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Preferred Child Body Size and Parental Underestimation of Child Weight in Mexican-American Families

Lauri A. Pasch¹ · Carlos Penilla² · Jeanne M. Tschann¹ · Suzanna M. Martinez³ · Julianna Deardorff² · Cynthia L. de Groat¹ · Steven E. Gregorich⁴ · Elena Flores⁵ · Nancy F. Butte⁶ · Louise C. Greenspan⁷

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Abstract *Objective* To determine whether parents who prefer a heavier child would underestimate their child's weight more than those who prefer a leaner child. *Methods* Participants were Mexican-American families (312 mothers, 173 fathers, and 312 children ages 8–10) who were interviewed and had height and weight measurements. Parents reported their preferred child body size and their perceptions of their child's weight. Parents' underestimation of their child's weight was calculated as the standardized difference between parent's perception of their child's weight and the child's body mass index (BMI) z-score. Demographic factors and parental BMI were also assessed. *Results* Although 50 % of children were overweight or obese, only 11 % of mothers and 10 % of fathers perceived their children as being somewhat or very overweight. Multiple regressions controlling for covariates (parental BMI and child age) showed that parents who preferred a heavier child body size underestimated their children's weight more, compared to those who preferred a

leaner child (β for mothers = .13, $p < .03$; β for fathers = .17, $p < .03$). *Conclusions for Practice* Parents who preferred a heavier child body size underestimated their child's weight to a greater degree than parents who preferred a leaner child. Attempts by pediatricians to correct parents' misperceptions about child weight may damage rapport and ultimately fail if the misperception is actually a reflection of parents' preferences, which may not be readily amenable to change. Future research should address optimal methods of communication about child overweight which take into account parent preferences.

Keywords Preferred body size · Children · Latino · Mexican-American · Pediatric obesity

Significance

What is already known on this subject? Parents tend to underestimate their child's weight but little is known about why. We hypothesized that parents who prefer a heavier child would tend to underestimate their child's weight more than those who prefer a leaner child.

What this study adds? Parents who prefer a heavier child are more likely to underestimate their child's weight than parents who prefer a lean child. Attempting to correct parent misperceptions about child weight may fail if the misperception is a reflection of parents' preferences.

Introduction

Childhood obesity is a significant health problem in the United States and Mexican-American children are at significantly greater risk for overweight and obesity than their

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non-Latino counterparts [12, 24]. Childhood overweight has both short and long term health consequences, including depression, poor self-esteem, Type 2 diabetes, and hypertension [27]. Children who are overweight are more likely than normal weight children to become obese adults [23]. Parents are highly influential in determining child weight outcomes, by deciding how much and what foods will be offered, and encouraging physical activity [13]. However, it has been argued that interventions targeting parents to combat childhood obesity are unlikely to be effective if parents do not recognize that their child is overweight or obese [22].

Mounting evidence indicates that parents, across different child ages, cultural backgrounds, and countries, tend to underestimate their child's weight and do not correctly identify their overweight or obese child as overweight or obese [7, 29, 33], but little is known about why parents do this. Some studies have shown that parents are more likely to underestimate the weight of younger children and boys [3, 8, 21] and that parents with less education and those who are overweight themselves are more likely to underestimate their child's weight [2, 3, 21].

An understanding of why parents do not view their overweight child as overweight will help pediatricians develop a positive alliance with parents to address child obesity and its associated health consequences. Several authors have suggested that parents tendency to underestimate their child's weight may be related to a preference for heavier children, with the idea that heavier children are seen as healthier, cuter, and more resilient, but this idea has not been directly studied to date [34, 35]. Several focus group studies with low-income Latina mothers do suggest a preference for chubbier children. Low-income Latina mothers have reported the belief that chubbiness in a child looks best, is a sign of better health, parental care, and resistance to illness, and that thinness is a sign of poor health, malnourishment, and poor parental care [6, 15, 31]. Several quantitative studies support the idea that on average, Latina mothers prefer a heavier child body size than what is considered ideal based upon normative data on body mass index (BMI) [5, 11, 30]. Whether Latino fathers prefer a heavier child as well has yet to be explored. We argue that parents who actually prefer a heavier child may be less likely to acknowledge that their child is overweight.

We examined why Mexican-American mothers and fathers might underestimate their child's weight status. We hypothesized that mothers and fathers who exhibit a preference for a heavier child would tend to underestimate their child's weight status. We also examined other factors shown in previous reports to be associated with underestimation of child weight status, including child age, child gender, socioeconomic status, language acculturation, and parent weight.

Methods

Procedure

This research was part of a study examining parental feeding practices and other parental influences on obesity among Mexican-American children. The study was approved by the university and Kaiser Permanente Northern California institutional review boards. We recruited families from the membership lists of Kaiser Permanente Northern California, an integrated health care delivery organization. Parents were sent letters introducing the research, were telephoned, screened for eligibility, and invited to participate in the study. Bilingual interviewers obtained parental informed consent and child assent to participate in the research. They interviewed family members individually in their homes, and recorded responses to the questionnaires in laptop computers. Interviews were conducted in English or Spanish, based on the participant's preference. Interviewers also measured family members' height and weight.

Participants

Families were eligible if the mother was of Mexican origin (born in the US or Mexico), the child was 8–10 years of age, and the child had no major illnesses. This age range was selected because by age 8, children can provide self-report data and adhere to assessment demands. In addition, we focused on a narrow age range, because there may be age-related differences in parental feeding practices across a wider age range. Families were eligible even if fathers did not participate in the research, but every effort was made to recruit fathers. A total of 322 mothers and 322 children participated in the study, as well as 179 (55 %) of fathers. After dropping 14 mothers and six fathers who were missing data on key study variables, such as height and weight, 312 mothers and 173 fathers were retained for analyses.

Measures

Measures were translated into Spanish and reviewed side-by-side by a bilingual committee. Translations were compared for equivalent meaning, and items were revised as needed to obtain linguistically and conceptually equivalent items.

Parents' Preferred Child Body Size

Three items were used to assess parents' preferred child body size. First, parents were shown two sets of drawings of children. Each set consisted of seven figures of school-

age boys or girls, that ranged from very thin (=1) to obese (=7), with the middle figure representing a normal body size (=4). We used figures that had been adapted for use with Latino children [25], and were based on figures originally developed by Collins [4]. These figures have been used frequently in studies of ideal body size [5, 11, 30]. In previous studies, participants were asked “Which picture shows the way you think is best for boys/girls to look?” To improve reliability, we asked this question, and two additional similar questions: “Which picture looks the healthiest?”, and “Which picture looks the cutest?” Parents’ responses to the picture matching the gender of their child participating in the study were utilized. Because the alphas among the three items were good (.87 for mothers, .79 for fathers), the mean of the three items was calculated to create each parent’s preferred child body size score. A higher score represented a heavier preferred child body size.

Body Mass Index

Trained research assistants measured height and weight using standard procedures [16, 32]. Height and weight were measured in duplicate while the participant was wearing light clothing and no shoes. Children’s BMI was calculated [$\text{BMI} = \text{weight}(\text{kg})/\text{height}(\text{m})^2$], converted to age- and gender-specific percentiles, and converted to z-scores using NCHS growth charts [14]. Based on BMI percentiles, children were also classified as underweight (<5th percentile), normal weight (≥ 5 th to <85th percentile), overweight (≥ 85 th to <95th percentile), or obese (≥ 95 th percentile). Parents’ BMI was calculated, and parents were classified as normal weight ($\text{BMI} < 25$), overweight ($\text{BMI} \geq 25$ to ≤ 30), or obese ($\text{BMI} > 30$).

Parent’s Perception of Child’s Weight Status

Parents responded to a question, “How would you describe your child’s weight?” Response options ranged from -3 to $+3$: “very underweight” ($=-3$), “underweight” ($=-2$), “slightly underweight” ($=-1$), about the right weight ($=0$), “slightly overweight” ($=1$), “overweight” ($=2$), “very overweight” ($=3$).

Underestimation of Child’s Weight

To assess underestimation of child’s weight status, the deviation of parents’ perception of child’s weight status from child’s actual weight was calculated in two steps, based on the procedure described by Maximova et al. [20]. First, standardized versions of both measures were used. Values for child BMI z-scores and parent’s perception of child’s weight status both had possible ranges of -3 to $+3$,

and the midpoint of 0 on each measure represented normal weight. Second, the underestimation score was calculated as the child’s BMI z-score minus parent’s perception of child’s weight status. Higher scores represented greater underestimation of child weight.

Demographic variables included child age in months, child gender, parents’ years of education, occupational status, parent country of origin, and parent language acculturation. Occupational status ranged from lowest ($=1$) to highest ($=9$) [9]. Language acculturation was assessed using the Spanish and English Language Use subscales of the Bidimensional Acculturation Scale for Hispanics [18]. A sample item is “How often do you speak English?” Items are scored from never ($=1$) to always ($=5$), and had good reliabilities in this sample (alphas = .88–.94). A higher score on the Spanish Language Use or the English Language Use subscale represented greater use of that language.

Statistical Analyses

We examined zero-order correlations between potential covariates (i.e., demographic variables and parent BMI) and underestimation of child’s weight to determine which study variables should be included as covariates in multivariate analyses. Those that were significantly related to underestimation of child’s weight were included in regression analyses. We then fit two hierarchical multiple linear regressions models, one for each parent, using the extent to which parents underestimated their child’s weight as the dependent variable. In the hierarchical regression, the covariates were entered in Set 1, and preferred child body size was entered in Set 2. The hierarchical approach allowed the effect of preferred child body size to be assessed after taking the covariates into account.

Results

Sample Characteristics

Most mothers were married or living together with the biological fathers (75 %). Of the 173 participating fathers, 90 % were biological fathers living with the mother; 7 % were stepfathers, and 3 % were biological fathers living apart from the mothers. As shown in Table 1, parents’ average education was slightly less than high school graduation, but ranged widely from 0 to 19 years. Most parents were employed (75 % of mothers, 89 % of fathers). Parents’ occupational status [9] ranged from unskilled worker ($=1$) to minor professional ($=8$), with the average occupation being skilled worker (3.23 for mothers, 3.73 for fathers). About one-fifth of parents were born in the U.S.

(22 % mothers, 19 % fathers), while 95 % of children had been born in the U.S. Parents had high scores on Spanish language acculturation (about 4), and somewhat lower scores on English language acculturation (less than 3). Participating children were ages 8–10, and 53 % were female.

Family Members' Weight Status and Scores on Study Variables

As shown in Table 1, parents' preferred child body size scores were, on average, slightly above the normal child body size of 4, with mothers' mean score =4.02 and fathers' mean score =4.07. Most parents were overweight (BMI \geq 25 and \leq 30; 34 % of mothers, 45 % of fathers) or obese (BMI > 30; 48 % of mothers, 46 % of fathers). Half of the children were overweight or obese: 20 % were overweight and 30 % were obese. None of the children were underweight. Only 11 % of mothers and 10 % of

fathers perceived their child as being somewhat or very overweight and 10.3 % of parents perceived their child as underweight. Underestimation of child weight ranged from -3 to +3, with a higher score indicating more underestimation, and 0 representing an accurate assessment. Overall, parents' underestimation of child weight was .56 (mothers) and .64 (fathers), indicating that the average was in the direction of underestimation.

Correlations Between Study Variables and Underestimation of Child's Weight

Correlations between study variables and underestimation of child's weight are shown in Table 2. Mothers and fathers with higher scores on preferred child body size underestimated their children's weight more ($r = .13, p < .02$; $r = .18, p < .02$, respectively). Mothers and fathers with higher BMI scores underestimated their children's weight more ($r = .11, p < .05$; $r = .20, p < .009$,

Table 1 Characteristics of Mexican-American mothers, fathers, and children on study variables

Parent characteristics (range)	Mean (SD) or %	
	Mother	Father
Education (0–19 years)	10.78 (3.66)	10.93 (3.73)
Occupational status (1–8)	3.23 (2.11)	3.73 (1.87)
Acculturation (1–5)		
Spanish	4.21 (1.11)	4.00 (1.10)
English	2.65 (1.28)	2.98 (1.12)
BMI (range 18–72)	30.37 (6.83)	29.90 (4.35)
Normal weight	18 %	9 %
Overweight	34 %	47 %
Obese	48 %	45 %
Preferred child body size (1–7)	4.02 (.59)	4.07 (.50)
Perception of child's weight (-3 to +3)	.41 (.95)	.30 (.98)
Very underweight (-3)	.3 %	.6 %
Somewhat underweight (-2)	2 %	3 %
Slightly underweight (-1)	8 %	9 %
Normal weight (0)	47 %	51 %
Slightly overweight (+1)	31 %	26 %
Somewhat overweight (+2)	8 %	8 %
Very overweight (+3)	3 %	2 %
Underestimation of child's weight (-3 to +3)	.56 (.72)	.64 (.77)
Child characteristics	Child	
Age (8–10 years)	8.86 (.83)	
Gender (% female)	53 %	
BMI z-score (range -1.59 to +2.97)	.97 (1.02)	
Normal weight	50 %	
Overweight	20 %	
Obese	30 %	

respectively). Fathers whose children were younger underestimated their children's weight more ($r = -.15$, $p < .05$). The remaining demographic factors (child gender, parent's education, occupational status, parent's country of origin, language acculturation) were not related to underestimation of child weight. Thus, child age and parent BMI were retained for use as covariates in the multivariate analyses.

Multiple Regressions Predicting Underestimation of Child Weight

In each multiple regression equation, covariates (parental BMI and child age) were entered in Set 1; and preferred child body size was added in Set 2. Table 3 shows the standardized regression coefficients (β s) for all predictors. In model 1, which included only covariates as predictors, mothers and fathers with higher BMI underestimated their children's weight more (β for mothers = .13, $p < .03$; β for fathers = .20, $p < .009$). Fathers with younger children also underestimated their children's weight to a greater degree, compared to fathers with older children ($\beta = -.16$, $p < .04$). In model 2, which included covariates and preferred child body size as predictors, mothers and fathers who preferred heavier child body sizes underestimated their children's weight more (β for mothers = .13, $p < .03$; β for fathers = .17, $p < .03$).

Discussion

Numerous studies have reported that parents tend to underestimate their child's weight, but little has been known about the reasons for this phenomenon [29]. A

Table 2 Correlations between study variables and underestimation of child weight, among Mexican-American parents

Study variables	Underestimation of child's weight	
	Mothers	Fathers
Child age	-.07	-.16*
Child gender	.08	.00
Parent education	.03	-.02
Occupational status	-.05	-.14
Parent country of origin	-.03	-.06
Acculturation—Spanish	.03	.12
Acculturation—English	.08	-.11
Parent BMI	.12*	.20**
Preferred child body size	.13*	.18*

* $p < .05$; ** $p < .01$

Table 3 Results of multiple linear regressions, using covariates and preferred child body size as predictors of parents' underestimation of child's weight (showing standardized regression coefficients)

Predictors	Underestimation of child's weight			
	Mothers		Fathers	
	Model 1	Model 2	Model 1	Model 2
Child age	-.09	-.09	-.16*	-.15*
Parent BMI	.13*	.13*	.20**	.20**
Preferred child body size		.13*		.17*
R ²	.02*	.04**	.07**	.09***

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

better understanding of why parents might underestimate their child's weight could help pediatricians improve their communication with parents. The current findings are novel in revealing that one reason parents may underestimate their child's weight (that is, not realize or not acknowledge they have an overweight child) is that they actually prefer a heavier child. We found that parents who preferred a heavier child body size underestimated their child's weight to a greater extent than parents who preferred a leaner child. Why might preference for a heavier child body size lead parents to underestimate their child's weight? A complete explanation requires further study, but it may be because preference for a heavier child and knowledge that overweight is unhealthy creates an uncomfortable cognitive dissonance for parents. Parents may then minimize their perception of their child's weight by thinking something like "He's not overweight, just a bit stocky" thus reducing the uncomfortable cognitive dissonance [26].

Consistent with previous research, parents who were heavier themselves were more likely to underestimate their child's weight [7]. This could be because parents do not want to admit to themselves that they are overweight and thus avoid acknowledging it in their children, or because of a normative shift in perception about what constitutes overweight in the family. Also fathers of younger children were more likely to underestimate their child's weight than fathers of older children, but mother's perceptions were not associated with child age. It may be that fathers are more likely than mothers to minimize or misinterpret overweight in younger children. Contrary to some previous research, underestimation was not related to parents' level of education, parents' occupational status, child gender, parent country of origin, or parents' level of language acculturation. Regarding acculturation, it is important to note that the great majority of parents in our study were immigrants

and thus there may have been somewhat limited variability in acculturation.

The strengths of this study were the relatively large sample size of an at-risk population in the United States, Mexican-American families, a range of socioeconomic status, and the inclusion of both mothers and fathers. A limitation is that the study focused on only Mexican-American children whose parents were mostly immigrants and therefore, the extent to which these findings operate in other cultural groups is unknown. Future research could examine these relationships in other populations in which qualitative data suggest similar associations may operate, such as African-Americans [10]. Also, the range of child ages was relatively narrow (ages 8–10), and thus we do not know how these findings apply to other developmental periods. Furthermore, our analyses accounted for a relatively small portion of the variance, suggesting that we have not yet identified all the factors which explain the phenomenon of parent underestimation. What is novel about this study is that we added preferred child body size in our model after including factors previously reported to be associated with underestimation of child weight, thus demonstrating that our newly tested variable increased our understanding of parent underestimation beyond that which had been shown in the literature previously.

It has been argued that pediatricians should attempt to correct parents' misconceptions about their overweight/obese child's weight [17, 29], and ensure that parents are aware their child is overweight or obese. However, the findings of the current study suggest that attempting to correct parent misperceptions about child weight may ultimately fail if the misperception is actually a reflection of preferences. Body size preferences may not be easily altered if they are rooted in longstanding beliefs about what makes a healthy child. For example, a chubby body size may have been seen as a sign of resilience to disease in a low resource environment, and as a sign of parental love and caring, whereas a thin child may be associated with fear of poor health or fragility [6, 31]. Among parents who prefer a chubby child, if their pediatrician tells them that their child is overweight, they may simply conclude that their pediatrician does not share their preferences (i.e., the pediatrician appears to prefer a thin child). To illustrate, consider the situation in which a pediatrician is seeing an obese 10 year old whose parent is not concerned. The pediatrician shows the parent that the child is obese using the BMI chart in attempt to correct the misperception. The parent views their child's body size as reflecting a resilient and well-loved child and sees the pediatrician as preferring a lean child whom the parent would perceive as underfed, sickly, and not well-loved. As a result, the parent perceives a disconnect between his or her values and the pediatrician's values. This perceived discrepancy in preferences

could result in poor rapport, the parent feeling misunderstood, and poor adherence to pediatrician recommendations or intervention efforts.

Conclusions for Practice

Many parents underestimate the weight of their overweight or obese child, and this tendency in part reflects parents' preferences for a heavy child body size. These results have implications for pediatrician-parent interactions. Expert committee recommendations emphasize the importance of using a supportive, empathic, and nonjudgmental approach when addressing child weight with parents [1]. The results of our study suggest that attempts by pediatricians to correct parent misperceptions about child weight may serve to damage rapport and ultimately fail if the misperception is actually a reflection of parent values, which may not be readily amenable to change [19]. It may be more productive for pediatricians to allow for variability in body size preferences, avoid prescribing an ideal size for children, and instead focus on the elements of a healthy diet and physical activity [6, 10]. Future research should identify specific pediatrician communication strategies that effectively promote parental engagement in weight management efforts as well as demonstrate appreciation of parents' preferences for child body size.

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Compliance with Ethical Standards

Conflict of interest The authors have no conflicts of interest to disclose.

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