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Elementary School Students' Health-Related Self-Beliefs*

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Abstract

OBJECTIVE: Increased action is needed to combat the growing epidemic of pediatric obesity. It is imperative that researchers investigate psychological and demographic variables that may be associated with pediatric obesity in order to formulate and implement more appropriate and effective interventions. The present study examined the univariate and multivariate relationships between child physical and psychological characteristics in a diverse sample of elementary students. METHODS: Questionnaires were collected from 109 students (63 girls, 46 boys; Mean age= 9.25 years) in grades 3-5 from two elementary schools in the Southeastern United States. Explanatory variables were gender, ethnicity, grade level, and body mass index; outcomes examined were self-reported life satisfaction, physical self-concept, social self-concept, general self-concept, eating self-efficacy, and exercise self-efficacy scores. Univariate and multivariate statistics were used. RESULTS: Correlations showed children with higher physical self-concept, social self-concept, general self-concept, and eating self-efficacy tend to have higher life satisfaction. Regressions revealed that African American students had a higher physical self-concept than both White and Hispanic students and older students had a higher perceived social self-concept than younger students. Multivariate regression results showed that the explanatory influence of gender, ethnicity, and grade level varied across outcome variables. CONCLUSIONS: The strongest explanatory variables of children's perceived life satisfaction, self-concept and self-efficacy were children's characteristics (age, gender, and race). Interestingly, children's psychological functioning was not found to be in direct relationship with their weight classification and children's body mass index was not significantly related to most outcome variables.

Keywords: Self-efficacy; life satisfaction; self-concept; physical health; well-being

Introduction

Recent data obtained by the National Center for Health Statistics of the Centers for Disease Control and Prevention (CDC) indicate that approximately one third of children and adolescents age 2-19 years are either overweight (at or above the 85th percentile on the CDC's BMI-for-age growth charts) or obese (at or above the 95th percentile; Ogden,

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Carroll, Kit, & Flegal, 2012). These statistics are alarming; not only are there serious health consequences for obese children and adolescents, but there are negative psychological and emotional consequences as well. Obese children are often ridiculed by peers and perceived as weak or lacking in self-control. Children as young as six have rated obese children as "less likable" than those who were not obese (Smith, 1999). Overweight children have reported a poorer quality of life, similar to that reported by young cancer patients receiving chemotherapy (Thompson & Shanley, 2004). As a result, obese children may experience lowered self-esteem and increased risk of depression in adulthood (Sanchez-Villegas et al., 2013; Taylor, Wilson, Slater, & Mohr, 2012). The negative effect of being overweight on children's psychological state may result in body dissatisfaction or lead to maladaptive behaviors such as binge-eating or the misuse of laxatives and diet pills (Bauer, Patel, Prokop, & Austin, 2006; Cole, Waldrop, & D'Auria, 2006).

Life Satisfaction

Life satisfaction is a global evaluation of one's life and/or specific life domains (e.g., family, friends, school; Selgison, Huebner, & Valois, 2005). Together, positive affect, negative affect, and life satisfaction comprise subjective well-being (Huebner, Suldo, & Gilman, 2006). Research on the life satisfaction of children and youth has lagged behind that of research with adults (Huebner, Seligson, Valois, & Suldo, 2006). Few studies have examined life satisfaction among obese children. One study to date has assessed the relationship between body mass index and quality of life (Haraldsted, Christophersen, Eide, Nativg, & Helseth, 2011), wherein an association was found between rated quality of life and perceived body image, but not body mass index. Similar to researchers who have shown the negative psychological and emotional consequences experienced by children who are obese, Seligson et al. (2005) reported that "individuals with decreased levels of life satisfaction are at a higher risk for a widened spectrum of both psychological and social problems such as depression, anxiety and poor social interactions" (p. 356). Gilman and Huebner (2003) found that depression shares a strong relationship with life satisfaction, with correlations ranging between .50-.60 across age ranges. In general, studies show children and adolescents report life satisfaction above the neutral range (Huebner et al., 2006). However, based on the findings from the aforementioned studies, it is suspected that children and adolescents who are obese experience lower life satisfaction than non-obese children and adolescents.

Self-Concept

The terms self-concept and self-esteem are sometimes used interchangeably in the literature; however, whereas self-esteem refers to a global self-view, the current study focuses on specific dimensions of self-concept (e.g., social, physical) that develop as children age (Marsh, Xu, & Martin, 2012). Although the self-concept of a young child may be global, undifferentiated, and situation-specific, "with increasing age and experience (especially acquisition of verbal labels), self-concept becomes increasingly differentiated" (Shavelson, Huebner, & Stanton, 1976, p. 414). The Self-Description Questionnaire I (SDQ1) adopted in this study is based on Shavelson et al.'s (1976) multidimensional hierarchical model of self-concept, in which self-concept refers to individuals' perceptions of themselves formed through their experiences with their environment that may be used to explain their behavior. Self-concept is particularly influenced by environmental reinforcements and significant others (Marsh et al., 2012). Theorists have suggested that a negative self-image results from dissonance between how individuals view themselves and how they perceive others to view them (e.g., Kimm, Sweeny, & Janosky, 1991).

Previous studies comparing levels of self-concept in obese and non-obese children have yielded mixed results. Some studies have found significant differences between these two

groups of children (Griffiths, Parsons, & Hill, 2010; Taylor, Wilson, Slater, & Mohr, 2012); others have found no significant differences (Falkner et al., 2001; Kimm et al., 1991; Wadden, Foster, Brownell, & Finley, 1984). Researchers hypothesize that these discrepant results may be due to the relative insensitivity of using measures of global self-concept (Kimm et al., 1991). We therefore undertook the present study with an assessment of the differentiated aspects of self-concept that might be related to children's physicality.

Gender, ethnicity, and severity of obesity have also been found to influence participants' overall self-concept and individual subscale scores (Kimm et al., 1991). It is of particular importance to examine potential ethnic differences in these self-concept variables given that prior research has found differences in multiethnic samples of obese children and adolescents in their emotional well-being, quality of life, and self-esteem (Calzo, Sonneville, Haines, Blood, Field, & Austin, 2012; Fallon et al., 2005; Strauss, 2000; Viner, Taylor, Head, Booy, & Stansfel, 2006). Findings from Viner et al. (2006) suggest that the influence of obesity on psychological functioning is mediated by certain cultural factors. For example, Fallon et al. (2005) compared the quality of life of overweight and non-overweight Black and White adolescents and found that, as adolescents became heavier, White adolescents described greater distress than Black adolescents. Strauss (2000) found that the consequence of obesity on self-esteem was significantly greater in White and Hispanic girls compared to Black girls. These findings suggest that ethnic differences in the evaluation of individuals' weight and shape are influential factors in the consequence obesity has on weight control behaviors and psychological well-being and should be further explored (Viner et al., 2006). Research suggests that age and gender differences may also be critical variables to assess given possible differences in adolescent and female distress of being overweight or obese (Bully & Elosua, 2011; Calzo, Sonneville, Haines, Blood, Field, & Austin, 2012; Mustillo, Budd, & Hendrix, 2013).

Self-Efficacy

In his social cognitive theory, Bandura (2004) argued that biomedical interventions are not the only means by which individuals can improve their health; instead, individuals can exercise control over their health by changing their lifestyle habits. The primary mechanism by which individuals exercise control over their own behaviors is through their personal efficacy beliefs (Bandura, 1997). Unless people believe they can implement the necessary skills and strategies needed to achieve desired outcomes, they have little motivation to act. Therefore, self-efficacy is a powerful predictor of individuals' health behaviors (Bandura, 1998). Those who have stronger self-efficacy for implementing health-promoting behaviors are more likely to exhibit and maintain these behaviors, especially when faced with perceived challenges or impediments (Bandura, 1998). Such individuals will set higher goals for themselves and will remain more committed to achieving these goals (Bandura, 2004).

A lack of activity is believed to contribute to the development and/or maintenance of pediatric obesity; therefore, it is important that children have a strong self-efficacy for engaging in physical activity to either prevent or reduce obesity (Annesi, 2006; Trost, Kera, Ward, & Pate, 2001). Because a diet high in fat and kilocalories is related to pediatric obesity, it is also important for children to have a strong self-efficacy for regulating their dietary intake (Annesi, 2006). Trost et al. (2001) found significant differences in the reported physical activity self-efficacy between a group of ethnically diverse obese and non-obese sixth-grade students. Specifically, obese children were less self-efficacious regarding their ability to overcome barriers to physical activity, asking their parents to provide opportunities for physical activity, and choosing physical instead of sedentary activities.

To change health habits, motivational and self-regulatory skills are required (Bandura, 2004). The beneficial effects of increased self-efficacy on health-promoting behaviors have been demonstrated with the treatment/regulation of numerous and various chronic illnesses and other health-related areas, including changing eating habits, reducing cholesterol intake, and adopting and adhering to physical exercise programs (Bandura, 1998). Another study used "The Exercise Barriers Self-Efficacy Scales for Children" to assess the effectiveness of the Fit for Life curriculum with children attending an after-school program at the YMCA (Anessi, 2006). The 12-week curriculum involved cardiovascular activities, resistance training, distribution of general health and nutrition information, and a workbook to train participants in self-management and self-regulatory skills. Results provided support for the curriculum, which was associated with significant increases in physical self-concept, exercise-related self-efficacy, and free-time physical activity. Of particular significance, the increase in physical activity was greater for the treatment group that received more extensive training on self-management and self-regulatory skills; therefore, the program's success was attributed to an increase in children's self-efficacy (Anessi, 2006).

Purpose

The first aim of this study was to investigate the relationship between physical (body mass index) and psychological characteristics (physical, social, and general self-concept; self-efficacy for regulating food intake and exercise) in a sample of elementary students'. The second aim was to examine how scores on each psychological characteristic vary as a function of students' gender, ethnicity, grade level, and body mass index. The third aim was to compare the relative influence that gender, ethnicity, grade level, and body mass index have on each psychological characteristic. For instance, how does the influence of gender on life satisfaction differ from its influence on physical self-concept? A final aim was to explore whether scores on the combined set of self-concept or self-efficacy variables vary as a function of students' gender, ethnicity, grade level, and body mass index. In other words, might the self-belief variables collectively (as opposed to individually) vary as a function of student characteristics? And, if they vary, which self-perception variable(s) have influence on the differences for gender, ethnicity, grade level, and body mass index (i.e., do boys score lower or higher than girls on the set of variables?).

Method

Participants and Procedure

Participants were 116 students (68 girls, 48 boys; Meanage= 9.25 years) in Grades 3-5 from two elementary schools in the Southeastern United States. Approximately 80% of participants received free or reduced-price lunch. Students self-identified as African American (*n*= 41), White (*n*= 36), Hispanic (*n*= 32), and other or mixed ethnicity (*n*= 7). Due to the limited number of other or mixed ethnicity participants, we focused on the remaining 109 participants (see Table 1).

Prior to data collection informed consent was obtained from the legal guardians of the participants. The questionnaire was distributed to participants by researchers in their classrooms at the beginning of the calendar year (i.e., January). Data were collected in small groups of no more than six participants. Participants completed the student survey as items were read aloud by the researcher. Items were read aloud by a researcher. Another researcher measured and recorded each student's height and weight.

Table 1. *Sample description* (*N* = 109)

Characteristic	Mean (*SD*) or *N* (%)*
Age	9.25 (1.03)
Gender	
Girls	63 (57.8)
Boys	46 (42.2)
Ethnicity	
White	36 (33.0)
African American	41 (37.6)
Hispanic	32 (29.4)
Height	55.5 (3.6)
Weight	87.8 (26.3)
BMI	19.7 (4.1)
grade level	
grade level 3	46 (42.2)
grade level 4	32 (29.4)
grade level 5	31 (28.4)
School	
School 1	58 (53.2)
School 2	51 (46.8)

Percentages may not add to 100 due to rounding.

*Numbers represent mean (standard deviation) for continuous variables and frequency (percentage) for categorical variables.

Measures

Demographics. Students responded to survey questions by indicating their gender, birth date and age (later verified with school records), grade level, and race/ethnicity.

Life Satisfaction. A modified version of The Brief Multidimensional Students' Life Satisfaction Scale (BMSLSS; Huebner, 1997) assessed overall life satisfaction. The 6-item scale addressed five specific domains: family, friends, self, school, and living environment and a global evaluation (e.g., "I am happy with my overall life") (Huebner et al., 2006). Students typically answer each question by selecting one of the following options: Terrible, Unhappy, Mostly Dissatisfied, Mixed (about equally satisfied and dissatisfied), Mostly Satisfied, or Delighted (Seligson, Huebner, & Valois, 2005). However, to facilitate student response and to make the completed questionnaire cohesive, the students responded using a 6-point Likert scale that ranged from "definitely false" to "definitely true."

The BMSLSS has acceptable psychometric properties and has consistently yielded acceptable internal consistency estimates. Huebner et al. (2006) reported an alpha coefficient of.76 for the 6-item BMSLSS when used with elementary school students.

Self-Concept. A modified version of the Self-Description Questionnaire I (SDQ1; Marsh, 1988) was used to assess self-concept. The original SDQ I has 76 items and consists of 8 subscales (Physical Abilities, Physical Appearance, Peer Relations, Parent Relations, Reading Mathematics, General School, and General Self) that measure children's self-perceptions in various areas of self-concept (Rubie-Davies, 2006). The eight subscales can

be analyzed separately or can be combined to form a measure of academic self-concept (the averaged scores on the Reading, Mathematics, and General School Self-Concept subscales) and nonacademic self-concept (the averaged scores on the Physical Abilities, Physical Appearance, Peer Relations, and Parent Relations subscales; Smith & Croom, 2001).

For the current study, selected items from the Physical Appearance, Peer Relations, and General Self subscales were included. Physical Abilities Self-Concept was not included because the items overlap with those included under the measure of self-efficacy for regulating exercise habits. Furthermore, research indicates that children do not provide consistent responses to negatively worded items; therefore, negatively worded items were not included in the questionnaire (Smith & Croom, 2001).

Self-Efficacy Scale for Regulating Eating and Exercise Habits. A modified version of the Self-Efficacy Scale for Regulating Eating and Exercise Habits (Bandura, 2006) assessed students' perceived capability to regulate eating and exercise habits. Perceived efficacy is measured against a variation of challenges and impediments (e.g., perceived efficacy to implement healthy eating and exercise habits in different conditions: for exercise, when tired, during bad weather, and when upset; for eating: when at home, at a restaurant, or bored).

The self-efficacy response scale is traditionally a 100-point scale; however, Bandura (2006) suggested that pictorial descriptors be used with young children. To provide a visual representation of the response choices, the scale for the current questionnaire used progressively larger letters to represent the varying levels of true and false responses. Participants responded using a 6-point Likert-type format that ranged from 1 (Definitely false) to 2 (Definitely true).

Body Mass Index (BMI). Body weight and standing height were measured with a calibrated portable scale and stadiometer. Height was recorded in inches and weight was recorded in pounds (both to the nearest ¼). BMI [weight (kg) / height2 (m2)] is a simple and convenient method of measurement to classify children as overweight or obese (Semiz, Özgören, & Sabir, 2007). BMI has been found to correlate with other fat thickness measurements; however, it is recommended for use with children when compared to skinfold thickness and waist/hip ratio (Semiz, Özgören, & Sabir, 2007). For the current study, participants' height and weight were measured and their BMI was then calculated.

Data Analysis

Univariate multiple linear regression analyses were used to explain scores on each of six dependent variables (life satisfaction, physical self-concept, social self-concept, general self-concept, eating self-efficacy, and exercise self-efficacy) based on gender (referent: boy), ethnicity (referent: White), grade level (referent: Grade 3), and BMI (mean centered). To address the third aim a multivariate multiple regression analysis was conducted to determine whether the influence any one predictor had across dependent variables varied. To address the final aim another multivariate multiple regression was conducted to explore the influence each explanatory variable had on each set of self-perception dependent variables. Specifically, we first conducted omnibus multivariate Wald tests for gender, ethnicity, grade level, and BMI for the set of self-concept variables (this analysis is akin to doing a MANCOVA). If the omnibus multivariate Wald test for a given predictor was significant, then a descriptive discriminant function analysis was conducted (as recommended by Enders, 2003) to determine which perception variables contributed most to discriminating or separating groups. These final analyses were repeated for the set of self-efficacy variables.

Due to the polytomous nature of the item responses on each self-report scale, a rating scale model was fit to the item response data using marginal maximum likelihood estimation. Then, expected a posteriori (EAP; Bock and Mislevy, 1982) estimation was used to create student latent scores (M= 0, SD= 1). IRTPRO 2.1 (Cai, duToit, & Thissen, 2011) was used to calibrate items and score students on each of the self-report scales. Univariate and multivariate regressions were conducted in Mplus 6.0 (Muthén & Muthén, 1998-2010) using maximum likelihood robust. SPSS version 21 was used to conduct descriptive discriminant function analyses.

Results

Univariate multiple regression

Table 2 (see appendix) provides the results for the univariate multiple regression models. Only the models explaining physical self-concept and social self-concept scores were significant. For the model explaining physical self-concept, BMI and ethnicity were significant contributors to the model. As expected, BMI had a negative influence with physical self-concept, whereas African American students had lower physical self-concept scores than both White and Hispanic students. For the model explaining social self-concept, only grade level was a significant contributor to the model. That is, students in Grade 5 had a lower perceived social self-concept than students in both Grades 3 and 4.

Table 3. *Omnibus Multivariate Wald Test for the Equality of the Influence of Gender, Ethnicity, Grade Level, and Body Mass Index Across Dependent Variables*

Variable	*W*	*df*	*p*
Gender	19.15	5	.0018**
Ethnicity	27.25	10	.0024**
Grade Level	27.34	10	.0023**
Body Mass Index	6.48	5	.26

W, Wald test of parameter constraints; *df*, degrees of freedom.
*p < .05. **p < .01. ***p < .001.

Table 4. *Single Degrees of Freedom Wald Test for the Coefficient Difference of Gender, Ethnicity, and Grade Level across Outcomes*

Variable	LS vs. PSC	LS vs. SSC	PSC vs. SSC	PSC vs. GSC	PSC vs. EAT	PSC vs. EXE	SSC vs. GSC	SSC vs. EAT	EAT vs. EXE
Gender								4.34*	13.72***
White vs. African American	7.81**			15.03***	12.57***	8.44**	4.61*	4.44*	3.91*
African American vs. Hispanic	8.68**			13.79***	12.27***	6.82**	6.25*	6.64*	
Grade 3 vs. Grade 5							7.65**		
Grade 4 vs. Grade 5		5.44*	8.37**				10.33***	9.09**	4.16*

LS, life satisfaction; PSC, physical self-concept; SSC, social self-concept; GSC, general self-concept; EAT, eating self-efficacy; EXE, exercise self-efficacy.
*p < .05. **p < .01. ***p < .001.

Multivariate multiple regression

The global multivariate multiple regression model result was significant and indicated that our model fit the data, $\chi^2(36, N= 109)= 76.58, p < .001$.

Multivariate results for equality of coefficients. The multivariate Wald tests for the equality of an explanatory variable across each dependent variable showed the influence of gender, ethnicity, and grade level varied across dependent variables (see Table 3).

To track down the different coefficient effects across dependent variables (see Table 2), single degrees of freedom Wald tests were conducted for each explanatory variable (see Table 4). Only those tests that were significant are provided due to the large number of comparisons conducted. Tables 2 and 4 show that the influence of gender on eating self-efficacy was opposite of its influence on social self-concept and exercise self-efficacy. This suggests that girls had lower eating self-efficacy scores compared to boys, but this pattern was reversed for social self-concept and exercise self-efficacy.

When examining the influence of ethnicity across dependent variables, we find White vs. African American on physical self-concept (b= 0.70) was greater than its influence on life satisfaction (b= 0.12), general self-concept (b= 0.01), and exercise self-efficacy (b= 0.14). The influence of White vs. African American on social self-concept (b= 0.36) was greater than its influence on general self-concept. Also, the influence of White vs. African American on eating self-efficacy (b= -0.19) was opposite its influence on physical self-concept, social self-concept, and exercise self-efficacy. This latter comparison indicates that African American students had lower eating self-efficacy scores compared to White students, but this was reversed for physical self-concept, social self-concept, and exercise self-efficacy.

Additional comparisons for ethnicity on dependent variables showed that the influence of African American vs. Hispanic on physical self-concept (b= -0.56) was greater than its influence on life satisfaction (b= -0.03), general self-concept (b= 0.07), eating self-efficacy (b= 0.23), and exercise self-efficacy (b= -0.06). The influence of African American vs. Hispanic on social self-concept (b= -0.33) was less than its influence on general self-concept (b= 0.07), eating self-efficacy (b= 0.23), and exercise self-efficacy (b= -0.06). The influence of African American vs. Hispanic on physical self-concept and social self-concept was opposite the influence of African American vs. Hispanic on general self-concept and eating self-efficacy, indicating that Hispanic students had lower physical self-concept and social self-concept scores compared to African American students. This pattern was reversed for general self-concept and eating self-efficacy.

As for grade level, the difference between Grade 3 vs. Grade 5 on social self-concept (b= 0.45) was greater than the difference on general self-concept (b= 0.03). The difference between Grade 4 vs. Grade 5 on social self-concept (b= 0.49) was greater than what was observed on life satisfaction (b= 0.70), physical self-concept (b= 0.01), general self-concept (b= 0.06), and eating self-efficacy (b= -0.16). The difference between Grade 4 vs. Grade 5 on exercise self-efficacy (b= 0.14) was greater than the difference on eating self-efficacy. Moreover, the difference between Grade 4 vs. Grade 5 on eating self-efficacy was opposite the difference of Grade 3 vs. Grade 5 on social self-concept and exercise self-efficacy. This finding suggests that students in Grade 5 had lower eating self-efficacy scores compared to students in Grade 4, but this was reversed for social self-concept and exercise self-efficacy scores.

In general, Table 4 shows the pattern of coefficient differences we observed for White vs. African American and Hispanic vs. African American were similar. Also, the coefficient differences across dependent variables were only notable for Grade 4 vs. Grade 5.

Multivariate results on the combined set of self-concept variables. The second multivariate multiple regression analysis was conducted to explore the influence or relationship that each explanatory variable had on all self-perception variables simultaneously when considered as a set. Table 5 summarizes the multivariate Wald tests for each explanatory variable on the set of self-concept variables. Results showed that ethnicity and grade level had a significant explanatory influence on the set of self-concept variables, whereas gender and BMI did not. A descriptive discriminant data analysis was next conducted to determine where ethnic and grade-level groups differed on the composite self-concept variable and which self-concept variable(s) contributed most to the differences for ethnicity and grade.

With respect to ethnicity, the standardized discriminant function coefficient showed physical self-concept (β= 1.01) and general self-concept (β= - 0.54) contributed most to the composite function, The mean composite self-concept score was 0.61 for African American children, -0.31 for Hispanic children and -0.42 for White children. These results suggest that African American children reported higher overall self-concept scores than did Hispanic and White children.

In regard to grade level, the standardized discriminant function coefficients showed that social self-concept contributed most to the composite self-concept variable (β= 1.28), followed by physical self-concept (β= -0.64) and general self-concept (β= -0.35). The mean composite self-concept score was -0.11 for students in Grade 3, -0.30 for students in Grade 4, and 0.48 for students in Grade 5. These results suggest that students in Grade 5 have higher overall self-concept than do students in Grades 3 and 4.

Multivariate results on the combined set of self-efficacy variables. Multivariate regression and discriminant analysis were also conducted for the set of self-efficacy variables. Table 6 shows only gender had a significant explanatory influence on the collective self-efficacy variables. Descriptive discriminant data analysis was conducted to determine where gender groups differed on the composite self-efficacy variables. The standardized discriminant function coefficients showed that exercise self-efficacy (β = 1 .09) and eating self-efficacy (β= -1.06) both contributed most to the linear composite. The mean composite self-efficacy variable was -0.27 for girls and 0.37 for boys. These results suggest that girls have lower eating self-efficacy and higher exercise self-efficacy relative to boys when the dependent variables are considered simultaneously.

Table 5. *Wald (W) Test for the Multivariate Effect of Gender, Ethnicity, Grade, and Body Mass Index on Physical Self-Concept, Social Self-Concept, and General Self-Concept Simultaneously*

Variable	*W*	*df*	*p*
Gender	2.490	3	.4771
Ethnicity	23.386	6	.0007
Grade	18.087	6	.0060
Body Mass Index	3.997	3	.2618

Table 6. *Wald (W) Test for the Multivariate Effect of Gender, Ethnicity, Grade, and Body Mass Index on Eating Self-Efficacy and Exercise Self-Efficacy Simultaneously*

Variable	*W*	*df*	*p*
Gender	14.369	2	.0008
Ethnicity	4.545	4	.3373
Grade	6.308	4	.1773
Body Mass Index	0.382	2	.8257

Discussion

An extensive literature base points to the fact that pediatric obesity impacts children's self-concept and quality of life (Griffiths, Parsons, & Hill, 2010). However, many studies fail to take into account the complexity of additional child characteristics, including race/ethnicity, gender, and age, when considering this impact. The present study demonstrates that these variables are critical to understanding the relationship between children's physical health status and psychological characteristics such as life satisfaction, self-concept, and self-efficacy.

Life Satisfaction

In general, findings revealed that the higher a child's life satisfaction, the higher the child's reported physical self-concept, social self-concept, general self-concept, and eating self-efficacy. Students' self-reported life satisfaction was not dependent on gender, race/ethnicity, grade level, and BMI, which is consistent with prior research that demonstrates relationships between perceived body image and self-concept, but not actual BMI (Haraldsted, Christophersen, Eide, Nativg, & Helseth, 2011). With respect to variations across ethnicity, we found that the magnitude of difference between White and African American students on life satisfaction was smaller than the difference on physical self-concept. Although prior literature reports some mixed findings with respect to the influence of ethnicity on youth life satisfaction (see Proctor, Linley, & Maltby, 2009 for a review), our results support the majority of studies, which report a weak connection between ethnicity and life satisfaction (Funk, Huebner & Valois, 2006; Gilman & Huebner, 2000). A similar relationship was found with age. That is, students' level of life satisfaction did not vary significantly across grade levels. These findings lend credence to the body of literature indicating that most youth report a positive level of life satisfaction that remains relatively stable over time and for students of different demographic groups (Proctor, Linley, & Maltby, 2009).

Self-Concept

Our findings showed that children with lower BMI reported higher levels of physical self-concept, but only after accounting for gender, race, and grade level; the simple correlation between BMI and physical self-concept was not significant. This is an important finding because it suggests that the relationship between a child's physical health status (BMI) and physical self-concept varies depending on other characteristics of the child that need to be taken into account. When considering all self-concept variables as a combined linear set, African American children had higher self-concepts (made-up mostly of physical and social self-concept) than both Hispanic and White children. Although little research has investigated differences in physical and social self-concepts across children of varying racial backgrounds, some prior studies have shown that significant mental health differences exist between female African American, Hispanic, and White individuals who

are obese (Anderson, Cohen, & Naumova, 2007; BeLue, Francis, & Colaco, 2009). Depressed mood and higher levels of mental health problems have been reported for White adolescents compared to African American or Hispanic adolescents. Our research shows that perceived physical and self-concept are important constructs to consider when evaluating the mental health needs of children from diverse racial backgrounds, as higher levels of BMI may carry unique implications on one's physical and social self-concept as a set according to one's cultural or ethnic membership.

Our analyses indicated that older students had a higher social self-concept than younger students regardless of BMI; this was observed both univariately and multivariately. Although this finding could mean that children's self-concept may serve a buffering effect as they age, it is difficult to extrapolate the significance of these findings given that so few studies have examined the associations of BMI, age, gender, and self-concept (Griffiths, Parsons, & Hill, 2010). Further research investigating children's overweight or obesity status over time is needed to clarify the moderating effect of these constructs.

Self-Efficacy

On the whole, children who reported a stronger sense of self-efficacy for regulating their exercise also reported higher physical, social, and general self-concept. Students' perceptions about their capability to regulate what they eat and how often they exercise did not vary by gender, race/ethnicity, grade level, or BMI, but multivariate results that compared the gender coefficients on eating and exercise self-efficacy were in opposite directions. We see this as good news, particularly the finding that, regardless of their BMI level, children reported similar levels of eating and exercise self-efficacy.

When we considered eating and exercise self-efficacy among the set of other dependent variables we found that girls tended to display higher eating self-efficacy and lower exercise self-efficacy than did boys. Although African American children reported higher levels of physical and social self-concept, African Americans had lowered eating and exercise self-efficacy than White students. Students in Grade 5 reported lower eating self-efficacy scores than younger students but had higher exercise self-efficacy.

Strengths and Limitations

The diversity represented in the present sample allowed for comparisons across children of varying age, gender, and ethnic/racial backgrounds. Few studies have been able to account for the complexity inherent in children's physical and psychological development, particularly with a focus on children's BMI. However, there are a number of limitations to this study. First, generalizations of the findings are limited to the elementary students recruited in this study. All students were recruited from two elementary schools in a Southeastern state and therefore the findings may not be generalizable to national populations. Second, there was a limited sample of students recruited to the study, with a risk of low statistical power for the multivariate analyses. Thus, a larger sample size would help to replicate these findings, reduce any possible missed effects, and allow for mediation and moderation tests for the study variables.

Conclusion

Research has shown that children who are classified as overweight or obese may be at increased risk for lower levels of self-concept, life satisfaction, and self-efficacy. However, what the present study has shown is that children's psychological functioning is not in direct relationship with their weight classification. Instead, child characteristics (age, gender, and ethnicity) were more important explanatory variables in children's perceived life satisfaction, self-concept, and self-efficacy, emphasizing the necessity in taking these constructs into account for future studies.

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Appendix: Table 2. *Univariate Multiple Linear Regression Results of Life Satisfaction, Physical Self-Concept, Social Self-Concept, General Self-Concept, Exercise Self-Efficacy, and Eating Self-Efficacy Scores from Gender, Ethnicity, Grade Level, and Body Mass Index (N = 109)*

	Life Satisfaction			**Physical Self-Concept**			**Social Self-Concept**			**General Self-Concept**			**Eating Self-Efficacy**			**Exercise Self-Efficacy**		
Independent Variable	**b**	**SE**	***β***	**b**	**SE**	***β***	**b**	**SE**	***β***	**b**	**SE**	***β***	**b**	**SE**	***β***	**b**	**SE**	***β***
Constant	-0.14	.18	-0.20	-0.44	0.19	-0.58	-0.34	0.21	-0.42	-0.01	0.17	-0.01	0.14	0.24	0.16	-0.32	0.19	-0.43
Girl vs. Boy	0.00	.14	0.00	0.11	0.14	0.07	0.17	0.15	0.11	-0.03	0.13	-0.03	-0.25	0.17	-0.15	0.28	0.14	0.19
Ethnicity†		.51			19.46***			5.02			0.31			1.77			0.67	
White vs. African American	0.12	.17	0.08	0.70***	0.17	0.45	0.36	0.19	0.22	< 0.01	0.15	< 0.01	-0.19	0.21	-0.11	0.14	0.17	0.09
White vs. Hispanic	0.08	.18	0.05	0.14	0.16	0.09	0.03	0.18	0.02	0.07	0.15	0.05	0.04	0.20	0.02	0.09	0.17	0.05
African American vs. Hispanic‡	-0.03	.16	-0.02	-0.56***	0.16	-0.33	-0.33*	0.16	-0.19	0.07	0.15	0.05	0.23	0.18	0.12	-0.06	0.16	-0.04
Grade Level†		.65			1.05			12.94**			0.25			0.95			2.56	
3rd vs. 4th Grade	0.07	.16	0.05	0.15	0.17	0.09	-0.03	0.19	-0.02	-0.03	0.16	-0.02	0.14	0.20	0.07	0.14	0.17	0.09
3rd vs. 5th Grade	0.14	.17	0.09	0.15	0.17	0.09	0.45***	0.17	0.26	0.03	0.13	0.03	-0.02	0.20	-0.01	0.28	0.18	0.18
4th vs. 5th Grade‡	0.06	.16	0.04	0.01	0.16	0.00	0.49***	0.15	0.28	0.06	0.14	0.05	-0.16	0.17	-0.08	0.14	0.16	0.09
Body mass index	-0.03	.02	-0.18	-0.04*	0.02	-0.20	-0.02	0.02	-0.09	-0.02	0.01	-0.10	0.02	0.02	0.07	0.00	0.02	-0.01
R-squared	.03				.20***			.11*			.01			.04			.05	

b, unstandardized coefficient; SE, standard error; β, standardized coefficient.

*p < .05. **p < .01. ***p < .001.

†Omnibus Wald test of parameter constraints with 2 degrees of freedom.

‡ To obtain the third possible group comparison between African American vs. Hispanic and Grade 4 vs. Grade 5 a second univariate regression model was conducted using African American and Grade 4 as the referent group for ethnicity and grade level, respectively.

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