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Mothers' feeding behaviors in infancy: do they predict child weight trajectories?

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Abstract

Objective—To determine associations between mothers' feeding behaviors in infancy, and child's weight from infancy through to toddlerhood, in urban, low-income, minority families, and to explore the contribution of concerns about infant eating/weight.

Methods—We recruited 169 mother-infant dyads (88% African-American) from an inner city pediatric practice. Questionnaires measuring restrictive feeding, pressuring to eat, and concerns about infant overeating/weight and undereating/weight were administered, and infants weighed and measured, at 6–12 months. Anthropometric data up to 30 months were obtained from multiple (8.9±2.6) well-child visits, with 84% completing 11 visits.

Results—Higher pressuring was associated with lower WLZ over the period from baseline out to 30 months, and higher restriction with higher child WLZ over the same period. Pressuring and concern about infant undereating/weight were independently associated with WLZ, but the relationship between restrictive feeding and WLZ was reduced by accounting for concern about infant overeating/weight. Child weight trajectories were not influenced by feeding behavior.

Conclusions—Mothers restricted heavier infants and pressured leaner infants to eat, and the relationship between restriction and higher infant weight was mediated by concern about infant overeating/weight. Correcting misperceptions and discussing feeding with mothers reporting concern may help prevent excessive early weight gain.

Keywords

maternal feeding; parental control; overfeeding; restriction; weight perceptions

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Contributor's statement

ED and LL conceived and designed the study and acquired the data. ED, SC, HH and YW analyzed the data. ED, SC and KP wrote initial and subsequent drafts of the article. All the authors approved and made intellectual contributions to the final manuscript.

Introduction

Obesity in young US children has increased significantly, especially in minority groups.¹ Among low-income minority children in New York City, 50% were overweight by age 5 years, with greatest weight gain between 1 and 3 years of age.² Since obesity is difficult to treat, and excessive weight gain in infancy predicts later obesity risk,³ it is essential to begin prevention efforts early in life.⁴

Parental feeding practices may be modifiable prevention targets. However, restrictive feeding, a practice that may reduce weight, has actually been associated with *higher* child adiposity in many pediatric cohorts including white and African-American (AA) 7–14 y olds,⁵ ethnically-diverse, predominantly low-income 4–6 y olds,⁶ and obese, low-income AA 2–5 y olds.⁷ This relationship has also been observed in low-income AA mothers of 3–18 month olds.⁸ One explanation is that restrictive parents cause children to overeat, suggesting avoidance of restriction.⁹ But parents may also be responding to a child's inherent drive to overeat with attempts to curtail intake. Consistent with this notion, maternal concern about child overweight fully mediated the association between restriction and adiposity in a diverse sample of UK 7–9 y olds.¹⁰

In contrast, pressure to eat, which one would assume to increase weight, has been associated with *lower* child weight in many groups, including socio-economically diverse AA, Hispanic American, and European American 7–12 y olds,¹¹ ethnically-diverse low-income 4–6 y olds,⁶ and also in samples of younger children, including low-income AA infants ages 3–18 months,⁸ educated UK mothers of 1 and 2 y olds,¹² and Australian mothers of 2–4 y olds.¹³ Again, two explanations are possible: either pressuring has the counter-intuitive effect of causing children to eat less; or parents are attempting to increase meal-time intake in children perceived to be underweight or not eating enough.

Fewer longitudinal results are available. In a study of 5 y olds restriction was associated with *greater increases* in BMI z-scores 2 years later, controlling for child weight at 3 y, but only in families with heavier mothers.¹⁴ In contrast, an Australian study of mothers of mixed socioeconomic backgrounds¹⁵ found that restriction was associated with *less* 3 y weight gain among 5–6 y olds, and a UK study of relatively educated mothers¹² found that both parental restriction and pressure to eat at 1 y predicted *lower* child weight, controlling for child weight at 2 y. However, another Australian study of middle-income families with children aged 1.5–2.5 y found that neither pushing to eat more, nor fat restriction, correlated with BMI z-score changes at 1 y.¹⁶ Longitudinal studies in younger infants have primarily focused on breast-feeding and formula feeding. However, one Swedish study¹⁷ found that higher restriction was associated with higher infant BMI at 6 and 12 months, and weight gain from 0–6 months, and lagged correlations conducted within a study of low-income families assessed at 5 time-points between 3 and 18 months found that measures of restriction predicted higher WAZ scores, while measures of pressure predicted lower WAZ/skinfolds, at subsequent visits.⁸

A number of features of previous research make interpreting existing results difficult. First, the majority of studies are cross-sectional. Second, with a few exceptions,^{8,12,17} longitudinal studies tend to begin at 3 y or later, when weight trajectories may already be established³ and parents could already have adapted their feeding practices according to their perceptions of children's needs.¹⁰ Third, the small number of studies beginning in infancy have either begun at 1 y, when infants are already eating solid foods and much maternal-child interaction has already taken place,¹² and/or stop following children before the 3rd year, when solid feeding is established and child appetite can be fully expressed.⁸ A fourth limitation is generalizability. Most studies have been conducted in predominantly white, middle class families in the US or elsewhere (e.g.^{12,17}). However, there is ethnic and socioeconomic variation in obesity rates,¹⁸ and in pressure to eat and restriction.^{6,19,20} The influence of such strategies on child eating and weight may also vary with ethnicity.²¹ Fifth, common measures of restriction and pressure to eat are confounded by maternal responses.^{12,14,15,22} For example, items from the Child Feeding Questionnaire (CFQ)²³ Restriction scale are indicative of parents responding to avert appetite in children, while items from the CFQ Pressure to eat scale suggest responses to low child appetite.²⁴ Finally, while a number of studies measure maternal concern about child *weight*,^{5–8, 14} to our knowledge, no study has explicitly explored how concern about *eating*, relates to child weight and parent feeding.

To address some of these gaps, we evaluated the relationship between separable measures of maternal feeding behaviors (restrictive feeding, pressuring to eat) and concerns (about overeating/weight, and undereating/weight) at 6–12 months, and multiple assessments of child weight extending to 30 months, in a prospective cohort study of predominantly AA, inner city families. We hypothesized that, if feeding behaviors have a straightforward causal influence on children's eating behavior and weight, greater maternal restriction at 6–12 months would be associated with *lesser child weight gain* up to 30 months, and greater pressure to eat with *greater weight gain*. In contrast, if they have counter-intuitive effects, we would expect restriction to be associated with *greater weight gain*, and pressure with *lesser weight gain*. Alternatively, if maternal feeding behaviors are early-emerging responses to child characteristics, we would expect restriction to be associated with *greater baseline and overall child weight*, and pressure with *lower baseline and overall child weight*, with no relationship between feeding behaviors at 5–12 months and subsequent weight trajectories. We would additionally expect the relationship between restriction and weight to be mediated by concern about overeating/weight, and the relationship between pressure and weight by concern about undereating/weight.¹⁰

Methods

Subjects

Participants were recruited from a large inner city pediatric practice serving minority children. Mothers of infants 6 to 12 months old (mean age 8.4±0.9 months, range 6.1–11.1 months) were approached in the waiting room and invited to participate. Six months was selected as the minimum age of enrollment to ensure mothers had already introduced solids into the diet. Premature (< 37 weeks gestation) infants, and those with chronic medical

problems that could affect growth, were excluded. This study was approved by the SUNY-Downstate Medical Center IRB.

Measures

Maternal and infant characteristics—After obtaining informed consent, demographic information was collected, including age, ethnicity, number of years in US, educational level and annual income. Mothers reported their height and current weight, duration of pregnancy, and infant's birth weight. History of prematurity and/or chronic medical problems was also obtained.

Infant growth parameters—Once mothers agreed to participate and gave informed consent, research assistants abstracted growth parameters from birth to current weight from participants' well-child records. Additional growth parameters were abstracted from well-child records prospectively as patients continued to return to the office for additional visits. To minimize measurement error, weight and recumbent height were obtained by trained clinical nursing assistants using a single Tanita BWB-800 scale, and a wall-mounted stadiometer for children over 2 y throughout the study. Growth parameters were transformed into weight-for-length Z-scores (WLZ) for those under 2 y, and weight-for-height Z-scores (WHZ) for those over 2 y, following National Center for Health Statistics growth curves;²⁵ since the majority of values are WLZ, both WLZ and WHZ are referred to as WLZ from hereon. Bright Futures Health Supervision Guidelines recommend that children complete 11 well-child visits by 30 months of age.²⁶ The subjects in this study had a mean of 8.9 ± 2.6 (range 1–17) visits, with 84% of children completing 11 well-child visits.

Maternal infant feeding behaviors and concerns—Mothers completed the Infant Feeding Questionnaire,²⁸ at the time of enrollment. Based on clinical experience with the study population, three items (*I believe that it is important to have a feeding schedule for my baby, I prop up the bottle so that my baby can eat, When my baby cries he is usually hungry*) were added to better capture the feeding practices of urban, AA mothers, with permission from the scale authors. Four original IFQ items that produced floor effects were excluded (*I know when he is full, I know when he is hungry, Do you talk or sing to your son while you are feeding him? To make sure that he does not get fussy, do you feed him even if you do not think that he is hungry?*).

Principal component analysis generated four subscales, explaining 47% of the variance (see Table 1). The Restrictive Feeding subscale ($\alpha=0.62$, 4 items) captured mothers' limiting of the frequency and amount of food intake, while Pressuring to Eat ($\alpha=0.70$, 8 items) assessed the application of pressure to eat larger amounts of food, as well as non-nutritive uses of food (e.g. to encourage sleep, to prevent the child from crying/fussing). Maternal concerns were assessed by the Concern re Overeating/weight subscale ($\alpha=0.59$, 2 items), and the Concern re Undereating/weight subscale ($\alpha=0.80$, 7 items). Item mean scores (range 1–5) were calculated for each behavior/concern.

Statistical analysis

Baseline characteristics of participants who did and did not complete this study were compared using Student's *t* and chi-squared tests, and associations between demographics, WLZ at enrollment, and maternal feeding behaviors/concerns with Pearson's correlations. The WLZ at enrollment variable was used to derive 3 subgroups (normal (WLZ < 85%), overweight (85% ≤ WLZ < 95%) and obese (WLZ ≥ 95%)), and a trend analysis using ANOVA was performed to explore graded associations with each behavior/concern. Prospective tracking of growth of this clinical sample from the time of enrollment to the age of 30 months generated varying numbers of growth data points for any one subject depending on how many of the recommended well-child visits were kept. Because of the asynchronous nature of the data and to allow for comparison of growth between subjects, generalized estimating equations were used to fit linear models using all available growth data (from before and after enrollment) to investigate changes in children's weight trajectories (WLZ) associated with each feeding behavior score (Model 1).^{28,29} To test whether the change in WLZ over time varied by feeding behavior at enrollment, we also conducted expanded analyses including the interaction between change in age and each behavior (Model 2). Next, to test whether relationships between feeding behaviors and WLZ were mediated by mothers' concerns about infant eating/weight, we added Concern re Overeating/weight to the model for restriction, and Concern about Undereating/weight to the model for pressuring to eat (Model 3). To test whether WLZ change varied by maternal weight concern, we also conducted analyses including the interaction between change in age and each concern (Model 4). Finally, to test whether relationships were already apparent at baseline, we ran models controlling for WLZ at enrollment (Model 5). Results were deemed significant at *p*<0.05 and marginal at *p*<0.06.

Results

Maternal and infant characteristics

Questionnaire data were obtained for 272 mother-infant dyads, 41 of whom were excluded because of prematurity or chronic health problems. Of the 231 remaining, 169 (73%) of infants had growth data up to 2.5 y, and these mother-infant dyads comprise the reported sample. Common reasons for attrition were discontinued attendance at the clinic due to moving or loss of insurance. There were no differences between subjects and drop-outs for any of the maternal or child characteristics, or mean behavior/concern scores (Table 2).

Mean maternal age was 29±7.22 y and the majority (88%) of mothers described themselves as AA. Eighty-five percent graduated from high school or had an equivalency diploma, and 58% reported annual income below \$30,000, with 79% of infants receiving Medicaid. Mean maternal BMI was 28±6 kg/m² and 64% of mothers were overweight/obese. Mean infant age was 8.8 months and 52% were female. The majority (74%) of mothers reported ever breastfeeding but only 27% continued any breastfeeding when infants were two months old.

Growth patterns of the cohort and demographic factors

Rate of weight gain was higher in this sample than for average US infants.³¹ At 6–12 months mean WLZ for our sample was 0.2 SD and 11% of infants were classified as obese

(WLZ>95th percentile); by 30 months, mean WLZ had increased to 0.33 SD, and 20% were obese.

Maternal infant feeding behaviors and concerns and maternal infant demographics at enrollment

Mean scores for each feeding behavior/concern ranged from 1.59 to 2.87 (possible range 1–5). Restrictive Feeding was higher in mothers with lower income ($r=-0.157$, $p<0.05$), and Pressuring to Eat was higher in mothers who were leaner ($r=-0.20$, $p<0.01$), younger ($r=-0.22$, $p<0.05$), less educated ($r=-0.19$, $p<0.01$), and who had lower income ($r=-0.16$, $p=0.02$). Concern re Overeating/weight was higher in younger mothers ($r=-0.20$, $p=0.05$), and Concern re Undereating/weight was higher in mothers who had lived in the US for fewer years ($r=-0.31$, $p<0.01$). There were positive correlations between Restrictive Feeding and Concern re Overeating/weight ($r=0.22$, $p<0.01$), and between Pressuring to Eat and Concern re Undereating/weight ($r=0.25$, $p<0.01$).

Maternal infant feeding behaviors and concerns and infant weight at enrollment

Unadjusted correlations demonstrated no significant relationship between Pressuring to Eat ($r=-0.112$, $p=0.093$) and WLZ, but higher scores on Restrictive Feeding were associated with higher WLZ ($r=0.22$, $p=0.001$). Higher Concern re Undereating/weight scores were associated with lower WLZ ($r=-0.23$, $p<0.001$), while higher scores on Concern re Overeating/weight were associated with higher WLZ ($r=0.20$, $p=0.002$). Stepwise relationships were evident between each behavior/concern and weight status (normal, overweight, obese) (all p for trend <0.05) (Figure 1).

Maternal infant feeding behaviors and concerns at enrollment and weight gain up to 30 months

Multiple regression models are described in Table 3. For Pressuring to Eat, there was a significant negative association with WLZ ($p=0.034$) (Model 1), but no relationship between pressuring and change in weight over time (Model 2). Entering Concern re Undereating/weight (Model 3) strengthened the association between pressuring and WLZ ($p=0.007$), and revealed a significant association ($p=0.011$) between Concern re Undereating/weight and WLZ, and this remained ($p=0.004$) when adding an interaction term between Pressuring to Eat and increase in child age, which was not significant itself (Model 4). Our final analysis (Model 5) demonstrated that initial weight was the best predictor of future weight gain ($p<0.001$) (Model 5). Concern re Undereating/weight dropped to marginal significance levels ($p=0.054$) in this model.

Restrictive Feeding scores were ($p=0.036$) associated with higher WLZ (Model 1). There was no significant interaction between Restrictive Feeding and increase in child age, indicating that restriction was not significantly related to patterns of weight gain over time (Model 2). Entering Concern re Overeating/weight (Model 3) eliminated the association between restriction and WLZ and revealed a marginal association ($p=0.051$) between Concern re Overeating/weight and WLZ; and adding a (non-significant) interaction term between Restrictive Feeding and increase in child age (Model 4) caused the association between Concern re Overeating/weight and WLZ to become significant ($p=0.023$). Our final

analysis (Model 5) demonstrated that initial weight was the strongest predictor of future weight gain ($p < 0.001$). However Concern re Overeating/weight remained a strong predictor ($p = 0.008$).

Discussion

Our goal was to explore the relationship between maternal feeding behaviors and subsequent weight gain in a high-risk sample of minority urban infants. Although there was no association between pressuring to eat and infant weight trajectories through to toddlerhood, higher pressuring at enrollment was associated with lower overall WLZ assessed at multiple time-points through to toddlerhood. Further, maternal concern about child undereating/weight was independently associated with WLZ out to toddlerhood, and this was reduced, but not eliminated when controlling for initial WLZ. That is, although mothers tended to be concerned about lower weight children, this did not explain the observed pressure to eat-WLZ association. The relationship could feasibly result from maternal pressuring at study enrollment causing lower child weight into toddlerhood. However, a third set of variables could also be responsible, for example, unmeasured child factors that may co-occur with both pressure to eat and low child weight without either being directly caused by maternal behavior, or being accompanied by maternal concern, e.g. high child satiety responsiveness.²⁴ Interestingly, the majority of mothers expressing concern about undereating/weight had children who were actually *heavier* than the average child, suggesting that mothers with normal-weight children may be underestimating their weight.

For restrictive feeding, higher scores were associated with higher WLZ at enrollment as well as through to toddlerhood, but, as with pressuring to eat, there were no discernible effects on infant weight trajectory. Although restriction in our sample did not predict *lower* weight, it is plausible that it was successful in preventing the further weight gain we might have expected among heavier children in this high-risk population. Unlike pressuring to eat, however, the relationship between restriction at enrollment and WLZ through to toddlerhood was partially explained by maternal concern about overeating/weight. This is consistent with a ‘maternal response’ model in which mothers feeding styles are partly reactions to their perceptions of infants’ needs, while weight trajectories are explained by other, potentially earlier-acting processes. These could include feeding practices during the exclusive milk-feeding period, genetically-influenced appetitive traits, or epigenetic changes occurring in utero. Interestingly, the predictive power of concern about overeating/weight (but not restriction) remained even when controlling for initial WLZ, suggesting that this variable may have been picking up on predictors of subsequent body weight that were not captured by initial WLZ, e.g. maternal observations of heightened infant appetite, the mothers’ own experience with weight and eating, or unhelpful concern-motivated maternal behaviors other than restriction.

Our findings in relation to pressuring to eat and concern re undereating/weight extend the results of studies in other populations and age groups demonstrating cross-sectional associations between higher pressuring and lower child weight,^{6,13,31,36} between higher pressuring and greater concern about child underweight,³⁷ and between lower child weight and greater concern about child undereating/weight.³⁸ Our findings are also consistent with

longitudinal studies not assessing weight concerns, but finding that infant size predicts maternal pressure to eat from 3 to 18 months,⁸ and that higher BMI at 2 y predicted higher levels of pressure to eat at 4 y.³⁹ Our failure to find an association between pressuring and weight trajectories echoed other studies,^{16,24} but differed from the UK study that found higher pressure at 1 y to be associated with lower WLZ at 2 y when controlling for initial WLZ,¹² and from the US study finding⁸ that higher pressuring predicted lower weight-for-age Z from 3 to 18 months.

Our findings relating to restrictive feeding and concern re overeating/weight are consistent with studies in other populations and age groups demonstrating cross-sectional associations between higher restriction and higher child weight,^{5,6,8,10,11,14,31,33,36} between higher restriction and greater concern about child overweight,^{5,13,38} and between higher child weight and greater concern about child overeating/weight.²⁷ Our partial mediation finding is consistent with studies demonstrating mediation of the relationship between restriction and weight by concern about overweight in older children,¹⁰ and the US longitudinal infant study, which did not assess concerns but found that infant size predicted maternal restriction in cross-lagged analyses of multiple measures taken between 3 to 18 months.⁸ In contrast to our negative finding regarding weight trajectories, though, a UK study found that restriction at 1 year of age was associated with *lower* WLZ at 2 years,¹² a Swedish study¹⁷ found that higher restriction at 12 months was associated with *higher* infant BMI at 6 months and 1 y, and the US study found that measures of restriction predicted *higher* WAZ scores in the period from 3 to 18 months.⁸

Discrepancies between our results and the results of others studying young children may be due to differences in growth modeling methods, obesity risk, ethnicity/culture and child age. Whereas we calculated weight trajectories based on infant weight and length/height using data from up to 11 time-points over an 18–24 month follow up period beginning at 6–12 months, the UK cohort¹² was assessed only twice (1 and 2 y), while the US cohort⁸, assessed at 5 time points, was younger (3–18 months) than our own. Feeding practices and weight trajectories may change rapidly in early life due to increasing dietary variety and more autonomous child-driven feeding, so differences in age of assessment and rate of sampling could significantly influence results. For example, by 30 months, increased demand for high-palatability foods and greater eating independence could have made restriction less effective than one would predict from the UK study result.¹² Ethnic and socioeconomic differences between our low-income AA sample and the higher-income UK participants may also have contributed to disagreement.

Limitations should be acknowledged. First, we used a convenience sample of families attending well-child care, who may not fully represent the larger urban, low-income, minority population. However, most mothers participated, increasing generalizability. Second, since visits were not standardized, there was likely inter-observer variability in anthropometric assessment, as well as variability in each child's assessment schedule. However, any power lost through measurement error was likely offset by the large amount of longitudinal growth data we were able to obtain in this hard-to-reach population, and our modeling technique accommodated the variable assessments. Although the IFQ was validated, there is some evidence that maternal reported and observed feeding practices are

not consistent⁴⁰. Further, we only administered questionnaires at enrollment. Behaviors and concerns may change over time, so ideally one would assess these variables at multiple time-points. Finally, although our study population is under-researched and in particular need of intervention, our results and recommendations may not apply to other groups.

Conclusions

This study demonstrated that pressuring to eat was associated with lower overall weight, and restrictive feeding with higher weight, in the first year of life, and that the relationship with restriction was partly explicable by maternal concerns about child eating and weight. However, feeding behaviors did not contribute to subsequent weight trajectories through to the middle of the third year of life.

These results have important practical implications. First, since low-income, minority mothers in our study may be responding to perceived needs of their infants, it would seem important to ascertain perceptions of their infant's weight, growth and eating habits early on, in a culturally sensitive way, before specific feeding recommendations are given.

Our findings further suggest that advice regarding specific feeding practices should be revisited. Current Bright Futures Health Supervision Guidelines recommend speaking to parents about avoiding overfeeding (a form of pressuring) in the first 6 months of life.²⁵ We found that pressuring was actually applied to *thinner* infants. Therefore, asking mothers if they are concerned about overeating/weight and/or feel the need to *restrict* their infant's eating may prove a better way of identifying high-risk infants, as well as creating an opportunity to discuss healthful feeding strategies.

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Abbreviations

WLZ	Weight-for-length Z
WHZ	Weight-for-height Z
WHZ	Weight-for-age Z
BMI	Body Mass Index
CFQ	Child Feeding Questionnaire

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What is already known about this subject?

- Mothers' child feeding behaviors (e.g. pressuring, restriction) have been cross-sectionally and longitudinally associated with body weight in preschool and older children.
- Relationships between feeding behaviors and weight gain in infancy and toddlerhood are less well studied, particularly among low-income, minority groups.
- It is unclear whether mothers influence infant weight via feeding behaviors, or respond to perceptions about infants' weight and eating behavior by adapting their feeding strategies.

What does your study add?

- Maternal restriction at 6–12 months was associated with greater child weight during the period from infancy through to the third year of life, and pressure to eat with lower child weight.
- Weight trajectories did not differ with feeding behavior, suggesting that maternal restriction and pressure to eat do not predict child weight beyond the relationships apparent in the first year.
- The association between restriction and child weight was partially mediated by mothers' concerns about infant overeating and overweight, supporting a child-responsive model of feeding.

Figure 1.
Maternal infant feeding behaviors and concerns by infant WLZ at 6–12 months
Bars show mean behavior/concern scores and asterisks indicate test for trend results:
* $p < 0.05$, ** $p < 0.01$

Table 1**Questionnaire Scales Measuring Maternal Infant Feeding Behaviors and Concerns**

Sub-scale	Items
Behaviors	
Pressuring to eat	Do you feed baby extra to be sure s/he got enough to eat?
	Do you put infant cereal in baby's bottle to be sure s/he will sleep longer at night?
	Do you put infant cereal in the bottle so that he will be full longer?
	When baby is fussy, is feeding baby the first thing you do?
	Feeding him is the best way to get him to sleep longer.
	When my baby cries he is usually hungry.
	I prop up the bottle so that my baby can eat.
	I believe it is important to my baby to finish all formula in bottle.
Restrictive feeding	I believe it is important to have a feeding schedule for my baby.
	Do you only allow him to eat at set times?
	Do you let him decide when s/he is finished eating?*
	Do you let him eat whenever he wants to?*
Concerns	
Concern re	Do you worry baby is not eating enough?
Undereating/weight	Is it a struggle to get baby to eat?
	Do you get upset if baby does not eat enough?
	If I do not encourage baby to eat, s/he does not eat enough.
	My baby eats enough.*
	I am worried my baby could become underweight.
	If you saw a baby the same age as yours who weighed more, would you feel you were not doing a good job feeding your baby?
Concern re	Do you worry that s/he is eating too much?
Overeating/weight	I am worried s/he could become overweight.

* Reverse coded

Table 2

Baseline characteristics of mother-child dyads who did and did not complete the study

	Did not complete (n=169)	Completed (n=60)	<i>p</i>
Demographic characteristics			
Maternal age (years), mean (SD)	26 (6.4)	30 (7.3)	0.08
African or Caribbean-American, %	92	88	0.63
Mother born in USA, %	38	37	0.88
Mother's years of education, mean (SD)	12.8 (1.9)	13.0 (1.9)	0.41
Mother's annual income < \$30,000, %	57	58	0.88
Mother's weight at enrollment (kg), mean (SD)	74.6 (15.9)	75.9 (17.6)	0.65
Proportion of boys, %	45	52	0.37
Age at enrollment (months), mean (SD)	8.5 (2.2)	8.9 (2.9)	0.33
Infant WLZ at enrollment, mean (SD)	0.22 (1.3)	0.35 (1.1)	0.38
Maternal feeding behaviors, mean (SD)			
Pressuring to Eat	2.5 (0.65)	2.4 (0.8)	0.88
Restrictive Feeding	2.8 (1.0)	2.9 (1.0)	0.43
Maternal feeding concerns, mean (SD)			
Concern re Undereating/weight	1.5 (0.7)	1.6 (0.8)	0.88
Concern re Overeating/weight	1.8 (1.0)	1.9 (1.1)	0.91

Table 3

Linear models showing relationships between maternal infant feeding behaviors/concerns and infants growth

Covariate	Model 1			Model 2			Model 3			Model 4			Model 5		
	B	SE(B)	p	B	SE(B)	p	B	SE(B)	p	B	SE(B)	p	B	SE(B)	p
Pressuring to eat															
Infant change in age	0.005	0.006	0.380	-0.010	0.014	0.502	-0.009	0.014	0.514	0.000	0.017	0.981	0.000	0.016	0.994
Pressuring	-0.023	0.011	0.034	-0.039	0.016	0.014	-0.043	0.016	0.007	-0.045	0.016	0.005	-0.025	0.013	0.054
Pressuring $\times$ infant change in age				0.001	0.001	0.236	0.001	0.001	0.247	0.001	0.001	0.212	0.001	0.001	0.192
Concern re underweight							0.104	0.041	0.011	0.159	0.055	0.004	0.119	0.041	0.004
Concern re underweight $\times$ infant change in age										-0.003	0.003	0.286	-0.004	0.002	0.095
Infant WLZ at enrollment													0.742	0.049	0.000
Restrictive feeding															
Infant change in age	0.005	0.006	0.380	0.009	0.017	0.581	0.010	0.017	0.575	0.015	0.020	0.431	0.012	0.019	0.541
Restriction	0.040	0.019	0.036	0.048	0.028	0.086	0.040	0.029	0.167	0.035	0.028	0.220	0.002	0.024	0.947
Restriction $\times$ infant change in age				0.000	0.001	0.770	0.000	0.001	0.764	0.000	0.001	0.909	0.000	0.001	0.814
Concern re overweight							0.081	0.041	0.051	0.128	0.056	0.023	0.108	0.041	0.008
Concern re overweight $\times$ infant change in age										-0.002	0.003	0.367	-0.004	0.002	0.112
Infant WLZ at enrollment													0.746	0.047	0.000