Perception versus Reality

An Exploration of Children’s Measured Body Mass in Relation to Caregivers’ Estimates

ANNA AKERMAN
Adelphi University, USA
MARSHA E. WILLIAMS
Nickelodeon, USA
JOHN MEUNIER
Cogent Research, USA

Abstract

This study investigated the relationship between parents’ reports, as compared with our obtained measurements, of their children’s body status. Separate body mass index (BMI) scores were calculated based on: (1) parents’ report of their children’s height and weight, and (2) children’s measured height and weight. Results indicate that parents’ perceptions of their children’s body status reliably varied from the scores obtained from our measurements, such that parents whose children classified as overweight consistently underreported their children’s BMI, while parents whose children fell into the underweight category did the opposite. Implications for the potential psychological mechanisms at play in addition to how these findings might relate to the larger childhood obesity crisis in the United States and internationally are discussed.

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Address. Correspondence should be directed to:
ANNA AKERMAN, PhD, Nickelodeon, Consumer Insights, 1515 Broadway, 44th Floor, New York, NY 10036–8995, USA. [Tel. +1 516 877 4916; Fax +1 516 877 4896; email: akerman@adelphi.edu]

Keywords
- accuracy
- body weight
- obesity
- parenting
- perception
WEIGHT, body size and body image are topics which have received increasing attention in recent years due to the growing numbers of overweight and obese children in the United States (Troiano & Flegal, 1998) and United Kingdom (Chinn & Rona, 2001), as well as Japan and regions of Northern Africa and Latin America (Deckelbaum & Williams, 2001), such as Morocco, Egypt and Costa Rica (de Onis & Blössner, 2000; Ebbeling, Pawlak, & Ludwig, 2002). While the percentage of overweight and obese children has risen, so too has body dissatisfaction, particularly among adolescents (Paxton et al., 1991), often resulting in eating disorders such as bulimia and anorexia (Geller, Srikameswaran, Zaitsoff, Cockell, & Poole, 2003). These numbers clearly indicate the growing need to understand the development of children’s attitudes and behaviors related to food, eating and their bodies. Given the significant physical, social and mental health repercussions that are associated with these obesity and body dissatisfaction trends, we sought to contribute to the existing body of knowledge on these issues by investigating caregivers’ perceptions of their children’s weight status. Clearly, any discussion of what has been referred to in popular and academic press alike as the rising ‘obesity epidemic’ among our youth requires a substantial exploration of the physical and psychological processes contributing to these growth rates. This article is an attempt to explore one particularly potent sociocultural influence on child development: the role of parents (or caregivers), and, more specifically, parents’ (or caregivers’) perceptions of their children.

Although most psychologists will agree that parents or dominant caregivers exert some influence on children’s development (a position espoused most strongly by, for example, Baumrind, 1993; Vygotsky, 1978), the amount of research examining parents’ impact on children’s body image and weight status is surprisingly small. In general, it appears that much more attention has been paid to adolescent samples, particularly with respect to body dissatisfaction. As Ricciardelli and McCabe state, ‘Relative to the amount of research that has been conducted with adolescent girls, there is little research on the role of parents, peers, and the media in determining body image concerns among children’ (2001, p. 330). Despite the seeming paucity of research dedicated to understanding the role of parents in contributing to the obesity narrative, caregivers clearly represent an important sociocultural factor worthy of investigation.

Some researchers have argued that families play a crucial role in the development of body image and schemas by providing children with pertinent information, models and feedback about body and food issues (Powell & Hendricks, 1999). Be they explicit or implicit, the messages that are communicated during the early stages of life are especially powerful because they serve the foundation upon which one’s own feelings and attitudes are subsequently formed. Indeed, parents’ appraisals of their children’s weight have been found to be significantly associated with children’s own self-evaluations, and to a greater extent than assessments made by other individuals (Levinson, Powell, & Steelman, 1986). Not surprisingly, researchers have also found family members to be an important source of weight control information and behavior as far as the initiation and maintenance of dieting goals are concerned (Powell & Hendricks, 1999).

Given the power of familial and, in particular, parental influence with respect to the development of children’s own body schemas and evaluations, it seems essential to closely examine the accuracy of parental assessments. After all, caregivers’ bodily evaluations of their young could contribute to the development of eating disorders like anorexia and bulimia on one extreme, and obesity on the other. While overestimating the weight of a lean child could contribute to unrealistic body standards, dissatisfaction, unnecessary and/or unhealthy dieting, and the development of clinical eating disorders, underestimating a heavy child’s weight could lead to a decreased emphasis on healthy eating and physical activity, and perhaps even the facilitation of obesogenic factors. Due to the associated health risks and relative controllability of each, both of these potential outcomes are cause for concern, especially given the high rates of young people afflicted with eating disorders and obesity alike (Strasburger & Wilson, 2002).

Indeed, research suggests that caregivers do exercise a tremendous amount of influence over their children’s diet and, by extension, general health (Brown & Ogden, 2004; Wardle, 1995). Parents provide models of healthy and unhealthy behavior for their children through simple everyday activities, such as the purchase and preparation of certain foods over others and the engagement and encouragement of physical versus sedentary activities (Lau, Quadrel, & Hartman, 1990). Though there is a rivaling perspective (known as ‘lifelong openness’), proponents of the view outlined thus far have coined the
influence that parents exert on the development of health beliefs and behaviors the ‘enduring family socialization effect’ (Lau et al., 1990; Wardle, 1995). This is because, irrespective of whether these models are transmitted purposefully or unintentionally, the beliefs and behaviors they support are thought to have a lasting effect on lifestyle choices that persist even after children leave the home and, some argue, well into adulthood.

For these reasons, we believe that caretakers’ perceptions of their children may be equally (if not more) important in contributing to their children’s actual body status than that of their children. This is not to say that caregivers are solely responsible for shaping the direction of their children’s development with respect to body image, weight control or obese-genic factors. Clearly, factors related to the psychological and genetic make-up of the child are but one set of important issues to additionally consider; and, needless to say, there are others. But, given that caregivers exert an undeniably potent socializing effect, particularly during childhood, they are certainly a sociocultural influence to consider.

The purpose of the current study was to closely examine the relationship between parents’ (or, whenever relevant, dominant caregivers’) perceptions of their children’s body mass and children’s measured body mass. A substantial amount of social psychological research in disparate domains attests to the fact that individuals’ perceptions of reality often fail to match objective, or accurate, versions of reality (e.g. Fiske & Taylor, 1984; Nisbett & Ross, 1980). Indeed, a certain degree of illusion appears to be a normal part of everyday human cognition. How might parents’ perceptions of their children’s weight status compare to children’s actual, measured weight status? Since failing to perceive oneself as overweight may result in a decreased motivation to lose excess weight, and thereby significantly increase the risk of developing obesity (Al-Sendi, Shetty, & Musaiger, 2004), understanding the origin of this misperception is important. This is especially relevant given the growing numbers of youth being classified as obese in the United States.

Recent research by Boutelle, Fulkerson, Neumark-Sztainer and Story (2004) investigated the accuracy of mothers’ perceptions of their adolescents’ weight status. Though the authors conclude that ‘the majority of parents do not need to be told that their children are overweight’ (2004, p. 1754), their results suggest the opposite. Most of the mothers sampled with offspring that were overweight or at risk for overweight in fact underestimated their adolescent’s weight status. Given the scarcity of research on parental accuracy, we thought we could contribute to this literature by exploring, more specifically, the relationship between parents’ perceptions of their children’s BMI and their children’s actual, measured BMI. In particular, given our review of the literature suggesting the significance of parents’ socialization effect with respect to food and health during the childhood years and the relative lack of information about this age group as compared with adolescents, we chose to investigate accuracy using a younger sample than that selected by Boutelle et al. (2004), namely children six to 14.

Although some research has indicated that parents tend to perceive their adolescents’ physical appearance more positively than the adolescents themselves do (such as Geller et al.’s (2003) findings that adolescents describe themselves as heavier than their parents believe them to be), the research in this area is hardly conclusive. One reason is that body size has been assessed using disparate and often indirect methodologies, which introduce a layer of seemingly avoidable experimenter bias. Researchers frequently measure body size perception by having perceivers (be they parents, peers or independent observers) select the silhouette that best represents the figure of the target (e.g. child or friend) from a set of silhouettes ranging in size (as in Al-Sendi et al., 2004; Geller et al., 2003) or by asking independent observers to classify subjects’ body build as thin, average or overweight (as in Forehand, Faust, & Baum, 1985).

To avoid adding the kind of bias associated with experimenter derived categories (be they silhouettes or verbal classifications), we opted for the seemingly more direct method of simply asking caregivers to report the weight and height of their children. Not only did this allow us to avoid the introduction of additional subjectivity related to the methodology being used, it also provided a more compatible measure to compare with actual body weight status, which is generally collected by obtaining weight and height measurements and using them to calculate body mass index (BMI). This approach is recommended by the World Health Organization (WHO) and the United States Department of Health and Human Services’ Center for Disease Control and Prevention (CDC) alike as a standardized way to measure body fatness (CDC BMI http://www.cdc.gov/nccdphp/dnpa/bmi/bmi-for-age.htm; WHO, 2000). Because children’s
bodies change so dramatically as they grow and follow different gender-specific trajectories, BMI-for-age takes age and gender into account and examines a child’s height and weight against specific growth charts, ultimately resulting in one of four distinct classifications for that child: underweight, normal, at risk for overweight and overweight (see also Hammer, Kraemer, Wilson, Ritter, & Dornbusch, 1991).

Thus, a further advantage of this study is that, rather than use silhouettes or other experimenter-derived and unnecessarily indirect ratings to measure parents’ classifications of their children’s body types, we asked parents to just report their children’s height and weight as our index of perceived weight status. Parents’ numerical reports were then easily transformed into BMI-for-age scores and subjected to the classification system used by the CDC and WHO to assess body weight status using standardized growth curves. We believe that using height and weight measurements as the starting point for both parents’ perceptions of their children’s body size and children’s measured body size, and then converting those scores into standardized BMI-for-age indexes, allowed for a more straightforward comparison of perception and reality.

The main hypothesis of the current study was that parents’ perceptions of their children’s body status would vary from their children’s measured body status. Given the social psychological research reviewed earlier claiming that individuals often perceive reality with less than perfect accuracy, we wondered if this phenomenon would apply here. More precisely, the positivity bias related to attributions about self suggests that normal individuals tend to distort reality in ways that allow them to maintain a positive self-image (Allport, 1937; Heider, 1958). Whether this bias would extend to offspring in the context of a highly visible domain such as weight status served as a primary basis of this article.

Method

Participants

In total 1205 children (610 females, 595 males) between the ages of six and 14, and 1205 caregivers (903 mothers, 250 fathers, and 52 reported legal guardians) participated in this study. Average caretaker age and child age were 37.7 and 9.95 years respectively (9.97 for boys and 9.93 for girls). To be eligible for the study, the participating parent or legal guardian of the child had to be living with him/her. The majority of caregivers were married or living with their partners (n = 828), followed by never married (n = 186) or divorced (n = 118). A smaller percentage classified themselves as either separated (n = 52), widowed (n = 13) or other (n = 8).

The sample was collected to be nationally representative of the general population with respect to geographic region, ethnicity and household income. As such, participants were recruited from 18 malls in 17 distinct cities selected to be representative of the United States Census Bureau regions and divisions (Northeast: Pittsburgh, PA; White Plains, NY; Springfield, MA; Midwest: Minneapolis, MN; Cincinnati, OH; Cleveland, OH; Chicago, IL; South: New Orleans, LA; Atlanta, GA; Jacksonville, FL; Baltimore, MD; Nashville, TN; San Antonio, TX; West: Seattle, WA; Denver, CO; Los Angeles, CA; San Rafael, CA). Though the initial sample (N = 905) was recruited to be ethnically representative of the general population, an additional 150 Hispanic and 150 African American children and their caregivers were sampled to allow for sufficiently large numbers to conduct comparative analyses between these ethnic groups, resulting in a final sample of N = 1205 with 656 Caucasians, 257 Hispanics, 251 African Americans, and 41 members of other groups (consisting of individuals who reported themselves as either Asian (8), Native American (1), multicultural (8) or ‘other’ (24)).

Given the diversity of the sample, annual household income ranged from ‘less than $20,000’ to ‘$120,000 or more’. Fifty-seven participants refused to self-report their annual income, leaving an average reported annual income of $53, 702.53 for the remaining sample of n = 1148.

Procedure

Interviewers intercepted adults accompanied by children at selected malls in the cities listed above and asked them if they would be interested in participating in a survey about ‘being a parent and being a kid in the United States today’. Targeted individuals were offered an honorarium of $5 for their participation in the study. In order to participate, the child had to be between six and 14 years of age and the adult with the child had to be not only the child’s parent or full-time caregiver but also living with the child. If the screening process was successful, participating adults and children were led to a room in the mall where parents completed a paper-and-pencil instrument and children
were individually interviewed; both protocols consisted of a series of attitudinal questions pertaining to food, health and lifestyle.  

Prior to completing their paper-and-pencil questionnaire, caregivers were asked a series of basic demographic questions followed by an open-ended question which specifically asked them to report on their participating child’s height and weight status without consulting him/her. After completing their one-on-one interviews, children were led with the interviewers and their parents to a height chart and weight scale at which point the children’s actual height and weight were measured and recorded. Identical Tanita HD 318 digital lithium scales (rated high for accuracy in Consumer Reports) and measuring tapes were used at each of the mall facilities. Twenty-eight of the parents refused to allow their children’s weight and height to be recorded, resulting in a final sample of 1177 for these measures. Total participation time was approximately 15 minutes. All data were collected between June and July of 2004.

Measures  
Perceived body mass index
In an open-ended format, parents and guardians were simply asked to write down their participating child’s height (in inches) and weight (in pounds). Their reports were recorded and then body mass index (BMI) was calculated using the CDC recommended methodology for children, described earlier. Based on this perceived BMI data, participating children were then classified into one of four groups based on the percentile category that they belonged to based on their caregivers’ reports of their height and weight. According to the CDC, WHO and others, a child is considered to be underweight if BMI < 5th percentile, normal if BMI is > 5th percentile to < 85th percentile, at risk if BMI > 85th percentile to < 95th percentile and overweight if BMI > 95th percentile.

Measured body mass index
Children’s measured height and weight were subjected to the same calculations as described above resulting in a second set of BMI scores and percentile classifications based on those scores for each child, hereafter referred to as measured BMI.

Results
As described above, once the body mass index scores were calculated based on children’s measured and perceived measurements, each child was classified as underweight, normal, at risk or overweight for each set of data, based on the CDC and WHO recommendations. In general, we chose to use the ANOVA methodology whenever possible because even when our chosen dependent variable is categorical, it is derived from continuous data (BMI percentile scores) and so not purely nominal. That said, we begin with our analyses of the continuous BMI percentile scores from which these categories were derived.

Parents’ perception of child’s weight status compared with measured weight status as a function of measured weight status
To examine the role of a given child’s actual weight status on the accuracy of parents’ perceptions of that status, we used the BMI percentiles (that serve as the basis of the four weight status classifications described above) and derived a difference variable whereby we subtracted the BMI percentile obtained from children’s measured height and weight scores from the BMI percentile we had calculated from parents’ reports of their children’s height and weight measurement (perceived BMI percentile–actual BMI percentile = percentile difference). These new difference scores could then be examined in absolute or signed form. While absolute differences provide an index of the degree of inaccuracy, signed deviations indicate the direction of the inaccuracy. Following the work of Vartanian, Herman and Polivy (2004) we analyzed the data using both types of difference scores in order to obtain the richest possible picture of the relationship between parents’ reports and children’s measurements.

When we conducted an ANOVA to examine whether the absolute BMI percentile difference scores (dependent variable) would vary by children’s four-tiered actual weight status classification (independent variable), we obtained a highly significant overall $F(3, 1173) = 40.13, p < .001$ with a strong linear component $F(1, 1173) = 56.03, p < .001$. The absolute percentile BMI raw score differences were largest among underweight children ($M = 27.21$), and grew progressively smaller among normal ($M = 20.7$), at risk ($M = 12.5$) and overweight ($M = 6.95$) children. This suggests that the degree of inaccuracy is greatest among parents of underweight children and decreases with incrementally larger weight status, resulting in less inaccuracy with at risk and overweight children, but...
provides no information about the direction of parents’ discrepancies from measurements.

Thus, in order to assess directionality, we looked at the signed differences, which could be positive (indicating that parents overestimated their children’s weight status), zero (indicating parents’ accuracy in estimating their children’s weight status) or negative (indicating that parents underestimated their children’s weight status). To examine whether the signed BMI percentile difference scores (dependent variable) would vary by children’s actual weight status classification (independent variable), we conducted the same ANOVA analysis and again obtained a highly significant overall $F(3, 1173) = 37.27, p < .001$ with a strong linear component $F(1, 1173) = 91.08, p < .001$. The average percentile BMI raw score differences were largest among underweight children ($M = 26.89$), and grew progressively smaller among normal ($M = 3.28$), at risk ($M = –8.67$) and overweight ($M = –6.18$) children. While parents of underweight children tend to err on the side of overestimating their children’s weight status, and parents of normal children hover near accurate (which would yield a difference score of zero), parents of at risk and overweight children tend to underestimate their children’s weight status, and significantly more so than parent’s of underweight or normal children (as per Games-Howell post-hoc mean difference analysis). It should be noted that although income was significantly correlated with measured weight status ($r(1123) = –.09, p < .01$), when we controlled its effects by entering it as a covariate in both ANOVA analyses, measured weight status was unaffected and maintained a robust effect on BMI percentile difference.

In order to further explore this provocative effect, we classified our sample of caregivers according to whether they underestimated, overestimated or accurately reported their children’s weight status based on the BMI percentile difference scores reported above. Parents who underestimated children’s weight status (BMI percentile difference $< –.5$) were assigned a 1, accurate estimators ($–.5 <$ BMI percentile difference $< .5$) were assigned a 2 and over-estimators (BMI percentile difference $>.5$) were assigned a 3, resulting in $n = 573, 92$ and $512$ respectively. We then conducted a one-way ANOVA to see if parents’ classification as under-estimators, over-estimators or accurate reporters of their children’s weight status might vary by children’s measured weight status. Confirming our earlier results, we found a significant effect of children’s measured weight status on parents’ estimation category ($F(3, 1173) = 18.65, p < .001$) which similarly had a strong linear component ($F(1, 1173) = 42.05, p < .001$). Again, according to Games-Howell post-hoc analysis, parents of overweight and at risk children were significantly more likely to underestimate their children’s weight status ($M = 1.69, 1.85$), than parents of underweight and normal children ($M = 2.56, 2.06$). For a frequency distribution of each of the three parent estimation types along the four weight status classifications, see Table 1.

**Parents’ perception of child’s weight status compared with measured weight status**

In order to obtain a more general understanding of the relationship between parents’ reports of their children’s body mass index values, versus children’s measures scores, we examined the data in a number of different ways. Correlation analyses of the continuous perceived and actual scores revealed a strong overall relationship between parents’ perceptions and children’s measured body mass percentiles, $r(1175) = .64, p < .001$. When we separated the sample by measured weight status, to

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**Table 1. Frequency distribution of parents’ estimation status by children’s measured weight status**

<table>
<thead>
<tr>
<th>Measured weight status (children)</th>
<th>Estimation statusb (caregivers/parents)</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Underweight</strong></td>
<td>Underestimated</td>
<td>7</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Accurate</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Overestimated</td>
<td>35</td>
<td>70</td>
</tr>
<tr>
<td><strong>Normal</strong></td>
<td>Underestimated</td>
<td>262</td>
<td>43.1</td>
</tr>
<tr>
<td></td>
<td>Accurate</td>
<td>46</td>
<td>7.6</td>
</tr>
<tr>
<td></td>
<td>Overestimated</td>
<td>300</td>
<td>49.3</td>
</tr>
<tr>
<td><strong>At risk</strong></td>
<td>Underestimated</td>
<td>116</td>
<td>54.2</td>
</tr>
<tr>
<td></td>
<td>Accurate</td>
<td>14</td>
<td>6.5</td>
</tr>
<tr>
<td></td>
<td>Overestimated</td>
<td>84</td>
<td>39.3</td>
</tr>
<tr>
<td><strong>Overweight</strong></td>
<td>Underestimated</td>
<td>188</td>
<td>61.6</td>
</tr>
<tr>
<td></td>
<td>Accurate</td>
<td>24</td>
<td>7.9</td>
</tr>
<tr>
<td></td>
<td>Overestimated</td>
<td>93</td>
<td>30.5</td>
</tr>
</tbody>
</table>

*Notes: a Based on the body mass index (BMI) for age percentile classification: underweight $< 5$th; normal weight $5$th to $< 85$th; at risk $= 85$th to $95$th; obesity $\geq 95$th percentile (http://www.cdc.gov/nccdphp/dnpa/bmi/bmi-for-age.htm) b Based on the obtained BMI percentile difference score (between parents’ perceived and children’s measured BMI percentile): underestimated $\leq –.5$, accurate $–.5 <$ to $< .5$, overestimated $\geq .5$*

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assess how the correlation between parents’ perceptions and children’s measurements might differ by this variable, we noted a pattern consistent with the findings reported above. The relationship between perceived and actual BMI percentile scores was strongest for those children who classified as normal, \( r(606) = .45, \ p < .001 \). There was no relationship to be found for those who classified as underweight, \( r(48) = .06, \ p > .05 \), or at risk, \( r(212) = .13, \ p > .05 \). We did find a significant, though weaker relationship between parents’ perceptions of and children’s measured BMI percentile scores for overweight children, \( r(303) = .16, \ p < .01 \). We revisit this finding, which corroborates earlier reports, and offer some potential explanations for these intriguing results in the Discussion section.

Parents’ and guardians’ perceptions of their children’s weight in relation to their children’s actual weight are reported in Table 2. To assess the overall relationship between parents’ perceptions of their children’s weight status against children’s actual weight status we computed the overall mean difference between children’s actual and perceived BMI using a paired samples \( t \)-test, still using BMI percentile scores as the basis of analysis. No significant differences between the perceived and actual weight status of children were obtained (\( p > .25 \)).

Table 2. Parents’ perceptions of current weight in relation to measured weight status

<table>
<thead>
<tr>
<th>Measured weight status</th>
<th>Underweight (%)</th>
<th>Normal weight (%)</th>
<th>At risk (%)</th>
<th>Overweight (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight</td>
<td>50 (46)</td>
<td>42 (6)</td>
<td>6 (6)</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Normal weight</td>
<td>608 (7.1)</td>
<td>73 (10.4)</td>
<td>9.5 (100)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>At risk</td>
<td>214 (2.3)</td>
<td>31.3 (41.6)</td>
<td>24.8 (100)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overweight</td>
<td>305 (0.7)</td>
<td>11.8 (15.4)</td>
<td>72.1 (100)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total (n, %)</td>
<td>1177 (73.6)</td>
<td>568 (48.3)</td>
<td>202 (17.2)</td>
<td>334 (28.4)</td>
<td>100</td>
</tr>
</tbody>
</table>

Notes: \* Based on the body mass index (BMI) for age percentile classification: underweight < 5th; normal weight 5th to < 85th; at risk = 85th to 95th; obesity ≥ 95th percentile (http://www.cdc.gov/nccdphp/dnpa/bmi/bmi-for-age.htm)

To even further confirm this non-difference, we used an ANOVA to see if children’s measured BMI percentile scores, which were used to classify them into the four aforementioned weight status categories, would vary by parents’ perceived classification of their weight status (independent variable). Not surprisingly, children’s measured scores varied significantly by their parents’ classification of them as either underweight, normal, at risk or overweight, \( F(3, 1173) = 192.13, \ p < .001 \). In fact, the obtained relationship was linear such that as parents’ reported weight status of their children went from underweight to normal to at risk and, finally, to overweight, the actual BMI percentile obtained for the child increased as well, \( F \) linear(1, 1173) = 411.43, \( p < .001 \). Parents who perceived their children to be underweight in fact had children with lower measured BMI percentile scores than those whose perceived weight and height scores resulted in a normal classification, and this trend was consistent across each of the four weight status classifications. See Table 3 for children’s average measured BMI percentile scores along with their corresponding classifications based on parents’ perceptions.

Taken together, these multiple findings clearly suggest that overall caregivers are quite accurate when estimating their children’s weight status. As indicated by the shaded cells in Table 2, for each weight status classification group, the largest percentage of caregivers reported their children as falling into the group that corresponded with their measured weight status. And, given that no significant interactive effect of ethnicity emerged (\( p > .10 \)), such is true regardless of ethnicity. This is so in spite of the measured BMI differences we found by ethnicity, reported next.
Measured body mass index

In order to obtain a better grasp of the nature of our sample, we conducted two analyses to assess the how measured weight status might vary by demographic variables: (1) ethnicity and (2) gender.

We first conducted a one-way analysis of variance (ANOVA) to assess the prevalence of obesity by ethnic group (independent variable). Here, even though our chosen dependent variable (the four-tier weight status classification system) is categorical, it is derived from continuous data (BMI percentile scores) and so not purely nominal. Children who could be classified by the CDC and WHO recommendations as underweight were assigned a 1, normal were assigned a 2, at risk were assigned a 3 and overweight were assigned a 4.

The distribution of measured weight status by ethnic group is shown in Table 4. We found a main effect for ethnic background, \(F(3, 1173) = 10.15, p < .001\), such that measured weight status varied reliably by ethnicity. More specifically, post-hoc (Games-Howell) tests revealed a significant mean difference between Caucasian (\(M = 2.55\)) and Hispanic (\(M = 2.91\)) children’s weight status according to the BMI classifications (African American \(M = 2.71\), Other \(M = 2.56\)). Replicating previously found ethnicity differences (Deckelbaum & Williams, 2001), Hispanic children systematically fell into the heavier range of classifications than Caucasian children, as illustrated by the fact that while the underweight and normal classifications were more common among Caucasian children (4.2% and 57.5%) than their Hispanic peers (2.8% and 40.3%), the classifications at risk and overweight followed the opposite trend in that both were significantly more prevalent among Hispanic (20.6% and 36.4%) rather than Caucasian children (17.8% and 20.5%). It should be noted that this pattern of results was obtained regardless of whether we employed the raw BMI or percentile scores instead of the BMI-derived classifications (underweight, normal, at risk and overweight) as the dependent measure.

Interestingly, when we examined the relationship between perceived and actual weight status by looking at the correlations between the two as separated by ethnic status, all groups demonstrated an equally robust and significant relationship (\(p < .001\)) that corresponded with the significant relationship obtained when the correlation was examined for the sample as a whole. This suggests that ethnicity may not influence the overall strong relationship that exists between parents’ reports of their children’s weight status and children’s actual weight status.

A one-way ANOVA was also conducted to see if weight status would vary by gender. No significant results were obtained (\(p > .25\)).

All of the results reported here were obtained with the original sample of \(N = 905\) as well, and are therefore representative of the general United States population regardless of the ethnic over-sample.

Table 4. Measured weight status of children, according to ethnic background (based on BMI)

<table>
<thead>
<tr>
<th>Measured weight status*</th>
<th>African Americans n (%)</th>
<th>Caucasians n (%)</th>
<th>Hispanics n (%)</th>
<th>Other n (%)</th>
<th>Total n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight</td>
<td>14 (5.8)</td>
<td>27 (4.2)</td>
<td>7 (2.8)</td>
<td>2 (4.9)</td>
<td>50 (4.2)</td>
</tr>
<tr>
<td>Normal weight</td>
<td>116 (47.7)</td>
<td>368 (57.5)</td>
<td>102 (40.3)</td>
<td>22 (53.7)</td>
<td>608 (51.7)</td>
</tr>
<tr>
<td>At risk</td>
<td>39 (16)</td>
<td>114 (17.8)</td>
<td>52 (20.6)</td>
<td>9 (22)</td>
<td>214 (18.2)</td>
</tr>
<tr>
<td>Overweight</td>
<td>74 (30.5)</td>
<td>131 (20.5)</td>
<td>92 (36.4)</td>
<td>8 (19.5)</td>
<td>305 (25.9)</td>
</tr>
<tr>
<td>Total</td>
<td>243 (100)</td>
<td>640 (100)</td>
<td>253 (100)</td>
<td>41 (100)</td>
<td>1177 (100)</td>
</tr>
</tbody>
</table>

Note: * Based on the body mass index (BMI) for age percentile classification: underweight < 5th; normal weight 5th to < 85th; at risk = 85th to 95th; obesity ≥ 95th percentile (http://www.cdc.gov/nccdphp/dnpa/bmi/bmi-for-age.htm)
Discussion

The influence of caregivers on children’s weight issues—be they physical or psychological—is a complicated process; the present findings represent our attempt to shed light on what is undoubtedly just a small piece of a larger puzzle. Although when we compared children’s measured weight status to parents’ paper-and-pencil reports of their children’s weight status parents were quite accurate in reporting their children’s weight status as a collective sample, this was not the case when we compared the difference between these two sets of scores on the basis of children’s measured BMI-for-age percentile-based weight status classification. While parents of overweight and at risk children had a tendency to underreport their children’s weight status, parents of underweight children tended to overreport their children’s weight status. These highly robust and internally consistent effects clearly point to the notion that perception and reality are not necessarily one and the same. And, the nature of parental inaccuracy was neither accidental nor random. The direction of parents’ skew in reporting their children’s physical status was directly predicated upon the specific physical status of the child in question, and where it fell with respect to ‘normal’. Weighing more than what the CDC prescribes as ‘normal’ for a child of that height, age and gender resulted in parents perceiving their children to have a lower BMI, whereas weighing less than what the CDC prescribes as ‘normal’ resulted in parents reporting their children having a higher BMI.

One interpretation for this finding is that these results are due to a perceptual or cognitive bias. Perhaps individuals simply overestimate the size of smaller objects and underestimate the size of larger ones. This explanation could be considered a variation of the contrast effect, a cognitive distortion whereby the perception of a stimulus’s dimension (here, its size) is enhanced or diminished relative to its actual measurement due to its relation to another stimulus (Plous, 1993). But, contrast effects are context-driven and, as such, thought to result from prior or simultaneous exposure to a larger/smaller stimulus, which then causes the perceiver to ‘correct’ in the direction of this other stimulus. Given that parents were asked to simply report the height and weight of only their own child, and undoubtedly had varied experiences with children of different sizes even in the moments just prior to participation, this seems to us an incomplete explanation.

We prefer an explanation that incorporates parents’ motivations, and like Vartanian et al. (2004) believe that our results provide support for a motivated distortion effect. What parents seem to be doing is perceptually correcting for their children’s actual deviations from ideal, in this case the CDC’s recommendation for a healthy body weight, perhaps resulting in a new reality, which erases undesirable imperfections. The direction of parents’ misperception, or perhaps auto-correction, is then entirely contingent on the target child’s particular deviation (be it above or below) from his/her ideal body status. These results are consistent with a highly documented phenomenon that researchers in general and social psychologists in particular, have addressed time and time again: the tendency by normal individuals to distort reality in a specifically self-serving manner and across numerous domains (Fiske & Taylor, 1984; Heider, 1958; Nisbett & Ross, 1980; Taylor & Brown, 1988). Evidence of this tendency has been sufficiently impressive to warrant recent speculations that the positivity bias, as it pertains to attributions made about the self, could be a universal phenomenon (Mezulis, Abramson, Hyde, & Hankin, 2004).

For decades, researchers from diverse perspectives have argued that there is a positivity bias in human cognition. According to this view, people seek a positive image of themselves and their environments with such vigor that reality is at times selectively interpreted and at other times patently ignored. (Mezulis et al., 2004, p. 711)

Can we recruit this empirically and theoretically rich history associated with the positivity bias to interpret the present finding of a discrepancy between perception and reality among parents of six to 14-year-olds? We believe so. Research on attribution suggests that individuals wish not only to maintain a positive image of themselves, but also of their valued others, with children being no exception (Gretarsson & Gelfand, 1988). Interestingly, this literature generally details parental tendencies to attribute positive personality traits to their children and overestimate their, often cognitive, abilities (e.g. Miller, Manhal, & Mee, 1991). Our findings point to the possibility that what is sometimes referred to as developmental optimism, a functional bias or illusory glow (Goodnow & Collins, 1990; Goodnow, Knight, & Cashmore, 1985) appears to extend beyond invisible characteristics to include the realm of physicality which is, needless to say, inescapably visible.
One mystery of the present phenomenon is why the absolute degree of inaccuracy was greater for parents of underweight children than those of overweight children. After all, the reasons for greater error when reporting the measurements of an underweight, versus an overweight, child are somewhat unclear. One possible explanation could have to do with the masking effect of clothing, which may make it more difficult to accurately assess the weight status of an underweight child. Another could involve parents’ greater attunement to the bodies of their overweight children, in particular, due to the recent attention that the obesity epidemic has received. Perhaps a heightened awareness of this issue can be linked to more accuracy in assessing the weight status of larger children. Clearly, these are just speculative explanations and warrant further research.

Regardless, with respect to the directionality of parents’ errors, recent work by Boutelle et al. (2004) found that parents of adolescents similarly tended to underreport the weight status of overweight children and err in the opposing fashion with underweight offspring. Though they conclude that parents of overweight children need not be told about their children’s weight status, a closer look at the findings suggests a pattern similar to that obtained here. The researchers report that 70.5 percent of the parents of adolescents classified as being at risk for overweight underestimated their adolescents’ weight status, as did 86.2 percent of those classified as overweight. While no parents of underweight adolescents underestimated their adolescents’ weight status, 62.1 percent of them overestimated it. We believe that these findings fit with our own and together provide evidence of a positivity bias.

The consequences of such a bias may be dire and are clearly worthy of further exploration. Indeed, as Al-Sendi et al. (2004) point out, the repercussions of misperceiving actual weight status can be dangerous, particularly due to the fact that the important steps involved in losing (or gaining) the necessary weight to maintain a healthy weight status, involve, not surprisingly, a base awareness of one’s actual status as overweight (or underweight). Given the body of research suggesting that an “established contact with reality” (Taylor & Brown, 1988, p. 193) is beneficial to the self, and that work extending this model to include one’s children points to the same notion, with more accurate parents having more competent children (Miller et al., 1991), these findings may have significant consequences. This is particularly true given the host of physical and social consequences associated with childhood obesity (Strasburger & Wilson, 2002) that may go unaddressed and indeed worsen if parents are perceptually correcting for their children’s above-normal weight status, and thereby ignoring the reality or severity of the situation at hand.

We present these findings as preliminary evidence of a positivity bias in parental perceptions of their children’s weight status which may, in part, help to explain the present obesity epidemic confronting today’s youth. Indeed, parents’ predilection to view their children in an ego-protecting fashion may serve to perpetuate, rather than prevent or modify, present attitudes and behaviors that could be maintaining their children’s weight at a less than ideal level for their height, age and sex. Interestingly, our results deviate from those of Boutelle et al.’s (2004) in that we found no evidence of a gender effect, whereas they found that mothers tended to underestimate their sons’ weight status more than their daughters’ status. Because Boutelle et al. (2004) surveyed adolescents and the present study involved a younger age group that spanned six to 14 years of age, this difference could be attributed to developmental stage and their gender finding might be unique to middle and/or late adolescence. Within the context of our data set, no developmental differences emerged.

Clearly, numerous additional factors, such as how the developmental stage of the target might influence the accuracy of the perceiver, need to be addressed. Further research could also examine how the presence of a positivity bias might affect children’s perceptions of themselves, an issue which we did not address in this study. Studying the dynamic interplay between parents’ perceptions of their children and their influence upon children’s developing self-schemas is highly relevant not only to better understand the impact that parental belief systems might have on children’s actual development, but also to help address some of the psychological factors that might feed into what public health practitioners, medical doctors and nutritional experts alike have cited as the fastest-growing and most preventable cause of disease and death facing America, and other nations, today.

Notes
1. Most of these measures were subjected to separate analyses and are reported elsewhere.
2. This is true of two analyses which appear later in the Results section. In the first, parents were
classified as: over-, under- or accurate estimators of their children’s weight status. In the second, the dependent variable is child’s classification as underweight, normal, at risk or overweight, which was assessed by ethnic and gender status (independent variable). In both cases, though the dependent variable is categorical, it is derived from continuous data, here percentile difference scores and percentile scores respectively.

3. For this analysis, income had no effect on parents’ triadic estimation of weight status, so no additional covariate analyses were necessary.

References

Author biographies

ANNA AKERMAN is an Assistant Professor of Communications at Adelphi University. She received her Ph. D in Social Psychology from New York University, where she concentrated in Developmental Psychology and is presently a visiting Scholar.

MARSHA E. WILLIAMS, is a formerly senior Vice President, Brand & Consumer Insights, with Nickelodeon’s kids & Family Group, is now President and Founding partner of Harvest Research Group, a market research and consulting company.

JOHN MEUNIER is a founder and Principal of Cogent Research, an evidence-based consultancy based in Cambridge, MA. Mr Meunier’s career has focused on public policy, opinion polling and strategic communications research.