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A Randomized Controlled Trial of Healthy Families: 6-Month and 1-Year Follow-Up

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Abstract
Home visitation research remains on the forefront as policy makers look to evidence for programs they believe are worthy of investment, particularly in terms of child abuse prevention. A randomized controlled trial ($N = 245$) of the Healthy Families Arizona home visitation program was conducted. Outcomes were assessed across several key domains related to child abuse and neglect: safety and resources, parenting attitudes and behaviors, health and maternal outcomes, and mental health and coping. Findings revealed significant differences between the groups at both 6-month and 1-year follow-up assessments on use of resources, mobilizing resources, home environment, subsequent pregnancy, positive affect, and problem solving favoring the Healthy Families group. A significant difference was also found between the groups on total violence measured at the 1-year follow-up favoring the Healthy Families group. A qualitative linguistic inquiry and word count analysis was conducted of parent's descriptions of their children and their parenting experiences. Results again revealed significant differences between the groups in narrative descriptions that favored the Healthy Families group. Implications of these findings are discussed in light of the existing evidence for home visitation programs.

Keywords Home visitation · Child abuse and neglect · Prevention · Randomized trial · Quantitative · Evidence-based practice · Mixed methods · Community-based research · Program evaluation · Outcome study

Prevention remains a long-standing goal of society. Yet, there are many challenges in demonstrating the effectiveness of prevention programs. Examples include the need for large samples when studying low occurring events like child abuse, the recognition that our most serious social problems have multiple etiologies and require complex multifaceted interventions, and the difficulties in measuring valid outcomes. Home visitation programs offer immense opportunities for prevention of many social problems such as child maltreatment, domestic violence, depression, and developmental delays as well as the promotion of protective factors.

Overall, home visiting programs are believed to produce at least modest benefits (Filene et al. 2013; Azzi-Lessing 2017; Nievar et al. 2010). For example, Nievar et al. (2010) examined 29 studies and found weighted mean effect size of 0.37. The authors concluded "home visitation for low-income or at-risk families improves maternal behavior" (p. 13). Filene et al. (2013) examined 51 studies and found an average effect size of 0.20 noting the effects varied by category with maternal life course, child cognitive outcomes, and parent behavior and skills showing positive average effect sizes.

Other studies find benefits for some participants but not others (DuMont et al. 2008; Matone et al. 2012). Such variability in effects is understandable given the diverse set of characteristics and circumstances present in the lives of program participants. A single mother with one child is different than a single mother with three children. Also, certain measures may be more sensitive to change depending on the participant and the outcome measure selected (LeCroy and Krysik 2010).

Quality of implementation may vary by site, and research has found benefits in some sites but not others (Olds et al. 1999), or in accredited programs (DuMont et al. 2008; LeCroy and Davis 2016) but not in non-accredited ones (Duggan et al. 2004). An increasing interest in implementation suggests that program outcomes are impacted by various implementation factors such as retention, home visits completed,

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curriculum content covered, alliance with the home visitor, and caseload (Nievar et al. 2010). Because of these variations, it is important to study program outcomes across a variety of programs and in multiple settings.

This investigation of the effectiveness of home visiting services focused specifically on the Healthy Families America program model. The program model lists eight aims: reduce child maltreatment, improve parent-child interactions and children's social emotional well-being, increase school readiness, promote child physical health and development, promote positive parenting, promote family self-sufficiency, increase access to primary care medical services and community services, and decrease childhood injuries and emergency department use. The home visitor assists in helping parents with their personal issues, parenting needs, reviewing the child's developmental progress, ensuring safety in the home, and successful adaptation to parenthood.

Over the past decade, six randomized trials have been conducted of the Healthy Families program: DuMont et al. 2008; Rausch et al. 2012; Jacobs et al. 2015; Rodriguez et al. 2010; LeCroy and Krysik 2011; and Green et al. 2014. These studies add different findings in terms of outcomes, populations, subgroups, and settings. For example, the Jacobs et al. (2015) study focused on adolescent parents and key findings included decreased stress, improved educational attainment, less risky behavior, and less intimate partner violence among the Healthy Families participants. The Rausch et al. (2012) study focused on a Dominican immigrant population and found participation in the intervention resulted in increased use of primary care physicians, increased breastfeeding, increased emergency room use, and improved child development outcomes when compared to a control group. The Rodriguez et al. (2010) study examined impacts based on observational data and found the program was effective in fostering positive parenting behaviors such as responsivity and engagement when contrasted to the control group; additionally, a subgroup of first time mothers revealed significantly less harsh parenting than the control mothers.

Other past studies (Caldera et al. 2007; Duggan et al. 2004) were limited to unique populations in Alaska and Hawaii and were conducted on programs with concerns about quality implementation. The findings from these earlier studies were much less positive than recent studies. Furthermore, neither of these early studies benefited from the current standards established by Healthy Families America for accreditation.

The current study adds to this literature by examining the effectiveness of a long standing accredited program using different outcome indicators with a diverse sample that includes a large percentage of Hispanic Americans. Outcome research on this program is needed because Healthy Families represents one of the most widely implemented home visitation programs across the country with over 550 programs (HFA 2017), and many studies show varied results suggesting additional benefits may still be discovered. A goal of this study was to examine the extent of the Healthy Families program model's effectiveness across a broad range of potential outcomes and to document 6-month and 1-year results in a final publication of this grant-funded research.

The study also adds new knowledge by examining linguistic words as an outcome of the home visitation program. Previous research (Pennebaker 2011) has suggested linguistic analysis can differentiate people based on the words they use. By examining data at this level, we hoped to understand how parents perceived their children and reveal more about how they thought about their parenting experiences. Research using this method (Pennebaker et al. 2007; Pennebaker 2011) has found that the words people use reflect their feelings and that counting the words can provide information about their psychological processes. A parenting intervention like Healthy Families may teach parents to use words differently and this may influence their psychological processes. Previous research has found linguistic analysis to differentiate people with psychological problems, and linguistic research suggests using different words is associated with improved functioning (Pennebaker 2011). Linguistic analysis examined whether parents in the treatment group would use different words when describing their children. The software is based on word dictionaries designed to capture psychological processes (see Pennebaker 2011).

The primary research objectives of this study include comparing the effectiveness of the HFA program with a control group on multiple measures of outcome and assessing the maintenance of treatment gains by conducting follow-up assessments at 6 months and 1 year.

Method

Participant Recruitment and Randomization

The study took place in Arizona where families were recruited by research staff from local hospitals following the standard protocol for program engagement in Healthy Families. For the purposes of this study, only screenings that occurred through hospitals were used to recruit, and families that had active child protection involvement were excluded.

Eligibility for the program is determined through a two-stage process. Families are initially screened through a 15-item Hospital Chart Screen conducted at hospitals at the time of a baby's birth. Items such as education level, single parenthood, and employment are included on the screen. If two or more items are endorsed on the Hospital Chart Screen, families were referred for further assessment with a 10-item Family Stress Checklist (FSC) interview. This instrument is used to assess program eligibility (Prevent Child Abuse America 2000). Individuals receive a score of 0 (no risk), 5

(moderate risk), or 10 (high risk) on each item for a total range of 0 to 100. Areas on the FSC include childhood history of abuse or neglect, potential for violence, and a history of mental illness, criminality, and drug abuse. A separate score is computed for the mother and father. A score of 25 or higher for either the mother or father on the FSC makes a family eligible for the program. Most of the families in the study had moderate risk of abuse (a score of 25 through 40).

The research study was explained to potential participants who were told that after their consent to participate, they would be randomly assigned to either a home visitation treatment group with regular home visits (i.e., Healthy Families) or a control group (i.e., referred to in the study as the child development group) that received assessment information about their child's developmental progress and referrals as needed.

Research staff conducted the random assignment using a computer-based random generator. Recruitment in the study was limited to availability of openings in the Healthy Families sites. The study began with a traditional 1:1 randomization strategy; however, as slots in the treatment group were limited, we switched to a 1:2 randomization (one treatment, two controls) to increase the power of the study (Dumville et al. 2006). The randomization procedure preserved the tenants of randomization by preventing selection bias, accidental bias, creating comparable groups, and eliminating any bias in assignments.

A total of 245 families met study criteria for inclusion and signed informed consent agreements. The total sample included in this study for analysis was 245 families randomized at baseline (147 control and 98 treatment); of this total, 100% completed baseline interviews. As shown in Fig. 1, participants were not recruited if they were out of state, unavailable when recruitment staff visited the hospital, or expressed no interest in participating in the study.

Treatment Conditions and Participants

Those families assigned to the treatment group received the normal course of services available from the Healthy Families Arizona program, and those assigned to the control group received no services except assessment information about their child's developmental progress. The treatment group adhered to the procedures outlined by Healthy Families America (2014) and used the Growing Great Kids curriculum (Elliot and Flanagan 2004). The curriculum includes practical strategies for strengthening protective factors with families. Activities done with parents are designed to enhance attachment, build parental empathy and responsiveness, promote parental resiliency, and strengthen child development. The home visitation program is implemented by paraprofessionals who receive specific training to qualify as home visitor practitioners. Most of the home visitors had been with the program for 1 year or longer (55%). The home visitors were almost all parents (99%) with one or more children in their home. A large percentage of home visitors were Hispanic American in order to match the parent's ethnicity.

Home visits are scheduled weekly during the first 6 months and then taper off as the family makes progress in the program. The program treatment revolves around four primary areas: (1) promoting positive child development using child development activities with families and promoting appropriate age-development expectations, (2) facilitating child health through child well visits and use of health care and community resources, (3) improving the parent-child relationship by promoting parent-child attachment and positive parent-child interactions, and (4) enhancing maternal life course outcomes by promoting positive mental health, goal setting and problem solving, referrals for assistance with substance abuse, mental illness, and interpersonal violence and continuing education, training, and employment. Additional information about the program model can be found at the Healthy Families website (http://www.healthyfamiliesamerica.org) and in other publications about the program model (Caldera et al. 2007; Duggan et al. 2004; Krysik and LeCroy 2012; Green et al. 2014; Jacobs et al. 2015; LeCroy and Krysik 2011; Rodriguez et al. 2010).

Participants

Two thirds of the study sample were Hispanic American and approximately 11% were White, 4% were African American, 15% mixed race, and 4% other. Approximately 60% percent of the Hispanic American participants were Spanish-speaking. The mother's average age was 26, had an average number of children prior to current birth of 1.3, 25% were employed, 42% had not graduated from high school or obtained a GED, and 13.2% had previous involvement with the state child welfare agency. Most of the families in the study (83.3%) were classified as engaged, that is, received six or more home visits. The average home visit was 13.29 visits at 6 months and 23.55 visits at 12 months.

Measures

Data were collected on all study participants at baseline and 6 and 12 months. Four primary domains of interest were identified, and outcomes were grouped within these domains: safety and the use of resources, parenting attitudes and practices, health and maternal outcomes, and mental health and coping. To minimize the measurement burden on families and maximize participation, some measures were collected at baseline and follow-up time points, while other measures were only collected at follow-ups. Participants received US$20.00 incentives for completing data collection at each time point.

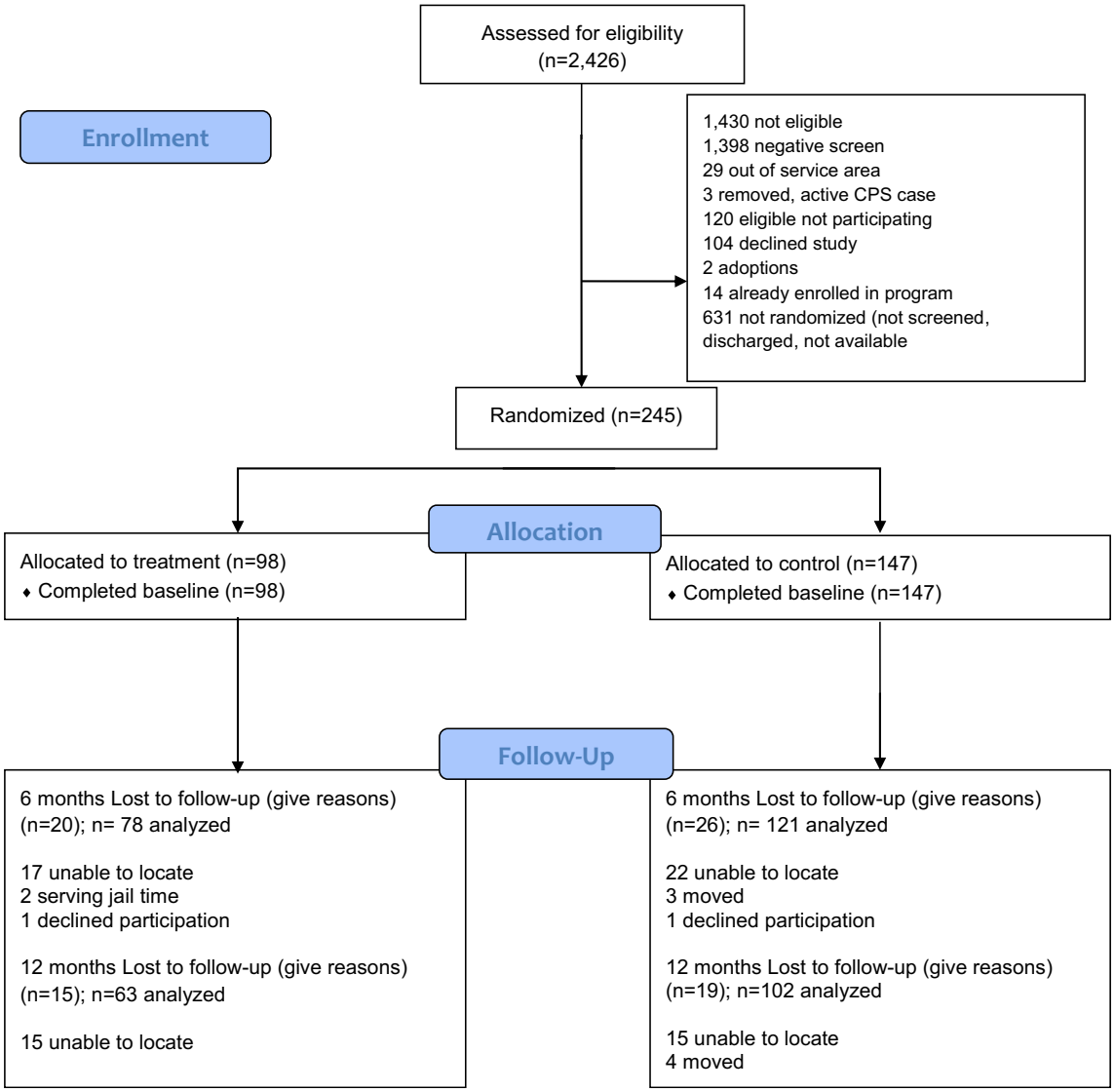

Fig. 1 Consort diagram for participant flow

Safety and Use of Resources Three single items of safety practices were combined and used to assess safety practice in the home. Access to resources can be an important outcome especially for poor families and failing to access resources "can increase the risk for child neglect in such families and for children being placed into foster care because of their parents being unable to meet their basic needs for housing, safety, and adequate nutrition" (Azzi-Lessing 2017). We counted what specific resources parents accessed, and we included the subscale Mobilizing Resources (LeCroy and Krysik 2011) that measured parent's capacity to mobilize resources to meet their needs (6 items, $\alpha = 0.78$). An example item from the mobilizing resources subscale is "I know where to find important medical information" rated on a Likert-type scale.

Parenting Attitudes and Practices We used the (HFPI) which includes four parenting subscales: home environment (10 items, $\alpha = 0.85$), role satisfaction (6 items, $\alpha = 0.85$), parent/child behavior (10 items, $\alpha = 0.85$), and parenting efficacy (6 items, $\alpha = 0.88$). The HFPI has been used in home visitation research and has good reliability and validity (LeCroy and Krysik 2011). Additional parenting measures included two single item assessments of the home environment: use of regular routines and reduced chaotic household. Because of an emphasis on school readiness, we also examined the frequency that parents reported reading to the child by asking parents to self-report on the time spent reading to the child on a weekly basis. At the 1-year follow-up, we used the parenting sense of competence scale (6 items, $\alpha = 0.77$) (Gibaud-Wallston & Wandersman 1978) and we assessed the amount of father contact per week.

Health and Maternal Outcomes Three health outcomes were accessed: breast feeding, immunizations, and well-baby visits. Maternal outcomes included measures of use of contraception,

subsequent pregnancies, and job training or employment. These outcomes were measured by single item dichotomous questions or frequency counts of the behavior.

Mental Health and Coping The primary outcome for mental health was the Rand Mental Health Inventory (Ware et al. 1994). The Mental Health Index was used as a single score (17 items, $\alpha = 0.91$) and designed as a summary index of the person's mental health status. We also used a subscale of the Adult Hope Scale (Snyder et al. 1991) referred to as pathway to goals (4 items, $\alpha = 0.67$). To examine coping and sense of isolation, the Social Loneliness subscale (14 items, $\alpha = 0.86$) was used (DiTommaso and Spinner 1993). Poor functioning in terms of loneliness and isolation has been found to be predictive of child abuse (Coohey 1996). Lastly, four subscales from the HFPI were used to assess different aspects of positive functioning: depression (9 items, $\alpha = 0.84$), social support (5 items, $\alpha = 0.87$), problem solving (6 items, $\alpha = 0.87$), and personal care (5 items, $\alpha = 0.80$). Although a narrow outcome, we included depression given the recent focus on depression in home visitation (Ammerman et al. 2013). Social support is included because it has been considered an important outcome with home visitation programs; problem solving reflects parent's capacity to solve immediate problems, and the personal care measures how much the respondent focuses on taking care of their own needs which might lead to better care for the child.

Violence At the one-year time point, we assessed the level of violence in the home. Because Healthy Families is a child abuse and neglect program, violence indicators were critical assessments of program impact. We examined frequencies of acts of violence such as shouted at child, threatened child, spanked child, slapped hand, swore at child, threw object at child and slapped the body of child. We created a total violence score (7 items, $\alpha = 0.82$). Past research has found using acts of violence a reasonable proxy to administrative child abuse data (Krysik and LeCroy 2012).

Parent Description of Child Participants in the study were asked to describe their child. Using the Linguistic Inquiry and Word Count software (Pennebaker, Booth, and Francis 2007; LIWC 2007; Pennebaker 2011) the words used were counted to provide information about their psychological processes. The software is based on word dictionaries designed to capture psychological processes and includes factors such as past, present, positive, anxiety, insight, and cause (see Pennebaker 2011).

Data Analyses

All variables used in the analyses were carefully examined for data that were missing or were out of range. When missing information was not available from the paper files or from collateral information within the dataset, imputation procedures were employed (Little and Rubin 1987). Dependent measures were treated as independent clusters and considered conceptually independent (Huberty and Morris 1989) and highly correlated measures were not included. The two groups were tested for baseline equivalence using *t* tests and chi-square statistics. To examine the differences in outcomes between the treatment and the control groups at the two time points, we used ordinary least squares and logistic regression models. We followed an intent-to-treat approach such that when participants were assigned to a group, they remained in that group for the entire study regardless if the participant in the Healthy Families program dropped out. To determine potentially relevant outcomes, variables with an effect size of 0.20 are noted as well significance levels, in recognition that effect sizes are less sensitive to small sample size problems (Rosenthal, Rosnow, and Rubin 2000). Cohen (1988) suggests a small effect is equal to 0.20 and can be interpreted as a meaningful effect.

Results

Baseline Equivalence, Condition Fidelity, and Retention

Baseline comparisons showed no significant differences in characteristics between the treatment and control groups across variables assessed such as prior children, average birth weight, smoked or used alcohol during pregnancy, health insurance, employment, car ownership, and history of child maltreatment.

The Healthy Families program followed existing protocols for delivery of services. The Arizona program had obtained statewide accreditation which includes a program review and site visits to assess the extent to which programs meet acceptable standards of practice (see www.healthyfamilies.com for details). The program staff were trained in the use the *Growing Great Kids* (Elliot and Flanagan 2004) curriculum which describes specific age appropriate activities for practitioners to use with families, and the implementation was monitored in supervision sessions which occurred weekly in individual sessions.

As noted in Fig. 1 at the 1-year follow-up, we obtained 102 participants in the control group (69%) and 63 participants in the Healthy Families group (64%). The retention rate was similar between the two groups, and no differential drop out was observed at the various assessment periods. Some of the factors that influenced retention in this study include the high mobility of the population in Arizona, the likelihood of undocumented participants in the study, and poor quality follow-up information. Retention in other studies varies from 50 to 75% (Krysik and LeCroy 2012; Duggan et al. 2007), and these rates are similar to other HFA programs (Harding et al. 2004).

There were specific reports of participants who were deported, were serving prison sentences, or had become homeless.

Outcomes

Table 1 presents key outcome measures across four different domains including safety and resources, parenting attitudes and practices, mental health and coping, and maternal outcomes for the 6-month follow up. In each of the major domains, there was a significant outcome for the Healthy Families Arizona treatment group in contrast to the control group. In the safety and resources domain, outcomes at 6 months showed the treatment group had implemented more safety practices ($p = .01$, $v = 0.17$) and scored higher on mobilizing resources ($p = .007$, $d = 0.43$). In addition, the treatment group used more resources to meet family needs ($p = .10$, $d = 0.24$),

Regarding parenting attitudes and practices, four outcomes significantly favored the Healthy Families condition including quality of the home environment ($p = .003$, $d = 0.47$), regular routines ($p = .02$, $d = 0.36$), reduced chaotic household ($p = .04$, $d = 0.29$), and reading to the child ($p = .03$; $d = 0.31$). One additional outcome, positive parent/child behavior ($p = .13$, $d = 0.24$) showed an effect size of larger than 0.20. Parent efficacy was not different between the groups and role satisfaction, while not statistically significantly different, did have an effect size of 0.32 favoring the control group over the Healthy Families experimental condition.

Results for the health and maternal outcomes domain found Healthy Families participants had higher rates of breast feeding ($p = .04$, $v = 0.29$). Contraception use while not statistically significant did have an effect size favoring the treatment group ($p = .14$, $d = 0.21$). There were no differences between the two groups on immunizations, well-baby checks, subsequent pregnancy, job training or employment, and substance abuse treatment.

Table 1 Comparison of outcome measures by study group at 6 months

Outcome	Healthy Families treatment ($N = 78$) 6 months M (SD)	Control group ($N = 121$) 6 months M (SD)	p	d
Safety and use of resources				
Safety practices	70%	53%	.01*	0.17
Use of resources	4.1 (1.7)	3.0 (1.9)	.10	0.24#
Mobilizing resources	24.6 (4.4)	22.2 (5.5)	.007*	0.43
Parenting attitudes and practices				
Mother's reading	4.1 (1.0)	3.6 (1.3)	.01*	0.38
Home environment	42.8 (5.1)	39.9 (5.1)	.003*	0.47
Role satisfaction	25.7 (4.5)	26.9 (3.9)	.06	−0.33#
Parent/child behavior	46.0 (4.0)	44.9 (4.7)	.13	0.24#
Parent efficacy	26.2 (3.7)	25.8 (3.7)	.47	0.11
Regular routines	1.8 (0.7)	1.6 (0.8)	.02*	0.36
Reduced chaotic household	1.2 (0.5)	1.4 (0.7)	.04*	0.29
Health and maternal outcomes				
Breastfeeding	89%	79%	.04*	0.29
Immunizations	13.7 (3.7)	13.7 (3.6)	.79	0.04
Well-baby checks	4.0 (1.9)	4.1 (1.9)	.70	−0.06
Contraception use	76%	66%	.14	0.21#
Subsequent pregnancy	1 Participant	3 Participants		
Job training or employment	49%	52%	.54	0.09
Substance abuse treatment	1 Participant	1 Participant		
Mental health and coping				
Mental health index	19.0 (1.7)	24.7 (16.7)	.02*	0.35
Emotional loneliness	9.8 (3.9)	10.0 (4.0)	.94	−0.03
Hope	26.9 (3.3)	26.6 (3.1)	.31	0.15
Depression	39.8 (5.2)	39.8 (5.5)	.85	0.00
Social support	21.6 (4.0)	20.6 (4.0)	.26	0.17
Problem solving	24.6 (3.9)	23.8 (3.9)	.20	0.20#
Personal care	19.2 (3.7)	18.7 (3.6)	.38	0.14

*$p \leq .05$; # $p > .05$ with a small effect size of $d \geq 0.20$

Mental health and coping measures found positive outcomes for the Healthy Families participants in comparison to the control condition on the mental health index ($p = .02$, $d = 0.35$). Problem solving ($p = .20$, $d = 0.20$) was not significantly different, but did have an effect size of 0.20. There were no between group differences on emotional loneliness, adult hope scale, depression, social support, or personal care.

Table 2 presents a comparison of 1-year outcome measures by study group across the four primary domains of outcomes. Both Use of Resources and Mobilizing Resources showed significant differences that favored the Healthy Families treatment group ($p < .01$, $d = 0.48$; $p < .01$, $d = 0.47$). There were no differences between the groups on the safety practices at 1 year. In the parenting attitudes and practices domain, there was one measure that showed a statistically significant difference between the groups. The Home Environment showed a difference that favored the Healthy Families group and had the largest effect size ($p < .04$, $d = 0.32$). Four additional measures had small effect sizes of 0.20 or greater including role satisfaction ($d = 0.27$), parent/child behavior ($d = 0.21$), regular routines ($d = 0.25$), parent satisfaction ($d = 0.23$), and the Parenting Sense of Competence ($d = 0.23$). Four outcomes in the parenting domain did not show significant differences: reading to the child, parenting efficacy, chaotic household, and father contact.

Six outcomes were used in the health and maternal domain with none showing statistically significant differences at the 1-year assessment. One outcome did have an effect size higher than 0.20, showing that the Healthy Families group had fewer subsequent pregnancies ($p < .10$, $d = 0.25$). The following measures did not show a significant difference: immunizations, well-baby checks, contraception use, job training or employment, and substance abuse treatment.

Table 2 Comparison of outcome measures by study group at 12 months

Outcome	Healthy Families treatment ($N = 63$) 12 months M (SD)	Control group ($N = 102$) 12 months M (SD)	p	d
Safety and use of resources				
Safety practices	71%	65%	.88	0.07
Use of resources	3.1 (1.5)	2.3 (1.8)	.01*	0.48
Mobilizing resources	25.0 (4.8)	22.8 (4.5)	.01*	0.47
Parenting attitudes and practices				
Mother's reading	3.9 (1.0)	4.0 (1.1)	.53	− 0.09
Home environment	43.5 (4.4)	41.8 (6.0)	.04*	0.32
Role satisfaction	26.3 (4.5)	27.4 (3.3)	.08	− 0.27#
Parent/child behavior	46.0 (3.8)	45.1 (4.4)	.21	0.21#
Parent efficacy	26.9 (3.0)	26.6 (3.3)	.53	0.11
Regular routines	2.4 (0.78)	2.2 (0.81)	.18	0.25#
Reduced chaotic household	1.8 (0.83)	1.8 (0.86)	.95	0.0
Parenting sense of competence	5.96 (0.81)	5.77 (0.83)	.15	0.23#
Father contact	0.85 (0.36)	0.84 (0.36)	.86	0.02
Health and maternal outcomes				
Immunizations	19.0 (3.7)	19.8 (3.3)	.23	− 0.02
Well-baby checks	0.98 (0.14)	1.0 (0.0)	.15	− 0.15
Contraception use	1.29 (0.46)	1.35 (0.48)	.51	− 0.12
Subsequent pregnancy	0.05 (0.22)	0.12 (0.32)	.10	0.25#
Job training or employment	0.21 (0.41)	0.14 (0.35)	.22	0.18
Substance abuse treatment	2.0 (0)	1.9 (0.10)	.32	0.12
Mental health and coping				
Mental health index	2.14 (0.71)	2.0 (0.64)	.19	0.20#
Positive affect	2.53 (0.95)	2.2 (0.89)	.06	0.35#
Hope	35.5 (3.2)	35.4 (3.5)	.86	0.02
Depression	40.9 (4.4)	40.3 (4.8)	.42	0.14
Social support	21.2 (3.8)	21.6 (3.9)	.53	0.11
Problem solving	25.0 (3.7)	24.3 (3.4)	.10	0.19
Personal care	19.1 (3.5)	19.6 (4.8)	.48	0.12

*$p \leq .05$; # $p > .05$ with a small effect size of $d \geq 0.20$

The mental health and coping domain examined eight different outcome indicators. Two outcomes had effect sizes larger than 0.20 that favored the Healthy Families group, the mental health index ($p < .19$, $d = 0.20$), and positive affect ($p < .06$, $d = 0.35$), and the problem-solving measure showed a significant trend ($p < .10$, $d = 0.19$). The following measures did not show a difference between the groups: hope, depression, social support, and personal care.

On measures of violence, total violence showed a significant difference between the groups ($p < .04$, $d = 0.31$) showing less violence in the Healthy Families group. Two additional differences with effect sizes larger than 0.20 were threatened child, ($d = 0.21$) and spanked child, ($d = 0.23$) which favored less violence in the treatment group.

Linguistic/Qualitative Results

Linguistic results revealed several significant differences at the 6-month follow-up; eight comparisons showed significance, all of which favored the Healthy Families group, and three indicators had an effect size larger than 0.20. The most meaningful findings showed the Healthy Families group expressed more positive emotions, less negative emotions, less sadness, showed more feeling expressions, had enhanced cognitive mechanisms, and greater insight. At 1 year, results show that Healthy Families participants used more first-person pronouns, less negative valenced words, greater feeling expression, more cognitive mechanism, greater insight, and greater cause than the control group at the one-year follow-up (Table 3).

Discussion and Implications for Practice

The context of this study includes examining the effectiveness of a long-standing accredited program (over 23 years) using a wide range of potential outcome indicators. Significant effects were found on safety and use of resources. These outcomes were consistent across both the 6-month and 1-year assessment periods. Obtaining additional safety in the home could be an important outcome because unintentional injuries are a leading cause of child death (Deal et al. 2000). Using resources has increasingly been recognized as important outcome. Azzi-Lessing (2017) raises concerns about programs that could "have the unintended harmful side effect of discouraging poor mothers from accessing benefits for which their families are eligible" and further notes that "failing to access government assistance can increase the risk for child neglect" (p.12).

It is noteworthy that resources can also bring enhanced opportunities to families, for example, using higher quality day care or accessing additional health options, and could promote better supportive services such as better mental health counseling or parent-child play groups. One randomized controlled trial (RCT; Caldera et al. 2007) found more use of supportive services, and a qualitative study on Healthy Family participants (Krysik et al. 2008) found families had a positive experience that may "promote future involvement with other social service programs when families need help in the future" (p. 59).

In the health and maternal domain, the 6-month assessment revealed a significant difference between the treatment and control group participants on breastfeeding. This was a surprising outcome because the program encourages breast feeding but it is not an active component of the intervention, and as a result, this finding may not be easily replicated. However, one RCT (Sandy et al. 2009) which included an enhancement of the Healthy Families program to promote breast feeding with a Latino population also found a significant effect on exclusive breast feeding. Studies suggest that breast feeding can improve child development outcomes such as lower childhood obesity, improved brain development, and reduced asthma symptoms (Horta and Victora 2013). Another potentially important finding was a positive trend at 6 months ($p < .14$, $d = 0.21$) toward contraceptive use. This finding was supplemented with a positive trend for reduced subsequent pregnancy at the 1-year follow-up assessment ($p < .10$, $d = 0.25$). In an RCT, Jacobs et al. (2015) also report a significant effect on contraceptive use with adolescent parents following participation in the program when compared to a control condition. Additional maternal outcomes like education and employment did not show any effects although previous RCTs have shown benefits in these areas (LeCroy and Krysik; Jacobs et al. 2015).

Other significant findings include increased maternal reading, enhanced home environment, use of more regular routines, and reduced chaotic household. The measure of home environment had the largest effect size of any of the outcomes and was significant at both the 6-month and 1-year assessment. This outcome suggests the intervention was successful in building a responsive "environment" that is conducive to promoting child development and wellness. An RCT evaluation of the Oregon Healthy Families program found a significant effect on a measure of reading to the child (Green et al. 2014), and a study with an American Indian population found significant effects in the parenting domain on parenting knowledge and involvement (Barlow et al. 2006). Caldera et al. (2007) examined measures of parent child interaction and found no significant effects but did report a significant difference, between the Healthy Families group and the control group, on the outcome of poor total HOME score, which measures the quality of the home environment. Using observational data, Rodriguez et al. (2010) documented significant effects of the Healthy Families program on positive parenting. Our findings are consistent with many other evaluations which find clear benefits in the domain of parenting attitudes and practices.

Table 3 Means, standard deviations, significance, and effect sizes for linguistic dimensions for the treatment and control groups

	6 month				1 year			
	Treatment Mean (SD)	Control	*p*	*d*	Treatment Mean (SD)	Control	*p*	*d*
Past	0.94 (1.6)	1.65 (1.4)	.10	0.27#	0.65 (1.5)	0.61 (1.4)	.87	− 0.02
Present	17.0 (5.8)	14.6 (5.5)	.008*	0.34	17.8 (8.1)	16.7 (5.6)	.37	0.15
Future	0.18 (0.77)	0.20 (0.67)	.81	− 0.02	0.22 (0.87)	0.13 (0.59)	.55	0.12
First person	3.7 (3.5)	3.3 (4.2)	.60	0.10	3.1 (4.8)	1.8 (2.5)	.001*	0.34
Affective processes	17.4 (8.4)	15.0 (11.4)	.15	0.24#	18.9 (10.5)	18.1 (10)	.67	0.08
Positive valenced	15.3 (8.3)	12.0 (9.2)	.02*	0.37	17.1 (10.6)	16.2 (10.3)	.63	0.08
Negative valenced	1.9 (2.4)	2.8 (3.6)	.08	0.29#	0.59 (1.3)	1.5 (2.0)	03*	0.54
Anxiety	0.20 (0.74)	0.53 (2.9)	.35	0.15	0.17 (0.63)	0.30 (1.0)	.44	0.15
Anger	0.39 (1.1)	0.47 (1.4)	.70	0.06	0.57 (1.4)	0.52 (1.3)	.84	− 0.04
Sad	0.78 (1.3)	1.5 (2.0)	.01*	0.42	0.56 (1.2)	0.67 (1.3)	.64	0.08
Perceptual process	4.2 (3.6)	2.9 (4.1)	.04*	0.33	3.5 (4.2)	3.1 (3.4)	.50	0.10
Feeling expression	1.6 (1.8)	0.77 (1.5)	.002*	0.50	2.0 (3.9)	0.81 (1.7)	.02*	0.39
Cognitive mechanism	16.4 (6.5)	13.4 (7.2)	.007*	0.44	16.5 (7.3)	13.4 (6.9)	.02*	0.42
Insight	3.2 (3.1)	2.2 (3.0)	.05*	0.33	3.7 (4.6)	2.6 (3.1)	.12	0.28#
Cause	2.1 (2.3)	1.3 (1.8)	.01*	0.39	2.9 (4.3)	1.2 (2.0)	.005*	0.50
Certainty	1.4 (2.5)	0.82 (1.6)	.08	0.27#	1.2 (2.1)	1.9 (3.1)	.03*	− 0.26

*$p \leq .05$, # $p > .05$ with a small effect size of $d \geq 0.20$

We examined multiple measures of mental health and coping. In the 6-month assessment, the mental health index showed a significant effect. Measures of depression, social support, problem solving, and personal care did not show any effects. At 1 year, the mental health index was not significant but two positive trends were noted in the areas of problem solving ($p < .10$, $d = 0.19$) and positive affect ($p < .06$, $d = 0.36$). When we examined the broadest measure of mental health, we were able to capture significant effects between the treatment and control groups. This might be attributable to the notion that an overall measure is more likely to capture subgroups of individuals who improve on some aspect of mental health. For depression, we did not see an effect, and while prevalent among the population of at-risk new mothers, there are still many participants who did not enter the program with any significant depression but may have had other kinds of mental health difficulties. For teen mothers, Jacobs et al. (2015) found a significant reduction in risky behaviors. It also appears that the Healthy Families program can have important benefits for the mothers' mental health. While studies have examined depression, future studies should examine the potential benefit in overall mental health as few trials have examined this outcome.

This study examined self-reported indicators of violence. Child protective services data may not be a valid measure as it only captures a small portion of actual maltreatment (Olds 2005) and suffers from surveillance bias (Krysik and LeCroy 2012) and low base rates. Many researchers prefer endangerment which includes acts of violent behavior toward the child such as hitting and shoving. The violence indicators used here showed a program impact on behaviors that can be considered physically abusive. At the 1-year assessment, participants in the Healthy Families group reported less violent behavior than the control group. Similar results were reported in some other studies of Healthy Families (Krysik and LeCroy 2012; LeCroy and Krysik 2011); however, other studies using this type of indicator have not shown positive results (Duggan et al. 2004; Jacobs et al. 2015). More research needs to investigate measures which can address how best to capture violent behavior and researchers should consider the implications of asking direct questions about violence.

The linguistic data examined the words participants use in describing their parenting. As hypothesized, parents in the Healthy Families treatment group were found to use linguistic patterns that were significantly different than the control group parents across many linguistic indicators. Results were most prominent at the 6-month assessment but four of the nine indicators were also significant at the 1-year assessment. The linguistic changes observed in this study suggest intervention families develop a different language that is perhaps helpful to them in their parenting. These results many have been responsive to the program curriculum, Growing Great Kids (Elliot and Flanagan 2004) that focuses on teaching parents to be positive, notice the positive aspects of attachment, be more responsive to cues, and improve overall communication between the parent and child. The theory supporting linguistic

analysis suggests that language and psychological processes and behavior go hand in hand (Pennebaker 2011). Linguistic research has found that when individuals change their perspective and the words they use they are more likely to function in a healthy manner (Rude et al. 2004). In the parenting context, the construction of a story or narrative using different words about being a parent may help parents cope and function better. While intriguing, this research is new and needs replication to determine future implications in prevention research.

Contextual Considerations and Limitations

A limitation of this study concerns the small numbers of participants and the corresponding decrease in statistical power. Interpretation of the results of this study is enhanced when both *p* values and corresponding effect sizes are examined together (Rosenthal et al. 2000). Because this is an underpowered experiment and a primary goal was to examine a large number of outcomes, experiment-wise error rate was not controlled, and readers should take this into account when interpreting the results. We proposed a large number of measures in this study because we were interested in learning more about how different outcome measures might show different effects. The addition of a 1-year follow-up potentially adds important information about the long-term benefits of home visitation, but this information is compromised due to the considerable loss of participants at follow-up and missing data that resulted. An additional limitation is that the outcomes presented in this study are primarily parent self-reports, and the demand characteristics to look good may be stronger in the treatment group.

Several factors made this research of interest in the study of existing child abuse prevention programs. We focused on a widely implemented program, Healthy Families America, which still needs further research of effectiveness. The program context was important since the program in Arizona is one of the oldest, has received continuous accreditation by the model developer, and was previously recognized as a promising program. Furthermore, we had engaged in similar past research with this program easing the difficulties that come with program implementation and the conduct of research within a service setting. Nonetheless, we encountered significant challenges in implementing this study.

While we understood the issues in recruitment for this study, we found this to be a consistent challenge. Working within an existing program of services meant that program openings had to occur before a randomly selected participant could enter the study. Often staff would leave the agency, and no new cases could be accepted until a new staff person was hired and trained which added significant delays in recruitment. Retention in the study was also more challenging than expected. Our work in Arizona included some families that were worried about deportation and that made follow-up difficult for some of the families.

Home visitation research is a significant challenge. Further research will need to address the extremely diverse participant characteristics recognizing that these characteristics will likely impact for whom the program has an impact. Conducting subgroup analysis is an important next step in building the needed knowledge about home visitation benefits. While the benefits of home visitation may extend over a wide range, policy makers should be cautious of expecting too much from one intervention. Azzi-Lessing (2017, p. 121) notes, "policymakers and the general public have a strong desire for cheap and simple solutions to complex, longstanding problems." The families targeted by home visitation programs face poverty, racial oppression, limited economic opportunities, barriers to transportation and child care resources and often live in stressed and violent neighborhoods. Most of these factors are not addressed within the home visitation models.

In spite of the challenges, important lessons, in both the benefits obtained and the lessons learned from implementation, have been documented. As research continues to unpack the complexities of the home visitation programs, the challenges of finding sensitive outcome indicators and overcoming difficulties in implementing research in a community setting will emerge to guide future work.

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Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Ethical Approval All assessments and procedures performed in this study were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments.

Informed Consent Informed consent was obtained from all participants included in the study.

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