencil methods. Efforts were made to utilize the same assessors for each testing cycle. Participants were paid \$50.00 for measure completion at each of the three assessment periods. Assessments were provided in Spanish or English according to the respective linguistic preference of the mother and child participants. All survey items had been previously used in LHA evaluations with predominately Spanish-speaking Latino immigrants (e.g., Knox et al., 2011). Measures were translated to Spanish from English using standard back-translation methods when necessary.

Measures

Assessments were selected and are organized below according to primary and secondary outcomes. Internal consistency (Cronbach's alpha) was recalculated for

each scale and is reported below for all three of the assessment time points (pretest, posttest, and follow-up).

Parenting Skills

Mothers reported on seven items from an adapted positive parenting behaviors scale that has shown adequate reliability in Latino immigrant samples (Leidy, Guerra, & Toro, 2010b). A sample item is “Use incentives and encouragement to build positive behavior, like doing homework.” Mothers rated the extent to which they were able to use the six parenting skills over the last month on a 3-point scale: 1 (*not at all*), 2 (*needs some changes*), and 3 (*OK, needs no changes*), with higher scores indicating increased use of parenting skills. Coefficient alpha for the current study was .78, .72, and .75, for pretest, posttest, and follow-up, respectively.

Parent Deviant Beliefs

Mothers rated their deviant beliefs on a 6-item self-report scale adapted from the Shared Deviant Beliefs scale (Tolan, Gorman-Smith, Huesmann, & Zelli, 1997). A sample item from this measure is “It’s OK to lie to someone if it will keep you from getting in trouble with them.” Items were on a 4-point scale ranging from 1 (*totally disagree*) to 4 (*totally agree*). Higher scores on this measure suggest higher levels of deviant beliefs. Prior studies have demonstrated acceptable reliability and validity for this measure (Tolan et al., 1997). Internal consistency ranged from .75 to .77 across the three time points in the current study.

Child Externalizing Behavior

Mothers reported on their focal child's externalizing behavior using the 10-item anger-aggression subscale from the Social Competence and Behavior Evaluation Scale—Short Form (SCBE-30; LaFreniere & Dumas, 1996), which Knox et al. (2011) found to be reliable for immigrant Latino children in the target age group. The SCBE-30 has adequate reliability and validity across its three subscales (anger-aggression; anxious-withdrawal; social competence; LaFreniere & Dumas, 1996). Higher scores on this subscale indicate greater levels of externalizing behavior. A sample subscale item is "My child hits, bites, or kicks other children." Responses to the SCBE-30 were on a 6-point scale, from 1 (*never*) to 6 (*always*) ($\alpha = .82, .86, \text{ and } .84$ at pretest, posttest, and follow-up in the current sample).

Child Internalizing Behavior

Nine items from the anxious-withdrawal subscale of the SCBE-30 (LaFreniere & Dumas, 1996) were used to assess mothers' perceptions of their child's internalizing behavior. Higher scores on this subscale indicate increased internalizing concerns. A sample subscale item is "My child is sad, unhappy, or depressed." Items were rated on the 6-point SCBE-30 scale, and coefficient alpha was .81, .82, and .82 at the three study time points.

Child Social Competence

Mothers reported on focal children's social behavior using the 10-item social competence subscale of the SCBE-30 (LaFreniere & Dumas, 1996), on the 6-point SCBE-30 Likert scale described above. Higher scores suggest higher child social

competence. A sample item from this scale is “My child works easily in a group.” Coefficient alpha was .79, .83, and .83 at pretest, posttest, and follow-up, respectively.

Child Deviant Beliefs

Child deviant beliefs, or normative beliefs about aggressive behavior, were measured using 5 items from a longer self-report measure of children’s normative beliefs by Huesmann and Guerra (1997), with adequate reliability and validity in diverse child samples. An item from this scale is “If someone pushes or hits you, it’s OK to hit them back.” Items were on a 4-point scale ranging from 0 (*never*) to 3 (*all of the time*). Internal consistency in the current study was acceptable ($\alpha = .77, .81, \text{ and } .84$ at pretest, posttest, and follow-up, respectively).

Child Aggressive Behavior

Children completed a self-report of aggressive behavior using a 7-item scale from the Metropolitan Area Child Study (MACS, 2002). Children rated how often in the last month they engaged in verbal and physical aggression (e.g., “Punched or beat up another kid”). Items were rated on a 3-point scale ranging from 0 (*never*) to 2 (*a lot*). Prior studies have shown adequate validity and internal consistency for this measure in diverse samples (MACS, 2002). Coefficient alpha was .81 to .86 from pretest to follow-up in the current study.

Child Social Competencies: Social Problem Solving, Self-Efficacy, and Conscientiousness

Children self-reported on their social competencies in three domains: (a) social problem solving skills, (b) self-efficacy, and (c) conscientiousness. Higher scores on

each of these measures indicate increased social competencies. Problem solving skills were measured using a 7-item scale from Causey and Dubow (1992), which has shown acceptable internal consistency. A sample item from this scale is “When I have an argument or fight with my friends I make a plan to solve the problem and then follow the plan.” Items were on a 4-point scale that ranging from 0 (*never*) to 3 (*all of the time*) ($\alpha = .76, .88, \text{ and } .87$ at pretest, posttest, and follow-up in the current sample). Children rated their self-efficacy on a 6-item scale adapted from Bandura, Barbaranelli, Caprara, and Pastorelli (2001), with adequate validity and reliability. Items asked children how good they were at several social behaviors. A sample item is “Making friends with other kids you don’t know.” Items were on a 4-point scale that ranged from 0 (*not good*) to 3 (*very good*). Coefficient alpha in the current sample was .77, .80, and .83 from pretest to follow-up. Conscientiousness was measured using a 4-item scale tapping how often children feel they try hard and are well prepared. The scale was adapted from a longer scale with adequate reliability by Friedman and Martin (2007). An item from this scale is “I always try my best.” Children responded items on 4-point scale from 0 (*never*) to 3 (*all of the time*), and coefficient alpha in this study was .74, .79, and .83 from pretest to follow-up.

Data Analytic Approach

Preliminary Analyses

Preliminary analyses were conducted to examine: (a) the distributional characteristics of primary and secondary outcomes at pretest, posttest, and follow-up, (b) the equivalence of the intervention and control groups at pretest, and (c) the pretest

intercorrelations among outcomes. Distributional characteristics at each time point were examined through descriptive statistics, including skew and kurtosis. Outcomes that participants rated on a Likert scale beginning at 1 (*not at all*) (i.e., all mother-rated scales) were rescaled to begin at zero to adequately screen for skewness. All descriptive statistics and analyses reported reflect the recoded scales. Chi-square analyses and independent samples *t* tests and were used to identify any pretest differences in demographics or study outcomes between the intervention and the wait-list control conditions. When pretest variables were skewed, the Mann-Whitney U test, a non-parametric alternative to the independent *t* test, was used to examine pretest differences. The Mann-Whitney U test is robust to violations of normality, and provides an estimate of rank-order differences with a *U* statistic, a *z* score, and an associated *p* value. Finally, intercorrelations among pretest variables were examined through zero-order bivariate correlations.

Missingness

Patterns of missing data were examined in order to select appropriate methods for handling missing data in the intervention outcome analyses. Two types of missingness are relevant to this study: non-response to items and study attrition, where the latter represents individuals who were completely missing for all outcome variables at the posttest and/or follow-up time periods. Dummy variables were computed to represent these types of missingness. Logistic regressions were then conducted to identify significant predictors of missingness for general missingness (non-response to items and/or study attrition) and for treatment attrition specifically at

posttest and follow-up. Predictors included in all missingness analyses were pretest primary and secondary outcomes and demographic characteristics.

Intervention Outcomes

Two-level hierarchical linear and non-linear growth models using *Hierarchical Linear Modeling 7* software (HLM 7; Raudenbush, Bryk, Cheong, Congdon, & du Toit, 2011) were constructed to examine differences in within-person growth trajectories over the pretest, posttest, and follow-up periods. Growth modeling allows for the examination of individual change over the course of the study, while also providing a test of the average intervention effect. When outcome variables were skewed, non-linear growth models using a Poisson distribution, with or without overdispersion (when the outcome's variance exceeds its mean; Atkins & Gallop, 2007), were employed to test intervention effects. These hierarchical analyses serve to determine whether changes in the outcome measures over the study period are in the desired direction for the intervention participants, and whether these changes are significantly different from those in the control group. Differences from the control group are indicated by a significant coefficient for the time-by-group cross-level interaction effect.

For both linear and non-linear multilevel growth models, the pretest, posttest, and follow-up assessment periods were entered as the level 1 (within-persons) variable $TIME_{ti}$, and were coded 0 (pretest), .33 (posttest), and 1 (follow-up). This coding of $TIME_{ti}$ reflects the pretest to 9-month follow-up period, rescaled so that slope

coefficients at level 2 represent the total average change, or growth, in the outcome over the entire study period.

For the linear growth models, the level 1 equation is:

$$OUTCOME_{ti} = \pi_{0i} + \pi_{1i}(TIME_{ti}) + e_{ti}$$

where $OUTCOME_{ti}$ is the outcome variable at time t for each individual i , π_{0i} is the intercept, or the model-implied outcome level for that individual at pretest, π_{1i} is the slope coefficient for time (or, the total change in the outcome over the study period), and e_{ti} is the residual variance for individual i 's outcome score at time t from the individual's predicted growth trajectory.

To then test potential differences in pretest outcome levels and in the intervention effect over time, intervention condition ($GROUP_i$) was entered as a binary level 2 predictor of within-persons intercepts and slopes, with the intervention condition coded as 1. For the linear models, the level 2, or between-persons, equations are:

$$\pi_{0i} = \beta_{00} + \beta_{01}(GROUP_i) + r_{0i}$$

$$\pi_{1i} = \beta_{10} + \beta_{11}(GROUP_i) + r_{1i}$$

where the within-persons intercept π_{0i} is predicted by: β_{00} , the model-implied pretest level of the outcome for the control group; β_{01} , the difference between the intervention and control groups in the model-implied pretest outcome; and r_{0i} , the deviation in the predicted pretest level for individual i . The within-persons slope π_{1i} is predicted by: β_{10} , or the model-implied growth trajectory for the control group; β_{11} , the difference between the intervention and control conditions in average growth trajectories; and r_{1i} ,

the individual-specific deviation from the average slope. Together, these equations yield a mixed model that includes the coefficient for the difference between conditions over time, or the time-by-group cross-level interaction term:

$$OUTCOME_{ti} = \beta_{00} + \beta_{01}(GROUP_i) + \beta_{10}(TIME_{ti}) + \beta_{11}(GROUP_i)(TIME_{ti}) + r_{0i} + r_{1i}(TIME_{ti}) + e_{ti}$$

For the non-linear growth models using a Poisson distribution (with or without overdispersion), the predicted outcome variable is transformed in HLM 7 using a natural logarithmic transformation, which linearizes the association between the outcome variable and the predictors (Coxe, West, & Aiken, 2009), such that the level 1 equation appears as:

$$E(OUTCOME_{ti} | \pi_i) = \lambda_{ti} \quad \log[\lambda_{ti}] = \eta_{ti}$$

$$\eta_{ti} = \pi_{0i} + \pi_{1i}(TIME_{ti}) + e_{ti}$$

Here, λ_{ti} is interpreted as the true value of the outcome variable at time t for individual i and η_{ti} is the log of the outcome. An overdispersed Poisson model contains the level 1 residual variance term, e_{ti} , but a Poisson distribution without overdispersion does not. The level 2 equations, with the $GROUP_i$ variable at intercept and slope, remain the same, with the cross-level time-by-group interaction term showing the difference between the treatment and control condition with regard to average growth over time. The mixed non-linear model (with overdispersion) is thus:

$$\eta_{ti} = \beta_{00} + \beta_{01}(GROUP_i) + \beta_{10}(TIME_{ti}) + \beta_{11}(GROUP_i)(TIME_{ti}) + r_{0i} + r_{1i}(TIME_{ti}) + e_{ti}$$

Similar to the linear growth models, the non-linear models provide unstandardized slope and intercept coefficients, but these are now in a natural log transformed metric. To interpret these coefficients, one must exponentiate the value of the coefficient. The resulting value, called an event rate ratio, is then interpreted as the predicted percentage of increase or decrease in the outcome variable, depending on the value of the exponentiated coefficient, given a one-unit shift in the predictor.

When there were significant pretest differences by group in study outcomes, the level 2 intercepts were used as a covariate in the level 2 slope equation, to control for pretest differences in the outcome when modeling change over time by condition. Equations for linear and non-linear models remain the same, with the exception of the level 2 slope equation, which becomes:

$$\pi_{1i} = \beta_{10} + \beta_{11}(GROUP_i) + \beta_{12}(\pi_{0i}) + r_{1i}$$

where $\beta_{12}(\pi_{0i})$ represents the level 2 intercepts and serves as a control for pretest differences.

The above models provide a test of the slope for the control group and for the difference between groups, but not for the intervention group. To test this, $GROUP_i$ was reverse coded so that the intervention condition was coded as zero and entered into the multilevel models, providing a significance test of the total intervention slope, or growth, over the study period.

Intervention Moderators

Post-hoc exploratory analyses investigated the potential moderating effects of child age and child gender on child behavior outcomes, including mother-reported

child internalizing, externalizing, and social competence, and child-reported deviant beliefs, aggressive behavior, social problem solving, self-efficacy, and conscientiousness. Conditional multilevel linear and non-linear models were constructed by entering a continuous child age variable, a binary child gender variable (female coded as 1), and the associated age-by-group and gender-by-group interaction terms at level 2 to predict intercepts and slopes.

Chapter 3

RESULTS

Preliminary Analyses

Distribution Characteristics and Pretest Comparisons

Several variables were significantly skewed at pretest, posttest, and follow-up. Positively skewed variables were mother-reported parent deviant beliefs and child internalizing behavior, and child-reported deviant beliefs and aggressive behavior. Negatively skewed variables were mother-reported parenting skills and child-reported conscientiousness. Linear transformations did not correct for skewness. As a result, non-parametric and non-linear methods were applied to test for pretest differences and intervention effects, respectively, for these skewed outcomes.

Table 2 shows participant demographic variables by condition. Chi-square analyses for binary demographic variables and independent t tests for continuous demographic variables revealed no statistically significant differences between the two study conditions. However, several pretest group differences were found primary and secondary outcomes. Compared to the control group, intervention mothers reported higher levels of deviant beliefs, $U = 3258.50$, $z = -3.68$, $p = .001$, and lower levels of parenting skills, $U = 3463.50$, $z = -3.15$, $p = .002$. There was a trend toward lower mother-rated child social competencies in the intervention group, $t(192) = 1.69$, $p = .093$. Children in the intervention group reported lower levels of social problem solving $t(192) = 3.53$, $p = .001$, self-efficacy, $t(192) = 3.08$, $p = .002$, and

conscientiousness, $U = 3209.50$, $z = -3.83$, $p = .001$. Table 3 presents observed means and standard deviations for pretest, posttest, and follow-up levels of primary and secondary outcomes by condition.

Table 2

Participant Demographic Characteristics by Condition

Variables	IC ($n = 113$)	WLC ($n = 81$)	Total ($N = 194$)
	M (SD)/%	M (SD)/%	M (SD)/%
Mother			
Age	34.26 (5.41)	34.20 (6.48)	34.23 (5.87)
Years in United States	12.05 (5.57)	11.99 (5.54)	12.02 (5.54)
Married	63.1%	51.2%	58.2%
Less than \$15,000/year income	60.5%	67.1%	63.3%
Number in home	6.05 (2.07)	6.79 (3.53)	6.36 (2.79)
Child			
Female	50.8%	62.1%	54.6%
Age	9.55 (1.59)	9.37 (1.54)	9.47 (1.57)
Born in United States	75.6%	71.9%	73.5%

Note. IC = intervention condition; WLC = wait-list control condition.

Table 3

Means and Standard Deviations for the Primary Outcome Variables by Condition at Pretest, 3-Month Posttest, and 9-Month Follow-Up

Variables	Pretest		3-month posttest		9-month follow-up	
	IC <i>n</i> = 113	WLC <i>n</i> = 81	IC <i>n</i> = 106	WLC <i>n</i> = 76	IC <i>n</i> = 100	WLC <i>n</i> = 62
Primary outcomes: mother reported						
Parenting skills						
<i>M</i> (<i>SD</i>)	10.97 (2.65)**	11.81 (2.48)**	11.81 (2.35)	12.03 (12.28)	11.51 (2.38)	10.97 (2.90)
Parent deviant beliefs						
<i>M</i> (<i>SD</i>)	3.06 (2.70)**	1.76 (2.32)**	1.61 (2.14)	1.50 (2.11)	1.81 (2.42)	2.03 (2.11)
Secondary outcomes: mother reported						
Child externalizing						
<i>M</i> (<i>SD</i>)	14.23 (8.67)	13.19 (7.37)	12.69 (9.19)	10.81 (7.54)	12.70 (8.71)	11.00 (5.84)
Child internalizing						
<i>M</i> (<i>SD</i>)	8.91 (6.43)	7.75 (5.28)	6.69 (6.81)	5.89 (5.40)	5.80 (5.80)	7.27(6.63)
Child social competencies						
<i>M</i> (<i>SD</i>)	38.22 (9.21)†	40.39 (8.29)†	39.43 (10.07)	41.95 (8.46)	39.02 (9.82)	40.67 (8.68)
Secondary outcomes: child reported						
Child deviant beliefs						
<i>M</i> (<i>SD</i>)	1.47 (2.56)	1.04 (2.03)	1.52 (2.58)	1.06 (2.16)	1.30 (2.33)	0.85 (2.16)
Child aggressive behavior						
<i>M</i> (<i>SD</i>)	1.75 (2.34)	1.37 (2.26)	1.74 (2.44)	1.39 (2.51)	1.67 (2.47)	0.98 (2.11)
Child social problem solving						
<i>M</i> (<i>SD</i>)	15.20 (4.00)**	17.17 (3.65)**	15.59 (4.51)	17.16(4.50)	15.32 (4.97)	16.65 (4.21)
Child self-efficacy						
<i>M</i> (<i>SD</i>)	11.09 (4.15)**	12.85 (3.68)**	11.40 (3.94)	12.56 (4.05)	11.57 (4.38)	12.28 (3.97)
Child conscientiousness						
<i>M</i> (<i>SD</i>)	9.30 (2.47)**	10.55 (1.93)**	9.62 (2.42)	10.21 (2.38)	9.45 (2.69)	10.48 (2.10)

Note. IC = intervention condition; WLC = wait-list control condition. Pretest differences: †*p* < .10, **p* < .05, ***p* < .01

Intercorrelations

Table 4 presents pretest zero-order bivariate correlations. The two primary outcome measures, parenting skills and mother deviant beliefs, showed a small negative correlation. Generally, similar measures of mother-rated and child-rated behaviors were significantly and positively intercorrelated. Mother-reported child externalizing behavior was modestly and positively correlated with child reported aggressive behavior, although mother and child deviant beliefs were not significantly associated. Mother-rated child social competence was positively correlated with child-reported social competencies (social problem solving, self-efficacy, and conscientiousness), and negatively correlated with mother- and child-rated child problem behaviors (externalizing and aggression) and child deviant beliefs. Mother-rated levels of child externalizing and internalizing behavior were also modestly positively correlated.

Table 4

Zero-Order Bivariate Correlations Among Primary and Secondary Outcomes at Pretest

Variables	1	2	3	4	5	6	7	8	9	10
Primary outcomes: mother reported										
(1) Parenting skills	--									
(2) Parent deviant beliefs	-.19**	--								
Secondary outcomes: mother reported										
(3) Child externalizing	-.28**	.06	--							
(4) Child internalizing	-.28**	.27**	.52**	--						
(5) Child social competencies	.33**	-.16*	-.29*	-.40**	--					
Secondary outcomes: child reported										
(6) Child deviant beliefs	-.20**	-.01	.09	.11	-.23**	--				
(7) Aggressive behavior	-.12	.07	.16**	.07	-.24**	.36**	--			
(8) Social problem solving	.21**	.01	-.13	-.09	.33**	-.28**	-.31**	--		
(9) Self-efficacy	.16*	-.15*	-.18*	-.20**	.19*	-.18*	-.21**	.51**	--	
(10) Conscientiousness	.14*	-.14*	-.16*	-.11	.27**	-.24**	-.36**	.56**	.50**	--

* $p < .05$, ** $p < .01$, *** $p < .001$.

Missingness

Logistic regressions predicting a general missingness (non-response to items and/or study attrition) dummy code at either the posttest or the follow-up period showed that demographic characteristics and pretest study outcomes were not significantly associated with missingness. When study attrition was examined separately, individuals in the control condition were significantly more likely to attrit at the follow-up time point only, odds ratio = 0.37, $z = -2.52$, $p = .012$, 95% CI [0.17, 0.80]. However, no other demographic or pretest variables were associated with study attrition at each study time point.

Based on these findings, we assumed that data were missing at random (MAR), as the probability of both general missingness and study attrition were found to be independent of the values of the observed outcome variables (Little, 1995). Under the assumption of MAR, missing data may depend on other observed variables, such as intervention condition (Gallop & Tasca, 2009; Schafer & Graham, 2002). Missing data were subsequently handled with full-information maximum likelihood (FIML) estimation in HLM 7, which treats data as MAR, resulting in unbiased parameter estimates and appropriate standard errors (Arbuckle, 1996). Compared to other methods for handling missing data, such as listwise deletion or mean imputation, FIML has been found to provide more accurate parameter estimates, even when the MAR assumption is not fully met (Schafer & Graham, 2002). FIML uses all available participant information, including participants with missing data at multiple time

points (Raudenbush & Bryk, 2002), allowing for the full sample of 194 mother-child dyads to be analyzed in the multilevel models.

Intervention Outcomes

Results for linear and non-linear growth models showing change in primary and secondary outcomes over the total study period are summarized in Table 5 (mother-reported primary and secondary outcomes) and Table 6 (child-reported secondary outcomes). Table 7 shows the test of the slope coefficient for the intervention condition (reverse coded).

Parenting Skills

As the parenting skills variable was highly negatively skewed, this variable was reflected to create a positive skew, for analysis using a non-linear growth model. Due to the reflection of the variable, this model is testing for *decreases* for the intervention group in the reflected outcome as a sign of improved parenting, as opposed to testing for *increases* in parenting skills. A Poisson distribution with overdispersion was used to test this outcome, as the reflected outcome's variance was greater than its mean. This model also controlled for the statistically significant pretest differences in parenting skills by condition. Results showed that there was a significant increase (a decrease in the original metric) in the control condition's average parenting skills over the study period, $\exp(b) = 1.51$, $p = .053$, 95% CI [1.01, 2.29]. An interpretation of the exponentiated cross-level time-by-group interaction shows that there was a statistically significant difference of 48% between the intervention and control conditions, $\exp(b) = 0.52$, $p = .023$, 95% CI [0.39, 0.93].

Pretest parenting skills were not highly correlated with parenting skills slopes (.04). Random effects indicated significant variability in parents' pretest levels of parenting skills, $\chi^2 = 300.20$, $df = 120$, $p < .001$, and in parents' slopes over the study period, $\chi^2 = 149.83$, $df = 120$, $p = .072$. When $GROUP_i$ was reverse coded to test the intervention group's slope coefficient, there was a statistically significant decrease in mothers' parenting skills (an increase in the original metric) over time, $\exp(b) = 0.71$, $p = .040$, 95% CI [0.51, 0.98]. The exponentiated coefficient shows that exposure to the intervention condition was associated with a 29% average reduction in the reflected parenting skills variable, or an average increase of 29% in the original parenting skills metric.

Parent Deviant Beliefs

A non-linear growth model using an overdispersed Poisson distribution and controlling for pretest differences in mothers' deviant beliefs showed a marginal difference of 35% between intervention and control mothers' slopes from pretest to follow-up, $\exp(b) = 0.65$, $p = .072$, 95% CI [0.40, 1.04]. The control condition showed a nonsignificant increase in deviant beliefs by 23% when controlling for starting values, $\exp(b) = 1.23$, $p = .245$, 95% CI [0.87, 1.74]. The control group's increase in deviant beliefs and the difference between groups was statistically significant before controlling for pretest values, but the significance for both effects diminished after including the pretest covariate. In the model with the pretest covariate, intercepts and slopes were negatively correlated at -.42, suggesting that increased pretest deviant beliefs were associated with a decreased rate of change from pretest to follow-up.

Random effects showed significant variability in pretest deviant beliefs, $\chi^2 = 615.80$, $df = 180$, $p < .001$, and in the rate of change for deviant beliefs over the study period, $\chi^2 = 329.85$, $df = 180$, $p < .001$. In the model with $GROUP_i$ reverse coded and the pretest covariate, the test of the intervention group slope coefficient was not statistically significant, and indicated that on average, there was a 20% reduction in intervention mothers' deviant beliefs over time, $\exp(b) = 0.80$, $p = .233$, 95% CI [0.54, 1.16]. Without the pretest control, the effect was larger (a 49% reduction) and statistically significant, $\exp(b) = 0.51$, $p < .001$, 95% CI [0.29, 0.78].

Child Externalizing Behavior

A linear growth model revealed a statistically significant decrease in control mothers' perceptions of child externalizing behavior over the course of the study, $b = -1.93$, $p = .011$, 95% CI [-3.40, -0.46]. The time-by-group cross-level interaction term showed no significant group differences, $b = 0.76$, $p = .427$, 95% CI [-1.10, 2.62], with intervention mothers rating their focal child as having slightly less of a decrease over time. The estimated correlation between the model-predicted intercepts and slopes was $-.25$, indicating that higher externalizing behavior at pretest was associated with a smaller slope, or less change, over the study period, with the opposite effect for children rated as having lower pretest values. In this model, the random effects indicated that substantial variation remained in individual intercepts, $\chi^2 = 1210.29$, $df = 179$, $p < .001$, and in individual growth trajectories, $\chi^2 = 230.378$, $df = 179$, $p = .006$. The test of the intervention condition's total slope showed that there was a statistically

significant decrease of in intervention mothers' ratings of child externalizing problems from pretest to follow-up, $b = -0.16$, $p = .017$, 95% CI [-0.27, -0.04].

Child Internalizing Behavior

A non-linear growth model using an overdispersed Poisson distribution showed that there was a nonsignificant decrease of 13% on average in control mothers' ratings of child internalizing behavior from pretest to follow-up, $\exp(b) = 0.87$, $p = .167$, 95% CI [0.73, 1.06]. However, there was a statistically significant difference in slopes between the intervention and control conditions, $\exp(b) = 0.65$, $p < .001$, 95% CI [0.51, 0.83], such that intervention condition slope showed 35% more of a decrease in the outcome than that of the control condition. Intercepts and slopes were correlated at .23, suggesting that higher pretest internalizing was associated with larger slopes (or growth) over time. Random effects indicated that there was significant variation in mothers' ratings of internalizing behavior at the pretest, $\chi^2 = 647.54$, $df = 181$, $p < .001$, but not in internalizing behavior trajectories over time, $\chi^2 = 188.05$, $df = 181$, $p = .344$. When $GROUP_i$ was reverse coded, the slope for the intervention group was statistically significant, with intervention mothers reporting an average decrease of 43% in their focal child's internalizing behavior, $\exp(b) = 0.57$, $p < .001$, 95% CI [0.49, 0.66].

Child Social Competence

Child social competence was tested using a linear growth model. Due to the trend for pretest differences in this outcome in by condition, this model controlled for pretest child social competence ratings. The control group showed a nonsignificant

increase over time, $b = 0.63$, $p = .884$, 95% CI [-7.77, 9.03]. No significant group differences were found when examining the time-by-group cross-level interaction term, $b = 0.67$, $p = .589$, 95% CI [-1.76, 3.10], which suggested that intervention mothers rated their children as having 0.67 more growth in social competence from pretest to follow-up compared to control children. Intercepts and slopes were not highly correlated (-.06). Random effects showed significant variation in children's pretest social competence, $\chi^2 = 727.12$, $df = 178$, $p < .001$, but not in children's growth trajectories, $\chi^2 = 198.65$, $df = 178$, $p = .138$. Testing the intervention group slope in the reverse coded model also revealed no statistically significant change in intervention mothers' child social competence ratings over time, $b = 1.30$, $p = .748$, 95% CI [-6.58, 9.16].

Child Deviant Beliefs

Changes in child self-reported deviant beliefs from pretest to follow-up were tested with a non-linear model using an overdispersed Poisson distribution. Results showed that there was a statistically significant decrease of 47% in control children's deviant beliefs, $\exp(b) = 0.53$, $p = .021$, 95% CI [0.31, 0.91]. Intervention children showed less of a reduction in deviant beliefs than control children over time, by 30%, although this group difference was not statistically significant, $\exp(b) = 1.30$, $p = .411$, 95% CI [0.69, 2.48]. There was a small, negative correlation between intercepts and slopes (-.11). Random effects demonstrated significant variation in pretest deviant beliefs, $\chi^2 = 853.06$, $df = 183$, $p < .001$. There was no significant variation in children's growth trajectories, $\chi^2 = 194.36$, $df = 183$, $p = .269$. Testing the slope of this outcome

for intervention children demonstrated that that overall, intervention children showed a statistically significant decrease in deviant beliefs by 30% from pretest to follow-up, $\exp(b) = 0.70$, $p = .046$, 95% CI [0.49, 0.99].

Child Aggressive Behavior

Child self-reported aggressive behavior was also tested using a non-linear model with an overdispersed Poisson distribution. Results revealed a statistically significant decrease of 37% on average in control children's aggressive behavior over time, $\exp(b) = 0.63$, $p = .031$, 95% CI [0.41, 0.96]. The time-by-group cross-level interaction term revealed that intervention children had a 32% difference from control children in slopes, which was not statistically significant, $\exp(b) = 1.32$, $p = .325$, 95% CI [0.79, 2.22]. Children's intercepts and slopes were negatively intercorrelated at $-.25$, indicating that higher pretest values were associated with less change over time. Random effects for the model showed significant variation in both children's pretest levels of aggression, $\chi^2 = 1786.14$, $df = 183$, $p < .001$ and in their trajectories over the study period, $\chi^2 = 282.97$, $df = 183$, $p < .001$. The test of the intervention condition slope showed that intervention children's self-reported aggressive behavior decreased by 17% from pretest to follow-up, but that this change was not statistically significant, $\exp(b) = 0.83$, $p = .180$, 95% CI [0.62, 1.12].

Child Social Competencies: Social Problem Solving, Self-Efficacy, and

Conscientiousness

Linear growth models that controlled for pretest differences were used to estimate change in social problem solving and self-efficacy over time by condition.

The linear growth model for social problem solving showed there were nonsignificant decreases in control children's self-reported social problem solving skills, $b = -1.71$, $p = .528$, 95% CI [-7.00, 3.58]. There were also no significant group differences in the slopes for children's problem solving skills by condition, $b = 0.69$, $p = .359$, 95% CI [-0.78, 2.16]. Slopes and intercepts were largely uncorrelated (.07). Random effects revealed significant variability in children's pretest problem solving, $\chi^2 = 549.01$, $df = 182$, $p < .001$, and in their rate of change over the study, $\chi^2 = 265.45$, $df = 182$, $p < .001$. The test of the intervention slope in the model with $GROUP_i$ reverse coded showed that although intervention children decreased less in social problem solving compared to control children, this was not a significant effect, $b = -1.02$, $p = .673$, 95% CI [-5.74, 3.30].

The linear growth model for child-reported self-efficacy showed a trend for increased self-efficacy in the control group, when holding pretest group differences constant, $b = 3.15$, $p = .062$, 95% CI [-0.14, 6.44]. However, similar to the social problem solving model, there were no significant differences between the intervention and control conditions in self-efficacy growth over time, $b = 0.53$, $p = .426$, 95% CI [-0.78, 1.84]. Intercepts and slopes were intercorrelated at -.34, such that lower levels of self-efficacy at pretest were associated with a higher rate of change in the self-efficacy slopes, and higher pretest values were associated with less change over time. The random effects showed significant variation in children's pretest levels of self-efficacy, $\chi^2 = 605.08$, $df = 182$, $p < .001$, as well as in children's predicted change in self-efficacy over time, $\chi^2 = 293.98$, $df = 182$, $p < .001$. Testing the slope for the

intervention group's self-efficacy trajectory demonstrated statistically significant increases in self-efficacy when controlling for pretest values, $b = 3.68$, $p = .012$, 95% CI [0.83, 6.52], but these increases were not significantly different from those reported by the control group.

Because child conscientiousness was negatively skewed, it was reflected prior to multilevel modeling, meaning that this model is testing for *decreases* in the reflected outcome variable as opposed to *increases* in the original metric. A non-linear growth model using an overdispersed Poisson distribution and controlling for pretest differences showed no significant group differences in child conscientiousness from pretest to follow-up, with only a 0.001% difference in slope between the intervention and control conditions, $\exp(b) = 1.001$, $p = .984$, 95% CI [0.70, 1.31]. Control children demonstrated nonsignificant decreases in conscientiousness by 4% from pretest to follow-up, $\exp(b) = 0.96$, $p = .804$, 95% CI [0.66, 1.51]. There was a small, negative correlation between children's intercepts and their rate of change over time (-.14). Random effects showed that there was significant variation in pretest levels of this outcome, $\chi^2 = 718.64$, $df = 183$, $p < .001$, and in children's change over time, $\chi^2 = 253.57$, $df = 183$, $p < .001$. The slope coefficient for the intervention group showed a nonsignificant change of 4% in intervention children's conscientiousness, $\exp(b) = 0.96$, $p = .994$, 95% CI [0.73, 1.26].

Multilevel Linear and Non-Linear Models for Primary and Secondary Mother-Reported Outcomes

Note. IC = intervention condition; WLC = wait-list control condition; $\exp(b)$ = exponentiated coefficient for non-linear models.

[†] $p < .10$, $^*p < .05$, $^{**}p < .01$, $^{***}p < .001$.

Multilevel Linear and Non-Linear Models for Secondary Child-Reported Outcomes

Note. IC = intervention condition; WLC = wait-list control condition; $\exp(b)$ = exponentiated coefficient for non-linear models.

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Table 7

Slope Coefficients of Intervention Condition for Primary and Secondary Outcomes

Variables	<i>b</i> / $\exp(b)_a$	<i>SE</i>	<i>t</i> ratio
Primary outcomes: mother reported			
Parenting skills	0.71 _a	0.17	-2.06*
Parent deviant beliefs	0.80 _a	0.19	-1.19
Secondary outcomes: mother reported			
Child externalizing	-0.16	0.06	-2.38*
Child internalizing	0.57 _a	0.08	-7.26***
Child social competencies	1.30	4.02	0.32
Secondary outcomes: child reported			
Child deviant beliefs	0.70 _a	0.18	-2.00*
Child aggressive behavior	0.83 _a	0.14	-1.34
Child social problem solving	-1.02	2.41	-0.42
Child self-efficacy	3.68	1.45	2.54*
Child conscientiousness	0.96 _a	0.14	-0.27

Note. $\exp(b)$ = exponentiated coefficient for non-linear models, denoted by the subscript a.

* $p < .05$, ** $p < .01$, *** $p < .001$.

Intervention Moderators: Child Age and Child Gender

With the exception of findings from the non-linear growth model for mother-reported child internalizing behavior, there were no main effects of child age or gender and no associated interaction effects at intercepts or slopes in the models predicting child-related outcomes (mother-reported child externalizing behavior and social competence, and child-reported deviant beliefs, aggressive behavior, and social competencies). For the internalizing behavior intercepts, there was an effect for gender, $\exp(b) = 1.41$, $SE = 0.16$, t -ratio = 2.11, $p = .036$, 95% CI [1.02, 1.96], and a

significant gender-by-group interaction effect, such that intervention group females were 36% higher on this outcome at pretest, $\exp(b) = 0.64$, $SE = 0.21$, $t\text{-ratio} = -2.05$, $p = .041$, 95% CI [0.43, 0.98]. For slopes, there was no main effect of gender, $\exp(b) = 0.81$, $SE = 0.19$, $t\text{-ratio} = -1.09$, $p = .274$, 95% CI [0.56, 1.18], and no gender-by-group interaction effects, $\exp(b) = 1.02$, $SE = 0.24$, $t\text{-ratio} = 0.09$, $p = .921$, 95% CI [0.64, 1.65]. In sum, despite slight differences in mother-reported internalizing behavior by group for females at pretest, gender differences were not apparent in trajectories of change overall or by group condition.

Intervention Attendance and Attrition

Of the 113 mother-child dyads that were allocated to the intervention, 106 dyads attended all 4 of the intervention sessions, a high attendance rate which LHA attributed to the home visit intervention format. Seven intervention mother-child dyads could not be located at posttest, and an additional six dyads could not be located at follow-up. For the seven dyads that did not complete the intervention, reasons for dropout included moving elsewhere or losing contact with the project team and promotoras. As stated above, logistic regressions predicting attrition showed that those in the wait-list control condition were more likely to attrit at the follow-up only, but that no demographic or pretest variables were associated with attrition. Percent calculations show similar rates of posttest attrition for the intervention (6.19%; 7/113) and control (6.17%; 5/81) groups. At follow-up, the intervention group had an attrition rate of 11.50% (13/113), which was significantly less than the 23.45% (19/81) rate for the control group, ($\chi^2(1, N = 194) = 4.90$, $p = .02$). The intervention attrition rate is

lower than those reported by other parent training evaluations with Latino families, and the control attrition rate is comparable (e.g., McCabe & Yeh, 2009; Reid et al., 2001).

Chapter 4

DISCUSSION

Results of multilevel non-linear growth models for the two primary study outcomes, mothers' parenting skills and deviant beliefs, partially supported our hypotheses. When controlling for pretest differences by condition in these two outcomes, intervention mothers improved in their parenting skills, and there were marginal reductions in intervention mothers' deviant beliefs, relative to the control condition. Without controlling for pretest differences in deviant beliefs, mothers' deviant beliefs decreased substantially over the study period. Although both of these variables were highly skewed (mothers overall reported high levels of parenting skills and low levels of deviant beliefs at pretest), our results suggest that exposure to the intervention was associated with some improvement in each of these primary outcomes.

These findings provide preliminary evidence for the efficacy of the Madres intervention in improving the parenting skills of immigrant Latina mothers. This finding is important given prior research on Latino families' lower acceptability of behavioral parent training techniques (Borrego et al., 2007), and demonstrates that relatively complex behavioral strategies can be delivered with success by lay community health workers (promotoras). Findings for the reduction in mothers' deviant beliefs are less strong when considering pretest differences. The marginal differences in change by condition after controlling for the pretest values may be due

to either the low base rate of highly deviant beliefs in the sample or the possibility that deviant parenting beliefs are more resistant to change than parenting skills or outward behavior.

There were also significant improvements in child outcomes. Specifically, per mother reports, the children in the intervention condition showed significant decreases in internalizing behavior, which did not vary by focal child age or gender. Studies of parent training interventions with similar components, such as the IY program, have also found decreased internalizing concerns for intervention children (Webster-Stratton & Herman, 2008). It may be that particularly for children who live in high poverty neighborhoods, increased parenting skills and enhanced parent-child interactions serve to reduce children's anxiety and sadness.

Levels of mother-reported child externalizing problems and child-reported aggression and deviant beliefs decreased in both the intervention and control children, but the difference between conditions for these outcomes was not statistically significant. As externalizing problems are typically low base rate behaviors, and these variables were positively skewed in our sample, it may be that there were not enough highly aggressive youth involved in the study to effectively test the impact of the intervention on children's aggressive behavior. In line with qualitative research on this subject (Knox et al., 2011), Latino youth of immigrant parents may not evidence substantial aggressive behavior problems until early to mid-adolescence. Given that children in our sample were age 9 on average, and only one child was age 13, sleeper effects of the Madres program on youth aggressive behavior may appear when

intervention children reach early adolescence. Children's deviant beliefs may also be more entrenched, and consequently less likely to change following a brief intervention that directly targeted mothers' but not children's belief systems. Alternatively, the brief nature of the Madres program may not be intensive enough to change the behaviors and beliefs of highly aggressive children.

Similarly, the lack of findings related to children's social competencies could be attributable to the short duration of the study follow-up period, or to the brief quality of the intervention itself. Children's social competencies are the most distal of the outcomes that were hypothesized to change following intervention. Based on the underlying program theory that improved parenting skills and knowledge about child competencies will positively impact child outcomes in subsequent developmental periods, effects on both mother-reported and child-reported child social competencies may not emerge until children in the sample are older, particularly in a sample with initially low levels of problem behavior.

Limitations and Directions for Future Research

Findings from this study should be considered in light of its limitations. The RCT design is a rigorous method for testing intervention efficacy, but the randomization technique for our study failed to produce equivalent groups at pretest with regard to primary and secondary outcome variables. Although we controlled for pretest differences in our subsequent analyses, efficacious intervention outcomes from this study should be interpreted with some caution. Other relevant methodological concerns are measurement-related. Findings from this study may be biased due to the

self-report nature of the study measures and source invariance. We attempted to have mothers and children report on similar child behavior, but were unable to ask children about internalizing problems due to IRB restrictions; including this measure may have strengthened the support for the mother-reported intervention effect on children's internalizing problems.

Results from this study could also have been strengthened through additional intervention outcome measures. For example, clinical scales for child behavior that utilize *t* scores or diagnostic/clinical cutoffs would have been useful in determining the clinical significance of intervention findings and comparing child behavior problems in this study with a normative sample. As research has shown that parental stress and/or mental health concerns can disrupt effective parenting practices (e.g., Forgatch & Patterson, 2010), additional data on parent mental health status should be included as a potential moderator of program effects. A measure of parent acculturation would also be important to include in future program effectiveness research, given variation in mothers' time spent in the United States in this sample, and previous studies linking variation in parent acculturation levels with differences in Latino parenting practices (e.g., Zayas et al., 2009). This study was also limited by the use of self-report data. As the Madres intervention includes the teaching, coaching, and practicing of parent-child interactions, observational coding systems like those used in the PCIT (McNeil & Hembree-Kigin, 2010) would have been useful when examining change in parent and child behavior over time.

The use of a highly specific population is another study limitation. We tested the Madres intervention with a predominately Mexican sample in a particular region of Southern California. Given that the culture of immigrant Latino families is not homogenous and various contextual circumstances (i.e., level of poverty, fear of immigrant raids and deportation) may differ widely across individuals who identify as Latino, this study is limited in its generalizability to Latino immigrant families from other countries, and to Latinos living in different social contexts. Study findings are additionally limited to Latina mothers, as fathers were not eligible for intervention participation. Despite the community agency's data on normative parenting roles in this specific population, future evaluations of the Madres program should include and compare intervention outcomes for fathers, consistent with other Latino-focused family-based interventions for child behavior problems (e.g., Martinez & Eddy, 2005; McCabe & Yeh, 2009).

This intervention was evaluated community, as opposed to a clinical, sample, which may impact the generalizability of the treatment to clinic-based samples. Several participant-rated child problem behaviors were also highly positively skewed, whereas some protective factors, such as positive parenting, were negatively skewed. These skewed data may have contributed to a lack of intervention effects on several outcomes, as stated above in the context of child aggressive behavior. Both mother- and child-rated aggressive behavior could additionally be analyzed with a focus on those children who were the most aggressive in the sample. For example, prior studies of programs for child aggressive behavior have found that interventions sometimes

produce effects only for the most aggressive children (Conduct Problems Prevention Research Group, 2011; MACS, 2002).

Future studies of this intervention should also test the underlying theory of change in the Madres parenting program—namely, that an increase in parenting skills during the intervention will mediate subsequent reductions in child behavior problems and improvements in child social competencies. Although there were marginal to significant effects for parenting outcomes and a significant effect on one of the child behavior outcomes, the relationship between parenting behavior and beliefs and child behavioral outcomes is important to examine.

Despite these limitations, the outcomes of this study demonstrated that the Madres a Madres program is a promising method for intervening with immigrant Latina mothers and their children. Based on attrition data, providing intervention in mothers' homes appears to be useful in retaining mothers during the intervention period. The use of promotoras is a cost-effective option for delivering preventative interventions to marginalized and/or culturally diverse communities (Rotheram-Borus et al., 2012). This study supports the use of promotoras for delivering brief, culturally relevant parenting interventions to immigrant Latina mothers. Although additional and extended research on the Madres program is necessary to discern the effects of the program on long-term changes in parenting skills and child behavior, as well as the mechanisms of change in this program, Madres a Madres is an innovative approach to disseminating evidence-based intervention practices in a culturally sensitive fashion to immigrant Latino populations.

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Appendix

IRB APPROVAL

Wednesday, February 12, 2014 1:11:32 PM Eastern Standard Time

Subject: MA Thesis Ariel Williamson human subjects verification

Date: Wednesday, February 12, 2014 10:27:12 AM Eastern Standard Time

From: Nancy Guerra

To: Burget, Eileen V, Martin, Mary J.

CC: Ariel Williamson, Richards, James G

Dear Eileen and Mary,

I am writing in regard to IRB approval for Ariel Williamson's MA thesis. This project was approved by UC Riverside as a project under the Southern California Center for Academic Excellence funded by the Centers for Disease Control and Prevention (CDC). The human subjects protocol number is HS-07-057 from UCR and the CDC grant number is 5U49CE000734.

We do not have a PDF copy of the protocol authorization. UCR does not yet have an online system, they only have paper forms and an internal data base. At the moment, all of the retired files have been either moved to a central storage facility or are in the process of being scanned and shredded. We have had multiple emails with UCR but they are unable to locate the protocol at this time. I left UC Riverside 3 years ago and also am not able to locate the HS authorization. However, CDC required regular submission of our HS protocols, and all of our research projects were approved by the UCR IRB committee. Accordingly, Ariel's master's thesis work was covered under this protocol.

Please consider this email as verification of the human subjects requirement for Ariel's thesis. As a faculty and funded researcher, I would never engage in nor allow my students to be part of research that did not have IRB approval.

Thank you,
Nancy Guerra

Dr. Nancy Guerra, Professor of Psychology
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