LONGITUDINAL ASSOCIATIONS BETWEEN TEASING AND
HEALTH-RELATED QUALITY OF LIFE AMONG TREATMENT-SEEKING
OVERWEIGHT YOUTH

BY

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Submitted to the graduate degree program in Clinical Child Psychology
and the Graduate Faculty of the University of Kansas in partial fulfillment of the
requirements for the degree of Doctor of Philosophy.

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Date defended: June 1, 2010

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ABSTRACT

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Overweight and obese children and adolescents frequently experience teasing. This investigation examined the longitudinal associations between teasing and pediatric health-related quality of life. Structural equation modeling was used to examine these associations in a sample of treatment-seeking overweight youth. Results from this study indicate that levels of teasing are inversely associated with quality of life, a correlation which remained stable over fifteen months. Complimenting the existing literature, study findings are suggestive of a directional relationship, with diminished quality of life predicting subsequent higher levels of teasing. This finding contrasts with previous cross-sectional studies which have inferred an opposite predictive direction (i.e., teasing predicts subsequent quality of life). Study results revealed no significant differences in this association for youths participating in an intervention which briefly addressed teasing when compared to controls. Results are suggestive of the potential for interventions designed to improve health-related quality of life to reduce teasing experiences for overweight youth.

Longitudinal Associations between Teasing and Health-related Quality of Life

among Treatment-seeking Overweight Youth

Teasing during childhood and adolescence has been widely studied over the past three decades. Defined as a personal communication which combines elements of aggression, humor, and ambiguity (Shapiro, Baumeister, & Kessler, 1991), teasing represents a significant threat to the social and psychological well-being of children and adolescents. A recent comprehensive US survey estimated that as many as one in four children experience teasing or emotional bullying (Finkelhor, Ormrod, Turner, & Hamby, 2005). Teasing communicates rejection from one child to another, which can lead to effects similar to those associated with physical violence (Asher, Rose, & Gabriel, 2001). Although teasing has been viewed as a normal part of childhood in the past, the recent deluge of research detailing the potential deleterious consequences of teasing has prompted increased efforts to understand the causes and correlates of teasing and to intervene to mitigate negative outcomes (e.g., Card, Isaacs, & Hodges, 2007; Storch & Ledley, 2005).

Numerous cross sectional studies have detailed the many potentially detrimental psychosocial correlates of teasing including social anxiety, depression, loneliness, poor self-esteem, and low levels of social competence and acceptance (Storch, Masia-Warner, & Brassard, 2003; Storch, Nock, Masia-Warner, & Barlas, 2003; Storch, Zelman, Sweeney, Danner, & Dove, 2002). In addition, children who experience frequent teasing are at increased risk for academic problems, including lower grade point averages and standardized test scores (Schwartz, Groman, Nakamoto, & Toblin, 2005). Longitudinal

studies have also demonstrated that teasing in childhood may be associated with psychological distress and interpersonal difficulties years later in young adulthood (Ledley, Storch, Coles, Heimberg, Moser, & Bravata, 2006; Roth, Coles, & Heimberg, 2002). Moreover, when comparing teasing to other forms of peer victimization (e.g., physically aggressive acts; rumor spreading) research has demonstrated that teasing is the most psychologically harmful type of peer victimization (Keltner, Capps, Kring, Young, & Heerey, 2001), a finding which underscores the significance of teasing during childhood and adolescence.

The high prevalence of teasing directed at overweight and obese youth is particularly disquieting given the host of psychological and health-related risks associated with teasing. A growing body of literature suggests that overweight and obese youth are at increased risk for peer victimization compared to their normal-weight peers. For example, in a large survey study of adolescents Neumark-Sztainer, Falkner, Story, Perry, Hannan, and Mulert (2002) reported that 45% of overweight adolescent girls and 50% of overweight adolescent boys reported experiencing teasing while only 19% of average weight girls and 13% of average weight boys reported being teased. Similarly, Hayden-Wade, Stein, Ghaderi, Saelens, Zabinski, and Wilfley (2005) found that 78% of a sample of overweight youth experienced teasing compared to 37.2% of a non-overweight sample. Further, van den Berg, Neumark-Sztainer, Eisenberg, and Haines (2008) recently presented data suggesting that weight-related teasing is commonly experienced by overweight and obese youth, regardless of racial or ethnic group. In summary, these findings suggest that overweight and obese youth are at substantially greater risk for experiencing teasing than their normal-weight peers.

Overweight youth who do experience frequent peer victimization are at particular risk for numerous negative psychosocial outcomes. For example, Young-Hyman, Schlundt, Herman-Wenderoth, and Bozylinsky (2003) reported that weight-based teasing was negatively correlated with self-esteem among African-American school-age children. Similarly, Eisenberg, Neumark-Sztainer, and Story (2003) found that weight-related teasing was correlated with thinking about and attempting suicide in a community adolescent sample, even after controlling for body weight. More recently, Storch, Milsom, DeBraganza, Lewin, Geffken, and Silverstein (2007) found that peer victimization was positively associated with child-reported depression, anxiety, loneliness, and parent-reported internalizing and externalizing psychological symptoms among overweight youth seeking weight management treatment. Moreover, Libbey, Story, Neumark-Sztainer, and Boutelle (2008) reported that frequent teasing was associated with higher levels of depression, anxiety, and anger in a sample of overweight adolescents participating in a variety of weight loss programs. Adolescents in this study who reported higher levels of being bothered by teasing were more likely to report low self esteem and elevated levels of anxiety compared to those who were less bothered.

In addition to the potential negative psychological sequalae of teasing, recent research has demonstrated that poor health behavior outcomes are associated with teasing, particularly among overweight youth. For example, Storch and colleagues (2007) found that among overweight children ages 8 to 18, peer victimization was negatively correlated with level of physical activity. Similarly, Faith, Leone, Ayers, Heo, and Pietrobelli (2002) reported that weight-related criticism (i.e., teasing about weight) during physical activity was associated with lower physical activity levels. More recently,

Jensen and Steele (2008) found that teasing during physical activity was associated with lower levels of physical activity among girls, a relationship that was particularly strong for those reporting high body dissatisfaction.

One potential negative outcome of teasing, particularly among overweight and obese youth, is the possibility of reduced health-related quality of life. Health-related quality of life (HRQOL) encompasses a wide array of indicators of health including physiology, physical and psychological functioning, social activity, cognition, emotion, sleep and rest, energy and vitality, health perception, and general life satisfaction (National Institutes of Health, 2009). Given the chronic, systemic effects of pediatric overweight and obesity, HRQOL is of particular interest as an outcome measure for children because it assesses functional impairment that may not be identifiable through objective measures such as BMI. While BMI is an important indicator of physical health and risk for weight-related illness, it does not assess the individuals' ability to function in daily life, the express purpose of quality of life measures (Modi & Zeller, 2008).

Past studies have demonstrated that HRQOL is significantly lower among overweight and obese youth than among their normal-weight peers. For example, Schwimmer, Burwinkle, and Varni (2003) reported that treatment-seeking overweight and obese youth reported significantly diminished quality of life compared to instrument norm samples. Levels of HRQOL in this sample were similar to those reported by children with cancer. Similarly, Janicke et al. (2007) found that parent and self-reported HRQOL was significantly lower among overweight and obese children and adolescents compared to a normative sample of healthy children. Consistent with these findings, Williams, Wake, Hesketh, Maher, and Waters (2004) reported decreased HRQOL among

overweight youth (i.e., BMI 85th percentile), particularly in physical and social functioning domains. Attenuated HRQOL in this study was particularly pronounced among obese children and adolescents (i.e., BMI 95th percentile), a finding which is consistent with many studies demonstrating lower HRQOL as degree of overweight increases. Further, Zeller and Modi (2006) reported relative agreement between parent- and child- reports confirming diminished HRQOL across domains among overweight youth, although parents consistently reported greater impairment than their children.

More recently, investigations of psychosocial factors contributing to lower HRQOL among overweight youth have begun to emerge. Janicke and colleagues (2007) detailed the influence of peer victimization, child depressive symptoms, and parent distress on child HRQOL in a study of treatment-seeking children and adolescents. They reported that a psychosocial model including all three aforementioned variables significantly predicted both parent- and child-reported HRQOL. Moreover, peer victimization was significantly negatively associated with total child-reported quality of life. Evidence also supported depression as a partial mediator of this relationship, suggesting that depressive symptoms may play an important role in the victimization-quality of life relationship.

Of particular relevance to the current investigation, Stern, Mazzeo, Gerke, Porter, Bean, and Laver (2007) demonstrated that weight-related teasing, as measured by the Perceptions of Teasing Scale (Thompson et al., 1995), was associated with decreased HRQOL in a sample of treatment-seeking obese adolescents. This association was partially mediated by self-esteem, suggesting that youths may internalize teasing, thereby decreasing self esteem and resulting in lower HRQOL. Prevalent teasing and decreased

HRQOL did not vary by gender or ethnicity, providing further evidence of the ubiquity of teasing and diminished QOL among obese (BMI% 95) adolescents.
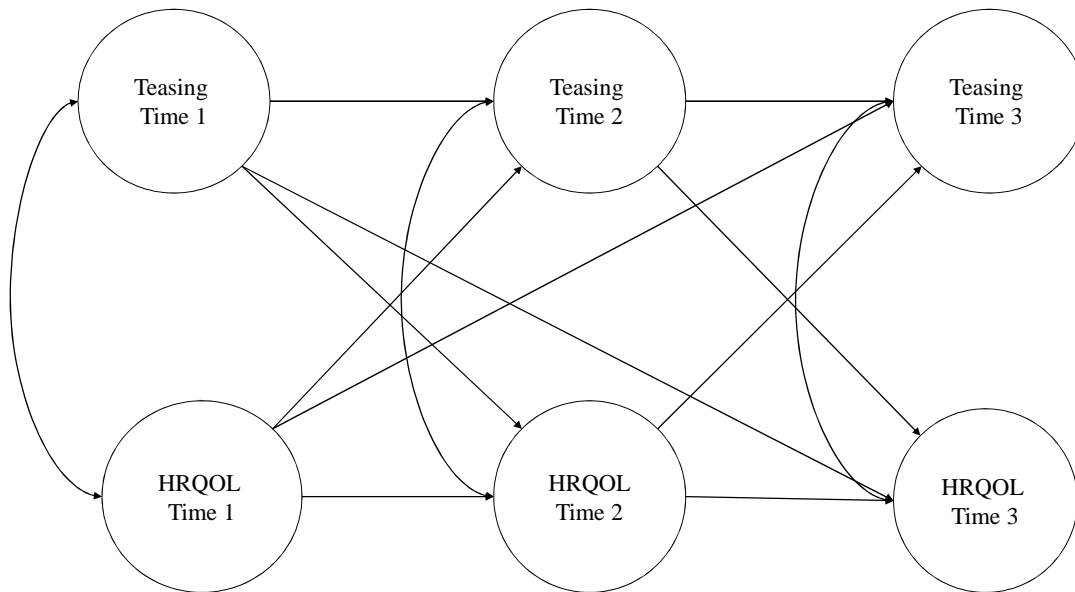
Several limitations to the existing literature examining the peer victimization/teasing – HRQOL relationship are salient. First, both of the studies which were discovered on this topic employed cross-sectional methodologies, a design which limits claims about causality. Because of this limitation, evidence for the directionality of this relationship is lacking. At present, one can only infer that teasing is associated with poorer HRQOL, a proposition that requires further evidence utilizing longitudinal data. Additionally, cross sectional designs preclude analyses of the stability of teasing and HRQOL over time. Studies utilizing longitudinal designs are uniquely positioned to increase understanding of the temporal stability of each construct and the interaction between teasing and HRQOL.

Second, only one of the studies located on this topic (i.e., Janicke et al., 2007) employed multiple reports of pediatric HRQOL. Incorporating parent and child report of HRQOL is important, particularly in light of mixed evidence for parent-child agreement on the PedsQL (e.g., Cremeens, Eiser, & Blades, 2006; Zeller & Modi, 2006). Moreover, previous studies have suggested that a unidirectional relationship exists between teasing and HRQOL while a bidirectional relationship may more accurately characterize this association. Because previous studies relied on cross-sectional data, they were unable to test for possible bidirectional effects. It is equally plausible that poorer HRQOL (e.g., social functioning) increases a child's propensity to be teased as it is that teasing leads to lower HRQOL.

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The present study is designed to address the limitations present in previous studies by testing a longitudinal model of the teasing-HRQOL relationship in the context of a larger investigation of the effectiveness of a treatment program for children and adolescents. The current investigation was designed to evaluate three previously unexamined questions concerning the teasing-HRQOL association. First, this study assessed whether teasing reliably predicted quality of life over three measurement occasions spanning fifteen months. Using participant reports at multiple time points allowed for a more reliable assessment of this relationship than was possible in previous studies. Second, the model (see Figure 1) was designed to assess potential bidirectional associations between latent constructs. Specifically, tests of relationships between latent variables sought to provide evidence for or against bidirectionality.

Next, the study was designed to evaluate the stability of the two latent constructs and their association over time. That is, did the relationship between constructs change over the course of a year? In addition to providing estimates of stability of constructs, the study examined the associations between constructs over three measurement occasions spanning a fifteen month period. Finally, the study was designed to test an exploratory hypothesis that an intervention which incorporates information about coping with teasing will reduce the association between teasing and HRQOL. Using a longitudinal design, this study evaluated changes in the teasing-HRQOL relationship over time as a function of treatment condition [i.e. comprehensive intervention (*Positively Fit;* Steele & The Pediatric Health Promotion and Maintenance Lab, n.d.) vs. active control (enhanced standard of care)].

Figure 1

Note: HRQOL = Health-related Quality of Life

Hypotheses

First, it was hypothesized that treatment-seeking youth who reported more teasing would experience poorer self- and parent-reported HRQOL than those experiencing less teasing. Correlations between these constructs were expected to be significant at all three measurement occasions. Second, it was expected that teasing would predict HRQOL longitudinally in latent regression models. Specifically, it was predicted that teasing at Time 1 (pre-treatment) and 2 (post-treatment) would significantly predict HRQOL at Time 2 (post-treatment) and 3 (1 year post-treatment follow up), respectively (see Figure 1). Third, it was predicted that the cross-lagged regression paths in the structural model, with HRQOL predicting teasing, would also be significant, indicating that quality of life (e.g., social functioning, physical functioning) predicts subsequent levels of teasing experienced by children and adolescents.

Fourth, it was anticipated that the two latent constructs (HRQOL and teasing) and the associations between them would remain stable over the course of one year. Specifically, it was predicted that children's self-reported teasing and HRQOL, along with the associations between these latent constructs, would remain relatively stable over time. Further, it was expected that the associations between constructs would remain significant across multiple time points (i.e., Time 1, Time 2, Time 3; see Figure 1).

Finally, an exploratory hypothesis of this investigation was that the treatment condition examined in the larger randomized clinical trial would moderate the teasing-HRQOL relationship, such that study participants receiving the *Positively Fit* intervention would demonstrate a weaker association between teasing and HRQOL at Times 2 and 3 than youths receiving the standard of care treatment. Because *Positively Fit* imparts cognitive and behavioral strategies for coping with teasing, it was predicted that this intervention would lead to fewer teasing-related insults to HRQOL. Consistent with Stern and colleagues' (2007) call for research examining efforts to increase resilience to teasing, it was anticipated that children and adolescents participating in a randomized clinical trial of *Positively Fit* would report better quality of life following the intervention, regardless of teasing level, compared to participants receiving a standard-of-care treatment.

Method

Participants

Ninety-three children and adolescents (ages 7-17) who participated in a behavioral/educational pediatric weight management program and their participating parent/guardian comprised the study sample. This sample was obtained through referrals

from physicians and school nurses, advertisements in newspapers, and fliers posted in community centers (e.g., recreation facilities). Eligibility criteria for participation in the study included: (a) the participating child or adolescent was between the ages of 7-17, (b) the participant's BMI percentile was categorized as overweight (i.e., BMI ≥ 85th percentile) or obese (i.e., BMI ≥ 95th percentile), (c) one parent/guardian participated in the intervention, (d) the participant had no serious mental illness or developmental delay, (e) the parent and child spoke English, (f) the parent provided written informed consent, and (g) the child verbally assented to participation. Of the 147 children and adolescents assessed for eligibility, 4 did not meet minimum age criteria (7 years), 16 refused to participate, and 34 did not return phone calls requesting pre-treatment assessment completion. Of the 93 families enrolled in the study, 14 did not complete any treatment, 64 completed the post-treatment follow-up assessment, and 56 were available for the one-year follow-up.

Procedure

Participants who met enrollment eligibility criteria were stratified by age (i.e., ages 7-12; ages 13-17) and were randomized into intervention (*Positively Fit*) and control groups (Enhanced Standard of Care) in blocks of 4-7 families without replacement using a random number generator.

Positively Fit. This manualized intervention (Steele et al., no date) was comprised of ten weekly group treatment sessions that last approximately 90 minutes per session. Groups ranged in size from 4 to 8 families per group and separate groups were held for children (7-12) and adolescents (13-17). While the same information was presented to both age groups, separate age cohorts were utilized to accommodate varied

developmental levels. To allow for more targeted delivery of the intervention, parents and children attended separate meetings for both nutritional/physical activity education and behavioral components of the treatment. Approximately 40 minutes of each session consisted of nutrition/physical activity education followed by 40 minutes of behavioral intervention with a 10 minute summary and goal setting period with both parents and children in attendance at the conclusion of the session. Behavioral treatment sessions addressed topics including stimulus control, rewards for change, modeling, goal setting, and lifestyle change. Nutritional sessions focused on understanding nutritional information and portion control, planning for special occasions, and increasing knowledge of and participation in physical activity. Of particular interest to the present study, one session directly addressed bullying and teasing from peers. Children were instructed about appropriate actions to deter future victimization and cognitive and behavioral strategies intended to reduce the effects of victimization were presented. Johnston and Steele (2007) reported that this intervention produced favorable reductions in body mass index (BMI) compared to a treatment-as-usual control group. Preliminary results from the randomized clinical trial utilizing the treatment sample employed in the present investigation also suggest that *Positively Fit* yields treatment effects similar to enhanced standard of care treatment (bibliotherapy plus nutrition education; Steele, Aylward, & Jensen, 2009).

Enhanced Standard of Care (ESC). Participants randomly assigned to the ESC intervention participated in the *Trim Kids* manualized treatment program (Southern, von Almen, & Schumacher, 2002). Consistent with recommendations made by the authors of this program, participants received three sixty-minute individual face-to-face visits with a

licensed nutritionist. Families in this condition received the *Trim Kids* manual at initial

(pre-treatment) assessment and were instructed to read the first four book chapters prior

to their first meeting with the nutritionist. Subsequently, participating families attended

three meetings over the course of ten weeks where meal planning, basic nutritional

principles, physical activity, and energy balance principles are discussed.

   Data Collection. Participants completed study measures at three time points over

the course of the study. First, all participating children and adolescents and one parent or

guardian completed demographic measures as well as all measures employed in the

present study prior to beginning weight management treatment (Time 1). The same

measures were completed once again after completion of treatment (approximately 10

weeks after commencing treatment; Time 2). A final assessment was conducted

approximately one year following treatment completion (Time 3).

Measures

   Teasing. This construct was measured using the Perceptions of Teasing Scale

(POTS; Thompson et al., 1995), an 11-item measure of teasing that assesses two distinct

teasing constructs: Weight-related teasing (WRT; six items) and Teasing about

Abilities/Competency (Competency Teasing; CT; five items). This instrument asks

questions about the child's experiences with teasing from kindergarten until the present

(e.g., WRT, *"People made jokes about you being too heavy"*; CT, *"People laughed at*

you because you didn't understand something"). Children are asked to rate the frequency

with which they have been teased since kindergarten on a five point scale from 1 (never)

to 5 (very often). Because frequency of teasing does not necessarily predict the level of

distress experienced by children (Vessey, Horrowitz, Carlson, & Duffy, 2008), this scale

also incorporates a subjective scale used to measure perceptions of distress. If the child has experienced the type of teasing referred to in the measure, they are asked to rate the degree to which they were upset by the teasing on a five point scale from 1 (not upset) to 5 (very upset). Consistent with Thompson et al., WRT scale scores consist of numerical ratings of frequency for six weight-related items plus associated ratings of distress, and CT scores consisted of five competency teasing ratings plus attendant distress ratings. Good test-retest reliability was reported by Thompson and colleagues in the measure's original development among young adults ($r = .88$). Test-retest reliability in the current study was acceptable between Time 1 and Time 2 ($r = .79$) and between Time 2 and Time 3 ($r = .57$). Internal consistency in the present sample was good at all three time points (= .91, = .92, = .90, respectively).

Quality of Life. Self-reported health-related quality of life (HRQOL) was measured using the Pediatric Quality of Life Inventory (PedsQL) 4.0 Generic Core Scales. This 23-item self-report measure of health-related quality of life yields scores on four subscales: physical functioning (8 items); emotional functioning (5 items); social functioning (5 items); and school functioning (5 items). Children and adolescents answer questions about how much of a problem negative physical, social, academic, and emotional problems have been on a five point scale from 0 (never) to 4 (almost always). The PedsQL has been demonstrated to have good reliability and validity. Internal consistency statistics are consistently above 0.70 (Varni, Seid, & Kurtin, 2001). Test-retest reliability for child-reported HRQOL in the present sample was acceptable between Time 1 and Time 2 ($r = .61$) and acceptable between time 2 and Time 3 ($r = .45$). Internal consistency was also high at all three time points in the present sample (= .86, = .87,

= .81, respectively).

Parent-report of HRQOL was measured using the PedsQL 4.0 Parent Proxy Report. Items on this form are virtually identical to the child/adolescent report except for minor changes in language for developmental appropriateness and tense (e.g., first to third person). The number of items and response choices are identical to the self-report form. Internal consistency statistics for this measure have also consistently been above 0.70. Construct validity has been established using the known-groups method (Varni, Limbers, & Burwinkle, 2007). In the present study, internal consistency was high at all three measurement occasions (= .91, = .85, = .87, respectively) and test-retest reliability was comparable to self report measures between Time 1 and Time 2 (r = .57), and between Time 2 and Time 3 (r = .48). In the proposed investigation, total HRQOL scores were used as the outcome measures for both parent and child report. Total scores represent the mean of the sum of all four quality of life subscale scores, with higher scores indicating poorer HRQOL.

Missing Data

Because completion of study measures occurred over three time periods spanning greater than one year, missing data resulting from participant attrition were addressed prior to conducting analyses. Recent literature concerning missing data suggests that researchers should assess the reasons for missingness prior to settling on a strategy for handling this problem. Graham, Hofer, Donaldson, MacKinnon, and Schafer (1997) among others, suggest that missing data may be organized into one of three categories: (a) missing completely at random (MCAR) or by the design of the researcher, (b) missing at random (MAR) where missingness is related to one or more known variables in the

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data, or (c) non-random incompleteness (NRI), where missingness is related to variables that are neither known nor present in the data. Because several measured study variables were associated with missing data (e.g., treatment attendance, distance from treatment site), missing data were best judged MAR. Multiple imputation is considered an acceptable technique for resolving missing data problems falling in either of the first two categories (i.e., MCAR and MAR). Therefore, a maximum likelihood multiple imputation procedure using SPSS 17.0 Missing Values was conducted prior to conducting study analyses. Multiple imputation confers several advantages over listwise deletion, including increased power to detect significant effects and decreased sampling bias (Buhi, Goodson, & Neilands, 2008). Study variables associated with missing data were included as predictors in the imputation procedure. Overall, 24.6% of the raw data necessary for analyses in the present study was imputed. This amount of missingness is well below accepted percentages of missing data that can reasonably be imputed using the full information maximization likelihood imputation method that was employed in this study (Graham, Olchowski, & Gilreath, 2007).

Analytic Plan

The measurement and predictive analyses were conducted using structural equation modeling (SEM) techniques in LISREL 8.80 (Jöreskog & Sörbom, 2007). SEM provides a flexible and powerful method for examining factor structure as well as testing predictive models. The benefits of SEM in conducting such analyses include the ability to control for measurement error by modeling constructs using latent representations and the ability to test complex models with multiple interacting dependent variables (see Nelson, Aylward, & Steele, 2008, for discussion of the unique benefits of SEM analyses in

pediatric research). Another benefit of SEM that is particularly salient to this investigation is the ability to test bidirectional associations within the same structural model. That is, a variable can be analyzed as both a cause and an effect of other variables simultaneously (Farrell, 1994). SEM procedures involve the integration of measurement models, which specify the relationships among latent and observed variables, with structural models, which specify the relationship between latent constructs. Because the x^2 statistic (routinely used to evaluate model fit in SEM) is highly sensitive to sample size (Kline, 2005), alternative fit statistics such as RMSEA, CFI, and NNFI were used to evaluate model fit for all CFA and SEM analyses.

Consistent with guidelines for conducting statistical analyses using SEM (Brown, 2006), the present investigation began with a confirmatory factor analysis (CFA) including both measures of interest (POTS and PedsQL; see Figure 2). When specifying the measurement model, a parceling technique was employed. Parcels are defined as "an aggregate-level indicator comprised of the sum (or average) of two or more items, responses, or behaviors" (Little, Cunningham, Shahar, & Widaman, 2002, p. 152). Parceling offers many advantages over item-level modeling, including reduction of sampling error, fewer chances for correlated residuals or dual loadings of indicators, and greater parsimony (Little et al., 2002). Consistent with previous validation studies (Thompson et al., 1995; Varni, Seid, & Kurtin, 2001), two parcels were created for the POTS [Weight-related teasing (WRT) and Teasing about Abilities/Competency (CT)] while four latent constructs were specified for the PedsQL (Physical, Emotional, Social, and School functioning). These parcels represent the subscales of each measure and allowed for evaluation of specific subscale loadings on latent constructs.

To evaluate the aforementioned hypotheses, subsequent directional regressions were performed using latent variables within the SEM framework. Using a fully cross-lagged longitudinal panel design (see Little, Preacher, Selig, & Card, 2007, and Burkholder & Harlow, 2002), the associations between latent variables at all three time points were tested simultaneously (see Figure 1). Moreover, the structural model incorporated auto-regressive paths designed to determine the stability of the latent constructs over time. To test the primary hypotheses, namely that teasing and HRQOL would demonstrate reciprocal (bidirectional) associations at each time point and prospectively, a panel analysis was conducted with predictive paths as illustrated in Figure 1.

Power Analyses

A priori power analyses were conducted to determine the likelihood of detecting good and not-good global model fit using a SAS program created by MacCallum, Brown, and Sugawara (1996). These tests employ root-mean-square error of approximation (RMSEA) values as indicators of model fit. In both analyses alpha was set to .05, degrees of freedom were 132, and sample size was 93. For the test of close model fit, the root-mean-square error of approximation (RMSEA) value for the null hypothesis was .05 while the RMSEA for the alterative hypothesis was .10. Generally, power estimates of .80 or above considered sufficient (Muthén & Muthén, 2002). Results of this analysis suggest a 98% chance of detecting close model fit given the aforementioned parameters. This finding suggested that there was an excellent chance of confirming a good-fitting model if one existed in the data. Furthermore, the likelihood of confirming not-good fit was examined. This approach allows one to determine power necessary for a direct test of

the null hypothesis and, if the null hypothesis is rejected, provides additional evidence of good model fit. For this test, RMSEA was set to .05 for the null hypothesis and 0.01 or the alterative hypothesis. This test yielded a power estimate of .47, suggesting that the power to detect not-good model fit was lower than power to detect good fit. Given these results, it was highly likely that a good fitting model would be detected if present. However, because of a relatively small sample size, our probability of detecting not-good model fit was moderate.

A separate power analysis was conducted for the exploratory tests of associations between study variables by treatment group. Sample size for this analysis was 79, reflecting the number of participants who attended 20% of sessions (ESC group) or *Positively Fit* session two (the session in which teasing was addressed). This percent attendance exclusion criterion was applied to remove variability introduced by reports from children who received no intervention while requiring attendance at session two for PF participants ensured that coping with/responding to teasing was included as a component of the intervention. Degrees of freedom for this analysis were 132. Employing the same RMSEA values listed previously, this analysis indicated a 95% chance of detecting a significant effect and a 38% chance of detecting not-good model fit.

Results

Means and standard deviations of study variables by treatment group are presented in Table 1. Demographic and anthropometric statistics are displayed in Table 2. As described in the *Methods* section, the hypothesized measurement and structural models were sequentially tested using structural equation modeling.

Table 1

Means and standard deviations of primary study variables, by treatment group.

Measure	Total	PF	ESC
POTS			
Time 1	32.78 (18.87)	35.59 (21.33)	30.17 (15.81)
Time 2	24.97 (15.41)	25.29 (17.99)	24.68 (12.56)
Time 3	24.28 (14.06)	22.08 (13.05)	26.31 (14.65)
PedsQL Self-report			
Time 1	22.95 (11.92)	20.93 (11.35)	24.82 (12.13)
Time 2	19.61 (11.90)	18.92 (10.99)	20.26 (12.66)
Time 3	17.47 (9.47)	14.37 (8.04)	20.34 (9.79)
PedsQL Parent-Report			
Time 1	27.59 (15.62)	28.35 (14.35)	26.89 (16.68)
Time 2	20.90 (11.70)	20.11 (13.16)	21.63 (10.10)
Time 3	22.64 (12.50)	22.83 (13.18)	22.47 (11.83)

Notes: POTS = Perceptions of Teasing Scale; PedsQL = Pediatric Quality of Life Inventory; *PF = Positively Fit*; *ESC =* Enhanced Standard of Care

Table 2

Demographic and anthropometric variable means, standard deviations, and frequencies.

Variable	Mean (SD)	Range	Frequency (%)
Age	11.74 (2.66)	7.17 - 17.93	
BMI %	98.18 (1.78)	88.6 - 99.8	
Overweight			7.5
Obese			92.5
Gender			
Female			59
Male			41
Ethnicity			
Caucasian			72.0
African-American			12.9
Hispanic			4.3
Asian			1.1
Native American			5.4
Biracial			4.3

Notes: BMI % = Body Mass Index Percentile for Age; Overweight = BMI % 85; Obese = BMI % 95 (CDC, 2007). Values for anthropometric data were reported at baseline (Time 1).

Measurement Model

Before testing specific hypotheses, confirmatory factor analyses were conducted to determine whether the two latent constructs of interest (Teasing and Health-related Quality of Life) were measured comparably across measurement periods (i.e., pre-treatment, post-treatment, one year follow-up). Specifically, tests were designed to determine whether strong metric invariance (i.e., invariance of the loadings and intercepts of the manifest indicators) could be established across measurement intervals. To answer this question, confirmatory factor analyses (CFAs) employing mean and covariance structures models (MACS; Little et al., 1997) were constructed using the full study sample. The initial, freely estimated model constructed using child-report Teasing and HRQOL data, demonstrated acceptable fit (χ^2 (102, $n = 93$) = 151.20, $p = .001$, RMSEA = .062, NNFI = 0.95, CFI = 0.97), suggesting that the pattern of free and fixed parameters was equivalent across measurement occasions.

Next, following standard procedures for evaluating measurement invariance, the loadings of the indicators on the latent constructs were equated across measurements to test for weak factorial invariance (i.e., are relationships between latent variables and manifest variables comparable across time?), a model that also demonstrated acceptable fit (χ^2 (110, $n = 93$) = 156.78, $p = 0.002$, RMSEA = 0.06, NNFI = 0.95, CFI = 0.97). No significant changes in model fit were observed based on the RMSEA model test (i.e., does the RMSEA value of the nested model fall within the 90% RMSEA confidence interval of the comparison model?; Little, 1997), suggesting that the loadings were relatively equal across measurement occasions.

Additionally, tests of strong factorial invariance (i.e., are values of each item corresponding to zero value of underlying construct invariant?) were conducted in the final sequential step by equating the intercepts. Results indicated that the model fit was acceptable (χ^2(118, n = 93) = 168.69, p = 0.001, RMSEA = 0.57, NNFI = 0.95, CFI = 0.97). No significant changes in model fit were observed based on the RMSEA Model Test. Factor loadings and R^2 values for each manifest indicator in the strong factorial invariance model are reported in Table 3. Taken together, these tests indicate that the constructs included in the model (WRT and CT) are invariant when measured across time periods, meaning that the same constructs are being assessed across time. Results of tests of factorial invariance are summarized in Table 4.

Table 3

Loading Values, Residuals, and R^2 Values for Each Indicator from the Strong Metric Invariance Model

Indicator	Unstandardized Loading (SE)	Standardized Loading [a]	Theta	R²
Perceptions of Teasing – Time 1:				
Weight-related Teasing	6.42 (1.05)	0.83	0.27	0.72
Teasing about Ability	6.77 (0.76)	0.78	0.44	0.56
Health-related Quality of Life (Child Report) – Time 1:				
Physical Functioning	3.26 (0.39)	0.67	0.56	0.42
Emotional Functioning	2.28 (0.32)	0.57	0.65	0.35
Social Functioning	2.96 (0.33)	0.75	0.41	0.59
School Functioning	2.27 (0.30)	0.62	0.65	0.35
Health-related Quality of Life (Parent Report) – Time 1:				
Physical Functioning	3.74 (0.33)	0.66	0.44	0.56
Emotional Functioning	2.45 (0.25)	0.58	0.58	0.42
Social Functioning	2.85 (0.23)	0.72	0.40	0.60
School Functioning	2.24 (0.24)	0.60	0.41	0.59
--				
Perceptions of Teasing – Time 2:				
Weight-related Teasing	9.42 (1.05)	0.80	0.46	0.54
Teasing about Ability	6.77 (0.76)	0.83	0.16	0.84
Health-related Quality of Life (Child Report) – Time 2:				
Physical Functioning	3.26 (0.39)	0.69	0.52	0.48

Emotional Functioning	2.28 (0.31)	0.54	0.65	0.35
Social Functioning	2.96 (0.33)	0.81	0.42	0.58
School Functioning	2.27 (0.30)	0.59	0.56	0.43
Health-related Quality of Life (Parent Report) – Time 2:				
Physical Functioning	3.74 (0.33)	0.73	0.55	0.45
Emotional Functioning	2.45 (0.25)	0.69	0.71	0.29
Social Functioning	2.85 (0.23)	0.75	0.52	0.48
School Functioning	2.24 (0.24)	0.60	0.67	0.33

Perceptions of Teasing – Time 3:				
Weight-related Teasing	9.42 (1.05)	0.72	0.41	0.59
Teasing about Ability	6.77 (0.76)	.077	0.48	0.52
Health-related Quality of Life (Child Report) – Time 3:				
Physical Functioning	3.26 (0.39)	0.64	0.54	0.46
Emotional Functioning	2.28 (0.32)	0.42	0.84	0.16
Social Functioning	2.96 (0.33)	0.75	0.49	0.51
School Functioning	2.27 (0.30)	0.55	0.62	0.38
Health-related Quality of Life (Parent Report) – Time 3:				
Physical Functioning	3.74 (0.33)	0.74	0.58	0.42
Emotional Functioning	2.45 (0.25)	0.67	0.61	0.39
Social Functioning	2.85 (0.23)	0.82	0.30	0.69
School Functioning	2.24 (0.24)	0.63	0.64	0.36

[a]Common Metric Completely Standardized Solution

Table 4

Fit Indices for the Nested Sequences in Confirmatory Factor Analyses

Model	χ^2	df	p	RMSEA	RMSEA 90% CI	NNFI	CFI	Constraint Tenable
Child: Configural Invariance	151.20	102	.001	.062	.032-.087	0.95	0.97	---
Child: Loading Invariance[1]	156.78	110	.002	.060	.031-.085	0.95	0.97	Yes
Child: Intercept Invariance[1]	168.69	118	.001	.057	.027-.081	0.95	0.97	Yes
Parent: Configural Invariance	115.22	102	.175	.018	.000-.058	0.99	0.99	---
Parent: Loading Invariance[1]	147.10	114	.020	.043	.000-.071	0.97	0.98	Yes
Parent: Intercept Invariance[1]	163.91	122	.006	.049	.000-.074	0.97	0.97	Yes

[1] Evaluated with the RMSEA Model Test
Note. Each nested model contains its constraints, plus the constraints of all previous, tenable models.

Measurement invariance was established for parent-report measures of quality of life using an identical procedure. The initial CFA model including parent reports of HRQOL and child reports of Teasing demonstrated excellent model fit, $\chi^2(102, n = 93) = 115.22$, $p = .175$, RMSEA = .02, NNFI = 0.99, CFI = 0.99. The subsequent test of weak factorial invariance also indicated close model fit, $\chi^2(114, n = 93) = 147.12$, $p = .020$, RMSEA = .04, NNFI = 0.97, CFI = 0.98. No significant changes in fit were observed based on the RMSEA Model Test. Finally, the strong factorial (i.e., intercept) invariance model demonstrated acceptable fit, $\chi^2(122, n = 93) = 163.91$, $p = .006$, RMSEA = .05, NNFI = 0.97, CFI = 0.97. Similarly, no significant difference in model fit was observed between weak and strong invariance models based on the RMSEA Model Test. These tests provide support for the measurement invariance of parent reports of quality of life over the three measurement occasions.

Structural Models

After establishing measurement equivalence over time, associations between latent constructs (i.e., Teasing and Health-related Quality of Life) over time were examined.

Child Report. The first structural model, constructed using child-report data, examined hypotheses regarding correlations and predictive associations between latent constructs and their stability over time. This structural model demonstrated close model fit and no significant difference in model fit was detected relative to the weak invariance model (χ^2(114, n = 93) = 167.70, p = <.001, χ^2(4, n = 93) = 4.98, p >.25, RMSEA = .059, NNFI = 0.99, CFI = 0.97), indicating that the specified directional associations are tenable. Correlations between latent constructs in this structural model are displayed in Table 4. Consistent with the first study hypothesis, child-reported Teasing and HRQOL remained significantly correlated at each of the three assessments.

Next, the study hypothesis postulating that Teasing would predict subsequent HRQOL in latent regression analyses was examined. To test this hypothesis, longitudinal structural paths were specified between Time 1 Teasing and Time 2 HRQOL and between Time 2 Teasing and Time 3 HRQOL. Teasing at Time 1 did not significantly predict HRQOL at Time 2 nor did Teasing at Time 2 predict HRQOL at Time 3 (β = .07, p > .05; β = .039, p > .05, respectively).

Similarly, it was anticipated that HRQOL would significantly predict subsequent Teasing in directional latent regressions. Findings indicated that HRQOL at Time 1 significantly predicted Teasing at Time 2 (β = .33, p < .01) and HRQOL at Time 2 predicted Teasing at Time 3 (β = .40, p < .01). In summary, the hypothesized predictive

relationship with Teasing predicting HRQOL was not supported. However, evidence supporting the hypothesis stating that HRQOL would predict subsequent levels of Teasing was observed.

Table 5

Correlations between Latent Constructs for the Child Structural Model

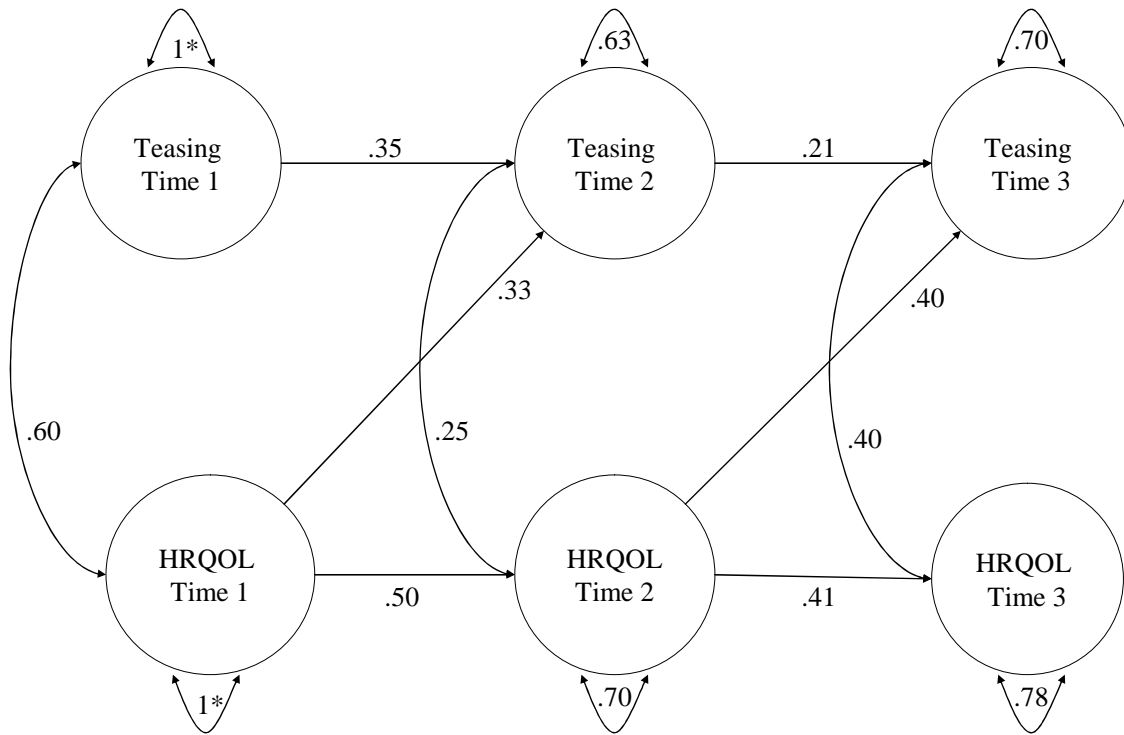|	Teasing T1	QOL T1	Teasing T2	QOL T2	Teasing T3	QOL T3
Teasing T1	1.00					
QOL T1	0.58 (0.10) 5.80	1.00				
Teasing T2	0.56 (0.09) 4.64	0.55 (0.09) 4.51	1.00			
QOL T2	0.37 (0.11) 2.98	0.55 (0.10) 4.74	0.58 (0.10) 4.01	1.00		
Teasing T3	0.38 (0.09) 2.77	0.32 (0.09) 2.35	0.43 (0.08) 2.67	0.51 (0.09) 3.32	1.00	
QOL T3	0.04 (0.09) 0.32	0.28 (0.09) 2.03	0.32 (0.07) 2.22	0.48 (0.09) 2.92	0.64 (0.08) 3.55	1.00

Note: Teasing T1 = Time 1 Teasing; QOL T1 = Time 1 Health-Related Quality of Life; etc.

Finally, the hypothesis predicting that both latent constructs would remain temporally stable was evaluated by examining the auto-regressive pathways within constructs at each measurement occasion. In these analyses Teasing at Time 1 significantly predicted Teasing at Time 2 (β = .35, p < .01) and Time 2 Teasing also predicted Teasing at Time 3 (β = .35, p < .01). Similarly, Time 1 HRQOL significantly predicted HRQOL at time 2 (β = .50, p < .01) and Time 2 HRQOL predicted HRQOL at Time 3 (β = .41, p < .01).

Because hypothesized latent regressions with Teasing predicting QOL were not significant, these pathways were removed, resulting in a close-fitting final structural model (χ^2(116, n = 93) = 162.23, p < .005, RMSEA = .058, NNFI = 0.96, CFI = 0.97) presented in Figure 2. Again, no significant difference in model fit was detected relative to the weak invariance model (χ^2(6, n = 93) = 5.14, p > .25).

Figure 2

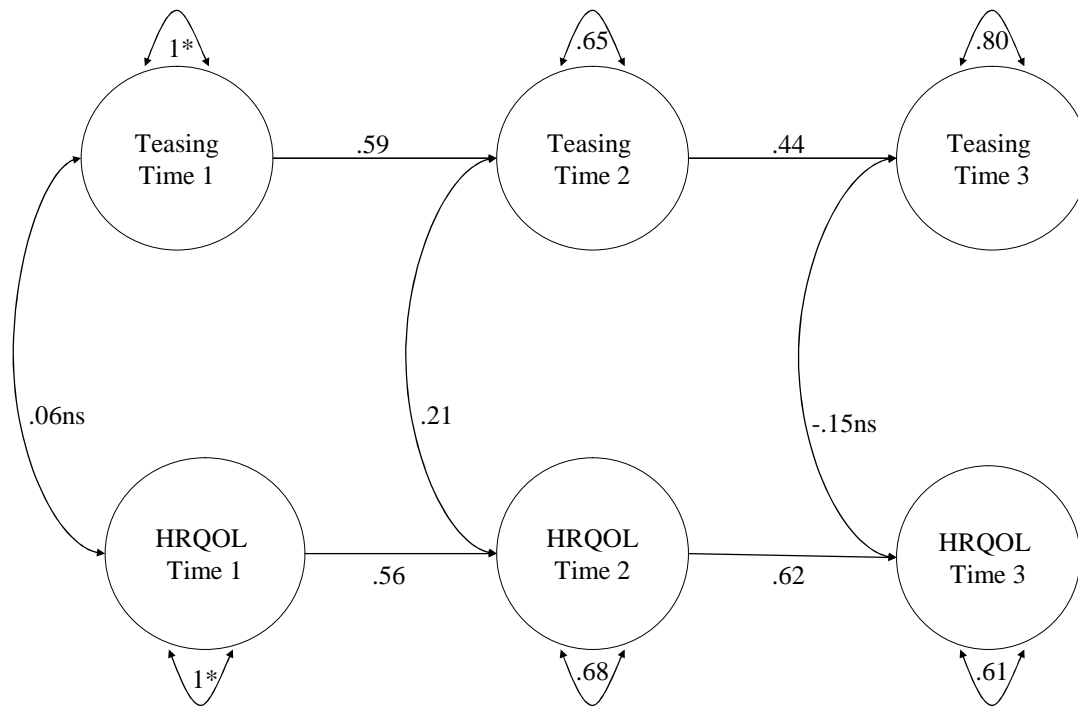*Path Diagram for Final Child-report Structural Model*

Model Fit: χ^2(116, n = 93) = 162.23, p < .005, RMSEA = .058, NNFI = 0.96, CFI = 0.97
Note: HRQOL = Health-related Quality of Life

Parent Report. Next, an identical structural model was specified for parent report

of HRQOL and child report of Teasing. This model demonstrated close model fit (χ^2

(114, *n* = 93) = 133.90, *p* = .09, RMSEA = .027, NNFI = 0.99, CFI = 0.99), however,

none of the specified cross-lagged regressive paths were significant. These pathways

were subsequently removed, yielding the close-fitting model (χ^2(118, *n* = 93) = 138.41, *p*

= .09, RMSEA = .028, NNFI = 0.99, CFI = 0.99) presented in Figure 3. No significant

difference in model fit was detected relative to the weak invariance model (χ^2(8, *n* =

93) = 8.71, *p* > .25).

Figure 3

Path Diagram for Final Parent-report Structural Model

Model Fit: χ^2 *(118, n = 93) = 138.41, p = .09, RMSEA = .028, NNFI = 0.99, CFI = 0.99*
Note: HRQOL = Health-related Quality of Life

Tests for Effect of Treatment

The final aim of this study was to examine potential differences in the

associations between latent variables across treatment groups. Specifically, it was

hypothesized that the relationships between Teasing and HRQOL would be attenuated for

children receiving the *Positively Fit* intervention. To test this hypothesis, a two-group

longitudinal confirmatory factor analysis was conducted followed by a structural equation

model including all predictive regressions included in the previous structural models.

Because the *Positively Fit* treatment addresses teasing in session number two, participants

assigned to the *Positively Fit* condition who did not attend this session were excluded. To

ensure comparability between groups, participants assigned to the Enhanced Standard of

Care condition who did not attend any treatment sessions (i.e., received no active

treatment) were also excluded from these group comparison analyses. The total sample

size for these analyses was 79 (ESC $N = 41$; PF $N = 38$). Because no significant

predictive regressions were observed between Teasing and HRQOL in the parent-report

data, this procedure was only conducted with data obtained from children.

An initial CFA, conducted to examine the comparability of measurement across

treatment groups, demonstrated marginal model fit (^{2}(240, $n = 79$) = 405.17, $p < .001$,

RMSEA = .11, NNFI = 0.83, CFI = 0.87). The subsequent test of weak factorial

invariance also indicated marginal model fit (^{2}(252, $n = 79$) = 402.23, $p = p < .001$,

RMSEA = .11, NNFI = 0.83, CFI = 0.86). No significant changes in fit were observed

based on the RMSEA Model Test. The strong factorial (i.e., intercept) invariance model

demonstrated acceptable fit (^{2}(264, $n = 79$) = 464.158, $p < .001$, RMSEA = .11, NNFI =

0.83, CFI = 0.86). Similarly, no significant difference in model fit was observed between

weak and strong invariance models based on the RMSEA Model Test. Next, an omnibus

test of the equality of variances/covarainces was conducted. This test revealed similar fit

statistics to previous tests (^{2}(279, $n = 79$) = 511.25, $p < .001$, RMSEA = .13, NNFI =

0.80, CFI = 0.82). However, the chi square difference test indicated that significant

differences between the two treatment groups existed. Therefore, the null hypothesis

stating that no differences in variances/covariances existed between groups was not

supported, prompting further investigation of potential structural differences between

groups. Results of the two-group tests of factorial invariance are summarized in Table 6.

Table 6

Fit Indices for the Nested Sequence in the Two-Group Confirmatory Factor Analysis

Model	χ^2	df	p	$\Delta\chi^2$	Δdf	p	RMSEA	RMSEA 90% CI	NNFI	CFI	Constraint Tenable
Configural Invariance	405.18	240	<.001	---	---	---	.118	.094-.139	0.83	0.87	---
Loading Invariance[1]	439.01	252	<.001	---	---	---	.117	.095-.138	0.84	0.86	Yes
Intercept Invariance[1]	464.15	264	<.001	---	---	---	.116	.094-.136	0.84	0.86	Yes
Homogeneity of Variances/ Covariances[2]	511.25	279	<.001	47.09	15	<.001	.128	.108-.147	0.80	0.82	No

[1] Evaluated with the RMSEA Model Test
[2] Evaluated with the χ^2 Difference Test
Note. Each nested model contains its constraints, plus the constraints of all previous, tenable models.

Subsequently, a two-group longitudinal structural model with model specification identical to the original single-group model was constructed. This model demonstrated fit comparable to the previous confirmatory factor analysis nested sequence (χ^2 (260, $n = 79$) $= 452.07, p < .001$, RMSEA $= .12$, NNFI $= 0.83$, CFI $= 0.86$), however, none of the cross-lagged latent regressions were significant for either group in this model. Specifically, Time 1 Teasing did not predict Time 2 HRQOL, Time 2 Teasing did not predict Time 3 HRQOL, Time 1 HRQOL did not predict Time 2 Teasing, and Time 2 HRQOL did not predict Time 3 Teasing. Because none of the hypothesized predictive regressions was significant for either group, no further group-wise comparisons were conducted.

Discussion

Numerous negative psychosocial correlates of overweight and obesity in childhood and adolescence, including increased peer victimization, have been identified in recent years. Moreover, research has demonstrated significant insults to health-related quality of life (HRQOL) among overweight and obese youth. The primary aim of this

investigation was to examine the longitudinal associations between perceived teasing experiences and HRQOL among children and adolescents who are overweight or obese. Consistent with previous studies demonstrating an association between these two constructs, results from this study suggest that child-reported teasing and HRQOL are correlated across three measurement periods spanning 15 months. Results from latent regression analyses did not support the hypothesis that teasing would predict subsequent HRQOL. However, study findings suggest that HRQOL predicts teasing at two prospective time periods. Furthermore, the correlations between these constructs remained consistent across time periods, suggesting stability in teasing and HRQOL over time. Generally speaking, these results are consistent with previous investigations of teasing/peer victimization and quality of life among overweight and obese youth (e.g., Janicke et al., 2007; Stern et al., 2007).

Building upon earlier cross-sectional studies documenting an association between teasing and HRQOL, the present investigation examined correlations between these two constructs over three consecutive measurement occasions. Evidence supporting a relatively consistent correlation over a period spanning fifteen months resulted from this study. In context of the larger literature regarding these psychosocial constructs, the present study provides evidence for a continuous longitudinal association, a result that has not been demonstrated previously. Furthermore, the correlations between constructs remained relatively high over the course of a 10-week weight management intervention and the subsequent year. These findings suggest that, generally speaking, overweight and obese children participating in weight management programs may be likely to encounter problems with co-occurring teasing and reduced quality of life despite weight

management intervention. This conclusion is consistent with past studies demonstrating a strong inverse association between quality of life and teasing among treatment seeking overweight youth (Schwimmer, Burwinkle, & Varni, 2003; Stern, Mazzeo, Gerke, Porter, Bean, & Laver, 2007). However, this finding is unique because it provides evidence for an association between these constructs over the course of treatment and the subsequent year.

This investigation was also designed to examine hypothesized predictive relationships between teasing and HRQOL to provide further information about directionality of influence. Previous cross-sectional studies have inferred that higher levels of teasing predict poorer quality of life outcomes (e.g., Janicke et al. 2007). One of the express aims of this study was to test this assumed predictive relationship. Contrary to the study hypothesis and in contrast with the previously-assumed direction of influence, teasing did not significantly predict HRQOL at subsequent time periods. Specifically, neither the predictive regression with teasing at Time 1 predicting HRQOL at Time 2 nor the regression with teasing at Time 2 predicting HRQOL at Time 3 was significant, indicating that teasing does not predict subsequent HRQOL in this study sample. Although this null finding does not provide definitive evidence that this predictive relationship is not possible, this study casts doubt on the previously inferred, and possibly intuitive, direction of influence in the teasing-HRQOL relationship for overweight and obese youths.

Next, this study sought to examine the possibility that the opposite predictive direction was tenable. Specifically, it was hypothesized that HRQOL would significantly predict teasing at subsequent measurement occasions. Study results supported this

hypothesis at both prospective time intervals: Time 1 HRQOL significantly predicted teasing at Time 2 and HRQOL at Time 2 predicted teasing at Time 3. This is perhaps the most interesting study finding, particularly because HRQOL has predominantly been conceptualized as an outcome variable in previous investigations. Results from the present study indicate that functional impairments associated with poor HRQOOL (e.g., physical limitations, school problems, social impairments) predict higher subsequent levels of teasing.

Although this finding is somewhat intuitive (i.e., limitations associated with obesity may be inferred to increase propensity for teasing), it represents a novel addition to the literature examining the psychosocial experiences of overweight and obese youth. Past studies have emphasized negative social and psychological sequelae of peer victimization (e.g., Storch et al., 2007) while psychosocial predictors that may predispose overweight children to being teased have not been investigated. Indeed, an extensive search of the existing literature yielded no studies examining factors which predispose overweight children to experience frequent teasing aside from weight status. Perhaps deficits associated with poor psychosocial functioning and health-related quality of life (e.g., physical limitations, social challenges, etc.) are equally if not more indicative of teasing risk than weight status. This may be an important area for future research, particularly because significant variability in HRQOL exists among overweight and obese youths and some domains of HRQOL appear to be more affected by weight status (physical and social) than others (emotional and school; Williams et al., 2005).

Moreover, findings from this study provide evidence that improving children's adaptive functioning may decrease the frequency and psychological impact (included in

this study's teasing measure as "upset" rating of teasing). Similarly, these findings provide some indication that competencies in HRQOL domains (e.g., social skills) may discourage teasing among overweight youth. Improving overweight children's functional competencies may thus reduce the likelihood that they will become targets of frequent teasing. A similar pattern has been demonstrated in studies examining self-esteem among overweight children. For example, Jelalian et al. (2006) demonstrated that an intervention incorporating peer-based social skills training improved overweight children's self esteem, even in the absence of weight loss. It is conceivable that increasing children's HRQOL (e.g., social skills training, increasing physical competencies) may not only lead to primary benefits of improved health but salutary effects on teasing.

Study results also provide support for the longitudinal stability of both teasing and HRQOL constructs among treatment-seeking overweight youth. Specifically, regression analyses demonstrated that earlier teasing and HRQOL predicted later levels for both constructs. Furthermore, these regression coefficients remained consistent over the three measurement occasions spanning fifteen months. Highly significant associations were observed for both child- and parent-reported HRQOL and child-reported teasing data. These findings provide additional support to previous investigations which have reported longitudinal stability in both teasing and HRQOL for overweight and obese youth (e.g., Eisenberg, Neumark-Sztainer, Haines, & Wall, 2006). Additionally, these results suggest that appreciable changes in HRQOL or teasing may be unlikely in the absence of interventions targeting these domains. Although improvements in physical health are often the ultimate goal of weight management intervention, numerous investigators have suggested that diminished HRQOL is the most prevalent and immediate consequence of

obesity in childhood (see Wallander, Taylor, Grunbaum, Franklin, Harrison, Kelder, & Schuster, 2009 for a review). Results from the present study provide additional support to this thesis, suggesting that improvements in HRQOL may lead to decreased risk for peer victimization.

Finally, although this finding should be interpreted in light of the small sample size in group comparison analyses, results provide no evidence that the brief advice regarding coping with and resisting teasing occurring in the *Positively Fit* intervention appreciably mitigated the associations between teasing and HRQOL in this sample of overweight and obese youth. It is possible that this null finding is attributable to the limited extent of the teasing intervention: Content addressing teasing comprises only a portion of one of the sessions in the *Positively Fit* intervention. A more comprehensive intervention, perhaps similar to others that aim to improve coping among children who experience bullying, may be necessary to provide protective benefits. For example, an intervention developed by Sapouna and colleagues (2010) used virtual reality to allow children and adolescents to role play various responses to bullying with real-time feedback regarding effectiveness of strategies. This program was designed to improve social coping skills necessary to assuage bullying and was shown to markedly reduce bullying experiences. Alternatively, and as noted above, improvements in HRQOL may be sufficient to reduce teasing. It is possible that teasing-specific intervention components are unnecessary for children who realize HRQOL gains through weight management intervention. This remains an important question for future studies.

In contrast to study results employing child-reported HRQOL, parent-reported teasing was not highly correlated with HRQOL at any of the measurement occasions.

Indeed, the small correlation observed at Time 2 was the only significant correlation of the three measured associations between parent-reported HRQOL and child-reported teasing. This result contradicts Janicke and colleagues' (2007) finding that child-reported peer victimization correlated with parent-reported HRQOL. However, this discrepancy may be a result of a differences between measured peer victimization constructs: Janicke et al. measured peer victimization generally (including physical aggression) while this study limited its scope to teasing about weight and ability. Moreover, this discrepancy may not be surprising given the reported inconsistencies between parent- and child-reported HRQOL in the larger literature (Cremeens, Eiser, & Blades, 2006; Zeller & Modi, 2006). Parent-child agreement on non-observable HRQOL domains (e.g., social and emotional) is low compared to those that are observable (e.g., physical functioning; Eiser & Morse, 2001), a finding that may explain the discrepancy between study findings across reporters.

Also contrary to results of child-reported data anlyses, predictive regressions between parent-reported HRQOL and child-reported teasing were non-significant. As mentioned previously, correlations at the three measurement intervals were small and only the Time 2 correlation reached statistical significance. As might be expected given this lack of association, none of the hypothesized longitudinal predictive regressions were significant. Because youth-reported teasing was used in both models, these discrepancies are likely attributable to differences in self- and parent-reported HRQOL discussed previously.

Limitations

Several methodological limitations to the present study should be noted. First, the use of a passive longitudinal design does not allow causal inferences to be drawn because this methodology does not allow for isolation of independent variables nor does it control potential confounding variables. Similarly, it is unlikely that the variables included in the present study are the only important variables contributing to HRQOL and teasing. Thus, causality can only be implied using the present study design (Little et al., 2007; Farrell, 1994). An experimental test of an intervention engendering increased HRQOL with appropriate control would be necessary to confirm a causal relationship with HRQOL predicting teasing. Furthermore, although this study provided evidence that the data fit the hypothesized model well (i.e., good model fit was demonstrated), there are likely other models that would fit the data equally well.

Concerning the analyses of treatment effects on HRQOL-Teasing relationships, the sample size reduction created by dichotomizing the two treatment groups and by removing participants who attended less than 20% of treatment sessions likely led to suboptimal fit statistics and may have prevented detection of group differences. Additionally, both HRQOL and teasing data were obtained from child-report pencil-and-paper measures, a study design feature that may have introduced common method variance into analyses employing only child-reported data. Moreover, because of the specific study sample, the results of this study are generalizable only to treatment-seeking overweight and obese youths. Finally, the existing literature suggests that peer victimization/teasing and the impact of these experiences vary across gender and

ethic/racial groups. Results of the current study should not be generalized outside of the specific demographic groups represented in the study sample.

Future Directions

Numerous recommendations for future studies may be gleaned from the aforementioned limitations. First, more studies incorporating longitudinal methodologies would provide increased confidence concerning directionality of influence and might allow for closer approximations of causal inferences. Because well controlled experiments concerning these topics would be impractical, rigorously designed longitudinal studies are likely to be the most feasible method for understanding these phenomena. Second, studies involving samples from more diverse weight categories and treatment settings (e.g., community populations) would provide information which would be more generalizable to the larger population. Finally, inclusion of other important psychosocial variables related to teasing and HRQOL (e.g., mood symptoms; Janicke et al., 2007) would improve future studies.

Implications

Results from this study support a number of implications for the assessment and treatment of pediatric obesity. In combination with previous studies documenting the negative psychosocial outcomes associated with peer victimization among obese and overweight children, this study suggests that interventions designed to improve HRQOL outcomes may reduce teasing among overweight and obese youth. Although quality of life is most often conceptualized as an outcome variable, this study provides evidence that poor physical and psychosocial functioning (e.g., mood problems, social interaction difficulties, physical limitations, and school problems) are risk factors for later peer

victimization. Moreover, results suggest that interventions leading to improved HRQOL may reduce teasing about weight and abilities. In general, multi-component pediatric weight management programs have proven to be the most effective currently available method for improving HRQOL among overweight youth, although specific mechanisms behind this improvement (i.e., which components lead to change) are unclear (Lamanna, Kelly, Stern & Mazzeo, 2010). The promise of pediatric weight management programs in effecting positive psychosocial outcomes is underscored by results from this study. Specifically, children participating in these interventions may realize appreciable improvements in social, emotional, school and physical functioning which may reduce teasing risk. However, improvements in HRQOL are generally attained only by weight management program participants who achieve weight loss (Fullerton, Tyler, Johnston, Vincent, Harris, & Foreyt, 2007). Future interventions for overweight youth and experimental studies of their effectiveness could target more proximal/functional variables associated with HRQOL even more so than weight reduction as critical outcomes.

Regarding directions for future research, findings from this study suggest that differential relationships between self-and parent-reported HRQOL and psychosocial outcomes may exist. Future studies could examine whether recently developed obesity-specific quality of life measures (e.g., Sizing Me Up; Zeller & Modi, 2009) are more likely to demonstrate concurrent validity across parent and child reports. Additionally, results from this study suggest that youth's responses on the PedsQL and Perceptions of Teasing Scale remain relatively stable over a time period exceeding one year. These measures appear to be well suited to longitudinal investigations. Finally, reconsideration

of the previously inferred direction of influence between teasing and psychosocial

outcomes is warranted. Future work could be designed to test bidirectional relationships

in order to more accurately characterize the associations between these constructs.

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