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Family support and family negativity as mediators of the relation between acculturation and postpartum weight in low-income Mexican-origin women

Shannon L. Jewell, M.A., Kirsten Letham-Hamlett, B.A., Mariam H. Ibrahim, M.A., Linda J. Luecken, Ph.D., and David P. MacKinnon, Ph.D.

Arizona State University, Department of Psychology, Tempe, AZ 85287-1104

Abstract

Background—Obesity presents a significant health concern among low income, ethnic minority women of childbearing age.

Purpose—The study investigated the influence of maternal acculturation, family negativity, and family support on postpartum weight loss among low-income Mexican-origin women.

Methods—Low-income Mexican-origin women (N=322; 14% born in the U.S.) were recruited from a prenatal clinic in an urban area of the Southwest U.S. Acculturation was assessed during a prenatal home visit (26–38 weeks gestation), and post-birth family support and general family negativity were assessed at 6 weeks postpartum. Objective maternal weight measures were obtained at five time points across the first postpartum year.

Results—Higher acculturation predicted higher family support and family negativity. Higher family support predicted decreasing weight across the first postpartum year, and higher family negativity predicted higher weight at 6 weeks postpartum and increasing weight across the first postpartum year. In combination, family negativity and support mediated the impact of acculturation on postpartum weight gain.

Conclusions—Cultural and family-related factors play a significant role in postpartum weight gain and loss for low-income Mexican-origin women.

Keywords

Hispanic; postpartum; weight; acculturation; family

Address correspondence concerning this article to Linda J. Luecken, Department of Psychology, Arizona State University, P.O. Box 871104, Tempe, AZ 85287.

The authors have no conflicts of interest, financial or otherwise.

Authors Statement of Conflict of Interest and Adherence to Ethical Standards

The corresponding author (Luecken) has the approval of all other listed authors for the submission and publication of all versions of the manuscript. All of the listed authors have made contributions to the data collection, analysis, and manuscript preparation. The work submitted in the manuscript is original and has not been published elsewhere and is not presently under consideration of publication by any other journal. The study obtained and maintained IRB approval by the Maricopa Integrated Health Services and by Arizona State University. Data collection was acquired in accordance with modern ethical standards. None of the authors have conflicts of interest, financial or otherwise. The study was funded by the NIH-National Institute of Mental Health which had no role in study design, collection, analysis, interpretation, or writing of the report; or in the decision to submit the article for publication.

The prevalence of obesity in the U.S. has reached alarming levels (1). Although obesity rates among non-Hispanic white women have not significantly increased in the last decade, obesity rates among Hispanic women have continued to rise, with 34–48% of Hispanic women classified as obese (2). Within the Hispanic ethnic subgroup, women of Mexican-origin (e.g. first-generation Mexican immigrants and women with Mexican heritage who are living in the U.S.) are even more at risk, with 38–54% classified as obese (2). As a result, Mexican-origin women in the U.S. may be particularly susceptible to poor health later in life, as obesity increases the risk of a wide range of health problems, including coronary heart disease, type 2 diabetes, cancer, and respiratory problems (3).

For women of childbearing age, the perinatal period presents elevated risk for significant weight gain, and failure to lose weight in the first postpartum year predicts higher risk of long-term overweight and obesity (4). It is particularly crucial to evaluate weight across the postpartum period among economically-disadvantaged Mexican-origin women, who have higher birth rates than ethnic majority women (5), and are significantly more likely than ethnic majority women to gain weight between childbirth and subsequent pregnancies (6) and to transition into a higher BMI category following pregnancy (7).

Research investigating health disparities experienced by Mexican-origin women demonstrates that the level of risk is influenced by the degree to which women have adapted to the majority culture (i.e., acculturation), and/or identify with and adhere to their Mexican cultural values. Acculturation is closely tied to generational status. Across immigrant generations, first-generation Mexican immigrants experience lower rates of obesity than Mexican-origin individuals who are second-generation or higher (8). Among first-generation women of Mexican-origin (i.e. women born in Mexico who have immigrated to the United States), greater time spent in the U.S. is associated with higher obesity risk (9, 10). The influence of acculturation on health is also evident during the perinatal period, a transition period during which unhealthy weight gain may set women on a path for long-term overweight and obesity (4). Among Hispanic women living near the U.S.-Mexico border, those with higher acculturation to U.S. culture experience greater perinatal weight gain relative to women with lower acculturation (11).

However, for new mothers, the role of cultural orientation is not necessarily straightforward; although recent immigration, a strong cultural identification, and traditional Mexican values may confer protective benefits, acculturation to Anglo U.S. culture and more time spent in the U.S. might also confer social and tangible resources beneficial to postpartum weight loss, such as larger social networks and social support, higher socioeconomic status, education, greater English proficiency, and better access to preventative health care practices and health services (12–14). A more nuanced understanding of the pathways through which acculturation may impact postpartum weight change will inform targeted interventions to reduce or prevent long-term overweight and obesity in this critical transitional period.

There are several behavioral pathways through which acculturation might influence weight gain in the perinatal period among Mexican-origin women. Generally, women who spent their childhoods in the U.S. or who are more acculturated to U.S. culture are less likely to engage in healthy behaviors (e.g. good diet) that promote weight loss (14). Breastfeeding

can also promote postpartum weight loss (15–16); among Mexican-origin women in the U.S., those with lower acculturation breastfeed at higher rates than more acculturated women (17).

Although less commonly studied, Mexican cultural values related to social and family resources and dynamics may also shed light on the influences of acculturation on postpartum weight. In general, there is a strong cultural tradition of family and kinship support in Mexican culture (18). However, more acculturated Mexican-origin women may be less immersed in Mexican culture and cultural values, and may find it more difficult to retain and/or rely on values of familism, and thus experience less family support (19). Indeed, some previous work has found that among Mexican-origin parents, those born in the U.S. perceive less family support than those born in Mexico (20).

Family support may present unique benefits for health and weight loss in the postpartum period, as mothers recover physically from the birth, care for their new infant, and continue with tasks such as caring for older children and other family members. Hispanic cultural practices such as La Cuarentena (21) may help with postpartum recovery. La Cuarentena refers to a 40-day period after birth where the mother is encouraged to recover using a variety of traditional practices to care for herself and her baby. A key part of La Cuarentena is increased support from family members. As such, family support (or the lack thereof) is particularly salient for many Mexican-origin women during the postpartum period (22). Mothers may also rely on family support to help care for the new infant, allowing for time and energy to attend to her own health (e.g. exercise, rest). Among Latina mothers, family and friend support has been linked to increased motivation for losing weight (23), reduced fat consumption (24), fewer perceived barriers to eating healthy (23–24), and increased physical activity and exercise (25).

However, associations between acculturation and family support are complex, particularly given the complicating factor of immigration. Although some studies suggest that greater acculturation can result in less family support (20–21), others suggest that more acculturated individuals may experience *more* support (26–27). Although later generation mothers are likely to have multiple generations of family in the U.S. to draw support from, recent immigrants, who are typically less acculturated, may not yet have broad family networks in their new country, and report feelings of alienation and persistent social isolation (28). In addition, the families of recent immigrants may have less time, financial resources, and social capital with which to provide support. Outside of the context of the postpartum period, women with higher acculturation report greater social capital (29), while recent Mexican immigrants report that stress and time constraints stemming from their new, demanding jobs interfere with their ability to provide support to their families (19). Research among low-income Mexican-origin immigrant women has found that a younger age at arrival in the US (indicating higher acculturation) is associated with higher social support during pregnancy, while more recent Mexican immigrants experience the lowest levels of social support (14).

In contrast to the positive aspects of support, families can also be a source of negativity for new mothers. Negative, conflictual, or critical family relationships may influence the process

by which acculturation affects postpartum weight. Some previous research has found that higher acculturation and differences in acculturation among family members is associated with higher family conflict (30–31). The health implications of family negativity have received little research attention in the context of postpartum weight or specifically among Mexican-origin women. However, we previously reported that *childhood* exposure to abuse and family conflict was associated with increasing postpartum weight in low-income Mexican-origin mothers (32). Other studies, not specific to the perinatal period and with broader samples of Hispanic women, have found that negative family relationships predict higher incidence of metabolic syndrome, including waist circumference (33). During qualitative interviews, non-pregnant Hispanic women (88% of Mexican-origin) cited family stress as a significant contributor to poor health habits and weight gain (34). Although some research shows that higher acculturation is associated with higher family conflict (30–31), this relation has not been consistent in the literature (27). Work is needed to clarify the relation of acculturation to post-birth family support and family negativity, and assess how these factors affect postpartum weight change among Mexican-origin women.

A better understanding of the relation of acculturation to post-birth family support and family negativity, and how these factors affect postpartum weight change among low-income Mexican-origin women, can provide key information for health promotion efforts. Researchers and healthcare providers could use this information in designing, targeting, and implementing effective and culturally-appropriate prevention and intervention efforts among low-income Mexican-origin women. The current study aimed to provide this information and address limitations in existing literature by examining the association between maternal acculturation and postpartum weight change among low-income women of Mexican origin and the role of family negativity and support as mediating mechanisms. We hypothesized that women with higher acculturation would lose less weight in the postpartum year relative to lower acculturated women. Further, we predicted that higher post-birth family support and lower family negativity would be associated with more weight loss across the postpartum period, and would mediate the effect of acculturation on postpartum weight change.

Methods

Participants

Participants included 321 Mexican-origin women (mean age = 27.8, SD = 6.5, range 18–42; mean years in U.S. = 13.3, SD = 6.8, range= 0–33) recruited from a prenatal clinic in an urban area of the Southwest U.S. that serves low-income and uninsured women from the surrounding community. Eligibility criteria included: 1) self-identification as Mexican or Mexican American, (2) fluency in English or Spanish, (3) age 18 or older, (4) low-income status (family income below \$25,000 or eligibility for Medicaid or Federal Emergency Services coverage for the birth), (5) healthy pregnancy; no prenatal evidence of an infant health or developmental problem, and (6) delivery of a live, singlet baby. See Table 1 for an overview of sample demographics.

Recruitment and retention

Female, bilingual recruiters approached women during prenatal care appointments and conducted a preliminary assessment of eligibility. Fifty-six percent of the women approached agreed to schedule a home visit, during which informed consent was obtained. Data collection took place at six time points: prenatal (26–38 weeks gestation; mean 35.4 weeks, $SD = 2.8$), and at 6 weeks, 12 weeks, 18 weeks, 24 weeks, and 52 weeks (1 year) postpartum. To retain participants over multiple time points while minimizing participant burden for our high-risk sample, the study followed a “planned missingness” design, in which all women were assigned to complete visits at 6 weeks and 52 weeks postpartum, but prior to recruitment a computer program *randomly* assigned each participant ID to miss *one* of the 12 week, 18 week, or 24 week postpartum visits, with the expected number of participants at each time point ($2/3$ of the sample) kept approximately equal. Because this design produces data missing completely at random, the missing data resulting from this technique are benign and do not introduce bias into parameter estimates (35).

Of the 322 women who consented to the study, 312 (97%) completed the 6 week visit, 203 (out of a randomly assigned 204; 99%) completed the 12 week visit, 209 (out of 218; 96%) completed the 18 week visit, and 209 (out of 226; 93%) completed the 24 week visit. Because funding was not initially available to provide compensation for an in-person visit at 52 weeks, only 266 women were within their target window when funding became available; of these, 206 (77%) completed the visit. An additional 59 women completed a brief phone survey prior to the availability of supplemental funding, for a total sample retention of 82% at 12 months. One participant was removed from analyses due to erroneous weight values (described below), leaving a final sample size of 321.

Procedure

The study was approved by the Internal Review Boards at Arizona State University and Maricopa Integrated Health Services. The 6, 12, 18, and 24 week interviews took place at participants’ homes. The 52 week interview was conducted either over the phone or in the lab at Arizona State University. For lab visits, the study provided families with free transportation or \$50 for travel compensation. Interviewers completed surveys in either Spanish (82%) or English (18%). Interviewers read survey questions aloud, and gave women written and graphic descriptions of item responses. Interviews lasted approximately two hours and were scheduled between 8:00 AM and 4:30 PM (median 11:30 AM). Women received \$75 and small gifts (e.g., bath oils) at the prenatal interview, and \$50 and small gifts (e.g., bath toys) at the 6, 12, 18, and 24 week interviews, and \$100 at the 52 week interview.

Measures

Acculturation—At a late prenatal visit (26–38 weeks gestation), women completed the Acculturation Rating Scale for Mexican Americans-II (ARSMA-II; 36), a widely used measure that independently assesses orientation toward Mexican and Anglo culture. The analyses use the Anglo Orientation ($\alpha = .93$) and Mexican Orientation subscales ($\alpha = .90$). Also at the prenatal visit, women reported the number of years they have lived in the US and their preferred language (Spanish or English). Women born in the U.S. had “years in the U.S.” set to their age. A latent variable was formed to quantify the construct of acculturation

using Anglo orientation, Mexican orientation, preferred language use and years in the U.S. as indicators. The measurement model for acculturation showed good fit according to criteria by Hu and Bentler (37; i.e., comparative fit index (CFI) < .95, root mean square error of approximation (RMSEA) < .06, standardized root mean square residual (SRMR) < .08; Chi-square (χ^2) (1) = 1.27, $p = .26$, RMSEA = .029 (90% CI 0, .155), CFI = .99, SRMR = .010. All indicators were statistically significant ($p < .001$).

Post-birth Family Support—At six weeks postpartum, women completed a postpartum version of the Prenatal Expectations Scale for Mexican Americans (PES-MA; 26); a scale developed for and validated with low-acculturated Mexican American women. Four items represented perceptions of received family support (Cronbach's $\alpha = .80$; e.g., “After your baby was born, family members stayed with you and helped take care of your baby”). Hereafter, this scale is termed ‘family support’ for simplicity. Response options ranged from “1” (Not at all) to “5” (Completely). Higher scores represent higher family support.

Family Negativity—General family negativity was assessed at 6 weeks postpartum with 3 items modified from the social strain items on the Midlife in the United States (MIDUS II) survey (38). Items included: “You feel that your family makes too many demands on you”, “Your family is often critical of you”, and “Your family is always pointing out mistakes you have made”. These items, with minor wording differences, have been found reliable in previous work with a range of samples, including Hispanic and low-income participants (39). Responses were rated from “1” (Never) to “5” (All of the time) and summed (Cronbach's $\alpha = .84$). Higher scores represent more family negativity.

Maternal weight—Trained staff assessed height and weight at each of the postpartum visits. Within-person analyses evaluated maternal weight; sample descriptives and zero-order correlations include BMI, calculated as kg/m^2 .

Demographic variables—At the prenatal visit, women reported their age, and the number of children they had given birth to (range = 1–10; mean = 3, SD = 1.7). At 12 weeks postpartum, women reported on their breastfeeding status (coded 0 = exclusive bottle-feeding [51.5%] or 1 = partial/exclusive breastfeeding [48.5%]). Primary analyses adjusted for these variables to account for their potential influence on pre-pregnancy or postpartum weight levels. We also considered birth outcomes, neonatal health status, maternal gestational diabetes, and marital status as covariates, but these variables were not related to acculturation or maternal postpartum weight, and their inclusion in statistical models did not affect the pattern or significance of results, therefore they were not included in final models.

Data analyses

Preliminary analyses—Table 2 contains zero-order correlations between study variables. Data from one participant was excluded due to an apparent 48 lb. weight gain between 6 weeks and 6 months postpartum, which was determined to be measurement error. Evaluation of outliers identified three women with BMIs > 3 SD from the mean across the first postpartum year and one participant with a BMI below 17kg/m^2 . When the primary analyses

were repeated excluding these 4 women, the results did not significantly change, therefore the data were retained.

Primary analyses—Primary analyses were conducted using MPlus 7.0 (40). A latent variable representing acculturation was formed from Anglo Orientation, Mexican Orientation, preferred language use, and number of years residing in the U.S. A latent growth curve model was estimated to evaluate the model shown in Figure 1. Slope was modeled with weight at 6 weeks, 12 weeks, 18 weeks, 24 weeks, and 52 weeks; the first four measurements were equally spaced with coefficients 0, 1, 2, and 3 (respectively) and the last coefficient (weight at 52 weeks) was free to vary. The intercept was covaried with the slope. The intercept represents the average weight at 6 weeks. First, separate models evaluated family support and family negativity as mediators, followed by the full model with both mediators included and allowed to covary. All models adjusted for maternal age, number of children, and breastfeeding status. Full information maximum likelihood (FIML) estimation was used to handle missing data, bootstrap resampling with 1,000 bootstrap samples was used, and model fit was examined using χ^2 , CFI, RMSEA, and SRMR. Criteria by Hu and Bentler were used to interpret fit indices (37).

Mediation of the effect of acculturation on weight intercept and slope by family support and family negativity was tested by examining the statistical significance of the indirect effect using the bootstrap confidence intervals because of the optimal statistical properties of this test over examination of p-values from normal-theory tests of mediation (41–42). If the 95% confidence interval does not include zero, the path is statistically significant. Results report the total, direct, and indirect effects of the models. The total effect is the relation of acculturation on weight without any mediating variables. The direct effect is the relation of acculturation on weight adjusted for the mediating variables. The indirect effect is the effect of acculturation on weight through a mediating variable.

Results

Maternal weight across the postpartum year

The percentages of women classified as overweight based on a BMI > 25kg/m² were: 76.4% at six weeks, 80% at 12 weeks, 77% at 18 weeks, 76.5% at 6 months, and 80% at one year. Obesity rates (BMI > 30 kg/m²) ranged from 37% to 43% (see Table 1). Weight loss/gain ranged from a loss of 22 pounds between six weeks and one year to a gain of 36 pounds. Forty-one percent of women lost at least one pound during this time period, 9% remained within one pound of their weight at 6 weeks postpartum, and 50% gained at least one pound.

The latent growth model of maternal weight across the year found a statistically significant positive slope across the sample (standardized estimate = .338, SE = .121, p = .005), and significant variability in the slopes (standardized estimate = .885, SE = .048, p < .001). The intercept and slope were positively correlated, R = .306, p < .001, indicating that higher weight at 6 weeks postpartum was associated with an increasing slope of weight across the year.

Predictors of postpartum weight

Family Support—On average, participants reported feeling relatively supported by their family (range=4–20, M=12.2, SD=4.9). Model fit was good for a model predicting the intercept and slope of weight across the postpartum year from acculturation and family support, $\chi^2(54) = 104.4$, $p < .001$, CFI = .987, RMSEA = .054 (90% CI .038, .069), SRMR = .032. Higher acculturation was associated with higher family support (estimate = 1.216, SE = .322, $p < .001$), fewer children (estimate = $-.801$, SE = .103, $p < .001$), lower maternal age (estimate = -3.08 , SE = .30, $p < .001$) and less breastfeeding (estimate = $-.171$, SE = .040, $p < .001$). Women with more children had a higher weight intercept (estimate = 4.174, SE = 1.81, $p = .021$) but did not differ in weight slope ($p = .16$). Breastfeeding and maternal age did not predict the intercept or slope (all p 's $> .24$). Higher family support predicted a decreasing slope (i.e., weight loss) across the year (estimate = $-.113$, SE = .040, $p = .005$) but did not predict weight intercept ($p = .43$).

The total effects (i.e., effects with no mediating variables) of acculturation on weight intercept (estimate = .526, 95% CI $\{-5.46, 10.18\}$) and slope (estimate = .153, 95% CI $\{-.412, .756\}$) were not statistically significant. The direct effect (i.e., effect with mediating variables) of acculturation on the intercept was not statistically significant (estimate = 6.75, 95% CI $\{-1.792, 15.08\}$) and the indirect effect through family support was not statistically significant (estimate = $-.468$, 95% CI $\{-1.73, .638\}$). The direct effect of acculturation on the slope was not statistically significant (estimate = .526, 95% CI $\{-.087, 1.133\}$) but the indirect path from acculturation to the slope through family support was significant (estimate = $-.138$, 95% CI $\{-.295, -.029\}$): higher acculturation predicted higher family support which predicted weight loss across the year.

Family Negativity—On average, participants reported a moderate level of family negativity (range=3–15, M=5.4, SD=2.9). A model predicting the intercept and slope of maternal weight from acculturation and family negativity showed good fit, $\chi^2(54) = 103.1$, $p < .001$, CFI = .987, RMSEA = .053 (90% CI .037, .069), SRMR = .033. Higher acculturation was associated with higher family negativity (estimate = .677, SE = .21, $p = .001$), fewer children (estimate = $-.793$, SE = .103, $p < .001$), lower maternal age (estimate = $-.305$, SE = .31, $p < .001$) and less breastfeeding (estimate = $-.169$, SE = .040, $p < .001$). Women with more children had a higher weight intercept (estimate = 3.917, SE = 1.61, $p = .015$) but did not differ in weight slope (estimate = .212, SE = .125, $p = .09$). Breastfeeding and maternal age did not predict intercept or slope (p 's $> .17$). Higher family negativity was associated with a higher weight intercept (estimate = 3.023, SE = .90, $p = .001$), and an increasing weight slope (estimate = .147, SE = .063, $p = .020$).

The direct effect of acculturation on the intercept was not statistically significant (estimate = 3.62, 95% CI $\{-3.76, 4.15\}$) but the indirect path from acculturation to the intercept (estimate = 2.046, 95% CI $\{.529, 4.153\}$) through family negativity was statistically significant. Similarly, the direct effect of acculturation on the slope was not statistically significant (estimate = .292, 95% CI $\{-.294, .897\}$) but the indirect path to the slope through family negativity was statistically significant (estimate = .100; 95% CI $\{.017, .229\}$). Higher

maternal acculturation predicted higher family negativity which predicted higher weight intercept and increasing weight across the year.

Full Model—Finally, the full model was estimated with acculturation, family support, and family negativity as predictors of the intercept and slope of maternal weight. Model fit was good, $\chi^2(62) = 114.9$, $p < .001$, CFI = .986, RMSEA = .052 (90% CI .037, .066), SRMR = .034. The amount of variance explained (model R^2) was 10.3% for the intercept and 10.8% for the slope. See Table 3 for complete statistical results. Higher acculturation was associated with less breastfeeding, fewer children, younger maternal age, higher family negativity, and higher family support. The weight intercept was significantly and positively predicted by family negativity and the number of children. The indirect effect of acculturation on weight intercept through family negativity was statistically significant (estimate = 2.022, {95% CI = .482, 4.184}). The direct path (estimate = 3.68, {95% CI = -3.82, 11.27}) and the indirect path to the intercept through family support were not significant (estimate = -.108, {95% CI = -1.312, 1.06}).

The slope of maternal weight across the first postpartum year was positively predicted by family negativity, and negatively predicted by family support. The indirect path from acculturation to the slope through family support was statistically significant, standardized estimate = -.124, {95% CI = -.266, -.021}. The indirect path from acculturation to the slope through family negativity was also statistically significant, estimate = .084, {95% CI = .006, .209}. The direct effect of acculturation on the slope was not statistically significant (estimate = .391, 95% CI {-0.174, 1.006}).

Discussion

Given the substantial health risks associated with overweight and obesity, research must identify factors that influence patterns of weight gain in high risk populations. In a sample of low-income Mexican-origin women, the current study evaluated postpartum weight at six weeks postpartum and longitudinal changes in weight from six weeks to one year postpartum, predicted by acculturation, general family negativity, and post-birth family support. High rates of overweight and obesity were evident in this sample, with 76–80% of women classified as overweight and 37–43% of women meeting criteria for obesity. Across the sample, there was a small but statistically significant increase in weight from 6 weeks to one year postpartum, and women who weighed more at 6 weeks had a higher risk of weight gain across the year. Further, results supported the hypothesis that maternal acculturation and characteristics of the family environment can significantly influence postpartum weight. Higher acculturation was associated with higher family support and higher family negativity, both of which mediated the impact of acculturation on the slope of weight change across the postpartum year: higher family support was associated with decreasing weight, while higher family negativity was associated with higher weight at 6 weeks postpartum and increasing weight across the year.

Contrary to our prediction, higher acculturation to Anglo culture was associated with *higher* family support after the birth. Although theory suggests acculturation to U.S. culture may result in less social support (20), previous work has been mixed (26–27), and/or has not been

specific to postpartum support. Recency of immigration may contribute to our results. More time in the U.S. allows time for broad family networks to grow. Recent immigrants might not have older generations of family nearby from which to draw support, and may feel isolated from family and friends in Mexico (14, 22, 28). Women with higher acculturation, who may have been born in the U.S. or immigrated many years prior, may be more likely than those with lower acculturation to have more family members in close proximity. Our measure of family support focused on direct, tangible forms of support specific to the context of the postpartum period (i.e. taking care of cooking and cleaning). While postpartum Mexican-origin women might rely on family who are not physically present for love and emotional support, receipt of tangible postpartum support requires local support networks, and this specific form of family support may be less available for women who have spent less time in the U.S. In addition, the families of women with higher acculturation may be more likely than those with lower acculturation to have the time, financial resources, and social capital to facilitate provision of this tangible postpartum support- for example, being able to take time off of work to provide child care. Previous work has found that higher acculturated women of Mexican descent report greater social capital (29), which could provide the means for family to support women in the postpartum period. In addition, recent Mexican immigrants report that work-related stress and time constraints reduce their ability to provide their families with support (19). Work examining broader networks of support or more generalized support might find a different relation with acculturation.

Although Mexican-origin women with higher acculturation may have more family members available for direct support in the postpartum period, acculturation was also associated with higher family negativity, in line with predictions. Higher acculturated Mexican-origin women may experience family negativity due to an acculturation gap with family members, e.g., less acculturated parental or extended family figures with conflicting cultural views. Indeed, acculturation gaps between immigrant parents and their second-generation youth can lead to increased family conflict (30–31). Family disagreements regarding caregiving have been found to be especially salient for Hispanic caregivers living near the U.S.-Mexico border, and have been linked to caregivers' depressive and physical health symptoms (43). Women who do not act or parent in alignment with the cultural expectations of their families in the postpartum period may experience higher negativity within their family.

Combined, our results highlight family support and family negativity as significant influences on postpartum weight trajectories among Mexican-origin women. As predicted, higher support predicted declining postpartum weight while higher negativity predicted increasing weight across the postpartum year. Family relationships play a salient role for Mexican-origin women, as Mexican culture traditionally places strong emphasis on family values, cohesion, and maintaining strong ties to family members (44). Direct and tangible support may play a critical role in health promotion during the demanding postpartum period. Among Latina mothers, family and friend support leads to reduced fat consumption (24) and a higher quality diet (14), fewer perceived barriers to consuming fruits and vegetables and eating healthy (23–24), and increased physical activity (25). Family support also leads to better emotional well-being and lower psychological distress among Latina women (45), which may promote healthy eating and an active lifestyle.

Higher family negativity predicted higher weight level at 6 weeks postpartum and increasing weight across the postpartum year. Family conflict predicts greater prevalence of metabolic syndrome (a constellation of risk factors for cardiovascular disease including abdominal obesity) among Hispanic women (but not men; 33), highlighting the possibility that negative family relationships may have a particularly strong influence on women's postpartum health. Stress stemming from negative family interactions may partially explain the link between family negativity and weight; previous work has found that family discord predicts psychological distress among emerging adults of Mexican descent (46). Studies have linked stress to increased consumption of foods high in sucrose and fat, especially among females (47–48) implicating unhealthy eating as a maladaptive coping response which could have consequences for postpartum weight (49). Biological mechanisms may also play a role; negativity within social relationships elicits multiple physiological responses (50), and negative family relationships may promote hypothalamic-pituitary-adrenal (HPA) axis dysfunction associated with weight gain and postpartum weight retention (51).

Interestingly, our results indicate that family negativity influences weight *levels*, while both family negativity and support influence weight *change* in the year following childbirth. The differential impact of negativity and support on weight level may be partially due to the differing foci of the measures. Family support was specific to the context of postpartum tasks of maternal and child care, which may have immediate benefits in promoting a new mother's healthy weight loss. A global measure of family support may better capture longstanding effects on overall weight level. In contrast, our measure of family negativity measure was more global and may represent longstanding influences on weight, later exacerbated by the challenges of postpartum weight loss. Future work on global and context-specific effects of family support and negativity on weight may be useful in developing targeted interventions for women's postpartum health.

As predicted, family support and family negativity had opposing effects on weight across the postpartum year; higher support predicted decreasing weight, while higher negativity predicted increasing weight. However, higher acculturation predicted both higher family support and higher family negativity, resulting in statistically significant mediational pathways with opposing directions of effects on postpartum weight (i.e., acculturation predicts increasing weight through family negativity, but decreasing weight through family support). These types of opposing mediated pathways have been found in many research areas and may more accurately represent the real-world complexity of relations among variables (52). Recent examples of opposing mediation effects have been found in evaluations of health promotion programs (53) and the influence of competition on performance (54). Mediated pathways with opposite signs are possible even when the overall effect of the independent variable on the dependent variable is not statistically significant (55–57). In the current study, the opposing effects of acculturation on weight via family negativity versus family support may explain why the total effect of acculturation on weight was not statistically significant but both indirect paths were statistically significant. In combination, the results suggest a complicated relation of acculturation to postpartum weight in low-income Mexican-origin women, conferring potential benefits via higher family support and risks via higher family negativity.

Because postpartum weight plays a critical role in women's lifetime risk for obesity, effective interventions during the postpartum period may assist with health promotion efforts among low-income Mexican-origin women. Multiple intervention efforts have been developed to increase healthy behaviors and promote healthy weight in the postpartum period among Mexican-origin women (58–59). Our results highlight the key role that cultural and family characteristics should play in designing, targeting, and implementing these interventions. Participants' level of acculturation may either protect or confer risk to Mexican-origin mothers, depending on the level of support and negativity within the family. Considering the impact of acculturation, family support, and family negativity, interventions designed to increase postpartum support may be particularly successful in improving diet and exercise for recent immigrants or women with lower acculturation, while Mexican-origin women with higher acculturation might benefit more from interventions focused on decreasing negativity and increasing positivity within the family alongside critical behavioral changes.

The current study has several strengths, including the longitudinal evaluation of an understudied population at high risk for obesity. The study benefitted from high retention rates despite investigating a very low-income ethnic minority population across a stressful life transition. Methodological strengths included the use of objective weight measurement, minimizing bias due to self-report. Our multidimensional assessment of acculturation strengthens existing literature relying on simplistic measures of acculturation such as country of birth or language use. Despite these strengths, the study had several limitations. First, we did not assess pre-pregnancy weight, and cannot estimate pregnancy weight gain or a return to pre-pregnancy weight. However, the sample includes both primiparous and multiparous mothers, complicating the interpretation of baseline pre-pregnancy weight. Instead, statistical analyses adjusted for maternal age and number of children in order to capture the influence of prior pregnancies on weight. Second, the sample included only low-income Mexican-origin women residing in the Southwestern U.S., and most were immigrants and/or reported relatively low acculturation. Participants were recruited at a prenatal care clinic, indicating at least some degree of access to medical care. The results may not generalize to more acculturated or higher income women, women residing in other areas of the country, or women without access to health care. Unlike our measure of family support, the measure of family negativity was not specific to the postpartum period. Future work may want to examine both global and context-specific influences of family processes on maternal weight. Finally, future studies may want to evaluate additional proximal mechanisms through which acculturation, family negativity, and family support affect postpartum weight change. For example, family support is theorized to influence diet and exercise perceptions, motivations, and habits (24), and thus may form a chain of mediating influences on postpartum weight.

Conclusions

This investigation of predictors of postpartum weight offers insight into factors that may contribute to increasing obesity rates among economically-disadvantaged Mexican-origin women. In a sample of low-income postpartum Mexican-origin women, this study found high rates of obesity and increasing weight, on average, in the postpartum year. Weight gain

or loss was influenced by women's level of acculturation and experiences of family support and family negativity. More acculturated women reported both higher family negativity and higher family support. Further, women with higher family negativity were at elevated risk of increasing weight across the first postpartum year, while higher family support predicted decreasing weight across the first postpartum year. The results demonstrate a complex risk and protective role of acculturation in postpartum weight gain and potentially long-term obesity risk. Although higher acculturation may be associated with increased family support, it may also increase family negativity, shifting low-income Mexican-origin women onto a path of increasing weight and obesity through the postpartum period and beyond.

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References

1. Ogden C, Carroll M, Kit B, Flegal K. Prevalence of childhood and adult obesity in the United States, 2011–2012. *Survey Anesthesiol.* 2014; 58(4):206.doi: 10.1097/01.sa.0000451505.72517.a5
2. Flegal K, Carroll M, Kit B, Ogden C. Prevalence of obesity and trends in the distribution of body mass index among US adults, 1999–2010. *JAMA.* 2012; 307(5):491.doi: 10.1001/jama.2012.39 [PubMed: 22253363]
3. Managing overweight and obesity in adults: Systematic evidence review from the Obesity Expert Panel. National Institutes of Health Web site; 2013. <https://www.nhlbi.nih.gov/sites/www.nhlbi.nih.gov/files/obesity-evidence-review.pdf>. Published April 2014 [Accessed June 2016]
4. Amorim A, Rössner S, Neovius M, Lourenço P, Linné Y. Does excess pregnancy weight Gain constitute a major risk for increasing long-term BMI? *Obesity.* 2007; 15(5):1278–1286. DOI: 10.1038/oby.2007.149 [PubMed: 17495204]
5. Gonzalez-Barrera, A., Hugo Lopez, M. A Demographic portrait of Mexican-Origin Hispanics in the United States. Pew Research Center; May 1. 2013 <http://www.pewhispanic.org/2013/05/01/a-demographic-portrait-of-mexican-origin-hispanics-in-the-united-states/> [Accessed January 25, 2017]
6. Sackoff JE, Yunzal-Butler C. Racial/ethnic differences in impact of gestational weight gain on interconception weight change. *Matern Child Health J.* 2015; 19(6):1348–1353. [PubMed: 25424453]
7. Hernandez DC. Gestational weight gain as a predictor of longitudinal body mass index transitions among socioeconomically disadvantaged women. *J Womens Health.* 2012; 21(10):1082–1090.
8. Creighton MJ, Goldman N, Pebley AR, Chung CY. Durational and generational differences in mexican immigrant obesity: Is acculturation the explanation? *Soc Sci Med.* 2012; 75(2):300–310. DOI: 10.1016/j.socscimed.2012.03.013 [PubMed: 22575698]
9. Oza-Frank R, Cunningham SA. The weight of US residence among immigrants: A systematic review. *Obesity Reviews.* 2009; 11:271–280. DOI: 10.1111/j.1467-789X.2009.00610.x [PubMed: 19538440]
10. Barcenas C, Wilkinson A, Strom S, et al. Birthplace, years of residence in the United States, and obesity among Mexican-American adults. *Obesity.* 2007; 15(4):1043–1052. DOI: 10.1038/oby.2007.537 [PubMed: 17426341]
11. Santi-Haghighi H, Lam K, Raine S. Gestational weight gain among Hispanic women. *Matern Child Health J.* 2013; 18(1):153–160. DOI: 10.1007/s10995-013-1248-3

12. Gallo L, Penedo F, Espinosa de los Monteros K, Arguelles W. Resiliency in the face of disadvantage: Do Hispanic cultural characteristics protect health outcomes? *J Personal.* 2009; 77(6):1707–1746. DOI: 10.1111/j.1467-6494.2009.00598.x
13. Lara M, Gamboa C, Kahramanian M, Morales L, Hayes Bautista D. Acculturation and Latino health in the United States: A review of the literature and its sociopolitical context. *Annu Rev Public Health.* 2005; 26(1):367–397. DOI: 10.1146/annurev.publhealth.26.021304.144615 [PubMed: 15760294]
14. Harley K, Eskenazi B. Time in the United States, social support and health behaviors during pregnancy among women of Mexican descent. *Soc Sci Med.* 2006; 62(12):3048–3061. DOI: 10.1016/j.socscimed.2005.11.036 [PubMed: 16403596]
15. Krause K, Lovelady C, Peterson B, Chowdhury N, Østbye T. Effect of breast-feeding on weight retention at 3 and 6 months postpartum: data from the North Carolina WIC Programme. *Public Health Nutr.* 2010; 13(12):2019–2026. DOI: 10.1017/s1368980010001503 [PubMed: 20519049]
16. Østbye T, Peterson B, Krause K, Swamy G, Lovelady C. Predictors of postpartum weight change among overweight and obese women: Results from the Active Mothers Postpartum Study. *J Womens Health.* 2012; 21(2):215–222. DOI: 10.1089/jwh.2011.2947
17. Nodora JN, Gallo L, Cooper R, et al. Reproductive and hormonal risk profile according to language acculturation and country of residence in the ella binational breast cancer study. *J Womens Health.* 2014; 23(6):532–540. DOI: 10.1089/jwh.2013.4498
18. Campos B, Schetter C, Abdou C, Hobel C, Glynn L, Sandman C. Familialism, social support, and stress: Positive implications for pregnant Latinas. *Cultur Divers Ethnic Minor Psychol.* 2008; 14(2):155–162. DOI: 10.1037/1099-9809.14.2.155 [PubMed: 18426288]
19. Bacallao ML, Smokowski PR. The costs of getting ahead: Mexican family system changes after immigration. *Fam Relat.* 2007; 56(1):52–66. DOI: 10.1111/j.1741-3729.2007.00439.x
20. Almeida J, Molnar B, Kawachi I, Subramanian S. Ethnicity and nativity status as determinants of perceived social support: Testing the concept of familism. *Soc Sci Med.* 2009; 68(10):1852–1858. DOI: 10.1016/j.socscimed.2009.02.029 [PubMed: 19303184]
21. Waugh LJ. Beliefs associated with Mexican immigrant families' practice of la cuarentena during postpartum recovery. *J Obstet Gynecol Neonatal Nurs.* 2011; 40(6):732–741. DOI: 10.1111/j.1552-6909.2011.01298.x
22. Clark L. La familia: Methodological issues in the assessment of perinatal social support for mexicanas living in the united states. *Soc Sci Med.* 2001; 53(10):1303–1320. DOI: 10.1016/S0277-9536(00)00411-1 [PubMed: 11676402]
23. Thornton P, Kieffer E, Salabarría-Peña Y, et al. Weight, diet, and physical activity-related beliefs and practices among pregnant and postpartum Latino women: The role of social support. *Matern Child Health J.* 2006; 10(1):95–104. DOI: 10.1007/s10995-005-0025-3 [PubMed: 16534660]
24. Schmied E, Parada H, Horton L, Madanat H, Ayala G. Family support is associated with behavioral strategies for healthy eating among Latinas. *Health Educ Behav.* 2013; 41(1):34–41. DOI: 10.1177/1090198113485754 [PubMed: 23711676]
25. Keller C, Allan J, Tinkle M. Stages of change, processes of change, and social support for exercise and weight gain in postpartum women. *J Obstet Gynecol Neonatal Nurs.* 2006; 35(2):232–240. DOI: 10.1111/j.1552-6909.2006.00030.x
26. Gress-Smith J, Roubinov D, Tanaka R, et al. Prenatal expectations in Mexican American women: development of a culturally sensitive measure. *Arch Womens Ment Health.* 2013; 16(4):303–314. DOI: 10.1007/s00737-013-0350-2 [PubMed: 23592028]
27. Rodriguez N, Mira C, Paez N, Myers H. Exploring the complexities of familism and acculturation: Central constructs for people of Mexican origin. *Am J Community Psychol.* 2007; 39(1–2):61–77. DOI: 10.1007/s10464-007-9090-7 [PubMed: 17437189]
28. Viruell-Fuentes E, Schulz AJ. Toward a dynamic conceptualization of social ties and context: Implications for understanding immigrant and Latino health. *Am J Public Health.* 2009; 99(12):2167–2175. DOI: 10.2105/AJPH.2008.158956 [PubMed: 19833986]
29. Valencia-Garcia D, Simoni JM, Alegría M, Takeuchi DT. Social capital, acculturation, mental health, and perceived access to services among Mexican American women. *J Consult Clin Psychol.* 2012; 80(2):177–185. DOI: 10.1037/a0027207 [PubMed: 22329824]

30. Leidy MS, Guerra NG, Toro RI. Positive parenting, family cohesion, and child social competence among immigrant Latino families. *J Lat Psychol*. 2012; 1:3–13. DOI: 10.1037/2168-1678.1.S.3
31. Smokowski PR, Rose R, Bacallao ML. Acculturation and Latino family processes: How cultural involvement, biculturalism, and acculturation gaps influence family dynamics. *Fam Relat*. 2008; 57(3):295–308. DOI: 10.1111/j.1741-3729.2008.00501.x
32. Luecken LJ, Jewell SL, MacKinnon DP. Prediction of postpartum weight in low-income Mexican-origin women from childhood experiences of abuse and family conflict. *Psychosom Med*. 2016; 78(9):1104–1113. DOI: 10.1097/PSY.0000000000000391 [PubMed: 27583713]
33. Penedo F, Brintz C, Llabre M, et al. Family environment and the metabolic syndrome: Results from the Hispanic Community Health Study/Study of Latinos (HCHS/SOL) Sociocultural Ancillary Study (SCAS). *Ann Behav Med*. 2015; 49(6):793–801. DOI: 10.1007/s12160-015-9713-4 [PubMed: 26068057]
34. Agne A, Daubert R, Munoz M, Scarinci I, Cherrington A. The Cultural context of obesity: Exploring perceptions of obesity and weight loss among Latina immigrants. *J Immigr Minor Health*. 2011; 14(6):1063–1070. DOI: 10.1007/s10903-011-9557-3
35. Enders, CK. *Applied Missing Data Analysis*. Vol. Chapter xv. Guilford Press; New York, NY: 2010. p. 377
36. Cuellar I, Arnold B, Maldonado R. Acculturation Rating Scale for Mexican Americans-II: A Revision of the original ARSMA Scale. *Hisp J Behav Sci*. 1995; 17(3):275–304. DOI: 10.1177/07399863950173001
37. Hu L, Bentler P. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Struct Equ Modeling*. 1999; 6(1):1–55. DOI: 10.1080/10705519909540118
38. Ryff, C., Almeida, DM., Ayanian, D., et al. National Survey of Midlife Development in the United States (MIDUS II), 2004–2006. Ann Arbor, MI: Inter-university Consortium for Political and Social Research; 2012.
39. Barrett AE, Turner RJ. Family structure and mental health: The mediating effects of socioeconomic status, family process, and social stress. *J Health Soc Behav*. 2005; 46(2):156–169. DOI: 10.1177/002214650504600203 [PubMed: 16028455]
40. Muthén, LK., Muthén, BO. *Mplus User's Guide*. 7. Los Angeles, CA: Muthén & Muthén; 1998–2012.
41. MacKinnon, DP. *Introduction to Statistical Mediation Analysis*. Taylor & Francis Group/Lawrence Erlbaum Associates; New York, NY: 2008. p. 477-xp. 477
42. MacKinnon DP, Lockwood CM, Williams J. Confidence limits for the indirect effect: Distribution of the product and resampling methods. *Multivar Behav Res*. 2004; 39:99–128.
43. Koerner S, Shirai Y. The negative impact of global perceptions of and daily care-related family conflict on Hispanic caregivers: Familism as a potential moderator. *Aging Ment Health*. 2012; 16(4):486–499. DOI: 10.1080/13607863.2011.638905 [PubMed: 22296313]
44. Katiria Perez G, Cruess D. The impact of familism on physical and mental health among Hispanics in the United States. *Health Psychol Rev*. 2011; 8(1):95–127. DOI: 10.1080/17437199.2011.569936 [PubMed: 25053010]
45. Almeida J, Subramanian SV, Kawachi I, Molnar BE. Is blood thicker than water? Social support, depression and the modifying role of ethnicity/nativity status. *J Epidemiol Community Health*. 2011; 65(1):51–56. DOI: 10.1136/jech.2009.092213 [PubMed: 19910646]
46. Hernández B, Ramírez García JI, Flynn M. The role of familism in the relation between parent–child discord and psychological distress among emerging adults of Mexican descent. *J Fam Psychol*. 2010; 24(2):105–114. DOI: 10.1037/a0019140 [PubMed: 20438185]
47. O'Connor DB, Jones F, Conner M, McMillan B, Ferguson E. Effects of daily hassles and eating style on eating behavior. *Health Psychol*. 2008; 27(1):S20–S31. DOI: 10.1037/0278-6133.27.1.S20 [PubMed: 18248102]
48. Zellner DA, Loaiza S, Gonzalez Z, et al. Food selection changes under stress. *Physiol Behav*. 2006; 87(4):789–793. DOI: 10.1016/j.physbeh.2006.01.014 [PubMed: 16519909]
49. Evans G, Fuller-Rowell T, Doan S. Childhood Cumulative Risk and obesity: The Mediating role of self-Regulatory ability. *Pediatr*. 2011; 129(1):e68–e73. DOI: 10.1542/peds.2010-3647

50. Brooks KP, Dunkel Schetter C. Social negativity and health: Conceptual and measurement issues. *Soc Personal Psychol Compass*. 2011; 5(11):904–918. DOI: 10.1111/j.1751-9004.2011.00395.x
51. Straub H, Simon C, Plunkett BA, et al. Evidence for a complex relationship among weight retention, cortisol and breastfeeding in postpartum women. *Matern Child Health J*. 2016; 20(7): 1375–1383. DOI: 10.1007/s10995-016-1934-z [PubMed: 26968183]
52. MacKinnon, DP. *Multivariate applications in substance use research: New methods for new questions*. Lawrence Erlbaum Associates Publishers; Mahwah, NJ: 2000. Contrasts in multiple mediator models; p. 141-160.
53. MacKinnon DP, Goldberg L, Clarke GN, et al. Mediating mechanisms in a program to reduce intentions to use anabolic steroids and improve exercise self-efficacy and dietary behavior. *Prev Sci*. 2001; 2(1):15–28. [PubMed: 11519372]
54. Murayama K, Elliot AJ. The competition–performance relation: A meta-analytic review and test of the opposing processes model of competition and performance. *Psychol Bull*. 2012; 138(6):1035–1070. DOI: 10.1037/a0028324 [PubMed: 23088570]
55. MacKinnon DP, Krull JL, Lockwood CM. Equivalence of the mediation, confounding and suppression effect. *Prev Sci*. 2000; 1(4):173–181. DOI: 10.1023/A:1026595011371 [PubMed: 11523746]
56. MacKinnon DP, Lockwood CM, Hoffman JM, West SG, Sheets V. A comparison of methods to test mediation and other intervening variable effects. *Psychol Methods*. 2002; 7(1):83–104. DOI: 10.1037/1082-989X.7.1.83 [PubMed: 11928892]
57. Shrout PE, Bolger N. Mediation in experimental and nonexperimental studies: New procedures and recommendations. *Psychol Methods*. 2002; 7(4):422–445. DOI: 10.1037/1082-989X.7.4.422 [PubMed: 12530702]
58. Gesell SB, Katula JA, Strickland C, Vitolins MZ. Feasibility and initial efficacy evaluation of a community-based cognitive-behavioral lifestyle intervention to prevent excessive weight gain during pregnancy in latina women. *Matern Child Health J*. 2015; 19(8):1842–1852. DOI: 10.1007/s10995-015-1698-x [PubMed: 25874878]
59. Walker LO, Sterling BS, Latimer L, Kim S, Garcia AA, Fowles ER. Ethnic-specific weight-loss interventions for low-income postpartum women: Findings and lessons. *West J Nurs Res*. 2012; 34(5):654–676. DOI: 10.1177/0193945911403775 [PubMed: 21483027]

Figure 1.

Full model: Acculturation and family influences on postpartum weight¹

¹“Anglo orient.” = Anglo Orientation; “Mex. Orient.” = Mexican Orientation; “Yrs in US” = number of years residing in the US; “Language” = preferred language use (coded Spanish = 1, English = 0); “Accult” = Acculturation; “ICEPT” = Intercept. Unstandardized estimates are shown. All independent variables were allowed to covary with each other. Dashed lines are not statistically significant. Covariates (maternal age, number of children, and breastfeeding), error terms, and covariances are not displayed in order to simplify presentation.

Table 1

Sample demographics

Age – Range; M (SD)	18–42; 27.8 (6.5)
Country of birth – N (%)	
U.S.	44 (14%)
Mexico	277 (86%)
Years in the U.S. – range, M (SD)	0–33; 13.4 (6.8)
Breastfeeding status at 3 months – N (%)	
Exclusive bottle-feeding	165 (51.5)
Partial or exclusive breastfeeding	156 (48.5)
Prenatal marital status – N (%)	
Married or living w/partner	248 (77%)
Not married or living w/partner	73 (23%)
Preferred language – N (%)	
Spanish	265 (82.5%)
English	56 (17.5%)
Education – N (%)	
0 through 8 years of school	87 (27%)
Some high school completed	103 (32%)
High school graduate	86 (27%)
Some college, vocational or technical school	26 (8%)
College degree (BS/BA) or above	20 (6%)
Family Income – N (%)	
\$10,000	101 (33%)
\$10,001 – \$15,000	87 (28%)
\$15,001 – \$20,000	37 (12%)
\$20,001 – \$25,000	40 (13%)
\$25,001 – \$30,000	16 (5%)
\$30,001	29 (9%)
Post-Birth Family Support – Range; M (SD)	4–20; 12.2 (4.9)
General Family Negativity – Range; M (SD)	3–15; 5.4 (2.9)
BMI (observed)	
6 weeks postpartum – Range; M (SD)	17.1–50.0; 29.1 (5.8)
% obese (BMI > 30 kg/m ²)	37%
12 weeks postpartum – Range; M (SD)	16.5–51.4; 29.4 (5.8)
% obese (BMI > 30 kg/m ²)	40%
18 weeks postpartum – Range; M (SD)	16.0–50.8; 29.6 (6.3)
% obese (BMI > 30 kg/m ²)	38%
24 weeks postpartum – Range; M (SD)	17.6–52.1; 30.0 (6.7)
% obese (BMI > 30 kg/m ²)	43%
52 weeks postpartum – Range; M (SD)	15.9–53.3; 29.6 (6.3)
% obese (BMI > 30 kg/m ²)	41%

Table 2

Zero-order correlations

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Mother's Age	1.0													
2. Education (yrs)	-.28**	1.0												
3. Breastfeeding ^a	.16*	-.07	1.0											
4. Nbr. Children	.61**	-.42**	.10 [‡]	1.0										
5. Anglo Orientation	-.51**	-.23**	-.23**	-.41**	1.0									
6. Mexican Orientation	.24**	-.11 [‡]	.17*	.09	-.38**	1.0								
7. Yrs in US	-.01	.07	-.27**	.12*	.58**	-.37**	1.0							
8. Language ^b	.36**	-.24**	.26**	.28**	-.64**	.47**	-.50**	1.0						
9. Family support	-.16**	.26**	-.15*	-.23**	.23**	-.08	.11 [‡]	-.08	1.0					
10. Family negativity	-.001	-.04	-.12	.03	.17**	-.15*	.21**	-.17*	-.12*	1.0				
11. 6 week BMI	.16**	-.16**	.07	.24**	-.08	-.01	.13*	-.03	-.07	.24**	1.0			
12. 12 week BMI	.24**	-.22	.07	.27**	-.18**	.04	.14*	.02	-.10	.23**	.99**	1.0		
13. 18 week BMI	.05	-.20	-.001	.24**	-.06	-.05	.10	-.08	-.11	.24**	.98**	.99**	1.0	
14. 24 week BMI	.13 [‡]	-.09	.18 [‡]	.19**	.01	-.03	.16*	-.09	-.11	.30**	.98**	.98**	.99**	1.0
15. 52 week BMI	.14*	-.17*	.12	.29**	-.05	-.05	.16*	-.02	-.08	.27**	.95**	.96**	.96**	.97**

^a coded 0 = bottle-feed only, 1 = partial or exclusive breastfeeding;^b Coded 0 = English, 1 = Spanish;

* p < .05;

** p < .01;

[‡] p < .10

Table 3

Prediction of maternal postpartum weight intercept and slope from postpartum family support and family negativity: Full model results.

	Estimate	SE	p-value
Acculturation →			
Family support	1.21	0.32	<.001
Family negativity	0.67	0.21	0.001
Number of children	-.79	0.10	<.001
Breastfeeding	-.17	0.04	<.001
Weight intercept	3.68	3.87	0.34
Weight slope	0.391	0.305	0.20
Family support →			
Weight intercept	-.089	0.49	0.86
Weight slope	-.10	0.04	0.011
Family negativity →			
Weight intercept	3.0	0.93	0.001
Weight slope	0.125	0.062	0.045
Breastfeeding →			
Weight intercept	5.70	5.99	0.34
Weight slope	0.582	0.479	0.22
Number of children →			
Weight intercept	3.87	1.69	0.022
Weight slope	0.169	0.124	0.17
Maternal age →			
Weight intercept	0.360	0.414	0.39
Weight slope	0.011	0.036	0.76

Note: Model fit: $\chi^2(62) = 115$, $p < .001$, CFI = .986, RMSEA = .052 (90% CI .037, .066), SRMR = .034