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Obesity-Specific Health Related Quality of Life Assessment: Examining Caregiver-Child Agreement

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Obesity-Specific Health Related Quality of Life Assessment: Examining Caregiver-Child Agreement

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Abstract

Obesity-Specific Health Related Quality of Life Assessment: Examining Caregiver-Child Agreement

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The proposed study seeks to add to the literature surrounding the assessment of obesity-specific health related quality of life (HRQOL) among youth. Assessing this construct provides valuable information regarding the impacts of obesity on quality of life in childhood and adolescence. However, discrepant reports between caregivers and children can lead to difficulty in interpreting assessment data. Using multiple regression, this study will explore whether observed differences in caregiver and child reports of obesity-specific HRQOL can be predicted by caregiver and child variables in a treatment-seeking sample. Variables of interest include parenting stress, body mass index (BMI), age, and gender. Significant results may help clinicians develop hypotheses about the causes of discrepancies when conceptualizing cases.
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Chapter 1: Introduction

Childhood obesity has increased dramatically in the last few decades. Recent government estimates report an obesity rate of almost 20% among U.S. children and adolescents (Ogden & Carroll, 2010). Because of the numerous health risks associated with obesity, this trend has been met with increasing alarm, and calls for serious intervention are mounting.

The health effects of childhood obesity are well known, and include joint problems, type II diabetes, sleep apnea, and asthma, not to mention problems that occur later in life as a result of childhood obesity (Ebbeling, Pawlak, & Ludwig, 2002). Thus, children with obesity should receive medical intervention. However, in addition to effects on physical health, obesity has also been associated with negative psychological impacts for children and adolescents. For instance, children with obesity are more likely to have low self-esteem, disordered eating, and symptoms of depression (Davison & Birch, 2001; Erickson, Robinson, Haydel, & Killen, 2000; Strauss, 2000; Stunkard & Allison, 2003). Thus, the impacts of obesity on the lives of children are both physical and psychological in nature.

To say that obesity has negative effects on the psychological health of children and adolescents oversimplifies the nature of the relation between the physical and psychological aspect of the condition. Rather, evidence suggests that the connection between obesity and psychological problems is bidirectional (Puder & Munsch, 2010). This means that while obesity can cause psychological problems for children,
psychological problems also contribute to obesity via unhealthy eating and reduced physical activity. Because of this link, there have been increasing calls to integrate physical and psychological interventions for childhood and adolescent obesity (Barlow, 2007; Epstein, Myers, Raynor, & Saelens, 1998).

In order to treat young people with obesity effectively, and in an integrated manner, it is important to measure the extent to which their physical health and size affect their day-to-day functioning, or quality of life. To this end, a pair of questionnaires have been published which are designed to measure obesity-specific health-related quality of life (HRQOL) in children aged 5-13 years (Modi & Zeller, 2008; Zeller & Modi, 2009). The first measure, called Sizing Them Up, is a parent-proxy measure that produces both overall and domain-specific HRQOL scores. The second measure, called Sizing Me Up, is a child self-report measure with a similar purpose. As noted above, these measures build on the broader concept of health-related quality of life, a construct which has long been considered a useful indicator of disease impacts and treatment outcomes (Hennessy, Moriarty, Zack, Scherr, & Brackbill, 1994).

Although Sizing Me Up and Sizing Them Up provide valuable information to practitioners seeking to help children and adolescents with obesity, when used together they often result in discrepant scores, and correlations between parents’ and children’s scores on the measures range from small to moderate (Zeller & Modi, 2009). This finding does not mean that either informant’s scores are invalid or inaccurate. In fact, integrating diverse perspectives is precisely the purpose of multi-informant assessment. Rather, such disagreement between parents and children is common in the literature on HRQOL, and it
has been suggested that further research is needed on what variables might contribute to this disagreement (Upton, Lawford, & Eiser, 2008).

Using extant data from Guilfoyle, Zeller, and Modi’s (2010) investigation of the association between parenting stress and obesity-specific HRQOL, the present study seeks to explore variables that might be associated with the level of agreement between parents and children as they report on that construct. This information, in turn, may help practitioners in the valid interpretation of health data, as well as in the design and implementation of interventions for obesity in children and adolescents. The overall goal of this investigation is to enhance the utility of the Sizing Me Up and Sizing Them Up measures of obesity-specific HRQOL by elucidating discrepancies between parent-proxy and child self-report, as well as to increase the field’s understanding of variables that may predict these discrepancies.
Chapter 2: Integrative Analysis

This integrative analysis aims to provide an understanding of Health Related Quality of Life (HRQOL) as it relates to child and adolescent obesity. Further, it aims to explore variables that may affect how children and their parents differently perceive the HRQOL of youths with obesity. This section begins with a general discussion of the prevalence and treatment of child and adolescent obesity in the United States, as well as the relation between obesity and mental health. Next, the construct HRQOL is introduced, and the usefulness of this construct for assessing youth with obesity is explored. Finally, this section examines the problem of discrepant perceptions of HRQOL between youths and their parents, followed by consideration of several variables that may influence those perceptions. Taken together, these topics establish a rationale for a study examining some potential predictors of disagreement between parents and children on ratings of obesity specific HRQOL.

Obesity, HRQOL, and Parent-Child Agreement

Child and Adolescent Obesity: Physical, Psychological, and Treatment Considerations

Child and adolescent obesity is a pressing health problem facing the United States and many other nations. Body Mass Index (BMI), a measure of weight that is adjusted for a person’s height, is the most widely accepted metric of degree of overweight or obesity. BMI percentiles relative to age and sex are calculated as a means of comparing an individual’s BMI to other similar individuals. A person is considered “overweight” if they have a BMI between the 85th and 95th percentile for age and sex. A person is
considered “obese” if they have a BMI at the 95th percentile or higher for age and sex (Barlow, 2007). Recent data from the National Health and Nutrition Examination Survey (NHANES) clearly show that rates of child and adolescent obesity have been increasing, and have reached alarming levels. About 17% of children and adolescents in the United States are now obese, up from approximately 5% in the early 1970s (Centers for Disease Control and Prevention, 2008). While it is more pronounced in the United States, this trend appears to be worldwide (Ebbeling et al., 2002). Fortunately, data from the US, the UK, and Sweden provide evidence that the rate of increase may be slowing, at least in some western countries (Han, Lawlor, & Kimm, 2010). Because of the increase in the prevalence of obesity in children and adolescents, there has been an explosion of research exploring the etiology, presentation, and possible treatments of the condition. Despite this added attention, the epidemic of child and adolescent obesity remains largely unresolved.

The adverse health effects of obesity in youth are well documented. Immediate complications include cardiovascular problems, asthma, type-2 diabetes, and many other serious and debilitating conditions (Deckelbaum & Williams, 2001; Must et al., 1999; Reilly et al., 2003). Although these complications are serious, the consequences of childhood and adolescent obesity become even more pronounced later in life. For example, if a child or adolescent is obese, his or her obesity tends to persist into adulthood, and is associated with type-2 diabetes, hypertension, sleep apnea, orthopedic problems, and premature death (Dietz, 1998; Reilly et al., 2003). Thus, obesity is not a cosmetic issue; it is one of the most serious public health crises we face today. Of course trends may change, but one alarming projection estimates that, if the current rate of
increase persists, obesity and overweight will account for 16-18% of total healthcare costs in the U.S. by 2030 (Wang, Beydoun, Liang, Caballero, & Kumanyika, 2008).

In addition to physical health problems, obesity in youth is associated with increased mental health difficulties. Adolescents with obesity have been found to have significantly lower self-esteem, increased depressive symptoms, increased body dissatisfaction, and more difficulties in interpersonal relationships when compared to non-obese peers, though these associations are sometimes weaker for boys and for those not yet seeking treatment for obesity (Braet, Mervielde, & Vandereycken, 1997; French, Story & Perry, 1995; Merten, Wickrama, & Williams, 2008; Puhl, 2007; Strauss, 2000). Further, youth with obesity often face weight-based stigmatization from peers, educators, and parents (Puhl & Latner, 2007). Contrary to those who argue that acceptance of those with obesity contributes to the persistence of the problem, this stigmatization does not seem to be helpful in reducing obesity or motivating individuals with obesity to lose weight (Puhl & Latner, 2007). Overall, youth who are obese are at higher risk for experiencing interrelated psychological and social problems.

Although there are clear associations between psychosocial issues and obesity in youth, the direction of causality between these variables is not well understood. It is often assumed that being obese negatively affects emotional health and social functioning, but there is evidence that the relation also works in the opposite direction, especially for depression. For instance, a prospective cohort study found that adolescent depression at baseline independently predicted obesity at 1 year follow-up, even after controlling for body mass index (BMI) and other important baseline variables (Goodman & Whitaker
Hasler et al. documented a similar relation between childhood depression and obesity in adulthood (2005). A 2008 meta-analysis found that there is clear evidence that depression predicts later obesity (Blaine, 2008). Looking beyond depression, in a review of the literature, Puder and Munsch asserted that both externalizing (e.g., impulsivity) and internalizing (e.g., anxiety and depression) problems predict obesity for children and adolescents (2010). The effects of psychological variables on obesity are typically thought to be mediated by behavior, such as decreased physical activity, eating unhealthy foods as a means of coping with distress, or loss of behavioral control, although there are plausible arguments that biological aspects of psychological problems (e.g., elevated cortisol in people with anxiety) may influence weight directly (Puder & Munsch, 2010).

While there is certainly a need for more research examining direction of influence between obesity and psychological variables, the evidence presented above suggests a bidirectional relation between mental health and obesity. That is, obesity can affect mental health in a variety of ways, but mental health can also affect obesity. This relation has important implications for designing interventions. Namely, interventions are likely to be most effective if they address the physical, psychological, and behavioral aspects of obesity concurrently.

Comprehensive treatment of child and adolescent obesity is informed by an understanding of the interrelated nature of physical, psychological, and social aspects of the condition. In 2005 the American Medical Association, Health Resources and Service Administration, and Centers for Disease Control collaborated to form an expert committee that made recommendations, based on the most current research as well as on
clinical experience, for the treatment of child and adolescent obesity (Barlow, 2007). These recommendations represent a model for best practice for the medical treatment of obesity in youth. While pediatricians are the intended consumers of these recommendations, many aspects of this treatment model are salient for mental health professionals working with young people who are obese. For instance, the report recommends that clinicians screen for psychiatric comorbidities, such as depression and eating disorders, and assemble multidisciplinary teams to implement evidence-based behavioral and medical interventions (Barlow, 2007).

Basic psychological, behavioral, and emotional assessment appears to be a common practice among medical professionals serving youth with obesity. One study found that a large majority of providers routinely assessed the psychological well-being of these patients (Jonides et al., 2002). However, in the same study, only a small percentage of providers routinely referred patients to behavior or mental health specialists. This seems to indicate that although best practice recommendations have been publicized, and many practitioners do consider psychological assessment when treating youth obesity, there is still work to be done when it comes to implementation of multidisciplinary interventions.

An important consideration when discussing the relation between obesity and mental health is that not all youth who are obese experience clinical levels of psychological distress. Thus, it is important not to over-pathologize those with obesity. In a study of 289 children, it was found that about 30% of children with obesity (both treatment-seeking and non-treatment-seeking) reported clinically significant (i.e., low)
levels of general self-worth (Braet et al., 1997). This finding suggests that, while a large percentage of youths with obesity experience negative impacts related to their obesity, the majority are not significantly impaired when it comes to their self-worth. However, regardless of the presence of clinical levels of psychological problems, research supports the efficacy of behavior and psychological treatments for obesity over those focusing solely on education. Reviews of the literature have concluded that behavioral and psychological treatments were consistently more efficacious than nutrition education alone (Jelalian & Saelens, 1999; Shaw, O’Rourke, Del Mar, & Kenardy, 2005). Similarly, Epstein and colleagues (1998) found in their review that behavioral modification and behavior therapy were essential components of treatment for children and adolescents with obesity.

In recent decades, child and adolescent obesity has become a major health concern in the United States. Youth with obesity often suffer from a variety of physical, psychological, and social difficulties, and evidence suggests that these problems are interrelated. Thus, experts in the medical community recommend a multidisciplinary approach to the treatment of obesity in this population. A critical component of this approach is the assessment and treatment of the psychological and behavioral aspects of child and adolescent obesity.

**Health Related Quality of Life**

The multidisciplinary treatment of child and adolescent obesity discussed above necessitates a good understanding of how patients’ health problems affect their everyday lives, especially when it comes to the psychological and social ramifications of obesity.
Further, assessing disease severity and monitoring treatment outcomes are essential parts of quality treatments for child and adolescent obesity, as well as programs of research surrounding obesity in youth. Thus, providers and researchers need ways to assess these constructs that go beyond the physical aspects of health. An important construct for conducting such assessment and research is health-related quality of life (HRQOL).

HRQOL was originally conceived as an important health status and treatment outcome construct that went beyond typical provider-centered measures of morbidity (i.e., physical symptoms) and mortality. A key component of the HRQOL construct is a patient’s subjective evaluation of their health’s impact on their daily life. As defined by Testa and Simonson (1996), HRQOL refers to “…the physical, psychological, and social domains of health, seen as distinct areas that are influenced by a person’s experiences, beliefs, expectations, and perceptions.” Presenting a similar definition, Leidy et al. wrote, “HRQOL is defined as the subjective perception of the impact of health status, including disease and treatment, on physical, psychological, and social functioning and well-being” (1999).

Although HRQOL is conceptualized as a subjective assessment of well-being, quality of life measures may include questions regarding subjective perceptions of functioning (e.g., ‘How satisfied are you with your sleep?’), broad perceptions of functioning (e.g., ‘How well did you sleep?’), and relatively objective items (e.g., ‘How many hours did you sleep?’) (WHO group, 1995). However, the more subjective items are what make HRQOL measures distinct from provider-centered measures of health. The HRQOL construct has been criticized as lacking a consistent definition in the
literature, and the terms ‘health status’, ‘functional status’, and HRQOL are sometimes used interchangeably (Murdaugh, 1997). Still, the construct remains widely used and seems to provide useful information beyond traditional provider-centered assessments.

Guyatt, Feeny, & Patrick (1993) outlined two main reasons why HRQOL emerged as an important construct in the field of medical and psychological research on chronic disease and treatment outcomes. First, it was apparent that physiological measures of the effects of disease (e.g., physical mobility, range of motion, heart-rate, etc.), while important indicators for clinicians, tended to be only loosely related to patients’ level of functional impairment in everyday life. Second, patients with similar physical symptoms often have very different subjective experiences of the severity of their condition. For these reasons, the HRQOL construct has become a common way of measuring disease severity and treatment outcomes from the perspective of the patient, and it provides valuable information to those interested in the effects of chronic disease on quality of life.

From a theoretical standpoint, the HRQOL construct is consistent with the biopsychosocial model of disease (Engel, 1977). The biopsychosocial model was proposed as a challenge to the dominant biomedical model, which Engel viewed as reductionistic and dualistic, reinforcing a socially constructed separation between mind and body. Borrowing from the broader systems theory made popular in the field of biology, the biopsychosocial model incorporates biological, psychological, social, and cultural variables in its conceptualization of the etiology and presentation of disease. While the connections between HRQOL constructs and the biopsychosocial model are
not explicit in the HRQOL literature, these connections do seem to be helpful in understanding the theoretical underpinnings of the construct. Rather than focusing only on the biological impacts of disease, HRQOL aims to assess disease severity in physical, psychological/emotional, and social domains, an approach that is very consistent with the biopsychosocial model.

When HRQOL is assessed in clinical settings, it is often measured as a general construct, applicable to a variety of patient populations. For instance, children and adolescents suffering from chronic illness are often assessed using a well-validated general measure of HRQOL called the Pediatric Quality of Life Inventory (PedsQL) (Varni, Seid, & Kurtin, 2001). One advantage of such a measure is that, because it is not disease specific, researchers can use this measure to compare patient ratings of quality of life across different disease categories. This information may be especially valuable for research on heterogeneous treatment-seeking populations (e.g., hospital administrators seeking to compare treatment efficacy across departments). A general HRQOL measure may also be the best option for clinicians who work with patients presenting with a variety of diseases.

Recognizing that each disease has its own unique array of effects on the quality of life of a patient, researchers and clinicians have also developed numerous HRQOL measures that are specific to diseases or disease categories. Guyatt and colleagues (1993) asserted that disease-specific measures are the most helpful for individual patients and their providers, as they are more directly relevant to patients’ lives. Further, Patrick and Deyo (1989) presented some evidence that disease-specific HRQOL measures are
potentially more sensitive to small changes in health, as well as more useful for tracking individual patients, than general measures of HRQOL. Currently there are many disease-specific measures of HRQOL, and such measures are widely used in clinical practice for tracking the status of patients as they undergo medical treatment. They are also frequently used as outcome variables in clinical research. The following section outlines the connection between obesity and HRQOL in children and adolescents, a central issue in the proposed study.

**Obesity and Health Related Quality of Life (HRQOL) in Children and Adolescents**

A number of articles have examined the relation between obesity and HRQOL in children and adolescents. A recent review examined twenty-eight studies on HRQOL in obese children and adolescents and pooled data from thirteen of these studies. Using these data, the investigators found a small but statistically significant inverse relation between BMI and HRQOL ($r = -0.7$) across studies (Tsiros et al., 2009). One study found that children and adolescents with obesity had lower general HRQOL than individuals with normal weight, while others have found negative association between body mass and HRQOL for some domains, but not for others (Friedlander, Larking, Rosen, Palermo, & Redline, 2003; Pinhas-Hamiel et al., 2006; Swallen, Reither, Haas, & Meier, 2005).

Several studies have also compared HRQOL among youth with obesity with that of youth with other diseases. For example, it was demonstrated that pediatric patients with obesity had lower HRQOL scores than patients from several other disease categories, including asthma and diabetes (Varni, Limbers, & Burwinkle, 2007). Even more striking, other researchers observed that the HRQOL of children and adolescents
with obesity was similar to those who were diagnosed with cancer (Schwimmer, Burwinkle, & Varni, 2003). These studies clearly show that youth who appear for obesity treatment tend to have significant impairments in quality of life because of their health, even when compared to patients with other serious diseases.

One potential limitation of the literature on the connection between obesity and HRQOL in youth is that much of this research has been done using treatment-seeking samples. These samples could be biased toward more severely impaired individuals, which means that statements about the HRQOL of obese youth may not always generalize to non-pediatric populations. In adult community samples, one study found a significant negative effect of BMI on weight-related quality of life (Kolotkin & Crosby, 2002), while another study found that obesity status (i.e., overweight, mild obesity, or moderate obesity) had a significant negative effect on physical, but not psychological, aspects of quality of life (Mond & Baune, 2009). These studies suggest that, while it is likely that connections between youth obesity and HRQOL carry over to non-clinical populations, until more research is done, generalization of findings to these populations remains tentative.

**HRQOL: Child and Parent-Proxy Reporting**

For adults, HRQOL is almost always assessed through patient self-report, and research suggests that self-report is superior to proxy reporting in this population (Hays et al., 1995). For children and adolescents, information regarding patient HRQOL often comes from caregiver-proxy reports (i.e., a parent answers questions on behalf of their child), self-report, or in many cases, both sources. There has been debate in the literature
regarding which informant provides the most valid account of a youth’s HRQOL, and at what age self-report is appropriate. This section briefly examines issues related to caregiver- versus child-reported HRQOL.

In deciding what informant to use in assessing pediatric HRQOL, patient age becomes an important consideration, though research seems to support the use of self-report even at young ages. An extensively studied general pediatric HRQOL measure, the PedsQL, has been shown to be reliable and valid for children as young as 5 years (Varni, Burwinkle, & Seid, 2005). A more general review of the literature surrounding the ability of young children to report on their health came to a similar conclusion, stating that children can report validly on their health starting around 6 to 8 years of age (Riley, 2004). Thus, there is significant evidence indicating that children can provide valuable information about their HRQOL starting between 5 and 8 years old.

Although self-reports are an important source of information in pediatric HRQOL, it is widely accepted that parent-proxy reports also provide a valuable perspective, as parent perceptions can influence engagement in treatment. Because parents are typically responsible for bringing their children in for treatment and implementing recommendations, their perceptions of the severity of their children’s illnesses could be critical when it comes to successful outcomes in treatment. Parents’ investment in their children’s treatment, as evidenced by adherence to behavioral strategies and modeling of healthy behavior, has been shown to predict success in reducing weight in children (Wrotniak, Epstein, Paluch, & Roemmich, 2005). Additionally, an experimental study looking at a parent-only versus child-only year-long
obesity intervention found less attrition and more weight reduction in the parent-only intervention, indicating that parents may actually be more important than children as agents of change in effective interventions for childhood obesity (Golan, Weizman, Apter, & Fainaru, 1998).

Another reason to include parent reports of children’s HRQOL is that it may be seen as giving providers a more ecologically valid estimate of a child’s HRQOL. Obtaining reports from multiple sources is a fundamental component of a multimethod approach to assessment (Sattler, 2008). Further, although children do seem to be valid reporters, some evidence suggests that younger children may be more influenced by social desirability (Dadds, Perrin, & Yule, 1998). For these reasons, it seems advisable to supplement child self-reports of HRQOL with parent-proxy reports.

In sum, evidence indicates that both parents and children are valuable sources of information regarding children’s HRQOL. Younger children may be influenced by social desirability, though research shows that children as young as 5 can provide useful information. Further, parents are responsible for bringing children into treatment, adhering to provider recommendations, and being agents of change themselves; therefore, parent perceptions of child HRQOL may be important indicators for providers. Insofar as multi-rater assessments are considered superior to individual sources in their validity, supplementing child self-reports with parent-proxy reports of pediatric HRQOL is thought to be good practice for health care professionals and researchers alike. Unfortunately, using multiple raters introduces complexity in that assessors may be faced
with the challenge of interpreting discrepant scores. The following section discusses this issue in more detail.

**HRQOL: Child and Parent-Proxy Agreement**

When clinicians and researchers choose to collect information on the same construct from multiple informants, they are often faced with the problem of discrepant scores. For instance, research using the popular Child Behavior Checklist (CBCL) found an average correlation between parents and children in the low range \( r = 0.28 \) (Rey, Schrader, & Morris-Yates, 1992). Another study found that, in a sample of parents and youth seeking psychological treatment, over sixty percent of dyads failed to agree on a single problem for which the child needed help, and over one third of dyads did not even agree on a broad problem category (e.g., delinquent, withdrawn) (Yeh & Weisz, 2001). Further, a meta-analysis looking at interrater agreement in the assessment of youth behavioral and emotional problems found that the average correlation between parent and youth reports was only .25 (Achenbach, McConaughy, & Howell, 1987). Clearly, discrepancies between parent and child reports are common in youth assessment.

The same issue presents itself when HRQOL data is collected from multiple raters. A number of studies have looked at general level of agreement between parents and children reporting on a child’s HRQOL. One study found that 64% of parent-child dyads showed disagreement larger than half a standard deviation of child scores on a measure of HRQOL (White-Koning et al., 2007). Upton et al. (2008) reviewed nineteen high-quality studies looking at this issue, finding that for the most commonly used general measure of pediatric HRQOL, the PedsQL, most studies found moderate \( r = .30 \)
- .50) or good (r > .50) agreement between parents and children, while four studies found poor (r > .30) agreement. These authors also found that, while it is often assumed that agreement will be better for subscales measuring more concrete, observable aspects of functioning, this is not always the case, and at least four studies reported better agreement for psychosocial domains (Upton et al., 2008).

There are several limitations to the common methods used to examine agreement. A typical way of reporting agreement in the literature is to report correlation coefficients. However, few authors acknowledge a limitation of this approach, which is that correlation coefficients actually measure the association between variables, not the agreement between them (Altman & Bland, 1983). To illustrate this point, if parents always reported their children’ HRQOL exactly ten points lower than their children did, this would result in a perfect correlation between the two raters, though there would clearly be disagreement between them.

Another common way to assess agreement is by examining mean differences between parent and child scores. When mean differences are used, small differences or null results are often found, however the trend seems to be for parents to report lower child HRQOL than children report themselves (Upton et al., 2008). Still, insignificant mean differences do not necessarily mean that parents and children agree. It could mean that disagreement occurs in both directions, with parents both overestimating and underestimating child HRQOL in equal amounts and with equal frequency. It has been suggested in the literature that, when examining patient-proxy HRQOL agreement, it is preferable to use both individual-level (e.g., correlations) and group level (e.g., mean

**Conceptualizing Parent-Child HRQOL Discrepancies**

From a theoretical standpoint, discrepant scores from a parent-child dyad can be conceptualized in one of three ways. The first way to understand such a score profile is to assume that one respondent is accurately reporting on the construct, while the other has a distorted (invalid) view, or is an unreliable reporter. The underlying assumption of this view is that the parent and the child are both reporting on the same construct, about which there is a single “true” score. In the instance of discrepant scores, from this perspective one respondent’s score is valid and reliable, while the other’s is either invalid or simply unreliable. If this is the case, the problem for the person conducting the assessment becomes finding out who is the trustworthy reporter, and using that informant exclusively. This is problematic because, as previously noted, the literature supports the notion that children and adults can acceptable reporters of youth HRQOL.

A second way to conceptualize discrepant scores is to assume that the child’s “true” HRQOL score is somewhere between the parent and child ratings, existing as a sort of latent variable. The underlying assumption of this view is that parents and children are essentially equal in their ability to report on the child’s HRQOL. Thus, if their scores are discrepant, the true score is likely somewhere between the two observed scores, and averaging their scores together will more closely approximate the reality of the child’s HRQOL. The problem with this view, and its corresponding solution, is that it discounts the importance of each rater’s subjective understanding of the construct being measured,
as well as the practical implications (e.g., treatment adherence) of each individual’s perspective.

A third way of conceptualizing discrepant scores between parent-proxy and child self-reports of HRQOL is to assume that each score represents an accurate depiction of reality as seen through the eyes of each respondent individually. In other words, each respondent’s score can be considered valid insofar as it represents that person’s subjective account of the construct being measured. Taking this view allows each score to stand alone, and does not favor one rater’s understanding over another’s. It allows for the interpretation of each score separately so that assessors can consider the implications that each score may have on a treatment plan or research finding. This conceptualization is also consistent with the definition of the HRQOL construct as representing a subjective account of how health affects a patient’s quality of life (Leidy et al., 1999). Finally, looking at discrepancies in this way provides a rationale for examining not only the child and parent scores individually, but also the discrepancy itself as an important piece of information.

Consistent with the third conceptual model described above, De Los Reyes and Kazdin (2005) presented a cohesive theoretical model, called the Attribution Bias Context (ABC) model, for understanding discrepancies between informant ratings in clinical assessment. This model asserts that differing informant causal attributions, perspectives, ideas about the goal of assessment, and the interaction between these variables comprise the main sources of discrepancies in ratings. Thinking about
discrepancies in this way normalizes them, and provides a context in which they may be considered important topics for investigation as opposed to sources of confusion.

Given this understanding, it becomes important to examine the nature of differences between parent and child ratings of pediatric HRQOL. While discrepancies may be considered an expected byproduct of the subjective nature of HRQOL, this does not mean that the discrepancy itself should be ignored or viewed as unimportant. Rather, this view implies that, because there is an observed difference between two valid and reliable ratings, the nature and cause of such a discrepancy itself is a point of interest. Given these considerations, the aim of this study is to enhance understanding of caregiver-child discrepancies in obesity-specific HRQOL ratings with the aim of uncovering some important associations between these discrepancies and a handful of potentially important variables.

**Variables of Interest**

Each of the following sections provides a brief summary of the literature surrounding variables included in this study, and their connection to parent and child perceptions about obesity, health, and HRQOL. Evidence seems to suggest that these variables could be related to caregiver-child obesity specific HRQOL agreement. These sections describe what research currently says about this topic, and draws conceptual connections between caregiver-child agreement and these variables of interest.
**Child Age**

Child development is an important variable to consider in studying agreement between parents and children on measures of HRQOL. As children’s cognitive abilities progress with age, their insight regarding their health may change as well. Further, children’s expanding social lives could similarly affect how they view themselves, as they become better able to compare their own experiences with the experiences of others. Finally, as children progress into adolescence, their increased autonomy may further expand their understanding of themselves. Thus, for the purposes of the present study, it is important to consider how age relates to perceptions of health among youth. A small number of studies have examined the relation between age and parent-child agreement on measures of HRQOL, with mixed results.

One study, using a sample of pediatric cancer patients, found that while parents’ ratings were generally more negative than children’s, mean differences between parent and child scores on a measure of child HRQOL did not vary as a function of the age of the child (Vance, Morse, Jenney, & Eiser, 2001). This finding adds evidence that age is not related to these differences. However, it is important to consider that mean differences may not be as revealing as correlation coefficients when it comes to levels of agreement.

Another study, which was a validation of a German version of the PedsQL, analyzed correlations between parent and child scores separately for younger (5 to 7 years) and older (8 years or more) children with cancer and epilepsy (Felder-Puig et al., 2004). For children with cancer, the authors found smaller correlation coefficients for
younger children on physical functioning ($r = 0.60$) and school functioning ($r = 0.27$) domains. For children with epilepsy, the authors reported a smaller correlation for younger children on the emotional functioning ($r = 0.26$) domain only. Unfortunately, the authors of this study did not report the significance of observed differences in correlation coefficients.

Finally, in a study looking at the viability of using the PedsQL for children with heart disease, researchers found some variation in Pearson correlations between child and parent ratings across child age, demonstrating that, for psychosocial scales, concordance was lower for adolescents (13-18) than for younger children (8-12) (Uzark, Jones, Burwinkle, & Varni, 2003). Again, the statistical significance of this comparison was not reported. This finding seems to suggest that, at least in some instances, agreement between parents and their children could actually decrease as children age.

Overall, there is conflicting evidence about the importance of age as it relates to parent-child agreement on measures of HRQOL. At once, there is evidence for equal agreement across age, lower agreement for younger children, and lower agreement for older children. Because of this lack of clarity, age is an important variable to consider when looking at agreement between parents and children on measures of child HRQOL, both as a potentially important control variable, and as a variable of interest. Unfortunately, none of these studies used a sample of children with obesity, and it may be difficult to draw conclusions across disease categories. Additional evidence in one direction or the other could add substantially to the field’s understanding of how development affects agreement between these raters.
Gender

Very few studies have examined how parent-child disagreement on measures of HRQOL may be influenced by a child’s gender. Upton et al. (2008), in their review of the literature, reported finding only two articles directly addressing this topic. One study found no differences in parent-child agreement by gender (Vance et al., 2004). However, a second study found gender differences in agreement between children and their parents on a measure of perceived mental health, though the magnitude and direction of this difference were not reported (Waters, Steward-Brown, & Fitzpatrick, 2003). For the most part, the impact of child gender on agreement between parents and children on measures of HRQOL has remained unexamined.

Although there is little research that directly addresses gender influences on parent-child HRQOL agreement, there is some evidence that the negative effects of obesity on the psychosocial well-being of children and adolescents are different for boys and girls. Generally, it has been observed that these effects tend to be more pronounced for girls than for boys. For instance, a study of the relation between obesity and self-esteem among youth found that, while boys showed some decreased self-esteem with higher weight, obese Hispanic and white girls’ self-esteem ratings were significantly lower than other groups included in the study (Strauss, 2000). Other researchers found that depressive symptoms were positively associated with BMI for girls, but not for boys, and that overweight concerns mediated this association for girls (Erickson et al., 2000). Further, girls seem to face greater social, educational, and psychological challenges because of their weight than boys do (Falkner et al., 2001).
Different weight stigmatization by gender is one possible explanation for the observed gender differences in social and psychological outcomes for children and adolescents with obesity. While research is mixed on whether boys and girls actually experience differing overall levels of stigmatization (Puhl & Latner, 2007), there is evidence that it may be the type, rather than the amount of stigmatization, that differs by sex, with boys experiencing more overt stigmatization (e.g., teasing) and girls being subject to more relational types (e.g., exclusion) (Pearce, Boergers, & Prinstein, 2002). Since much of the research exploring weight stigmatization focuses on overt forms, such studies may not be sensitive to the overall experience of stigmatization.

Boys and girls also seem to have different perceptions about the importance of weight. For instance, among adolescents it has been found that boys were just as likely to want to be heavier as lighter, while girls were very unlikely to want to be heavier (Furnham, Badmin, & Sneade, 2002). In the same study, it was also observed that girls associated the concept of body dissatisfaction with self-esteem, while boys did not show this association. In a rare study of body image among preadolescents (8- to 11-years-old), researchers found that girls showed greater interest in dieting, more concerns about their weight, and reported receiving more parental messages about weight and diet when compared to boys of the same age (Phares, Steinberg, & Thompson, 2004). These studies show that perceptions about weight, body image, and diet among children and adolescents differ by gender.

Gender is a potentially important variable when examining perceptions about child health. This is especially true when it comes to obesity, as research has
demonstrated that obesity may have more negative consequences for girls. Differences in stigmatization and general perceptions of weight may lead to important differences in perceptions of health between boys and girls. In turn, such differences may lead to more or less disagreement between parents and children on pediatric HRQOL measures, depending on the child’s gender. Understanding the magnitude and direction of these differences could help practitioners individualize treatment and understand the influence of gender on the health perceptions of children and adolescents with obesity.

**Body Mass Index (BMI)**

Body mass index (BMI) is the most widely used measure of obesity in both adults and children. The purpose of calculating BMI in medical settings is to approximate the adiposity, or body fat, of individuals. Therefore, it is important to understand how BMI is measured, as well as the utility and limitations of BMI when conducting research or discussing research findings surrounding obesity. Understanding the limitations of BMI is especially important when it comes to studying childhood obesity, as developmental factors play an important role in the body composition of children. Further, the limited research base on differences between parent and child perceptions of HRQOL has yet to address how caregiver and child BMI might be related to those perceptions.

In the simplest terms, BMI is a measure of body weight adjusted for height. Raw BMI scores are calculated as a ratio of weight to height, commonly weight in kilograms divided by height in meters squared. Compared to simply measuring weight, BMI accounts for variation in height among individuals. Clearly, an adult over six feet tall would be expected to weigh more than an adult who is five feet tall, other things being
equal. Controlling for height represents the biggest strength of raw BMI scores as a way of determining obesity status. Other methods of measuring adiposity, such as waist circumference, triceps skin fold thickness, dual-energy x-ray absorptiometry (DEXA), impedance-based measures, or densitometry, are valuable measures, and are often more accurate than BMI (Rothman, K. J., 2008; Freedman, D. S., & Sherry, B., 2009). However, BMI is still the recommended measurement method for determining obesity status, as these other methods tend to be clinically impractical (Barlow, 2007).

For children and adolescents, developmental factors add complexity when it comes to interpreting BMI scores and determining obesity status. This is because as children age, their body composition (i.e., percent body fat) varies as a result of normal developmental processes. As an example of how development complicates the interpretation of BMI scores, data from the Centers for Disease Control and Prevention show that a BMI of twenty-three is approximately at the 50th percentile for a 20-year-old man, but is at about the 97th percentile for a 10-year-old boy (Kuczmarski et al., 2002). For this reason, BMI in youth is almost always converted to a standard score based on age and sex norms (reported periodically by the Centers for Disease Control and Prevention) prior to interpretation. This is not true for adults, however, and raw BMI scores are often used in analyses of adult obesity.

Despite its status as the method of choice for measuring adiposity, BMI has several limitations. First, as discussed above, BMI is an indirect measure of adiposity, and therefore has the potential to be inaccurate. This has been shown to be a problem when using BMI to assess adiposity in children who are closer to the middle of the BMI
distribution, as BMI differences can be due to differences in fat-free mass (Freedman & Sherry, 2009). Second, standardized BMI scores (i.e., zBMI or BMI percentile), although essential in assessing adiposity in children and adolescents, are problematic when it comes to evaluating adiposity change because variability is greatly reduced among children at the high end of the distribution (i.e., those who are obese) (Cole, Faith, Pietrobelli, & Heo, 2005).

The literature shows that parent BMI and child BMI are significantly related. For instance, studies have found that maternal obesity is a significant predictor of obesity status among 0 to 8-year-old children (odds ratio = 3.62), and that maternal or paternal obesity was a significant predictor of obesity among 7 to 12-year-old children, with odds ratios for children with obese mothers or fathers of 2.38 and 3.50, respectively (Fogelholm, Nuutinen, Pasanen, Myohanen, & Saatela, 1999; Strauss & Knight, 1999). These findings are consistent with additional evidence that both genetic and so-called obesogenic environmental factors work together to cause obesity in children, as parents and children share both environmental and genetic risk factors (Wardle, Carnell, Haworth, & Plomin, 2008).

That said, a number of studies have shown that parents are often inaccurate in their perceptions of their children’s weight status, although these studies tend to include mothers almost exclusively. In general, it seems that parents tend to underestimate their overweight children’s weight-status. One study found that only about 10% of parents of overweight children accurately perceived their children’s weight compared to about 60% of other parents, even though parents did not differ in their knowledge about healthy
eating or the health risks of overweight (Etelson, Brand, Patrick, & Shirali, 2003). Another study looking at this issue that also included age found that 89% of parents of overweight children reported them as having “average weight”, though perceptions were more accurate among parents of older children (Crawford, Timperio, Telford, & Salmon, 2006). Further, in a study with only adolescents, it was found that, while 60% of mothers were able to accurately assess their children’s weight status, 35% underestimated their child’s weight (Boutelle, Fulkerson, Neumark-Sztainer, & Story, 2004). Finally, Maynard et al. found that 32% of mothers perceived their overweight children as being “about the right weight”, and parents of younger children were more likely to have this perception (Maynard et al., 2003). Interestingly, this study also looked at instances of parent overestimation of non-overweight children’s weight and found that mothers were more likely to make this error when children were older, female, and/or had higher (but not overweight) BMI.

It does not appear that any studies have directly examined the association between BMI and caregiver-child differences in ratings of obesity-specific or general HRQOL. However, Guilfoyle et al. (2010) found that caregiver BMI was not a significant predictor of parent-proxy and self-reported obesity-specific HRQOL, or child BMI. Further, multiple studies have looked at the influence that parent weight status has on perceptions of children’s weight. Boutelle et al. (2004) found that overweight mothers were more likely than non-overweight mothers to be inaccurate in their assessment of their children’s weight, while Maynard et al. (2003) found that lower parent BMI was associated with overestimation of non-overweight children’s weight. In a review of the
literature on parent perceptions of their children’s weight, it was concluded that there was significant evidence across studies that, although parents tended to underestimate their children’s weight across the board, this was especially true when parents were themselves overweight (Doolen, Alpert, & Miller, 2009). The question of why parents are inaccurate in their perceptions remains largely unanswered by researchers. However, one study using focus groups of mothers of overweight preschoolers indicated that mistrust of growth charts, lack of knowledge about weight-status definitions (e.g., “overweight”), fear of judgment, and resistance to labeling their children were salient for these mothers (Jain et al., 2001).

Overall, BMI is an important physiological measurement tool for clinicians and researchers studying obesity. This section has briefly summarized the utility and limitations of BMI as it is used in the field. Further, it is clear from the literature that perceptions of weight are quite often inaccurate, and parent and child weight status can impact perceptions about weight and health. Thus, BMI is an important variable to include when examining discrepancies in parent and child perceptions of HRQOL.

**Parenting Stress**

Parenting stress has been defined as “…the aversive psychological reaction to the demands of being a parent” (Deater-Deckard, 1998). Implicit in this definition is the idea that there are certain roles or demands that parents face in childrearing that may be overwhelming, and cause psychological distress. Abidin (1992) wrote, “Parenting stress is…the result of a series of appraisals made by each parent in the context of his or her level of commitment to the parenting role.” Thus, parenting stress is inextricably linked
to parent perceptions about this role. Further, parenting stress influences parent behavior. High levels of parenting stress has been associated with poor parenting practices, and therefore may have impacts on child adjustment (Belsky, Woodworth, & Crnic, 1996). In addition, research has demonstrated that stress and anxiety have a negative impact on making complex judgments (Gillis, 1993). For the purposes of the current investigation, parenting stress is potentially important because of the effect it may have on parent and child perceptions of children’s HRQOL.

Currently, there is little research on parenting stress among parents of children with obesity. In one of the few studies examining this topic, Guilfoyle et al. (2010) revealed that parenting stress was a significant predictor of parent-reported obesity-specific HRQOL for school-aged children, though it did not predict children’s self-reported HRQOL. More generally, chronic illness in childhood has been associated with increased parenting stress (Krulik et al., 1999). Seeing the unique stressors that parents of children with health concerns face has prompted efforts to create illness-specific parenting stress assessment tools. One such measure, the Pediatric Inventory for Parents (PIP), builds on Abidin’s (1995) parenting stress construct, focusing on medical care, communication (with child and healthcare team), role functioning, and emotional functioning domains (Streisand, Braniecki, Tercyak, & Kazak, 2001). Having a child with health concerns clearly adds stress within the typical parenting role, and expands that role to include extensive interaction with healthcare systems.

Increased parenting stress may also affect how children perceive their own health, and how caregivers perceive illness and treatment. For example, Mullins et al. (2007)
found that, controlling for a number of other important variables, parenting stress was significantly related to children’s uncertainty about their illness. Specifically, higher reported parenting stress was associated with increased uncertainty among children. The reason for this association was not examined, but it is possible that a similar association exists between parenting stress and children’s self-reported HRQOL, especially considering the conceptual similarities between HRQOL and illness uncertainty.

Parent perceptions related to childhood illness also seem to be associated with parenting stress. In a sample of children with type-one diabetes, it was found that increased parenting stress was associated with a number of illness-related perceptions among parents, including lower self-efficacy for treatment, greater feelings of responsibility for treatment, and greater fear of hypoglycemia (Streisand, Swift, Wickmark, Chen, & Holmes, 2005). Thus, parenting stress seems to influence both parent and child perceptions related to childhood illness, and could therefore influence ratings of HRQOL.

Overall, the literature suggests that parenting stress seems to be affected by children’s chronic illness such that childhood illness predicts higher parenting stress. The same is likely true for stress among parents of children seeking treatment for obesity-related illness. Further, parenting stress may also influence parents’ and children’s perceptions of health, perceptions that are central to reported HRQOL. Thus, parenting stress is a potentially significant predictor of the differences between caregiver and child ratings of HRQOL.
SUMMARY

In efforts to address childhood obesity, a mounting public health crisis, assessing how youth’s excess weight affects their quality of life is an important step in research as well as clinical practice. In performing such assessment, clinicians and researchers often wish to use multiple informants, usually caregivers and children. While this strategy represents best-practice and is more ecologically valid than using self- or proxy-reports alone, these assessments often produce discrepant ratings between caregivers and children. While some research has been done to analyze these discrepancies descriptively, there is a paucity of research examining individual variables that predict levels of agreement between caregivers and children. Further research in this area could help both clinicians and researchers more fully understand differing caregiver and child perceptions. Each of the variables that have been described in this section shows a potential relation to parent and child perceptions of health and obesity. Therefore, these variables show promise as potential predictors of agreement between informants. The present study aims to add to the field’s understanding by examining the associations between caregiver-child obesity-specific HRQOL difference scores and multiple potentially predictive parent and child variables.
Chapter 3: Proposed Research Study

The present study is proposed as a means to further develop the field’s understanding of the differences between caregiver and child perceptions of obesity-specific HRQOL, and to improve the utility of current assessment instruments for this construct. Although discrepancies between caregiver and child reports of HRQOL are frequently observed, little is known about what variables may predict such discrepancies. Understanding these connections may help researchers more fully understand the obesity-specific HRQOL construct, and help practitioners conceptualize cases and design interventions to address the differing perceptions of caregivers and children.

This section outlines the proposed research study. First, some general research questions and hypotheses are presented, along with a literature-based rationale for each hypothesis. Next, the method of the present study is explained in detail, followed by a description of proposed analyses. Finally, a brief discussion section is presented, including a consideration of study limitations, future directions of study, as well as potential implications of study results.

Research Questions and Hypotheses

Because parent-child HRQOL difference scores have not been extensively researched, the present study may be considered exploratory. For this reason, a causal model of influence is not proposed. An alpha level of .05 will be used for all analyses.

Research Question 1: What is the overall level of agreement and magnitude of association between caregiver and child obesity-specific HRQOL ratings?
• Hypothesis 1a: Mean differences between parent and child obesity-specific HRQOL scores will not be statistically significant.

  o Upton et al. (2008) reported that parent reports of child HRQOL tended, in general, to be lower than child self-reports. However, in the validation study for the self-report obesity-specific HRQOL used in the present study a statistically significant mean difference between parent and child reports was found for only one subscale (Zeller & Modi, 2009). Since the present study uses the same measures, and also has a smaller sample size, it is expected that mean differences between parents and children are not likely to attain statistical significance.

• Hypothesis 1b: The association between caregivers and youth in their reports of youth obesity-specific HRQOL will be statistically significant, but small to moderate in magnitude.

  o Rationale: A recent validation study of a measure of obesity-specific HRQOL in children aged 5-13 years has shown small to moderate Pearson correlations ($r$ values ranging from .22 and .44) between parent and child reports (Zeller & Modi, 2009). The present study uses the same measure as the aforementioned study. Therefore, it is expected that a comparable correlation will be observed. As suggested by Cohen (1988), correlation coefficients of .10, .30, and .50 and above will be considered small, moderate, or large respectively.
Research Question 2: Are differences in caregiver-child obesity-specific HRQOL scores predictable by other variables?

- Hypothesis 2: A small, but statistically significant amount of variance, as indicated by change in $R^2$, in caregiver-child difference scores can be explained by caregiver and child characteristics after controlling for demographic background variables.

  - Rationale: As discussed in the integrative analysis, each of the independent variables included in this study have shown a potentially significant association with parent-child HRQOL difference scores. However, given that the HRQOL construct encompasses the impacts of health on physical, social, and emotional quality of life, it is reasonable to expect that a large number of variables may determine the extent to which caregivers and children agree versus disagree in their ratings of youth obesity-specific HRQOL. Further, the explicitly subjective definition of the construct, more individual variables may be expected to influence perceptions of quality of life (Leidy et al., 1999; Testa & Simonson, 1996). Thus, while there is reason to believe that the variables included in this study are associated with parent and child perceptions of HRQOL it is not expected that they will account for a particularly large amount of observed variance in difference scores.
Research Question 3: Does parenting stress predict caregiver-child obesity-specific HRQOL difference scores?

- **Hypothesis 3:** Parenting stress will be a significant predictor of caregiver-child difference scores, as evidenced by a statistically significant regression coefficient for parenting stress in multiple regression.
  
  - **Rationale:** In general, chronic illness in childhood has been associated with increased parenting stress (Krulik et al., 1999). Further, some research has demonstrated that parenting stress is related to child perceptions of their health-status, and parent perceptions surrounding their children’s illness and treatment (Guilfoyle et al., 2010; Mullins et al., 2007; Streisand et al., 2005). These findings suggest that parenting stress could be a predictor of differences between caregiver and child perceptions of obesity-specific HRQOL.

Research question 4: Do parent and child BMI scores predict caregiver-child obesity-specific HRQOL difference scores?

- **Hypothesis 4a:** Caregiver BMI will not account for a statistically significant amount of variance in caregiver-child difference scores.
  
  - **Rationale:** Guilfoyle et al. (2010) found that caregiver BMI was not a statistically significant predictor of parent-proxy or self-reported obesity-specific HRQOL in children. The proposed research uses data from that
study. Therefore, as an individual variable, caregiver BMI is not expected to be a significant predictor of parent-child difference scores.

- Hypothesis 4b: Child BMI will account for a statistically significant amount of variance in caregiver-child difference scores.
  
  o Rationale: Research supports the notion that BMI is related to youths’ perceptions about their HRQOL, and could therefore predict agreement between caregivers and children on measures of HRQOL (Schwimmer et al., 2003; Tsiros et al., 2009; Varni et al., 2007). It should be noted, however, that due to restriction of BMI range in a sample of youth already identified as being obese (BMI greater than or equal to the 95th percentile for age and sex), it could be that such an association will be underestimated, or will not attain statistical significance.
METHOD

Participants
Participants in the study from which these data were taken (Guilfoyle et al., 2010) were 120 caregiver-child dyads. A subset of these participants will be used in the present study. Demographics of youths and caregivers in the original sample are listed in Table 1.

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<tr>
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<th>Caregivers</th>
<th>Youth</th>
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<tbody>
<tr>
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<td>11.0 (3.0)</td>
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<tr>
<td>Child Sex</td>
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<tr>
<td>SES</td>
<td>34.7 (19.9)</td>
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</tr>
</tbody>
</table>

Table 1: Participant demographics.

Participants in the present study will be 100 mother-child dyads who participated in a behavioral weight management program for childhood and adolescent obesity at a pediatric medical center in the Midwest region of the United States. This sample was used by Guilfoyle et al. (2010) in a study examining the associations between Parenting
Stress and pediatric health indicators among youth with obesity. Although data were collected for mothers, fathers, and other caregivers, analyses included only mothers, as too few fathers ($N = 6$) and other caregivers ($N = 14$) were available for participation. Children ranged in age from 5 to 13 years. Eligibility criteria included documented child BMI at or above the 95th percentile for age and height.

**Measures**

The measures described below will either be used directly in the analyses, or will be used to compute composite variables as described in the next section.

**Anthropometric Data**

Height and weight were measured for both caregivers and children. These data were used to calculate a raw body mass index (BMI) score for each individual using a kilograms per meter squared formula. Child and adolescent scores were transformed to standardized ($z$BMI) scores using age- and sex-specific data from the 2000 United States norms presented by the Centers for Disease Control and Prevention (Kuczmarski et al., 2002).

**Demographic Background Questionnaire**

Parent participants completed a background questionnaire reporting parent and child age, sex, and race/ethnicity. This questionnaire also gathered information regarding parent marital status, education, occupation, and socioeconomic status (SES). An occupation-based measure of SES was used. Duncan SEI scores were calculated using these data, with higher scores representing higher occupational status (Mueller & Parcel, 1981; Nakao & Treas, 1992).
**Sizing Me Up (Zeller & Modi, 2009).**

Sizing Me Up is a self-report measure for assessing obesity-specific health related quality of life in children, ages 5 – 13 years. This measure consists of 22 items including five subscales: Emotional Functioning, Physical Functioning, Teasing/Marginalization, Positive Social Attributes, and Social Avoidance. A Total Quality of Life score can be obtained by taking an average of subscale scores. Item wording places a child’s quality of life within the context of their physical size (e.g., “…were teased by other kids because of your size”). Sizing Me Up has been found to have satisfactory reliability and validity, with subscale internal consistency values (Cronbach’s alpha) between .67 and .86 for a sample of 141 obese European-American and African-American children aged 5-13 years. The reported internal consistency value for the overall score was .82 (Zeller & Modi, 2009).

**Sizing Them Up (Modi & Zeller, 2008)**

Sizing Them Up is a parent proxy-report measure for assessing obesity-specific health related quality of life in children, ages 5 – 18 years. This measure consists of 22 items comprising six subscales: Emotional Functioning, Physical Functioning, Teasing/Marginalization, Positive Social Attributes, Mealtime Challenges, and School Functioning. A Total Quality of Life score can be obtained by taking an average of subscale scores. Sizing Them Up was designed in parallel with Sizing Me Up, and is intended to be used in conjunction with that measure. Like Sizing Me Up, item wording for this measure places a child’s quality of life within the context of their physical size. Sizing Them Up has been found to have satisfactory reliability, with subscale internal
consistency values (Cronbach’s alpha) between .58 and .89 for a sample of 220 primary caregivers of obese youth. The reported internal consistency value for the overall score was .91 and the scale showed evidence of construct and convergent validity, as well as responsiveness to weight change for adolescents who underwent bariatric surgery (Modi & Zeller, 2008).

**Parenting Stress Index (PSI) (Abidin, 1995).**

The PSI is a self-report measure of parenting stress for parents of children ages 3 months to 10 years. It consists of 120 items. For this study, only the 54 items comprising the Parent Domain were administered. The Parent Domain consists of seven subscales: Competence, Isolation, Attachment, Health, Role Restriction, Depression, and Spouse. These subscales produce a Parent Domain (PSI-PD) score, which is a summation of the seven subscales. High scores indicate higher parenting stress. For the sample used in the current study, internal consistency (Cronbach’s alpha) values for subscales ranged from .55 - .83 (Guilfoyle et al., 2010).

**Stress Index for Parents of Adolescents (SIPA) (Sheras, Abidin, & Konold, 1998).**

The SIPA is a 112 item self-report measure of parenting stress for parents of children ages 11 to 19 years. This scale is intended to be a developmentally adjusted parallel measure to the PSI, which is described above. For this study, only the subscales in the Parent Domain (SIPA-PD) were administered. The SIPA-PD consists of 4 subscales: Life Restrictions, Relationship with Spouse/Partner, Social Alienation, and Incompetence/Guilt. These subscale scores sum to produce the SIPA-PD. High scores
indicate higher parenting stress. For the current sample, internal consistency (Cronbach’s alpha) values for subscales ranged from .67 - .83.

**Composite Variables**

*Obesity-specific HRQOL difference scores.*

*Sizing Me Up* and *Sizing Them Up* share four equivalent subscales: Emotional Functioning, Physical Functioning, Positive Social Attributes, and Teasing/Marginalization. Only these four subscales will be used to calculate total quality of life scores for children and parents. After these summary scores are calculated, obesity-specific HRQOL difference scores will be calculated by subtracting each youth’s *Sizing Me Up* total score from his or her parent’s *Sizing Them Up* total score. The resulting difference score will indicate the degree and direction of difference between youth HRQOL scores and parent-proxy HRQOL scores for each parent-child dyad. A larger absolute value of this difference score will indicate more disagreement, and a score of zero will mean that the overall HRQOL scores do not differ between parent and child. A negative value will indicate a dyad in which the caregiver rating is lower than the youth rating. Conversely, a positive value will indicate a dyad in which the caregiver rating is higher than the youth rating. Difference scores for HRQOL subscales will be examined for each dyad to see whether the direction of differences are consistent across subscales for each dyad, though these subscale-level difference scores will not be included in analyses.
**Parenting Stress.**

Although percentile rank scores for parenting stress were used in the study for which these data were originally collected (Guilfoyle et al., 2010), for the purposes of this study, z-scores based on population age-norms will be used for the PSI-PD and SIPA-PD in order to create equal-interval variables. z-scores from the two parallel measures will be combined into a single continuous variable. This combination will allow a single parenting stress variable to be entered into a regression analysis, regardless of whether parents completed the PSI-PD or the SIPA-PD. A similar procedure was used by Guilfoyle et al. (2010) in the study from which these data will be taken.

**Procedure**

Researchers obtained informed consent and assent from participants prior to their participation in the original study. Once informed consent and assent were obtained, caregivers and children filled out packets containing all measures included in this study. During administration, a researcher was readily available to answer any questions participants had. For all participants, participation in the study took place on their first (intake) visit to the hospital for obesity-related services. Participants were not compensated for their participation in the study. Of the 131 dyads that were approached about participation in the original study, 129 agreed to participate. 9 of these dyads were excluded for the following reasons: 4 children had siblings who were already participating in the weight-management program, 3 children could not comply with study protocol or could not validly complete the questionnaires, and 2 caregivers could not adequately read the measures. As stated previously, due to low rates of participation, fathers and other caregivers who participated in the original study will be excluded from
the current analyses, yielding a total sample size of 100 mother-child dyads for the present study.

**DATA ANALYSES**

**Preliminary Analyses, Correlations, and Mean Differences.**

Descriptive statistics, including means, standard deviations, minimums, maximums, and frequencies, will be calculated for all measures and composite variables. Standardized residuals from the regression analyses will also be examined to identify potential outliers and normality of the data, as well as to check that the assumption of homoscedasticity has been met for each independent variable.

A correlation matrix will be produced that includes all variables in the study, with the addition of individual caregiver and child total obesity-specific HRQOL scores. This matrix will be examined for the statistical significance and magnitude of parent-child HRQOL association as a test of hypothesis 1b. It will also be examined for evidence of multicollinearity that could invalidate the results of multiple-regression analysis. In addition, tolerance will be calculated in multiple regression analyses as an additional test of multicollinearity, with a tolerance value greater than or equal to .17 indicating acceptable independence of variables.

Independent samples *t*-tests will be used to compare parent and child obesity-specific HRQOL mean ratings for overall quality of life, as well as comparable subscales, on Sizing Me Up and Sizing Them Up. These values will be examined for statistical significance as a test of hypothesis 1a. Finally, because parent-child difference scores will be analyzed at the level of total QOL in multiple regression, subscale-level difference
scores will be examined for dyads to assess uniformity in the direction of difference scores within dyads.

**Multiple Regression.**

Hierarchical multiple regression will be used to examine the associations between obesity-specific HRQOL difference scores and the variables of interest. The dependent variable for this regression will be parent-child total HRQOL difference scores.

In the first block of the regression, difference scores will be regressed on socioeconomic status and dyad ethnic background as demographic background variables. Unstandardized regression coefficients ($b$ values) and $R^2$ will be reported and examined for significance in the first block of the regression.

In the second block of the regression child age, child gender, child BMI, caregiver BMI, and parenting stress will be entered. Unstandardized regression coefficients ($b$ values) for each variable will be interpreted and examined for statistical significance. These values will serve as tests of hypotheses 3, 4a, and 4b. In addition, $R^2$ change for the second block of the regression will be reported and examined for statistical significance as a test of hypothesis 2.

A third and final block of the regression will include squared variables to test for curves in the regression. Squared variables will include child age, child BMI, caregiver BMI, and parenting stress. Regression coefficients for these variables will be examined for statistical significance. A statistically significant regression coefficient in this block of the regression will indicate a non-linear association between that variable and the dependent variable. Although curvilinear associations are not hypothesized in this study,
due to the scale of the dependent variable (i.e., -100 to 100) and the exploratory nature of the study, it will be important to rule out such associations.

**Histograms and Plots.**

Histograms of parent-child HRQOL difference scores for overall HRQOL, as well as for parallel subscales, will be produced in order to examine the distribution of these scores within the sample. After running the proposed multiple regression, each independent variable that shows a statistically significant association with the dependent variable in the regression will be plotted against the dependent variable, and a regression line will be displayed. These plots will be examined, and the nature of the observed associations will be described. In the case of a statistically significant curvilinear association, a quadratic regression line will be interpreted rather than a linear one.
Chapter 4: Discussion

SUMMARY

The proposed study seeks to add to the literature surrounding the assessment of obesity-specific HRQOL among youth. Assessing this construct provides valuable information for clinicians and researcher regarding the impacts of excess weight on quality of life in childhood and adolescence. However, discrepant reports between caregivers and children can lead to difficulty in interpreting assessment data. This study will explore whether observed differences in caregiver and child reports of obesity-specific HRQOL can be predicted by a number of caregiver and child variables. It is expected that the variables included in this study will predict caregiver-child HRQOL difference scores to a statistically significant degree. If this is true, the present study will allow professionals to have a more thorough understanding of the variables associated with agreement versus disagreement between caregiver and child raters.

LIMITATIONS

There are a number of limitations to the present study that should be noted. First, a broad limitation of this study is that the lack of prior literature specifically addressing discrepant HRQOL reports between parents and children limits the ability to make causal inferences from the findings. In other words, the literature does not yet warrant a causal model to explain associations that may be observed in this study. Further, other potentially important variables, such as beliefs about body size or more objective health variables (e.g., presence of diabetes, asthma, or sleep apnea) are not be included in the
present investigation, which could limit the amount of variance that will be accounted for in the regression.

Another limitation of this study is that the sample only includes European-American and African-American dyads. Thus, the sample cannot be considered representative of the diversity that is present in the overall population, which could affect the generalizability of findings. Further, parent participants were exclusively mothers, which means that potential differences in findings between mothers and fathers cannot be examined, and the child gender variable is confounded with parent-child gender match.

Although the use of difference scores as a dependent variable is a strength of this study in that it allows for the examination of associations while controlling for other variables, it also poses some limitations. These issues have been documented in the literature, and include potentially lower reliability of difference scores when compared to their component measures, the fact that difference scores conceal separate associations between independent variables and each component measure, and that using difference scores essentially transforms a multivariate model into a univariate one (Edwards, 1995). For these reasons, using difference scores as the dependent variable in these analyses can also be considered a limitation. Employing multivariate analyses and being cautious in interpreting findings when using difference scores have been suggested as good practice when conducting similar studies and when examining results (Edwards, 2001; Laird & Weems, 2011).
**IMPLICATIONS AND FUTURE RESEARCH**

Results of this investigation could have important implications for future research, and for clinical practice. Additional knowledge about the associations between individual variables and caregiver-child HRQOL agreement may prompt further research examining influences on differing caregiver and child perceptions. Because perceptions of disease severity may have implications for treatment-related behaviors, the variables influencing these perceptions are important topics of study. Also, the use of multiple-regression analysis in the present study may advance the field’s understanding of the associations between these variables by providing information about the relative importance of variables for predicting caregiver-child differences.

Further, significant results may be useful for clinicians who work with obese youths and their caregivers, and who wish to assess obesity-specific HRQOL. Understanding these associations could help professionals develop hypotheses about the likely influences on discrepancies when conceptualizing cases. Because differing parent and child perceptions about the impact of youth obesity on quality of life could have implications for treatment-seeking or treatment-adherence behavior, it may be helpful for clinicians to have some understanding of variables that are associated with these differences. For example, if a clinician observes that a parent’s obesity-specific HRQOL rating for their child is much higher (i.e., better reported quality of life) than the child’s self-report rating, this could raise a concern that the parent may be underestimating the negative impact their child’s obesity is having on their quality of life. Assuming significant findings in the present study, this clinician may hypothesize that the parent’s
stress level, for instance, is related to his or her perceptions about the child’s quality of life. This hypothesis, in turn, may prompt the clinician to intervene with the parent to prevent non-adherence to treatment and increase motivation to change.

There are several areas of future research that could follow from this study. In order to overcome some of the methodological limitations of the present study, future researchers may wish to replicate and expand on significant findings using a more representative sample, as well as employing multivariate analyses to achieve a more detailed understanding of the associations between independent variables and parent-child discrepancies. Further, incorporating additional independent variables in future studies could enhance the treatment implications of significant findings.

Future studies should also be done to explore the implications of discrepant scores for treatment-seeking behavior, as well as treatment outcomes. It remains to be seen whether the level of obesity-specific HRQOL agreement between parents and children has a significant impact on, or predictive value for, these important variables. If so, topics of interest may include whether there is an optimal level of agreement or direction of disagreement, and whether interventions designed to alter parent and child perceptions, and therefore agreement, could enhance treatment outcomes.
References


Laird, R. D., & Weems, C. F. (2011). The equivalence of regression models using difference scores and models using separate scores for each informant:
Implications for the study of informant discrepancies. *Psychological Assessment*, 23(2), 388-397.


Varni, J. W., Seid, M., & Kurtin, P. S. (2001). PedsQL™ 4.0: reliability and validity of the Pediatric Quality of Life Inventory™ Version 4.0 generic core scales in healthy and patient populations. *Medical Care, 39*(8), 800-812.


