

THE INTERACTION OF SOCIOMETRIC STATUS,
WEIGHT, AND SELF-ESTEEM AMONG FIRST
GRADE CHILDREN

By

TAREN M. SWINDLE

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Thesis Approved:

Dr. Amanda Harrist

Thesis Adviser

Dr. Robert Larzelere

Dr. Laura Hubbs-Tait

Dr. Lenka Shriver

Dr. A. Gordon Emslie

Dean of the Graduate College

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CHAPTER I

INTRODUCTION

Reports from the Center for Disease Control and Prevention (CDC, 2009) indicate that incidence of obesity is at a historic high among 6 to 11-year-olds with a prevalence of more than 17% in the U.S.. These children face numerous, serious health risks (cardiovascular disease, diabetes, asthma, etc.) as well as an increased probability of becoming obese adults, as high as an 80% chance for obese boys and a 92% chance for obese girls (Wang, Chyen, Lee, & Lowry, 2008). The medical issues associated with obesity cost Americans over \$92.6 billion per year with approximately \$11 billion of this expenditure associated with obesity in children (Marder, Chang, & Medstat, 2005). In a call for action to prevent and decrease obesity, the Surgeon General has requested efforts to "change the perception of overweight and obesity at all ages. The primary concern should be one of health and not appearance" (U.S. Department of Health and Human Services; USDHHS, 2001). To accomplish this task, research is needed to expand our understanding of the perceptions of overweight and obesity, how they affect overweight and obese children, and are perhaps contributing to or exacerbating their struggle with weight.

There are many negative social and emotional consequences of obesity including negative self-concept, diminished quality of life, and depression, to name but a few

(Allon, 1979; Eremis, Cetin, Tamar, Bukusoglu, Akdeniz, & Goksen, 2004; Pinhas-Hamiel, Singer., Pilpel, Modan, & Reichman, 2006). Additionally, some overweight children report less favorable relationships with their peers than children who have never been overweight (Gable, Krull, & Chang, 2009). To aid in understanding these psychosocial factors related to weight and to gain a better picture of the contextual experience of obesity, this study will address two of the potentially harmful social-emotional correlates of childhood overweight and obesity: self-esteem and sociometric status. Additionally, sociometric status will be tested as a moderating and/or mediating factor between weight and self-esteem. Insight into the social and emotional experience of being an overweight child may provide valuable information for developing intervention programs to decrease obesity in children.

CHAPTER II

REVIEW OF LITERATURE

Self-esteem and Overweight

Self-esteem, an index of one's feelings of competence and acceptance (Harter & Pike, 1984), is a construct of interest in the present study as it has been shown to be an important factor in the emotional experience of obesity. Low self-esteem can in a sense "feed" obesity (and vice versa). For example, one study (Martyn-Nemeth, Penckofer, Gulanick, Velsor-Friedrich, & Bryant, 2009), found that low self-esteem is related to unhealthy eating behaviors (e.g., overeating, watching television while eating, skipping meals). Additionally, low global self-esteem has been shown to be associated with emotional eating (eating in response to emotional arousal) and restraint eating (dieting followed by overeating) while aspects of self-esteem such as scholastic and behavior competence are correlated with external eating (eating in response to stimuli such as sight and smell rather than hunger; Hoare & Cosgrove, 1998). Noting this link between self-esteem and eating behaviors, it may be expected that obesity and self-esteem exhibit a similar relation.

In some studies (e.g., Allon, 1979; Braet, Mervielde, & Vandereycken, 1997; Davison & Birch, 2001; Hesketh, Wake, & Waters, 2004; Sallade, 1973), overweight children do exhibit lower feelings of self-worth on measures of global esteem, physical competence, and cognitive ability. However, other studies show mixed findings

concerning the relation between overweight and self-esteem (e.g., Israel & Ivanova, 2002; Mendelson & White, 1985; Strauss, 2000). Self-esteem did not correlate with obesity equally across genders, in younger age groups, nor across dimensions of esteem. Specifically, these studies show a negative relation between overweight and (a) global self-esteem, but not the dimensional aspect of scholastic competence; (b) global self-esteem for older children (14.5-17.4), but not younger (8.5-11.4); and (c) physical self-esteem for girls, but not boys. A greater effect has also been observed among Spanish American and European American females than African American females (Strauss, 2000). In addition to these mixed findings on the relation between self-esteem and obesity, some studies find no connection between self-esteem and obesity (e.g., Erickson, Hahn-Smith, & Smith, 2009; Pastore, Fisher, & Freidman, 1996; Wadden, Foster, Brownell, Finley, 1984). In these studies, there were no significant differences among weight groups on measures of global self-esteem. Some have attributed differences in the findings to the dimension of self-esteem being measured. It might be noted, for example, that the latter studies were exclusively evaluating the global (or general) construct versus dimensional aspects of self-esteem. However, some studies, as mentioned, do find a relation between a global assessment of self-esteem and obesity. Hence, self-esteem is a complex variable when examined in relation to obesity.

Considering these findings, this study will focus on self-esteem in relation to obesity for several reasons. First, the mixed empirical evidence on the relation between self-esteem and childhood obesity deserves additional research to understand which aspects of self-esteem (dimensional, global, or both) are influenced by obesity in particular samples. The present study will use a measure that taps multiple dimensions of

self-esteem as well as the global construct (Harter & Pike, 1984; See Appendix F for a survey of self-esteem measures used in extant studies of obesity and self-esteem).

Subscales assessing perceived cognitive competence, perceived physical competence, and perceived peer acceptance will be examined in relation to children's weight. Beyond the exploratory interest of dimensional differences in the relation of self-esteem and weight, each subscale may be related in a conceptual manner to self-esteem. For every subscale of interest, the spillover effect may be influential such that obese children feel bad about their weight and in turn feel badly about aspects of themselves unrelated to weight.

Alternatively, there are several other ways weight may relate to perceived competence.

Concerning the physical competence subscale, overweight and obese children may perceive low physical competence as a result of (a) negative athletic experiences (i.e., they are accurate about their physical ability) or (b) comparison to thinner, athletic bodies portrayed as ideal in the media (which may or may not reflect their own physical ability; e.g., Murnen, Smolak, Mills, & Good, 2004). Perceived peer acceptance may also be related as (a) obese and overweight children project negative feelings about themselves to perceptions of peer acceptance or (b) accurately detect that their peers do not accept them and report this observation. Finally, diminished perception of cognitive competence may be found in obese children due to (a) an acceptance of the media's portrayal that overweight children are unintelligent (e.g., Herbozo, Tantleff-Dunn, Gokee-Larose, and Thompson, 2004) or (b) an accurate report of decreased school performance due to distractions associated with their weight (e.g., Datar & Sturn, 2006). Additionally, it is important to evaluate cognitive competence in light of the findings of Latner, Simmonds, Rosewall, and Stunkard (2007) showing that a significant portion of obesity stigma can

be accounted for by peer perceptions of low intelligence. While this stigma was assessed with computer-generated images (a problem discussed hereafter), it suggests a relation between perceived intelligences and obesity that should not be overlooked. If peers believe that obese children's cognitive competence is low, it is possible that the obese children do as well. In sum, the present study expects significant relations between each of these subscales and weight for this sample.

Furthermore, the relation between weight and global self-esteem will be explored with a global score being derived from the mean of the subscales administered. This global scale includes perceived maternal acceptance in its calculation although it was not a subscale of conceptual interest in the current study. No predictions are made for this global scale due to the small number of studies on weight and self-esteem obtaining a global scale in this manner and the mixed findings offered in studies using other measures of global self-esteem. However, findings will be of importance as a global scale may be differentially related to self-esteem than the dimensional subscales, and this will contribute to a better understanding of the mixed findings on self-esteem and weight in the literature.

Another possible explanation for the mixed findings on the relation between weight and self-esteem could be that the link between is mediated or moderated by other, typically unmeasured variables. For example, Davison and Birch (2002) report that weight-based teasing partially accounts for the association between obesity and self-esteem among girls aged 5 to 7 years. The present study will seek to explore the possibility that a similar interaction exists between obesity stigmatization (as expressed by peer rejection or neglect) and low self-esteem. A negative peer status may explain

(i.e., mediate) or exacerbate (i.e., moderate) low self-esteem among overweight and obese children. This will extend the work by Davison and Birch (2002) by expanding generalizability to a wider sample that includes girls and boys as well as a more diverse socioeconomic and ethnic range. Finally, self-esteem is important to this study as it may act as an index of other emotional problems (e.g., Braet, Mervielde, & Vandereycken, 1997; Martyn-Nemeth, Penckofer, Gulanick, Velsor-Friedrich, & Bryant, 2009) as clustering of emotional symptoms for overweight persons is common (Gibson, Byrne, Blair, Davis, Jacoby, & Zubrick, 2007). Deductively, poor self-esteem could be representative of a host of emotional problems for obese children. Thus, assessing self-esteem will help to generalize the findings of this study to other social, emotional problems.

Obesity Stigma

In addition to possible struggles with self-esteem, obese children may face stigmatization from their peers, family members, and even school personnel (Gapinski, Schwartz, & Brownell, 2006; Puhl, Schwartz, & Brownell, 2005; Quinn & Crocker, 1999). Pressure to be thin from the media and society at large may also affect obese children. For example, a content analysis conducted by Herbozo et al., (2004) found that 64% of children's top movies depicted obese characters with negative traits (e.g. evil, unattractive, unfriendly, cruel). Thus, the stigma obese children face may permeate all or most aspects of their lives.

Peers may be one source that is especially salient as alienation in this setting may disrupt the socialization process (Harris, 1995). Additionally, low peer status is associated with many negative developmental outcomes including school failure/drop

out, psychological maladjustment, and delinquency (Gifford-Smith & Brownell, 2003). The present study will seek to explore if overweight and obesity among children is correlated with peer status. Existing research suggests that children three and older tend to exhibit prejudice toward endomorphic (heavier) body styles compared to their thinner cohorts on measures of relational preference and trait attribution (e.g., Bell & Morgan, 2000; Tiggemann & Anesbury, 2000; Tillman, Kehle, Bray, Chafouleas, & Grigerick, 2007). These studies indicate that, when asked to pick a friend or assign a positive description, either from a selection of figurines or a line-up of pictures, children are less likely to pick an obese choice rather than ectomorphic (thin) and mesomorphic (average) choices. Negative descriptions such as “mean” and “lazy” are more common in ratings of the endomorphic children by their peers than in ratings of thinner children (Cramer & Steinwert, 1998) while positive evaluations such as athletic, artistic, and positive social ability tend to be reserved for thinner targets (Penny & Haddock, 2007).

Furthermore, obesity seems to carry the most negative bias when compared with other disabilities indicated by facial disfigurement, a wheelchair, and crutches (Latner, Stunkard, & Wilson, 2005). Only figures without a hand were rated more disapprovingly than the obese figure in these comparisons. Similarly, a study conducted by Klaczynski (2007) found that when asked to rate beverages purportedly created by an average or overweight child, 7- and 10-year-olds report that the “obese-created” drinks were less tasty and more likely to make them sick than the “average-created” equivalent. This finding was true for both samples of U.S. and Chinese children indicating that the obesity bias exists across (at least some) cultures. It seems that children may believe something is wrong with obese peers and the objects associated with them.

Stigmatization of overweight children has also been observed among a sample of Mexican children (Bacardi-Gascón, Leon-Reyes, & Jiménez-Cruz, 2007). Parallel to the studies mentioned, the majority of children selected a target in a wheelchair as their most-preferred friend and an obese target as their least-preferred friend.

With the number of obese children increasing, it could be expected that such stigma is decreasing as obesity becomes more normative. The opposite seems to be true. The obesity bias among children has been followed since the 1960s (Richardson, Goodman, Hastorf, & Dornbusch, 1961), and its prevalence appears to have almost doubled in the decades since (Latner & Stunkard, 2003). In addition, Cramer and Steinwert (2003) report that bias against obesity increases with participant age and that by age four children can articulate the reason for their bias. Thus, children do not seem to become less biased over time and as they age, but more so.

It might also be presumed that prejudice against obesity will be comparatively low among the attitudes of obese children, offering one group in which obese children can feel accepted. Obese children should understand that stereotypes against overweight individuals are harsh and unfounded. Yet, even this is not an accurate assumption; bias has been documented among all body builds (Latner et al., 2005; Tiggemann & Anesbury, 2000) with one study finding the strongest preference for thinness among overweight children (Cramer & Steinwert, 1998). Moreover, gender does not seem to have a significant influence on obesity stigma. Tillman et al. (2007), for example, found girls and boys display this tendency equally. Consequently, it appears reasonable to conclude that the obesity prejudice exists across ages, genders, body-builds, and at least some ethnicities.

The obesity-stigma studies conducted in the past often relied on using hypothetical situations accompanied by computer-generated pictures or cartoon-like drawings of unknown obese targets. Perhaps a more valid assessment of obesity stigma would be found in the ratings of peers who children actually know. The current study will seek to explore this possibility by gathering sociometric ratings in which children give evaluations on peers in their classroom.

Peer Experience of Obese Children

While it is rare that research has used a sociometric approach in assessing the relation between weight and children's peer relationships, researchers are beginning to recognize the need for study of obese children's actual relationships to determine if the stigma observed in controlled experimental settings translates to the lives of obese children. Using the Revised Class Play (RCP) method of peer report, Zeller, Reiter-Purtill, and Ramey (2008) found that obese children (approximately 13 years of age) in clinical treatment for weight management were less likely to be selected as a best friend in addition to receiving lower overall ratings of peer liking among classmates. An additional study of adolescents acquired sociometric ratings of obese children and found that social preference³ was negatively and significantly associated with self-reported body size (Wang, Houshyar, & Prinstein, 2006). Earlier studies (Cohen, Klesges, Summerville, & Meyers, 1989; Phillips & Hill, 1989) also explored the relation between ratings of actual peers and weight. Cohen et al. (1989) found that overweight 1st grade males received fewer liking nominations than their non-overweight male peers while 3rd grade overweight males were rated lower than non-overweight males on a 5-point Likert scale. However, in a small sample (N = 313; n obese/overweight = 47) of British 9-year-

old girls, overweight and obese children were not significantly less popular than normal and underweight children (Phillips & Hill, 1989). Furthermore, in an unpublished paper, Summerville (1987) reported that weight significantly predicted lower social preference scores among a sample of 143 non-clinical 1st-grade children. In alignment with these findings on obese children's social status, Strauss and Pollack (2003) found that overweight 7th through 12th graders were more likely to be isolated from social networks than their normal-weight peers and received no friendship nominations significantly more often.

Three other studies are indirectly related. Graham, Eich, Kephart, and Peterson (2000) used the sociometric approach and found that 15-to 18-year-olds categorized as popular by their peers reported the most satisfaction with their bodies. Dunn, Dunn, and Bayduza (2006) similarly found that popular-rated children received higher ratings of athletic ability in comparison to rejected peers among 10 year olds. Lastly, another study using the Revised Class Play measure found that peer ratings of appearance, academic competence, and athletic ability were significantly related to peer acceptance in grades 2 through 10 (Vannatta, Gartstein, Zeller, & Noll, 2009). The latter three investigations imply, but do not measure, that non-overweight body types are more accepted by peers.

Together, these studies suggest that the obesity stigma may be reflected in the actual relationships of obese children. However, methodological limitations to generalizability are not absent. Of all the studies identified, only one peer-reviewed study examines the actual peer relations of children in the 3rd grade or younger (viz. Cohen et al., 1989). In fact, most studies on peer relations and obesity tend to focus in the adolescent population. Thus, the present study will be one of the few to directly

assess obesity's association with peer acceptance using sociometric ratings within a population of young children. Additionally, some of the studies examining sociometric status in overweight children have used small samples sizes while, in some cases, only including one gender or those available in clinical treatment for their weight. This study will include data from a large sample of both boys and girls in a non-clinical population to strengthen potential generalizability. If negative peer relationships explain (i.e., mediate) or exacerbate (i.e., moderate) the consequences of childhood obesity, research is needed to detect the development of peer difficulties and design interventions for the development of healthy relationships of obese children with their peers at an early stage.

While it is not definitively known how obesity stigma may translate to actual peer relations, there is evidence that overweight children are at increased risk for problems in their social lives. Pearce, Boergers, and Prinstein (2001) found that obese high school students were classified as more undesirable as dating partners when compared with their average-sized peers. Additionally, obese girls encountered more victimization in relational contexts while obese boys experienced more overt discrimination than their non-obese peers. In a sample of 10-to-14-year-olds, Hayden-Wade et al. (2005) found that overweight children were more likely to experience teasing related to their appearance and competence than average sized children with such teasing more likely to come from all peers rather than a specific peer (i.e., a bully). For the victims of weight-related teasing, loneliness, weight concerns, and preference for sedentary and isolative activities increased while self-perception of physical appearance decreased. Moreover, Janssen, Craig, Boyce, and Pickett (2004) and Griffiths et al. (2009) found that overweight and obese children were more likely than others to be victims of aggression,

both relational and physical, starting as young as 7.5 years of age. However, in pre-adolescence and adolescence, overweight and obese participants in these samples were also more likely to be both perpetrators and victims of bullying according to self-report. Together, these studies suggest that obese children may have a negative peer experience. In fact, poor relationships with peers may be a source of pain and thus a possible explanation for the negative emotional experience and low self-esteem of obese children (i.e., peer relations may be a mediating variable). Alternatively, poor peer relations may not cause low self-esteem, but may exacerbate existing low-self esteem among overweight children, (i.e., may be a moderating variable). The present study will use sociometric data to test these possibilities.

Sociometrics, Self-Esteem, and Weight

In using sociometric peer ratings, five categories represent the way in which a child may be rated by his or her peers. These categories are popular, average, controversial, rejected, and neglected (Coie, Dodge, & Coppotelli, 1982). Of these, two are typically indicative of an “unpopular” or negative status: rejection (many nominations for being disliked and few nominations for being liked) and neglect (rarely nominated for being liked or disliked; i.e., ignored in the sociometric interview). Conceptually, being disliked or ignored by your peers would serve to decrease self-esteem. Reflecting this notion, de Bruyn and van den Boom (2005) found that being perceived as a good friend by peers (not rejected) reduced peer strain and was positively related to scores of social self-esteem (social acceptance subscale of the Self-Perception Profile for Adolescents). Additionally, approximately half of 11-year-old rejected children report more negative self-perceptions and lower self-esteem (Boivin & Begin, 1989). Research on the relation

between peer neglect and self-esteem is less abundant and consequently less clear. Bovin and Begin (1989) found no significant differences between average and neglected children on measures of self-esteem while Bishop and Inderbitzen (1995) report no differences among any sociometric groups.

Early research on popularity and self-esteem, however, does support a prediction of low self-esteem among low status children. Self-esteem and popularity were significantly and positively correlated (Chambliss, Muller, Hulnick, & Wood, 1978) with children reporting high self-esteem perceiving themselves as most popular (Simon, 1972). Additionally, Asher, Hymel, and Renshaw (1984) found that children of low status with their peers reported less satisfaction in social settings and increased loneliness compared to high status children. This further supports the idea that children of low status may have low self-esteem (perceived peer acceptance especially).

Research on weight and sociometric status is also weak in some aspects. The only identified studies relating weight to sociometric status analyzed social preference in a continuous rather than categorical manner (Cohen et al, 1989; Wang et. al, 2006). These studies provide a guide for what may be found in a true sociometric study, but do not offer clear direction on relations with specific categories. As such, a clear link between peer rejection/neglect and weight is not fully developed in the literature. Thus, the present study will look at both peer rejection and neglect in relation to weight and self-esteem although they will be examined separately in initial analyses due to a stronger support in the literature for a link with self-esteem and rejection. Controversial children will be examined in an exploratory fashion due to the lack of existing literature on this group related to weight and self-esteem. Only one study was identified that relevantly

addressed controversial children; Bovin and Begin (1989) found lower academic and conduct self-perceptions. With only this study to use as a prediction guide, no hypotheses will be made for the controversial group.

Weight Statuses

Four weight groups will be of interest: normal weight (BMI 10th to 75th percentile), the high-reference range (BMI 75th to 85th percentile), overweight (85th to 95th percentile) and obese (95th percentile and above). The self-esteem and peer status of overweight and obese children is expected to be the most affected of the weight groups. However, it is possible that the high reference range is trending toward overweight at this age and that they will experience some of the same negative consequences of having a heavier body style. Nader et al. (2006), for example, found that children with BMIs between the 75th and 85th percentile at 4.5 years of age were significantly more likely to be overweight by age 12 (> 6 times more) than children with BMIs below the 50th percentile. Including this group will provide information on a group that may be inclined to develop overweight. Analyses of this group will be exploratory with no hypothesized outcomes. Finally, the normal weight group will serve as a comparison group.

The Present Study

To summarize, this will be the first study in children below the third grade to relate sociometric status to weight status. It also will be the first to provide data on sociometric status and self-esteem in this age sample. Most importantly, it will be the first study to consider all three of these variables--weight, sociometric status, and self-esteem--in a non-clinical sample of both boys and girls providing needed information on the role of peer relations in the development of self-esteem for obese and overweight

children. The specific research questions and hypotheses guiding the present study are as follows.

Research Question One. How do overweight and obese children differ on measures of self-esteem from non-overweight children?

Question One (a). How do overweight and obese children compare to non-overweight children on the dimensional aspects of self-esteem?

Hypothesis One. Children categorized as overweight and obese are hypothesized to score significantly lower than non-overweight children on each of the subscales of self-esteem: cognitive competence, physical competence, and peer acceptance.

Question One (b). Will overweight and obese children differ from non-overweight children on global self-esteem? As aforementioned, analyses for global self-esteem will be exploratory. Thus, no hypothesis is made.

Analysis. To potentially increase the power of analysis, comparisons among the four weight groups will be explored with quadratic *á priori* trend analyses. This test is selected to ensure that curvilinear relations between weight and self-esteem are not overlooked. It could be, for example, that self-esteem decreases with weight only to a certain point and that beyond that point no change is seen in self-esteem with changes in weight. For scales without significant quadratic trends, the linear trend will be examined to test if self-esteem decreases with weight increases. Appropriate post hoc analyses will be employed for any subscales with an overall significant difference among the means.

If quadratic or linear trends do not exist for each subscale, weight categories will be combined into 2 or 3 groups for analysis of variance tests after determining that group combinations are statistically legitimate with t-test comparisons.

Research Question Two. How will overweight and obese children be regarded by their peers compared to non-overweight children?

Hypothesis Two. It is hypothesized that higher rates of rejection and neglect will be found for obese and overweight children.

Analysis. A chi-square test will explore differences between weight groups (IV₁, 4 levels) in relation to peer status (DV, 5 levels). If significance is found, post-hoc analyses will proceed to confirm the source of differences.

Research Question Three. How will status among peers relate to self-esteem?

Hypothesis Three. A significant difference between groups is hypothesized such that rejected and neglected children will have lower self-esteem than other groups.

Analysis. A one-way ANOVA will explore differences between peer groups (IV, 5 levels) on measures of both global and dimensional self-esteem (DV). Peer status groups will be combined and reanalyzed if the initial ANOVA is non-significant and t-test comparisons between the groups to be combined are non-significant.

Research Question Four. Why and when are weight and self-esteem related?

Hypothesis Four (a). It is hypothesized that ratings by one's peers explain, either partially or fully, why BMI-for-age-% and self-esteem are related, if they are. A partial mediation is hypothesized indicating that peer ratings explain some of the variance in self-esteem predicted from weight.

Analysis. Mediation will be tested in accordance with Baron and Kenny's (1986) four-step method. Thus, as a first step, bivariate correlations were computed between all independent variables, mediators, and dependent variables (See Table 2). Mediation will be tested in instances when all three are significantly correlated.

Hypothesis Four (b). It is hypothesized that children who are overweight and have a rejected and/or neglected peer status will have lower self-esteem than children who are overweight but have average or popular status among their peers. Specifically, a moderation effect is predicted. Overweight children with rejected and/or neglected peer status will have the lowest self-esteem of the sample. Note that hypothesis 4b will be tested even if hypothesis 1 is not supported, because a significant relation between weight and self-esteem might exist only within negative peer status groups, in which case a main effect of weight on self-esteem would be small or non-existent.

Analysis. A two-way analysis of variance will be used to test for a moderating effect of sociometric status between weight and self-esteem (IV_1 [weight status with 4 levels] by IV_2 [sociometric status with 5 levels]; DV=Self-esteem). If this initial analysis is insignificant, sociometric status groups and weight groups will be combined to test for differences between collapsed groups where t-tests ensure that group combinations are not problematic statistically.

Research Question Five. How do children classified as controversial by their peers compare to other children on measures of BMI and self-esteem? Exploratory analyses will test for possible relations to bolster the literature on this under-studied group.

CHAPTER III

METHODOLOGY

Participants

The present sample is composed of children in 1st grade classes from 29 schools. In total, 1043 children completed all components of the data collection process after active consent was gained from parents informing them of the intents and purposes of the study. European-American participants comprised 71% of the sample followed by Native American participants at 18%. Other ethnicities included Hispanic (3.8%), African American (2.3%), Multiethnic (2%) and Asian American (0.2%). Additionally, the sample had nearly equally numbers of gender: males (47.7%) and females (52.3 %). Reflecting the low socio-economic status of the sampled schools, 65% of the total number of children attending the schools qualified for the free or reduced-price lunch program. Additionally, a high proportion of obese and overweight children were present in the sample (34.4%). The average age of participants was 6.9 (sd = 0.41).

Procedure

As part of the larger study of the Families and Schools for Health project (Harrist, Page, Kennedy, Topham, Hubbs-Tait, Ledoux, & Longoria, 2007), sociometric interviews, child self-reports of self-esteem, and anthropometric data were gathered in the winters of 2005-2006 and 2006-2007. Data were collected on children at the schools in individual,

hour-long sessions with a trained research assistant (advanced undergraduate and graduate students). See Appendices A and B for actual measures used.

Measures

Sociometrics. Selecting from photographs of their participating classmates, children were asked to nominate three children whom they liked the most and three children they liked the least. *Social preference*³ and *social impact* scores were created from these nominations in accordance with the procedure outlined by Coie et al. (1982). Each of these scores (*liked most nominations*, *liked least nominations*, *social preference*, and *social impact*) was standardized for classroom, but not for age and gender. Using *social preference* and *social impact* scores, *sociometric statuses* were created with children designated as *popular* (many most-liked nominations and few least-liked), *average* (a few most-liked and a few least-liked nominations), *rejected* (many least-liked nominations and few most-liked), *neglected* (few total nominations and no liked most), or *controversial* (several nominations of both most and least-liked). The four indices of peer status (*peer ratings*) were correlated with other variables as appropriate to test for mediation. Consult Appendix A for the script of this measure and Appendix C for psychometric properties.

For the first cohort of participants, the average classroom size from which these data were collected was 20.1 with an average of 9.6 (sd = 1.24) of those children participating. In other words, 47.76 % of children available to participate did, in fact, take part. Participation rates ranged from 20% to 83.33 % per classroom, and classrooms with fewer than four children participating in sociometric interviews were excluded from analyses. Although participation rates are not yet available for the second cohort, the

average number of children participating per class was 10.99 with a minimum of 6 and a maximum of 20 (sd = 3.63).

Anthropometrics. Height was measured to the nearest tenth of a centimeter. To ensure validity in this measure, a research assistant measured each child at least two times. If these measurements did not agree within 0.3 centimeters (due to slouching, wiggling, etc.), a third measurement was taken and an average of the three measurements was utilized. Using an electronically calibrated scale, weight was measured to the nearest tenth of a pound. This height and weight information was then translated into *BMI-for-age-%* scores. Four weight statuses were considered: (a) Children at or above the 85th percentile and lower than the 95th percentile received a designation of *overweight* (17.7%); (b) Children at or above the 95th percentile for children of the same age and sex were categorized as *obese* (16.8 %; CDC, 2009); (c) Children in the 75th to 85th percentile are referred to as the *high reference range* (17 %); and (d) The remaining children are classified as the *normal* weight status (52.4 %). See Appendix D for information on the calculation of BMI and a discussion on the exclusion of underweight children (*BMI-for-age-%* at 10th percentile or less; Ogden, Kuczmarski, Flegal, et al., 2002).

Pictorial Scale of Perceived Competence and Social Acceptance (PCSA).

The PCSA (Harter & Pike, 1984) is a 24-item scale assessing child self-perception consisting of four subscales. In the current study, the following three subscales were used: *perceived cognitive competence*, *perceived physical competence*, and *perceived peer acceptance*. A *global esteem* scale was obtained from the mean of these three scales and the subscale of maternal acceptance (Windecker-Nelson, Melson, & Moon, 1997). The PCSA was administered to each child with visual cartoon anchors representing each

question as appropriate to the child's gender. Cronbach's alphas were calculated for the subscales of interest and the global scale: *perceived cognitive competence*, $\alpha = .72$; *perceived peer acceptance*, $\alpha = .79$; *perceived physical competence*, $\alpha = .56$; and *global esteem*, $\alpha = .74$. These indexes of internal consistency are consistent with those reported by Harter (Appendix E). The script for this measure can be found in Appendix B while additional information on procedure and psychometrics is available in Appendix E. Mean self-esteem scores delineated by sociometric status and weight status can be found in Table 1.

CHAPTER IV

FINDINGS

Testing of Hypotheses and Research Questions

Research Question One (a), Hypothesis One. Four *á priori* trend analyses were employed to test for differences among *weight statuses* on the dimensional aspects of *self-esteem*. Trend analysis is a specialized case of analysis of variance used to test planned theoretical comparisons. Herein, it was selected to test for a potential curvilinear or linear relation between levels of weight (4) and mean scores on the PCSA subscales. A quadratic trend for the relation between *weight status* and *perceived physical competence* approached significance [$F(1, 1039) = 3.79; p = .052$]. Figure 1 illustrates the general trend for physical competence to decrease with increased weight but lower *physical competence* for *normal* children versus the *high reference range* being the source of the marginally significant quadratic trend. However, the linear trend was significant [$F(1, 1039) = 9.82; p = .002$; Partial $\eta^2 = .013$], with *perceived physical competence* decreasing as *weight* increased in this sample. Additionally, Tukey pair-wise comparisons revealed that *obese* children were significantly lower in *physical competence* than both the *high reference range* ($p = .02$) and the *normal* weight group ($p = .003$). No significant quadratic or linear trends were observed for the remaining subscales. Thus, group combinations proceeded to test for differences between group means as found in Appendix G.

Research Question One (b). Trend analysis was also conducted to test for a trend between *weight status* and *global esteem*. The initial tests for a quadratic or linear trend were not significant. See Appendix G for analyses with group combinations.

Research Questions Two, Hypothesis Two. To test for differences in frequencies of the 5 *sociometric statuses* among *weight statuses*, a chi-square analysis was computed, and an overall significance was observed ($\chi^2 = 25.82$, $df = 12$; $p = .011$). Post-hoc standardized residual scores were then calculated for each cell to determine the contributing sources of this significance. Scores beyond ± 1.96 were interpreted as significantly different from the expected values at the 95% confidence level. *Obese* children were significantly more likely to be *neglected* ($Z = 2.9$) and significantly less likely to be *popular* ($Z = -2.4$) than other children. Four additional frequencies approached significance compared to expected values: *obese* children were marginally less likely to be *controversial* ($Z = -1.9$); *normal* weight children were marginally more likely to be *popular* ($Z = 1.9$); and both the *high reference range* ($Z = -1.6$) and the *normal* children ($Z = -1.7$) were marginally less likely to be *neglected*. No other significant group differences were found. Hypothesis 2 was therefore partially supported with *obese*, but not *overweight*, children being more likely to be *neglected* but neither group more likely to be *rejected*. The finding that *obese* children were less likely to be *popular* was not predicted but will be of conceptual interest.

Research Question Three, Hypothesis Three. Four one-way ANOVAs assessed differences among the five *peer statuses* on the subscales of *self-esteem* and

global esteem. No significant differences were found. Analyses with group combinations can be found in Appendix G.

Research Question Four, Hypothesis Four (a), Mediation. Correlations between the independent variable (*BMI-for-age-%*), potential mediators (*peer ratings*), and dependent variable (*self-esteem*) were examined to determine where mediation could be tested (See Table 2). A test for mediation proceeded for the measure of *physical competence*, as this was the only measure of *self-esteem* significantly correlated with *BMI-for-age-%*. In accordance with Baron and Kenny's (1986) method, the data were then examined in four steps. First, did *BMI-for-age-%* (IV) predict *peer ratings* (the potential mediator)? Linear regression analysis showed that *BMI-for-age-%* significantly predicted the peer rating of *liked most nominations* [$F(1, 1041) = 26.79, R^2 = .03, p = .000$]. For the second step, did *BMI-for-age-%* (IV) predict *physical competence* (DV)? A test of linear regression of *BMI-for-age-%* (IV) and *physical competence* (DV) revealed that *BMI-for-age-%* did, in fact, predict *physical competence* [$F(1, 1041) = 4.49, R^2 = .004, p = .03$]. Additionally, to satisfy the third condition, did *liked most nominations* (the mediator) predict *physical competence* (DV)? *Liked most nominations* did predict *physical competence* [$F(1, 1041) = 5.05, R^2 = .005, p = .03$].

Multiple regression was employed to test for full and partial mediation in this fourth step by entering the independent variable of *BMI-for-age-%* as the final step and comparing the amount of variance accounted beyond *liked most nominations* to the amount of variance accounted for without controlling for *liked most nominations*. Prior to controlling for *liked most nominations*, *BMI-for-age-%* predicted *physical competence* at a significance level of .034 ($R^2 = .004$). After controlling for *liked nominations*, the

significance of *BMI-for-age-%* in predicting *physical competence* beyond *peer liking* decreased to .074 ($R^2 = .008$; $\Delta p = .04$). To determine if this was a significant mediation, a Sobel test was conducted (Sobel, 1982). The beta weight for *BMI-for-age-%* in predicting *like most nominations* ($b = -0.006$, $s_b = .001$; path a), and the beta weight for *like most nominations* in predicting *physical competence* ($b = .038$, $s_b = .017$; path b) were entered into the Sobel equation. A test statistic value of -2.09 ($p = .036$) resulted. Thus, *liked most nominations* was deemed a partial mediator of the relation between *BMI-for-age-%* and *physical competence* (See Table 3).

Research Question Four, Hypothesis Four (b), Moderation. Potential moderation was tested regardless of the significant correlations between variables. To begin, each independent variable retained its original number of levels (*weight status* = 4 levels, *sociometric status* = 5 levels). Two-way analysis of variance yielded marginal significance [$F(11, 1024) = 1.63$; $p = .08$] for the interaction of *sociometric status* and *weight status* on the *physical competence* subscale (DV). No significant or marginally significant interactions were observed on the other scales of *self-esteem*. Group combinations for additional analyses were conducted and are reported in Appendix G.

Research Question 5. Of the significant findings in the previous analyses, only one was found relating to *controversial* children. *Obese* children were marginally less likely to be *controversial* ($Z = -1.9$).

CHAPTER V

CONCLUSION

Summary of Findings

The significant findings of this study are of interest and importance in understanding factors associated with obesity in young children. First, physical competence decreased with weight, yet no additional scales of esteem were related to weight in this age group. From this finding, speculation can be made concerning the relation between weight and self-esteem as it develops with age. Second, obese children were more likely to be neglected and less likely to be popular. This is the first research on sociometric status and weight in a sample of children of this young age and will be important for designing future research and intervention. Third, sociometric status did not relate to self-esteem. While reasons for lack of significance cannot be determined with certainty, it is possible that peer relations do not affect feelings about oneself at this age. Finally, peer ratings (like most nominations) mediated, but did not moderate, the relation between weight (BMI-for-age-%) and self-esteem (physical competence). Implications for the explanation of this relation will be discussed.

Physical Competence and Weight

A significant relation between weight and perceived physical competence was found while relations between other aspects of self-esteem and weight were not observed.

This coincides with the findings of Braet et al. (1997) who report significantly lower physical competence for clinical and non-clinical obese (mean age \approx 10) children compared to children of normal weight. Phillips and Hill (1998) also found significantly lower athletic competence for obese 9-year-old girls but no differences on scholastic competence, social acceptance, and global self-worth. Given the young age of the current study's sample, it could be that physical competence is the first dimension of self-esteem to be negatively affected by weight and that intervention at this step could eliminate the spread of negative feelings to other aspects of the self. This proposition would reflect studies finding significant differences in self-esteem in older children but not younger children (Erickson, Hahn-Smith & Smith, 2009; Mendelson & White, 1985) and increased internalizing problems with increasing BMI as children age (Bradley, Houts, Nader, O'Brien, Belsky & Crosnoe, 2008).

This significant relation is also notable in the context of many studies showing a negative relation between physical activity and weight and the positive association between weight and sedentary behavior (For a review, see Must & Tybor, 2005). A weak belief in the ability to successfully engage in physical activities may discourage obese children from doing so and thus contribute to the maintenance of obesity as they assume less active lifestyles. While the present study did not measure the likelihood to engage in activity, research (e.g. Hayes, Crocker and Kowalski, 1999) reports a positive relation between perceived physical self-worth and reported physical activity in a sample of young adults, especially for males. Additionally, Goldfield et al. (2007) found that overweight/obese children assigned to a trial designed to increase physical activity showed gains in physical self-worth. This association may be such that efforts to

improve physical competence may increase physical activity. Practical applications of this finding relate to the school setting as recess supervisors and physical education teachers need to encourage and reinforce activity for all students while designing activities (as much as is possible) that children of all sizes can partake in and enjoy without feeling self-conscious.

In regards to this study's exploratory interest in children of the high reference range, it should be noted that this group was more similar in physical competence to normal weight children than obese children. In fact, children in the high reference range exhibited the highest perceived physical competence of any group, although not significantly higher than the normal weight and overweight groups. Thus, the findings of this study do not indicate increased socioemotional risk for 1st-grade children in the 75th to 85th BMI-for-age-% range.

Sociometric Status of Obese Children

Neglect. As predicted based on conceptual grounds (i.e., empirical studies of neglect and weight largely absent from the literature), obese children were significantly more likely to be neglected by their peers than children of other weight statuses. To obtain this designation, a child received absolutely no liked-most nominations from their peers reflecting a very low visibility in the peer context. While the number of neglected children in this sample was low ($n = 16$), obese children comprised nearly half that number ($n = 7$). Given that higher rates of rejection were not found for obese children, it seems that neglect and rejection are differentially related to weight in this sample. Obese children appear not to be more disliked by their classmates but, instead, overlooked.

The experience of neglect for obese children is worthy of consideration. A meta-analysis by Newcomb, Bukowski, and Pattee (1993) revealed that although neglected children were low in aggression and disruptive behaviors, they were less likely to have social interactions, less likely to enact positive social actions, less likely to possess positive social traits, and more likely to exhibit withdrawal than average children. The causality of these associations is indeterminate, but it is possible that being neglected by one's peers promotes these outcomes. While not all researchers agree that neglect is an at-risk group for negative socioemotional outcomes, no research is yet available on the potential risks of being obese and neglected. This combination could be particularly harmful considering the literature on obesity and loneliness.

For example, one study found that loneliness mediated the link between peer relations and physical activity in a clinical sample of overweight and obese children (Storch, Milsom, DeBraganza, Lewin, Geffken, & Silverstein, 2007). Additionally, lonely adults tend to have higher BMIs than non-lonely adults and are significantly less likely to desire weight loss through physical activity (Lauder, Mummery, Jones & Caperchione, 2006). Thus, the relation between weight and peer relations could be bidirectional. Obese/neglected children do not have many friends and are, therefore, potentially lonely. As a result they are less likely to engage in physical activity, which contributes to the maintenance of their weight problem. As they remain obese, they may continue to be lonely and overlooked by peers.

Another significant difference in weight statuses that was found is that obese children were less likely to be popular than children of other weight statuses. Although this was not predicted, it is of conceptual interest. Of the 90 children identified in the

study as popular, only 7 were obese. Additionally, normal weight children were those most likely to be reported as popular, approaching significance ($Z = 1.9$). While, again, it cannot be definitively known if popularity results in positive outcomes or if positive personal characteristics result in popularity, the beneficial aspects of this sociometric status seem to be more common for normal weight than obese children. The results of a meta-analysis by Newcomb, Bukowski, and Pattee (1993) reveal that positive attributes of sociometric popularity include high social ability, high cognitive ability, increased social problem-solving, positive social traits, and increased friendships relative to other statuses. Popular children also scored low in aggression, withdrawal, disruptive behavior, and loneliness. There are at least two speculative potential reasons why obese children were less commonly found in the popular status: a) obese children may be lacking in the skills to become popular or, alternatively, b) they may be deprived of the opportunity to develop positive characteristics because of low frequency of interactions with peers.

Although no differential hypotheses were made for overweight and obese weight statuses, differences between the two groups were evident in the study's findings. Together, the findings on physical competence and sociometric status suggest that the experience for obese children is different from that of overweight children. Overweight children did not exhibit any undesirable outcomes (lower self-esteem or increased rejection/ neglect) while obese children did. One speculative reason could be that appearance of overweight children is not visually extreme enough to elicit a differential rating from peers, particularly at this age. In other words, children of this age may see obese, but not overweight, children as different. This could be true for both the children

providing ratings and the overweight children themselves. Supporting this idea, Israel and Ivanova (2002) found lower physical competence for highly overweight (mean overweight = 71.63%) but not moderately overweight (mean overweight = 38.36%) 8-to 14 –year-old females. Perhaps interventions targeted at overweight children to prevent movement into the obese category would be influential in averting deleterious social experiences for heavier children. Additionally, it could be that programs designed for obese children to promote maintenance of weight as they age (versus the normal increase of weight with age) could be socially beneficial. An improvement in social experience could subsequently foster an environment for the reduction of overweight and obesity. While this may seem a common sense approach, it is encouraging that intervention and prevention programs may not need to move mountains to have influence.

Despite the fact that it is becoming common to forego the use of sociometric categories in favor of continuous measures of peer status (e.g., de Bruyn & van den Boom, 2005; Wang et al., 2006), these findings support the retention of the use of sociometric statuses in peer relations studies, as the utilization of continuous social preference would not detect this specific difference. More specifically, it seems that being rejected and neglected are two distinct experiences that the use of continuous measures would not detect. Being low in social preference, for example, could describe either neglected or rejected children, and analyses would miss the differential relation of these statuses to weight.

Rejection. Counter to predictions, neither the obese nor overweight group was more rejected by their peers compared to other weight statuses. This is an important finding given the lack of research on this topic for this age group. One reason could be

the increasing trend to obesity, particularly in this sample (e.g., children in the current study were on average 10 pounds heavier than the national average for first graders). Social comparison theory posits that people tend to judge themselves in relation to those proximal to them when objective standards are unavailable (Festinger, 1954). Based on this premise, rejection of obese/ overweight children may not occur due to their high numbers in the peer group. For example, it might be more difficult to form negative comparisons of 34 % of your class (the percentage of overweight and obese in this sample) than 17 % of your class (the national average). When evaluating peers through comparisons with the self (process according to social comparison theory), the number of familiar overweight/obese children may override the thought that 'fat is bad.' While this is not consistent with the findings of Cramer and Steinwert (1998) mentioned previously, it is a preliminary conjecture for why heavy children were not disliked by their peers. Applying this theory to the neglect findings previously discussed is also problematic at first consideration. However, it could be that the social comparisons made to evaluate overweight peers do not find them different enough to reject (due to their high frequency) but also do not find them similar enough to accept (due to a overarching obesity stigma). This finding is important in relation to the abundance of stigma literature assessing attitudes toward obesity based on hypothetical situations and generated pictures discussed in the review. Based on such studies, rejection of obese children would certainly be assumed. The lack of corroboration by the present study suggests that there is a difference between a general obesity stigma and feelings about overweight and obese persons they actually know. Additional research is needed to replicate these findings.

A final consideration on this topic concerns that of gender. It is possible that gender may play a role in weight's relation to peer status such that being overweight or obese is more likely to result in rejection/neglect for one gender versus the other. Future research should also consider this possibility.

Future Study of Rejection and Self-Esteem. Other future study should also compare the rates of rejection of overweight and obese children in relation to the proportion of overweight and obese children present at a particular school to test the social comparison explanation. It could be that overweight/ obese children are rejected in schools of lower average weight. Multilevel modeling could be used to compare this phenomenon between schools of different weight distributions. Self-esteem of overweight/obese could be more affected in schools where it is less common to be obese. Additionally, more rejection and neglect of overweight and obese children may be found at these same schools.

Sociometric Status and Self-esteem

The lack of any differences between sociometric statuses on self-esteem in this study is important given the small number of studies on sociometric status and self-esteem available on this age sample. The findings of no differences between neglected and average children by Bovin and Begin (1989) are supported by the present study and expanded by also finding no differences between average and rejected children. While this study did not endeavor to separate rejected children into low and high self-esteem as Bovin and Begin did, no significant between group differences were found (lowest p value = .176). Perhaps low sociometric status has more bearing on alternate socioemotional outcomes not considered here or combines with other factors to affect

children rather than in a direct fashion. For example, a study conducted in Norway found that peer acceptance predicted loneliness, which, in turn, predicted self-esteem (Sletta, Valås, Skaalvik, & Søbstad, 1996). Additionally, other measure of peer relations may be more predictive of self-esteem than sociometric status. Bishop and Inderbitzen (1995) found that reciprocal friendships were a more important predictor of self-esteem than sociometric status for adolescent children. Future studies should examine the differential influence of these variables on self-esteem in children of this aged sample.

A final explanation is possible for the lack of a relation between sociometric status and self-esteem in this study. An experimental manipulation of a child's sociometric status by Nesdale and Lambert (2007) did not elicit changes in the children's self-esteem. By setting up a situation in which one child was "rejected" due to his inadequate artwork, these researchers were able to observe the influence of the rejection experience on self-esteem. Observations of increased negative affect were significant while self-esteem was not significantly changed for children in the experimental "rejected" group. This suggests that any effect of sociometric status on self-esteem may be due to repeated exposure of negative peer experience rather than isolated incidences. As the children in this sample are young and relatively new to the peer context, rejection/neglect may not yet have accumulated to influence children's evaluation of self. If this is the case, peer interventions designed to decrease rejection and neglect may be most beneficial at young ages such as this before peer status has time to interfere with the child's view of the self. Research is needed to replicate and support this possibility.

Mediation

Evidence supported the hypothesis of peer ratings as a partial mediator between weight and physical self-esteem. The significance of the effect of weight on physical competence was most reduced after controlling for the effect of liked most nominations. In line with the findings of Davison and Birch (2002), an indicator of peer experience partially explained why BMI and perceived physical competence were negatively related. This suggests that promoting friendships for obese children may decrease the effect of BMI on perceived physical competence. Increased physical competence may in turn result in more physical activity for obese children. However, this mediation should be interpreted carefully due to the low (but significant) amount of variance BMI accounts for in physical competence to start with and the relatively small reduction in the significance of this equation after controlling for liked most nominations.

Besides providing partial support for the conceptual model of peer relations as a process mechanism between weight and self-esteem, this mediation suggests that there is an experiential difference between the number of times you are selected as a friend by classmates compared to the scores of social preference (liked most nominations minus liked least nominations) and social impact (liked most nominations plus liked least nominations). This suggests that future studies on reciprocal friendships may be valuable for researchers desiring to more fully understand the relationship between weight and socioemotional outcomes.

Moderation

Sociometric status did not moderate the relation between weight and self-esteem as expected. Thus, peer status partially explained why BMI and perceived physical competence are related but not when they are related. Although neglected obese children had the lowest physical competence, this was not a significant finding. Additional study is needed to see if the association between weight/ peer status with self-esteem varies with age.

Strengths and Limitations

Strengths of the present approach should be noted. First, the large size of the sample allowed the researcher to gain an adequate number of obese children of interest and non-obese peers to compare on sociometric ratings. An additional strength as mentioned previously is this study's use of real assessments of obesity stigma that allow us to understand how the obesity bias is enacted in the peer groups of actual rather than hypothetical children. While past studies were certainly strong and numerous enough to say that an obesity stigma exists, the present study augments the literature by providing a realistic assessment. Finally, the evaluation of self-esteem on multiple dimensions is a strength of this study. This will shed light on the conflicting studies of the association between childhood obesity and self-esteem by illuminating which aspects of self-perception are affected by obesity and which are not in 1st grade children.

Despite the strengths of this study, limitations should not be overlooked. In particular the effect sizes of the significant findings were low as reported and the distribution of children in sociometric and weight statuses was not normally distributed. Although a normal distribution in each of these cases wouldn't be conceptually expected

or desirable, it should be noted when interpreting the results. In some cases, this resulted in a low n for sociometric/weight group cells used in statistical analyses. Additionally, the participation rate per classroom was lower than might be desired. Crick and Ladd (1989) report that accuracy of classification declines as fewer children in the classroom provide nominations with 18% of children being misclassified at a participation rate of 50%. Ideally, a rate of 70% participation would have been obtained. Finally, Cronbach's alpha for the self-esteem scales ranged from .56 to .79 with the lowest of these being perceived physical competence, the only scale to show a significant relation with weight in this study. Although this is higher than the .50 reported by Harter and Pike (1984) for perceived physical competence, the low internal consistency should be considered.

Conclusions

Through the use of sociometric interviews, child-report, and collected anthropometric data, this study explored the relation between child BMI, peer status, and perceived self-competence. A significant relation between weight and physical competence was found, but associations between weight and others aspects of self-esteem were not present. An explanation for these differential relations is offered in an attempt to make sense of the mixed literature on obesity and self-esteem and what the present study adds. Concerning the peer status of overweight and obese children, obese children were found to be significantly more neglected and significantly less popular than children of other weight statuses. Additionally, being liked by peers mediated the association between weight and physical competence. This indicates that designing interventions to promote friendships for obese children may have a positive effect on the physical competence and, potentially, their likelihood to engage in physical activity. More

research is needed to confirm and fully understand the relation between these variables. Finally, group differences between sociometric statuses on self-esteem and an additive effect (moderation) of peer status on the relation between weight and self-esteem were not found. Overall, this study contributes to a better understanding of the psychosocial factors influencing the obese child and provides the first data on this topic in young children.

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APPENDICES

Appendix A

Sociometric Script

First, I would like to ask you about what you like to do. Tell me one of your favorite things to do.

[Pause. If the child fails to respond, suggest some activities like bike-riding or watching TV.]

[Record response.]

Tell me another thing you like to do.

[Record response.]

Great, that sounds like fun! Now, just as there are some things that you like and don't like to do, there are probably some kids you like to play with more than others. I want you to tell me how much you like to play with the other kids in your classroom. To answer these questions, you will use these pictures of the boys and girls in your class.

[Expose array of student pictures]

First I'd like you to find your picture in the group. When you've found your picture, point to it and tell me your name.

[Pause. Remove child's picture from array and place aside.]

You found it. [Look at child's picture.] Wow! That's a great picture.

Now, when answering the questions I ask you, you will use the pictures of the students in your class, and if you can, you will tell me their name. Okay?

[Pause. Now check to make sure no child is missing from the pictures or if someone has moved away, their picture is not there]

Let's make sure there's nobody you can think of in your class whose picture is missing... do you see anybody missing? And has anybody in these pictures moved away? [Adjust pictures as needed.] Great, then, let's get started.

Nomination: Like to play with the most.

Let's begin. Everybody has some people that he or she likes to play with more than others. Which of the people in your class do you like to play with the most? Find their picture in this group of pictures. Remember, this is the person who you like to play with the most. When you find the picture, point to it and tell me the person's name if you can.

[Record answer and state name aloud to confirm their choice.]

Now I'd like you to pick out another child who you like to play with the most.

Point to their picture and tell me their name if you can.

[Record answer and state name aloud to confirm their choice.]

Now find just one more child who you like to play with very much. Point to their picture and tell me their name if you can.

[Record answer.]

- If child says a different name other than what is shown on the picture, say “Well, this is (child’s name shown on picture), not _____. Did you mean _____ or _____?”
- If more than one answer is given, record first three.
- If child says they like to play with everyone, say “Maybe you do like to play with everyone, but there are some kids you like to play with more than others.”
- If child states that they cannot choose a third person, encourage them by asking to find someone they would like to play with more than the others.
- If a child chooses a classmate who is not participating in the study, say "Gosh, I don't have their picture. Please pick someone else." After finished, stack the photos in a pile.]

Nomination: Like to play with the least.

Now, everybody has some people that he or she doesn't like to play with as much as others. Which of the people in your class do you like to play with the least?

Find their picture in this group of pictures. Remember, this is the person who you like to play with the least. When you find the picture, point to it and tell me the person's name if you can.

[Record answer and state name aloud to confirm their choice.]

Now I'd like you to pick out another child who you like to play with the least.

Point to their picture and tell me their name if you can.

[Record answer and state name aloud to confirm their choice.]

Now find just one more child who you don't like to play with as much as others.

Point to their picture and tell me their name if you can.

[Record answer.]

- If child says a different name other than what is shown on the picture, say
“Well, this is (child’s name shown on picture), not _____. Did you mean
_____ or _____?”
- If more than one answer is given, record first three.
- If child says they like to play with everyone, say “Maybe you do like to play
with everyone, but there are some kids you don’t like to play with as much as
others.”
- If child states that they cannot choose a third person, encourage them by
asking to find someone they like to play with less than the others.
- If a child chooses a classmate who is not participating in the study, say "Gosh,
I don't have their picture. Please pick someone else." After finished, stack the
photos in a pile.]

Appendix B

The Pictorial Scale of Perceived Competence and Social Acceptance Script

I am going to ask you some questions about yourself, and about ways that you're like other kids, and ways that you're different from other kids. [Get out picture plates and prompts, and continue script as written.] I have something here that's kind of like a picture game..." [Rest of script is included with measure, approved by IRB previously.]

[Read intro and script from separate bound booklet]

*Note that the "Boys" script was exactly the same with correctly gendered nouns.

This girl (girl's)...

... is usually kind of happy/ usually kind of sad

1. isn't very good at numbers/ is pretty good at numbers.
2. has lots of friends to play with/ doesn't have very many friends to play with.
3. isn't very good at swinging by herself/ is pretty good at swinging by herself.
4. mom usually doesn't let her eat dinner at friend's houses/ usually lets her eat dinner at friend's houses.
5. knows lots of things in school/ doesn't know very many things in school.
6. A few kids share their toys with this girl/ Pretty many kids share their toys with this girl.
7. pretty good at climbing/ isn't very good at climbing.
8. mom takes her to a lot of places that she likes to go/ doesn't take her to very many places she likes to go.
9. isn't very good at reading by herself/ is pretty good at reading by herself.

10. has pretty many friends to play games with/ doesn't have a lot of friends to lay games
with.
11. isn't very good at bouncing the ball/ is pretty good at bouncing the ball.
12. mom cooks a few of the foods she likes/ cooks a lot of the foods she likes.
13. is pretty good at writing words/ isn't very good at writing words.
14. doesn't have very many friends to play with on the play-ground/ has lots of friends to play with on the playground.
15. is pretty good at skipping/ isn't very good at skipping.
16. mom reads to her a little/ reads to her a lot.
17. isn't very good at spelling words/ is pretty good at spelling words.
18. usually gets asked to play with the other kids/ gets lonely sometimes because the other kids don't ask her to play
19. can't run very fast/ can run pretty fast.
20. mom usually lets her stay overnight at friend's houses/ usually doesn't let her stay overnight at friend's houses.
21. pretty good at adding numbers/ isn't very good at adding numbers.
22. A few kids want to sit next to this girl/ A lot of kids want to sit next to this girl.
23. pretty good at jump rope/ very good at jump rope.
24. mom likes to talk with her a lot/ likes to talk with her a little.

Appendix C

Sociometrics

Coie et al., (1982) conducted test-retest reliability on this construct over a 12-week period. Pearson product-moment correlations for the sociometric variables of interest to this study (like most and like least scores) were each .65. After summing the “like most” and “like least” nominations, each total was standardized to account for differing class sizes. To create social preference scores, “like-least” scores were subtracted from “like-most” scores. To create social impact scores, “like least” and “like-most” scores were summed. For both social preference and social impact scores, standardization occurred again within classroom to return the scores to a reflection of the normal distribution. Sociometric categorization followed the recommendations outlined by Coie et al., (1982) with the uses of obtained social preference and social impact scores.

Appendix D

Anthropometrics

BMI will be calculated using the BMI-for-age-% formula whereby the child's weight in kilograms is divided by the child's height in meters squared. Epi Info software will be used to perform these calculations (CDC, 2006). Children at or lower than the 10th percentile will be excluded from analysis as underweight children may have different *self-esteem* and peer acceptance than normal weight children. Exclusion of this group will avoid overlooking differences between overweight and normal *weight statuses* due to the possible skew obtained by including underweight children.

Appendix E

Pictorial Scale of Perceived Competence and Social Acceptance (PSCA)

Children answered the questions in two parts. First, two statements were read aloud that corresponded to opposing pictures presented to the child. For example, “This child is good at math. This child is not good at math.” The child then indicated which statement was most like him or her by pointing to the picture that represented his or her thoughts. Once the child indicated a response, he/she was asked if the child in the statement was sort of like or really like him/her. Each response was scored on a 4-point scale with the most positive extreme (e.g., good at activity and really similar to the child in the picture) given a score of 4 points and the most negative extreme (e.g., not good at activity and really dissimilar from the child in the picture) receiving 1 point. For each subscale, the item scores are averaged across the six items. The Harter Pictorial was developed specifically for and validated with children age 4 to 7. When subscales are factor loaded into the scales of General Competence and Social Acceptance, reliabilities fall in the range of .75 to .89. Specifically, the Cognitive Competence subscale exhibits a reliability of .71 with 1st graders; the Physical Competence subscale shows reliability of .50; and the Peer Acceptance scale displays a reliability of .78. For the total scale, reported reliability is .87 for children in the first grade. Convergent, discriminative, and predictive validity tests indicate that children give accurate judgments of their self-competence based on outside behavioral observations and self-report, and that perceived competence (similar to that of the teacher) accurately predicts behavior (Harter & Pike, 1984).

Appendix F

Summary of Self-esteem Studies

| Author(s) | Measure | Findings |
|---------------------|--|--|
| Allon | Qualitative Interviews | Overweight lower in self-competence |
| Braet et al. | PSCA | Overweight lower in physical competence and general self-worth |
| Erickson | P-H CSC | No significant difference between 3 weight groups on global self-esteem. |
| Israel and Ivanova | PCSC | Highly overweight reported lower self-esteem than moderately overweight (Ages 8-14). |
| Krahnstoever | PSCA | Overweight girls lower on cognitive ability but not physical competence (Age 5). |
| Mendelson and White | CSEI and BES | Youngest age had similar self-esteem across weight. Middle age showed lower self-esteem for obese boys, but not girls. Oldest group shows lower self-esteem for obese girls but not boys. |
| Pastore et al. | RSE | No significant difference between weight groups on global self-esteem among adolescents. |
| Pierce and Wardle | P-H CSC | Significantly lower self-esteem for obese. |
| Sallade | "Way I Feel About Myself" Scale | Obese did not show poorer emotional adjustment. |
| Strauss | Self-Perception Profile for Children and 2 PSCA scales | No differences in global or scholastic competence (Age 9-10). Longitudinal decrease in global self-esteem for obese. Significantly lower self-esteem by age 13-14 for obese (more for girls not boys). Greater effect on Hispanic and Caucasian girls. |
| Wadden et al. | P-H CSC | No significant differences across weight groups. |
| Wake and Waters | 6 items for Australian Child Health Questionnaire | Significantly lower self-esteem for obese. |

Appendix G

Analyses with Group Combinations.

Hypothesis One (a). Due the lack of statistical differences and the lack of a strong conceptual rationale to expect differences on *cognitive competence* [$t(1, 681) = 1.42, p = .16$] and *peer acceptance* [$t(1, 358) = .54, p = .41$], children in the high-reference range were combined with the *normal* weight group, and two one-way ANOVA analyses then tested for differences (IV = weight, 3 levels; DV = *perceived cognitive competence* and *perceive peer acceptance*). No significant differences were found among the three *weight statuses*. Additional collapsing of the *weight statuses* was conducted after employing *t*-tests to ensure that there were no differences between *overweight* and *obese* children on the remaining subscales to preclude their combination. *Overweight* and *obese* children were not significantly different on *cognitive competence* [$t(1, 358) = -.41, p = .68$] or *peer acceptance* [$t(1, 358) = -.77, p = .44$] and were thus combined into one group. Two one-way ANOVAs tested for differences between *weight statuses* (2 levels) on these subscales. No significant differences were found. Thus, Hypothesis One (a) was supported for only *obese* children on the measure of *physical competence*.

Hypothesis One (b). The *high reference range* was combined with the *normal* weight status after determining that these children were not different on *global esteem* [$t(1, 681) = .59, p = .56$]. An ANOVA with combined groups (3 levels of *weight status*) then revealed no significant differences on *global esteem*. *Weight statuses* were combined as before with *overweight* and *obese* children collapsed into a single group due to the lack of difference between mean scores of *global esteem* [$t(1, 358) = -1.48, p = .14$].

14]. This ANOVA also revealed no significant differences between groups (2 levels of *weight status*).

Hypothesis Three. The *average* and *popular* groups were combined for additional analyses (IV= *sociometric status*, 4 levels) after determining that they were not significantly different on each subscale and *global esteem*: *perceive peer acceptance* [$t(1,896) = -1.91, p = .85$]; *perceived cognitive competence* [$t(1, 896) = 1.27, p = .21$]; *perceived physical competence* [$t(1, 896) = -.43, p = .67$]; and the *global esteem* [$t(1, 896) = .64, p = .52$]. ANOVA analyses yielded no significant differences on each subscale or the global measure. A final combination of *sociometric statuses* was then made such that the *rejected* and *neglected* children were combined into one group and compared with the *average* and *popular* children in the other group (IV= *sociometric status*, 2 levels) with *controversial* children being excluded. This combination was considered statistically legitimate due to the lack of differences between *rejected* and *neglected* children on the indices of *self-esteem*: *perceived peer acceptance* [$t(1,106) = 1.52, p = .13$]; *perceived cognitive competence* [$t(1, 106) = -.78, p = .44$]; *perceived physical competence* [$t(1, 106) = .84, p = .40$]; and *global esteem* [$t(1, 106) = .92, p = .34$]. ANOVA analyses with the combined groups produced no significant differences between the two groups. These results suggest that the null hypothesis for Hypothesis three should not be rejected. *Sociometric statuses* were not different on measures of *self-esteem*.

Hypothesis Four (b), Moderation. The *average* and *popular* sociometric statuses were combined due to the lack of a conceptual or statistical reason ($t(1, 896) = -.43; p = .67$) to expect differences on this measure for these groups. A 4 x 4 ANOVA

was then conducted. The interaction of *weight status* and *sociometric status* was significant after this combination [$F(8, 1028) = 1.96, p = .05$]. However, a Levene test for homogeneity of variance [$F = 2.159, p = .005$] revealed that analysis of variance was not an appropriate statistical test for this interaction, as equal variances across cells were not found. In particular, the number of *rejected* participants in the *high reference* group was equal to zero. Attempts to overcome this issue were made by collapsing groups. Comparisons with *t*-tests revealed there were no significant differences between the *high reference range* and the *normal weight* group on the measure of *physical competence* [$t(1, 681) = .36, p = .72$]. As such, this combination was deemed statistically valid and a 4 x 3 ANOVA was conducted. While this combination eliminated the cell with zero participants, the Levene test remained significant ($p = .01$) and the interaction of weight and sociometric status became non-significant [$F(1, 1031) = 1.563, p = .16$]. Additional combinations of weight and sociometric groups were not able to overcome either of these problems. Thus, the significant 4 x 4 interaction was judged as due to anomalies of heteroscedasticity and unequal *n* between cells.

The two combinations mentioned (collapsing *average* and *popular* sociometric groups and *normal* and *high reference range weight statuses*) yielded no significant results for tests of moderation on *cognitive competence*, *peer acceptance*, or *global esteem*. Additionally, *sociometric statuses* and *weight statuses* were collapsed to two levels each to carry out extreme group comparisons. A positive *sociometric status* group was created by combining *average* and *popular* children. By contrast, a negative *sociometric status* group included *rejected* and *neglected* children. *Controversial* children were excluded from this analysis. *Weight statuses* were combined such that the

high reference range and *normal* weight group were conjointly contrasted against the group comprised of *obese* and *overweight* children. Statistical justification for combination of these groups is provided in earlier sections. Three 2 x 2 ANOVAs revealed no significant differences between extreme groups on measure of *perceive peer acceptance*, *perceived cognitive competence*, and *global esteem*.

Table 1

Mean Self-Esteem Scores by Sociometric and Weight Status

| | Normal | High Reference | Overweight | Obese | Full Sample |
|----------------------|----------------|----------------|----------------|----------------|----------------|
| Popular | | | | | |
| | <i>n</i> = 56 | <i>n</i> = 13 | <i>n</i> = 14 | <i>n</i> = 7 | <i>n</i> = 46 |
| PC | 3.41 (.46) | 3.46 (.54) | 3.24 (.54); | 3.41 (.47) | 3.40 (.50) |
| PA | 2.94 (.70) | 3.24 (.78) | 3.11 (.59) | 2.74 (.61) | 3.00 (.68) |
| CC | 3.22 (.54) | 3.53 (.56) | 3.07 (.56) | 3.24 (1.01) | 3.24 (.59) |
| GE | 3.04 (.40) | 3.28 (.46) | 3.00 (.35) | 2.95 (.57) | 3.06 (.41) |
| Average | | | | | |
| | <i>n</i> = 423 | <i>n</i> = 105 | <i>n</i> = 138 | <i>n</i> = 142 | <i>n</i> = 808 |
| PC | 3.41 (.49) | 3.37 (.49) | 3.39 (.55) | 3.21 (.50) | 3.37 (.51) |
| PA | 2.95 (.78) | 3.06 (.72) | 3.01 (.71) | 2.96 (.72) | 2.99 (.75) |
| CC | 3.33 (.60) | 3.38 (.61) | 3.34 (.59) | 3.29 (.63) | 3.34 (.59) |
| GE | 3.10 (.49) | 3.11 (.48) | 3.13 (.50) | 3.02 (.47) | 3.10 () |
| Controversial | | | | | |
| | <i>n</i> = 17 | <i>n</i> = 8 | <i>n</i> = 10 | <i>n</i> = 2 | <i>n</i> = 37 |
| PC | 3.34 (.58) | 3.53 (.42) | 3.65 (.33) | 3.57 (.33) | 3.47 (.48) |
| PA | 3.15 (.67) | 2.94 (.66) | 3.47 (.66) | 3.58 (.12) | 3.17 (.70) |
| CC | 3.44 (.42) | 3.27 (.62) | 3.62 (.56) | 3.58 (.35) | 3.45 (.49) |
| GE | 3.15 (.50) | 3.03 (.49) | 3.36 (.31) | 3.37 (.17) | 3.17 (.47) |

| | Normal | High Reference | Overweight | Obese | Full Sample |
|--------------------|----------------|----------------|----------------|---------------|-----------------|
| Rejected | | | | | |
| | <i>n</i> = 46 | <i>n</i> = 10 | <i>n</i> = 19 | <i>n</i> = 17 | <i>n</i> = 92 |
| PC | 3.29 (.63) | 3.70 (.34) | 3.12 (.78) | 3.37 (.61) | 3.33 (.64) |
| PA | 3.07 (.78) | 2.43 (.89) | 2.98 (.89) | 3.24 (.54) | 3.03 (.79) |
| CC | 3.13 (.76) | 3.38 (.68) | 3.26 (.58) | 3.30 (.58) | 3.23 (.70) |
| GE | 3.04 (.55) | 3.00 (.57) | 3.08 (.64) | 3.22 (.45) | 3.09 (.55) |
| Neglected | | | | | |
| | <i>n</i> = 5 | - | <i>n</i> = 4 | <i>n</i> = 7 | <i>n</i> = 16 |
| PC | 3.00 (.61) | | 3.42 (.48) | 3.14 (.67) | 3.17 (.57) |
| PA | 2.56 (.32) | - | 2.67 (.36) | 2.80 (.82) | 2.72 (.57) |
| CC | 2.87 (.91) | - | 3.50 (.27) | 3.64 (.54) | 3.35 (.69) |
| GE | 2.61 (.47) | - | 3.04 (.44) | 3.12 (.50) | 2.96 (.49) |
| Full Sample | | | | | |
| | <i>n</i> = 547 | <i>n</i> = 136 | <i>n</i> = 185 | <i>n</i> = 46 | <i>n</i> = 1043 |
| PC | 3.40 (.51) | 3.41 (.49) | 3.36 (.58) | 3.23 (.52) | 3.37 (.52) |
| PA | 2.96 (.77) | 3.03 (.75) | 3.03 (.72) | 2.98 (.71) | 3.00 (.75) |
| CC | 3.31(.61) | 3.39 (.61) | 3.33 (.60) | 3.31 (.64) | 3.32 (.61) |
| GE | 3.08 (.49) | 3.11 (.49) | 3.12 (.50) | 3.05 (.48) | 3.09 (.49) |

Note: PC= Perceived Physical Competence, CC= Perceived Cognitive Competence, PA = Perceived Peer Acceptance, GE = Global Esteem (includes Maternal Acceptance)

Table 2

Correlations among Self-Esteem Scales, Peer Ratings and BMI-for-age-%

| | PC | CC | PA | GE ^A | Like Most | Like Least | Social Preference | Social Impact | BMI |
|-----------------|------|-------|-------|-----------------|------------------|------------|-------------------|------------------|--------|
| PC | 1.00 | .45** | .38** | .69** | .07* | -.005 | .05 [†] | .06 [†] | -.10** |
| CC | | 1.00 | .42** | .74** | .05 [†] | -.02 | .05 | .02 | .009 |
| PA | | | 1.00 | .80** | .05 [†] | .02 | .03 | .06 [†] | .03 |
| GE ^A | | | | 1.00 | .04 | .01 | .02 | .04 | -.009 |
| BMI | | | | | -.19** | .07* | -.15** | -.11** | 1.00 |

** $p < .001$, * $p < .05$, [†] $p < .10$; N= 1043

Note: PC= Perceived Physical Competence, CC= Perceived Cognitive Competence, PA = Perceived Peer Acceptance, GE^A = Global Esteem (includes Maternal Acceptance)

* Correlations with BMI Z-scores revealed no additional significant relations.

Table 3

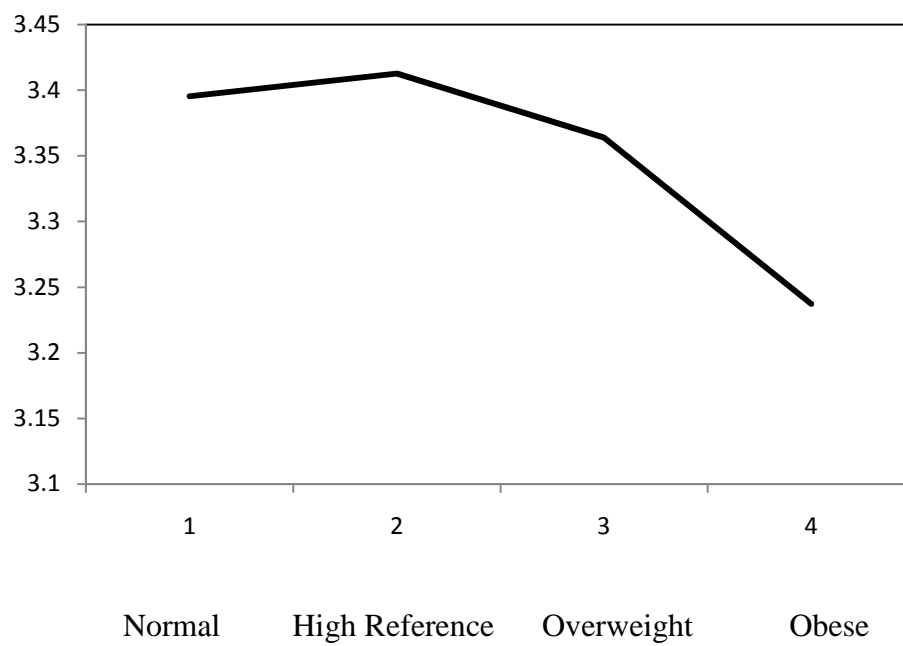
Regression Tests for Mediation of Liked Most Nominations between BMI-for-age-% and Perceived Physical Competence

| Predictor Variables | R^2 | ΔR^2 | F | F (final) |
|-----------------------------|-------|-------------------|-------|-------------|
| BMI | .004 | | 4.47* | |
| Liked Most Nominations (LM) | .005 | | 5.05* | |
| LM, BMI | .008 | .003 [†] | | 4.13* |

* $p < .05$, [†] $p < .10$

Figure 1

Trend between Weight and Perceived Physical Competence



ENDNOTES

¹ In this manuscript, overweight will be used as a noun (just as obesity) in accordance with the nomenclature of the nutrition literature (e.g., Overweight contributes to health problems). While this may seem awkward to the lay population, it is an accepted use of terminology.

²The terms obese and overweight are used in this manuscript to refer to two distinct weight statuses. Overweight refers to those children whose BMI ranges from the 85th to 95th percentile. Obese children are those who exceed the 95th percentile of BMI.

³ Social preference is a standardized index of the number of times a child is nominated as “least liked” subtracted from the number of “most liked” nominations from his or her peers. Social impact is a standardized index of the total number of nominations a child receives (“most liked” plus “least liked” nominations). Both social impact and social preference scores are required to place children in sociometric categories. No identified study employs this full method in analyzing the peer relations of overweight and obese children.

VITA

Taren M. Swindle

Candidate for the Degree of

Master of Science

Thesis: THE INTERACTION OF SOCIOMETRIC STATUS, WEIGHT, AND SELF-ESTEEM AMONG FIRST GRADE CHILDREN

Major Field: Human Development and Family Science

Biographical:

Education: Graduated from Greene County Tech High School, Paragould, Arkansas, in May, 2005. Received a Bachelor of Arts in Psychology from Harding University, Searcy, Arkansas, in July, 2008. Completed the Requirements for the Master of Science at Oklahoma State University, Stillwater, Oklahoma in December, 2009.

Experience: Employed by Oklahoma State University, Department of Human Development and Family Science, as a graduate research assistant, 2008 to present.

Name: Taren M. Swindle

Date of Degree: December, 2009.

Institution: Oklahoma State University

Location: Stillwater, Oklahoma

Title of Study: THE INTERACTION OF SOCIOMETRIC STATUS, WEIGHT, AND
SELF-ESTEEM AMONG FIRST GRADE CHILDREN

Pages in Study: 70

Candidate for the Degree of Master of Science

Major Field: Human Development and Family Science

Scope and Method of Study: Using sociometric interviews, child-report of self-esteem, and anthropometric data, this study explored the relations among child BMI, peer status, and self-esteem. In particular, the present study was interested in differences in self-esteem among weight status groups and sociometric statuses, and differences in sociometric status among weight groups. Additionally, peer status was explored as a process variable between weight (BMI) and self-esteem to determine if it explained or exacerbated the relation.

Findings and Conclusions: A significant linear trend was observed between weight and physical competence such that higher weight groups exhibited lower physical competence. Obese children were significantly lower in physical competence than the normal group and high reference range. Furthermore, obese, but not overweight, children were more likely to be neglected and less likely to be popular than children of other weight statuses. Neither the obese nor overweight group were more likely to be rejected. Finally, the standardized number of liked most nominations mediated the relation between BMI-for-age-% and physical competence indicating that BMI's relation with physical competence was in part explained by how well liked a child was by their peers. Together, these findings indicate that physical competence may be the first aspect of self-esteem to be affected by weight and that interventions should target this aspect of self-esteem in young children. Promoting friendships for obese children may also help to avoid decreases in physical competence.

ADVISER'S APPROVAL: Dr. Amanda W. Harrist
