The Relationships Among Self-Esteem, Stress, Coping, Eating Behavior, and Depressive Mood in Adolescents

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Abstract: The prevalence of adolescent overweight is significant, almost 25% in some minorities, and often is associated with depressive symptoms. Psychological and psychosocial factors as well as poor coping skills have been correlated with unhealthy eating and obesity. The purpose of this study was to examine relationships among self-esteem, stress, social support, and coping; and to test a model of their effects on eating behavior and depressive mood in a sample of 102 high school students (87% minority). Results indicate that (a) stress and low self-esteem were related to avoidant coping and depressive mood, and that (b) low self-esteem and avoidant coping were related to unhealthy eating behavior. Results suggest that teaching adolescents skills to reduce stress, build self-esteem, and use more positive approaches to coping may prevent unhealthy eating and subsequent obesity, and lower risk of depressive symptoms. © 2008 Wiley Periodicals, Inc. Res Nurs Health 32:96–109, 2009

Keywords: self-esteem; stress; coping; eating behavior; depressive mood; adolescent

The prevalence of adolescent overweight has increased from 5% to 17% over the past 30 years in the United States. In some ethnic minorities the prevalence can reach as high as 25% (Centers for Disease Control [CDC], 2007a). There are serious long-term health consequences for adolescents who are overweight. For example, the prevalence of Type 2 diabetes is increasing among children and adolescents and is greater among minority than majority groups, primarily due to excess body weight (Bloomgarden, 2004). In addition, all overweight adolescents are at increased risk for depressive mood and clinical depression (Goodman & Whitaker, 2002; Sjöberg, Nilsson, & Leppard, 2005). Overweight adolescents tend to remain overweight as adults, with an increased risk of diabetes, cardiovascular disease, and cancer (Freedman et al., 2005). The overall

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estimated economic burden of obesity in the nation for the year 2002 was 93 billion dollars (Finkelstein, Fiebelkorn, & Wang, 2003). These expenses are projected to rise as today’s young people reach adulthood.

Unhealthy eating behavior has been proposed as a contributing factor to the etiology of overweight in both adolescents and adults (Budd & Hayman, 2006). In adults, obesity has been linked to stress-induced eating, low levels of social support, and inadequate coping skills (Laitinen, Ek, & Sovio, 2002). In adolescents, low self-esteem, stress, and poor coping have been associated with unhealthy eating attitudes related to eating disorders (Fryer, Waller, & Kroese, 1997). The teen years are associated with changes in self-esteem and stress related to school, family, friends, self, and one’s future. Low self-esteem, stress, low levels of social support, and avoidant coping have been related to unhealthy eating behaviors as well as depressive mood in adolescents (Cartwright et al., 2003; Falkner et al., 2001; Sjöberg et al., 2005; Wadsworth & Compas, 2002). Most of these relationships have been explored primarily in females, in European-American populations, and from an eating disorders perspective.

It has been suggested that coping may serve as a mediator between stress and health outcomes, including eating behavior and psychological health (Fryer et al., 1997; Southall & Roberts, 2002). The relationships among self-esteem, stress, social support, coping, eating behavior, and depressive mood have not been examined simultaneously, nor has coping been examined as a mediator of this process. The purpose of this study was to investigate relationships among self-esteem, stress, social support, and coping, and to test a model of their effects on unhealthy eating behavior and depressive mood in adolescents.

Low self-esteem has been associated with adolescent overweight and overeating, even after controlling for body mass index (Ackard, Neumark-Sztainer, Story, & Perry, 2003). In addition, ethnic and racial differences have been identified for their relationship with self-esteem and eating behavior. For White and Hispanic girls, low self-esteem has been associated with being overweight to a greater degree than among Black girls (Brown et al., 1998; Strauss, 2000). Thus, there is evidence that unhealthy eating behavior is associated with low self-esteem and that this may vary among ethnic and racial groups.

Stress has been proposed as a factor that leads to increased food consumption in vulnerable adults, including dieters and self-described emotional eaters (Greeno & Wing, 1994). Youth (aged 8–11 years) with high levels of dietary restraint (an index of control over eating), consumed more total calories and snacks when experiencing higher levels of stress (Roemmich, Wright, & Epstein, 2002). Increased stress also has been associated with high fatty food consumption, decreased fruit and vegetable intake, and decreased breakfast consumption among adolescents (Cartwright et al., 2003).

The role of social support in adolescent eating behavior is supported by evidence that it buffers stressful experiences (Yarcheski & Mahon, 1999), by enhancing positive coping strategies (Brissette, Scheier, & Carver, 2002). Social support has been shown to have a direct impact on health behavior (Mahon, Yarcheski, & Yarcheski, 2004), including dietary practices (Kubik, Lytle, & Fulkerson, 2005). Overweight adolescents have lower levels of social support and participate in fewer health promoting behaviors than adolescents with normal body weight (Chen, Wang, & Chang, 2006). The lower levels of social support may be related to the stigmatization of being overweight, which may limit social networks and thus contribute to social isolation (Falkner et al., 2001).

In adolescence, coping might serve as a mediator between stress and health outcomes, including dietary intake and psychological well-being (Dinsmore & Stormshak, 2003; Laitinen et al., 2002). Avoidant coping has been correlated with overeating and unhealthy eating attitudes and behavior in adolescents (Fryer et al., 1997). The avoidant strategies most closely linked to unhealthy eating are tension-reducing strategies such as crying, shouting, or taking drugs (Garcia-Grau, Fusté, Miró Saldaña, & Bados, 2002). Eating itself has been identified as a maladaptive coping mechanism used to abate stress (Lee-Tarver, 1999; Solomon, 2001). Although several investigators have studied the relationship between coping and eating patterns in adolescents, samples have included mostly White females, with minorities and males underrepresented. In addition, dietary patterns have been explored from an eating disorder perspective, and the focus was not on obesity (Fryer et al.; Garcia-Gau et al.; Lesk, 1996).

Although avoidant coping patterns have been related to unhealthy eating behaviors, approach coping has been associated with health promoting behaviors and fewer risk-taking behaviors such as sexual activity and substance abuse (Steiner, Erickson, Hernandez, & Paveskki, 2002). The relationship between approach coping and healthy behavior has provided support for interventions that use coping skills training in disease manage-
ment and weight loss programs for adolescents (Grey, Boland, Davidson, Li, & Tamborlane, 2000). In a prospective randomized trial of coping skills training in a school-based weight loss program targeted to pre-diabetic middle school minority students, those receiving a coping skills training intervention demonstrated lower blood glucose and insulin levels and decreased central adiposity compared to students who did not receive the coping skills training (Grey et al., 2004). These researchers suggested that coping may play an important role in health promotion and body weight regulation among ethnic minority school children.

Healthy nutritional status promotes physical, intellectual, and emotional health (Grodner, Long, & DeYoung, 2004), and eating behavior is a significant contributor to nutritional status through its influence on body weight (Grodner et al.). Certain eating behaviors that are associated with a healthy diet and body weight include eating at regular meal times, eating breakfast, and eating meals with the family (Taversas et al., 2005; Videon & Manning, 2003). Conversely, skipping meals, snacking, eating at fast food restaurants, and eating while watching television have been associated with increased fat and total calorie consumption, increased body weight, and a lower intake of fruits, vegetables, vitamins, and minerals (Francis, Lee, & Birch, 2003; Stockman, Schenkel, Brown, & Duncan, 2005). In addition, the disparities in body weight between Whites and other ethnic groups are in part due to cultural eating patterns, such as a greater preference for high fat food among Black girls (Crawford, Story, Wang, Richie, & Sabry, 2001). The factors related to the regulation of eating behavior and body weight are complex and interrelated, thus needing further study. One of the weaknesses in the conceptualization of eating behavior is that it has either encompassed eating pathology, or has described healthy versus unhealthy eating activities without a synthesized construct of normative eating behavior.

Depressive mood has been related to eating and dietary problems, as well as to low self-esteem, stress, low levels of social support, and avoidant coping skills. Low self-esteem and increased stress are independently associated with depressive mood (Southall & Roberts, 2002), with daily hassles associated with poorer psychological adjustment than to major life events (Seiffge-Krenke & Klessinger, 2000). Higher levels of social support are related to fewer depressive symptoms (Brissette et al., 2002) and lack of social support has been identified as a correlate of depressive mood among overweight adolescents (Sjöberg et al., 2005). In longitudinal studies, avoidant coping styles have been shown to predate the onset of depressive symptoms, suggesting that depressive mood is an outcome of avoidant coping styles (Seiffge-Krenke, 2000; Seiffge-Krenke & Klessinger).

In summary, it is known that low self-esteem is associated with overeating and weight gain in adolescents, and stress-induced eating and inadequate coping skills have been related to overeating and obesity in adults. Avoidant coping has been proposed as a mediator of unhealthy eating behavior and depressive mood (Seiffge-Krenke, 1995; Steiner et al., 2002). However, important questions remain about the relationship of self-esteem, stress, social support, and coping to eating patterns and depressive mood in racially/ethnically diverse male and female adolescents. A better understanding of the interrelationships among these factors would facilitate the development of nursing strategies to promote healthy coping and eating patterns, and reduce depressive symptoms in ethnically diverse adolescents.

This study was guided by the theoretical framework developed by Seiffge-Krenke (1995) for adolescent coping, which was derived from Lazarus and Folkman’s conceptualization of adult coping. Adolescent coping processes are thought to differ from those of adults (Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001), therefore, a framework specific to adolescents was chosen. Consistent with the conception of Lazarus and Folkman, the individual is said to engage in a cognitive appraisal of the perceived stressor. Cognitive appraisal of the stressor is affected by (a) the nature of the stressor, (b) internal coping resources, and (c) external social resources. Coping entails cognitive or behavioral response(s), which have been grouped as approach or avoidant strategies. Approach strategies entail active problem-solving coping responses to manage or solve the problem; avoidant strategies comprise passive responses to withdraw from or ignore the problem (Seiffge-Krenke). The Seiffge-Krenke framework differs from Lazarus and Folkman in that social support, through relationships with parents, family, and peers, is viewed as an important external social resource for adolescents. Developmental factors are also considered in the framework, as coping strategies change with maturation and personal experience. Coping strategies increase in early adolescence, reflecting the increase in stressors encountered with puberty, then stabilize during middle adolescence, reflecting advances in
cognitive development and social maturity (Seiffge-Krenke).

The variables for the current study were organized in a directional model as shown in Figure 1. Self-esteem, stress, and social support were conceptualized as antecedents to the coping process. Self-esteem is a key internal resource; social support represents an external coping resource. In adolescence, stressors primarily include relationships with family and peers, academic demands, and issues with self and the future (Lewis & Frydenberg, 2002; Seiffge-Krenke, 1995). Coping was conceptualized as a mediator of the effects of self-esteem, stress, and social support on the outcomes of eating behavior and depressive mood. It was hypothesized that adolescents with low self-esteem, increased stress, and decreased social support would use a predominance of avoidant coping strategies. The predominance of avoidant coping strategies would then mediate the negative outcomes of unhealthy eating behavior and depressive mood. The research questions were:

1. Are self-esteem, stress, social support, and coping related to unhealthy eating behavior and depressive mood in adolescents?
2. Does the use of food as a coping mechanism relate to being overweight?
3. Does coping mediate the relationship of low self-esteem, increased stress, and decreased social support with the outcomes of unhealthy eating behavior and depressive mood?

**METHODS**

**Design and Setting**

A descriptive, correlational cross-sectional design was used. Two public high schools (School A = 2,068 and School B = 1,563 students) in a suburban metropolitan area of the Midwest were sites for data collection from February through May 2005. The communities in which the students lived were predominantly residential, consisting of families with children. The community crime rates of both communities exceeded the national average (State Crime Statistics, 2002). Approximately one-third of the adults living in the communities had a high school diploma, and the median income was $46,500, which was slightly lower than the national average. The ethnic/racial distributions of the communities were primarily Black (82.7% and 52.9%), Hispanic (10.5% and 10.9%), and White (9.7% and 38.7%), as reported by the U.S. Census Bureau (2000).

**Sample**

The inclusion criteria were adolescents currently enrolled in high school, who were able to read and write English (in order to complete a 45-minute questionnaire). Both sexes and all racial and ethnic groups were included. To determine the sample size, moderate effect sizes of .2 – .3 were estimated.

**FIGURE 1.** Study model.

Controlled variables: age, gender, ethnicity, SES
using the published literature. The path model with 14 parameters (3 y-variables, 3 x-variable covariates, 5 paths, and 3 residual terms for y-variables, Fig. 1) required a sample size of 100 to achieve 80% power to detect a .224 effect size (Hintze, 2001). In addition, other sources report a sample size of at least 100 is needed when conducting path analysis (Thompson, 2000). A convenience sample of 119 high school students from the two sites was recruited through school announcements, flyers, and school staff. Once missing data and outliers were examined, there were 102 usable surveys for this study. The high school students (N = 102) who participated were largely minority (65.7% Black, 21.6% Hispanic, 12.7% White) and female (79%), with a mean age of 16.8 years (Table 1).

### Measured Variables

**Self-esteem.** Self-esteem was measured with the Rosenberg Self-Esteem short-form (Rosenberg, 1965), a self-administered 6-item, 4-point Likert-type instrument (1 = strongly disagree to 4 = strongly agree) developed to measure global self-esteem in adolescents. The possible scores range from 6 to 24; higher scores indicate higher levels of self-esteem. The instrument is concise and has a 5th grade reading level. Reliability using Cronbach alpha of .78 has been reported in ethnically diverse adolescents (Ackard et al., 2003). Construct validity has been determined through factor analysis (Rosenberg, Schooler, Schoenbach, & Rosenberg, 1995; Shevlin, Bunting, & Lewis, 1995). The Cronbach alpha coefficient was .75 in this study.

**Stress.** Using the six major adolescent stressors identified in the Coping Across Situations Questionnaire (CASQ; Seiffge-Krenke, 1995; school, parents, friends, romantic interests, self, and future), a 6-item stressor scale assessing level of stress in each of these respective domains (1 = not at all to 4 = very much), was constructed for the study. This instrument paralleled previously validated stress measures, equivalent in focus and content to these six items studied (Compas, Davis, Forsythe, & Wagner, 1987; Connor-Smith & Compas, 2002), thus providing evidence of construct validity for the measure. In addition, higher stress scores were significantly correlated with a higher frequency of all coping strategies (r = .30, p = .002) in the major domains that are associated with stress in the literature (Seiffge-Krenke). Scores ranged from 6 to 24, with higher scores indicating more stress. The Cronbach alpha in our study was .70.

**Social support.** Social support was measured with the Medical Outcomes Survey (MOS; Sherbourne & Stewart, 1991). The scale has 19 items using a Likert-type scale (1 = none of the time, 5 = all of the time). Higher scores are reflective of more social support. The tool measures functional aspects of support. Cronbach alphas ranged from .91 to .97 and validity was ascertained using multitrait scaling and factor analysis (Sherbourne & Stewart). The MOS has demonstrated reliability with minority adolescents (Allen et al., 2004; Bachanas et al., 2002). Two items were eliminated as they did not relate to adolescents. The Cronbach alpha reliability coefficient for the remaining 17 items was .94 for this sample.

**Coping.** Coping was measured with the Coping Across Situations Questionnaire (CASQ) (Seiffge-Krenke, 1995). This scale is specific to adolescents and measures approach and avoidant coping. Participants select from a list of 20 coping strategies across six problem situations that coincide with major adolescent stressors (school, parents, peers, romantic interests, self, and future). The respondents are able to choose as many of the

### Table 1. Health and Demographic Characteristics (N = 102)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>n</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>81</td>
<td>79.4</td>
</tr>
<tr>
<td>Male</td>
<td>21</td>
<td>20.6</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>5</td>
<td>4.9</td>
</tr>
<tr>
<td>15</td>
<td>10</td>
<td>9.8</td>
</tr>
<tr>
<td>16</td>
<td>21</td>
<td>20.6</td>
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<td>17</td>
<td>32</td>
<td>31.4</td>
</tr>
<tr>
<td>18</td>
<td>34</td>
<td>33.3</td>
</tr>
<tr>
<td><strong>Race/ethnicity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black/African American</td>
<td>67</td>
<td>65.7</td>
</tr>
<tr>
<td>Hispanic/Latino</td>
<td>22</td>
<td>21.6</td>
</tr>
<tr>
<td>White</td>
<td>13</td>
<td>12.7</td>
</tr>
<tr>
<td><strong>Socioeconomic status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>10</td>
<td>9.8</td>
</tr>
<tr>
<td>Low-middle</td>
<td>29</td>
<td>28.4</td>
</tr>
<tr>
<td>Middle</td>
<td>35</td>
<td>34.3</td>
</tr>
<tr>
<td>Upper-middle</td>
<td>20</td>
<td>19.6</td>
</tr>
<tr>
<td>High</td>
<td>8</td>
<td>7.8</td>
</tr>
<tr>
<td><strong>Body mass index percentile</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underweight</td>
<td>2</td>
<td>2.0</td>
</tr>
<tr>
<td>Normal weight</td>
<td>48</td>
<td>47.1</td>
</tr>
<tr>
<td>Risk for overweight</td>
<td>20</td>
<td>19.6</td>
</tr>
<tr>
<td>Overweight</td>
<td>28</td>
<td>27.5</td>
</tr>
<tr>
<td>Missing data</td>
<td>4</td>
<td>3.9</td>
</tr>
</tbody>
</table>
coping strategies as they typically use when problems occur in each situation. The proportion of avoidant coping use was computed for each adolescent using the total number of coping strategies as the denominator, and the sum of avoidant coping strategies as the numerator. The range for the proportion of avoidant coping was .00 to .55, indicating that some adolescents used no avoidant coping, and others used up to 55% avoidant coping. The proportion of avoidant coping was a better representation than frequency of avoidant coping because the former approach controls for the total numbers of coping strategies each individual employs, whereas the latter approach does not. The use of proportion for coping has previously been reported (Seiffge-Krenke, Weidemann, Fentner, Aegenheister, & Poeblau, 2001). The Cronbach alpha for this instrument has ranged from .73 to .88; construct validity has been established through factor analysis (Seiffge-Krenke). The Cronbach alpha was .94 for this study. One additional coping strategy, I try to forget the problem with food, was added at the end of the CASQ with the author’s permission (I. Seiffge-Krenke, personal communication, May 2004). The additional item was used for descriptive analysis and was not calculated into the overall coping scores.

Eating behavior. Eating behavior was measured using a modification of the Project EAT Survey (2004), a self-report instrument that measures a range of variables related to nutritional health and normative eating patterns among ethnically and socioeconomically diverse adolescents. Stability and internal consistency of the tool has been demonstrated (M. Eisenberg, personal communication, June 2004). For this study, a factor analysis using principal axis factor method was performed on the eating behaviors from the scale. A single dominant factor emerged with eight items representing normative eating behaviors. The presence of healthy behaviors (e.g., regularity of meals, frequency of eating meals with the family) and the absence of unhealthy behaviors (e.g., skipping meals, watching television while eating), were complementary and represented one dominant factor for eating behavior. The items were scored by summing the Likert-style scale ratings (e.g., 1 = never, 4 = everyday) to obtain a single sum score. The possible range of scores was from 8 to 36 with higher scores reflecting unhealthy (or less healthy) eating behavior and lower scores reflecting healthy (or less unhealthy) eating behavior. This score is a composite index of the frequency of unhealthy eating behaviors. The Cronbach alpha was .62.

Depressive mood. Depressive mood was measured as an affective indicator of psychological well-being using the Kandel Depressive Mood Scale for adolescents (Kandel & Davies, 1982). This 6-item, 3-point Likert-style (1 = not at all to 3 = very often) mood assessment scale measures depressive mood. Higher scores on the tool are reflective of depressive mood. The instrument has been used with large samples of ethnically, racially, and socioeconomically diverse adolescents. The Cronbach alpha was reported as .79 and construct validity was determined with factor analysis (Kandel & Davies). The Cronbach alpha for the current sample was .77.

Demographic data and health information. Age (in years), sex, ethnicity/race, and socioeconomic status (SES) were obtained by self-report using the demographic subscale from the Project EAT Survey (Ackard et al., 2003). Ethnicity/race was assessed with the question, “Do you think of yourself as”: (a) White, (b) Black or African American, (c) Hispanic or Latino, (d) Asian American, (e) Hawaiian or Pacific Islander, or (f) American Indian or Native American. Participants were allowed to choose more than one group. The parents’ highest educational level was used to identify socioeconomic status. This indicator has been shown to correlate well with socioeconomic level (Ackard et al.). Self-reported height and weight were obtained to calculate the body mass index (BMI). For this study, the BMI was converted to a percentile using the CDC Body Mass Index-For-Age Percentile Growth Charts 2000. A BMI <5th percentile is defined as underweight; 5th percentile to <85th percentile as normal weight; 85th percentile to <95th percentile as at-risk for overweight; and ≥ 95th percentile as overweight (CDC, 2007b). In this sample, 47% were either at risk for overweight or overweight (Table 1).

Procedures

Approval was obtained from the University Institutional Review Board for the protection of human subjects. Permission and support for the study were obtained from each respective school. Packets were provided to all interested students along with a verbal description of the study. A written letter to parents describing the study was included in each packet with the investigator’s contact information for additional questions. Data were collected after both parents and students agreed to participate, and had signed an informed consent (parents), and informed assent (adolescents). The survey was
administered to small groups (up to 10 students) on the school premises, during lunch or after school, by the principal investigator. The survey data were collected anonymously; no identifiers linked the participants to the surveys. Following survey completion, the students received a $10 gift card to a local store for their participation and an information sheet containing contact information for the school health staff and the investigator. All students were made aware that counseling could be received from the school-based health center counseling staff if they felt under stress, were sad or upset, or had any questions regarding their health.

**Data Analysis**

The data were entered into a data base (SPSS 15.0) and screened for missing data and outliers. All cases with missing data and outliers were removed. Screening for normality using histogram plots and the Kilmogorov–Smirnov statistic was completed and revealed that all variables were normally distributed. Differences in the six key variables of self-esteem, stress, social support, coping, eating behavior, and depressive mood were examined by the demographic characteristics of age, gender, ethnicity/race, and socio-economic status, using multivariate analysis of variance (SPSS). Age was further examined using a t-test of independent means to determine if there were differences for younger adolescents (14–15 years) versus older adolescents (16–18 years). Pearson correlations were computed to determine the relationship of “using food to cope” and body mass index. The proposed model was evaluated with path analytic techniques.

**RESULTS**

No significant differences in demographic characteristics emerged. The range, mean, and standard deviation for the six key variables are reported in Table 2.

<table>
<thead>
<tr>
<th></th>
<th>Self Esteem</th>
<th>Stress</th>
<th>Social Support</th>
<th>Avoidant Coping %</th>
<th>Eating Behavior</th>
<th>Depressive Mood</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean/SD</strong></td>
<td>18.6/3.4</td>
<td>16.0/4.0</td>
<td>77.1/19.9</td>
<td>29.2/9.5</td>
<td>23.1/4.9</td>
<td>20.6/4.9</td>
</tr>
<tr>
<td><strong>Possible range</strong></td>
<td>6–24</td>
<td>6–24</td>
<td>0–100</td>
<td>0–100</td>
<td>8–36</td>
<td>10–30</td>
</tr>
<tr>
<td><strong>Actual range</strong></td>
<td>11–24</td>
<td>6–24</td>
<td>16.2–100</td>
<td>0–55</td>
<td>13–35</td>
<td>10–30</td>
</tr>
<tr>
<td><strong>Normative range</strong></td>
<td>16–18</td>
<td>70–77.7</td>
<td>20–25</td>
<td></td>
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</tbody>
</table>

**Self-Esteem**

The level of self-esteem for this sample was moderately high. Overall 68% were satisfied with themselves. Most of the adolescents (94%) felt that they had a number of good qualities, and 93% felt they were able to do things as well as most people.

**Stress**

Stress levels were normally distributed. Stress levels were greatest for school (26%) and parents (21%). These were also the situations in which the students reported using the greatest number of coping strategies (Fig. 2).

**Social Support**

Social support levels for the group were high. The adolescents reported the greatest support in the area of emotional information, such as having someone to listen to you, help you with problems, and give advice.

**Coping**

Approach-oriented coping comprised 70.6% of all coping strategies used; avoidant coping comprised 29.4% of coping strategies. The most frequent approach strategies used were: discussing the problem with parents or other adults, thinking and trying to find solutions, and talking about the problem with the person concerned. The most frequent avoidant strategies were: behaving as if everything is alright, avoiding thinking about the problem, and energy releasing activities. Most approach strategies were used in dealing with problems related to school (74%), most avoidant strategies with problems related to parents (35%), self (33%), and romantic interests (32%; Fig. 2).
Responses to the additional item, *I try to forget the problem with food*, added to the end of the CASQ indicated that about one-fourth of adolescents used this strategy to cope with problems related, respectively, to self (26%), romantic interests (26%), parents (25%), and school (22%). Using food to cope was associated with a greater number of avoidant strategies ($r = .47$, $p = .001$). Adolescents who were above normal weight (> 85th percentile BMI) also reported a greater frequency of the use of food to cope (68.8% of risk for/overweight teens vs. 37.5% of teens of normal weight; $t(4.39) = -2.08$, $p = .04$). Using food to cope was positively correlated with a higher BMI percentile ($r = .26$, $p = .009$).

**Eating Behavior**

Eating behavior scores ranged from 13 to 35 ($M = 23.1$). Several unhealthy eating behaviors were reported. Breakfast was the least frequently eaten meal, with only 13% of the students reporting eating breakfast every day over the past week. Only 36% reported eating lunch every day, despite having a scheduled lunch period in school. Dinner was the most frequently eaten meal (59%), yet only 16% of students reported eating daily meals with most of the family; and 51% indicated that they were too busy to eat dinner with the family over the past week.

**Depressive Mood**

The range of scores on the Depressive Mood Scale spanned the full range of the scale, from a level of 10 to 30 (Table 2). The mean was higher than that reported in the literature with this instrument ($M = 17–18$; Eisenberg, Olson, Neumark-Sztainer, Story, & Bearinger, 2004; Fulkerson, Sherwood, Perry, Neumark-Sztainer, & Story, 2004). Thirty-five percent scored higher than 23. Scores of 23 or greater have been correlated with the diagnosis of depression (Kandel & Davies, 1982).

**Model Testing**

A path analysis was used to test a causal model of coping as the mediator between stress, self-esteem, and social support and the outcomes of unhealthy eating behavior and depressive mood. The data were analyzed using Lisrel 8.72 (Jöreskog & Sörbom, 2004). Age, sex, race/ethnicity, and socioeconomic status were controlled by using multivariate regression techniques to partial out the demographic variation in the dependent variables (avoidant coping, unhealthy eating behavior, and depressive mood). The remaining variances in avoidant coping, unhealthy eating behavior, and depressive mood were saved as unstandardized residuals of each of these variables. The unstandardized residuals for avoidant coping, unhealthy eating behavior, and depressive mood were then entered as dependent variables in the path model. One-tailed tests at the .05 level of significance were used. Model fit was evaluated using three absolute and three relative fit indices. The absolute fit indices comprised: the Minimum Fit Function Chi-Square ($\chi^2$), the Goodness of Fit Index (GFI), and the Standardized Root Mean Residual (SRMR). The relative fit indices chosen were: the Normed Fit Index (NFI), the Non-Normed Fit Index (NNFI), and the Comparative Fit Index (CFI; Kline, 2005).

The initial model did not demonstrate adequate model fit. To improve the model, two direct effects of self-esteem and stress to depressive mood were added (Fig. 3). Self-esteem and stress have been associated with depression in the literature.
(Seiffge-Krenke, 1995). The model fit was much improved and met recommended target values (Kline, 2005; Table 3).

In the final model (Fig. 3), low self-esteem ($\beta = -.28, \ p < .002$) and increased stress ($\beta = .28, \ p < .0014$) were significant predictors of avoidant coping. Low self-esteem and increased stress also had significant direct effects on depressive mood ($\beta = -.26, \ p < .01$ and $\beta = .52, \ p < .001$, respectively). Avoidant coping had a significant direct effect on unhealthy eating behavior ($\beta = .19, \ p = .03$), but no significant effect on depressive mood. The methods outlined by Baron and Kenny (1986) were used to test for mediation. The model failed to show that coping was a mediator of eating behavior. The relationship between avoidant coping and unhealthy eating behavior was not significant when controlling for the effect of self-esteem on eating behavior.

### DISCUSSION

According to the Seiffge-Krenke framework, internal and external resources interrelate with stress to influence coping styles. Coping styles subsequently have an impact on psychological well-being and health behavior (Seiffge-Krenke, 1995). Results of the current study partially support these propositions. Increased stress was correlated with low self-esteem and avoidant coping, while low self-esteem was associated with avoidant coping, which is consistent with prior research (Byrne & Mazanov, 2001; Wilburn & Smith, 2005). Social support was not significantly related to stress or coping. This finding is inconsistent with findings of earlier studies. One possible explanation is that the social support scale may not have captured the types of social support beneficial to adolescents in managing stress in this sample. Additionally,

### Table 3. Model Fit Indices

<table>
<thead>
<tr>
<th>Fit Indices</th>
<th>Target Value</th>
<th>Initial Model $N=102$, $df=7$</th>
<th>Revised Model $N=102$, $df=5$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$X^2$</td>
<td>$p &gt; .05$</td>
<td>56.0 ($p &lt; .001$)</td>
<td>9.6 ($p = .09$)</td>
</tr>
<tr>
<td>GFI</td>
<td>$\geq .90$</td>
<td>.87</td>
<td>.97</td>
</tr>
<tr>
<td>SRMR</td>
<td>$\leq .08$</td>
<td>.14</td>
<td>.07</td>
</tr>
<tr>
<td>NFI</td>
<td>$\geq .90$</td>
<td>.59</td>
<td>.93</td>
</tr>
<tr>
<td>NNFI</td>
<td>$\geq .90$</td>
<td>.14</td>
<td>.88</td>
</tr>
<tr>
<td>CFI</td>
<td>$\geq .90$</td>
<td>.60</td>
<td>.96</td>
</tr>
</tbody>
</table>

### FIGURE 3

Revised path model with standardized path coefficients.

Controlled variables: age, gender, race/ethnicity, SES

* $p < .05$

** $p < .01$
Meehan, Durlak, and Bryant (1993) found that for adolescents, social support may be more weakly related to coping with negative situations than it is with the promotion of positive experiences. It may be that adolescents associate social support with happiness and entertainment rather than with the management of stress. In the current study, the focus was on negative aspects of the stress and coping relationship, which may have partially accounted for the absence of a relationship with social support.

Adolescents in this study used a greater proportion of avoidant coping strategies than previously reported (Seiffge-Krenke, 1995). There is evidence that avoidant coping can be adaptive in adolescent populations that are facing uncontrollable or chronically high levels of stress (Dempsey, Overstreet, & Moely, 2000; Gonzales, Tein, Sandler, & Friedman, 2001; Grant et al., 2000). Given that the present adolescent sample consisted predominantly of middle to low SES minority adolescents living in neighborhoods having a higher level of crime than surrounding communities, it seems reasonable to assume that most participants were experiencing at least some degree of uncontrollable environmental stress in their life circumstances. This might explain why the present sample had higher levels of depressive mood and avoidant coping than found in past studies.

Twenty-five percent of the adolescents in this sample reported that they used food as a coping mechanism to deal with problems related to parents, self, and romantic interests. This is a concerning number of youth who are eating for non-nutritive purposes. Using food to cope also was associated with increased body weight. Solomon (2001) identified that overweight adult women were more likely to report eating to cope than women of normal weight, but eating to cope has not been well studied in adolescents. The practice of eating to cope may lead to two potential problems. Overeating may lead to unhealthy weight gain (Ackard et al., 2003) and food choices during episodes of stress-induced eating tend to be less healthy (Pelchat, 1997). Foods that are typically craved during episodes of stress-induced eating tend to be sweet or salty snacks and high-fat types of foods (Laitinen et al., 2002). Eating to relieve stress is usually an unplanned activity. Adolescents who plan and eat meals with regularity tend to demonstrate healthier food intake (Dwyer et al., 2001; Rampersaud, Pereira, Girard, Adams, & Metzl, 2005).

Coping did not serve as a mediator between self-esteem and eating behavior as originally proposed. Path analysis revealed a direct effect of self-esteem on coping and an indirect effect of self-esteem on eating behavior through coping. Adolescents with lower self-esteem used more avoidant coping strategies; and those who used more avoidant coping strategies reported less healthy eating behavior. Fryer et al. (1997) used multiple regression analyses to test a causal model of the relationships between stress, coping, self-esteem, and disordered eating in adolescent girls. The sequence of the causal relationships in Fryer’s study differed from that in the current study in that stress and poor coping promoted low self-esteem. Self-esteem imperfectly mediated disturbed eating attitudes. Contrary to Fryer et al.’s findings, findings of the current study suggest that low self-esteem promotes avoidant coping. The findings from the two studies may vary because in the current study, normative eating behaviors were measured. Fryer et al. in contrast, focused on disordered eating, which included characteristics such as feeling that food controls one’s life, a preoccupation with thinness, and feeling guilty. These characteristics suggest an internalization of negative feelings towards the self, which may be an indicator of low self-esteem. Because Fryer et al. used regression analyses to test separate parts of the underlying causal model piecemeal and never tested the model’s overall goodness-of-fit, it is unclear how well the underlying casual model actually fit their data, thus poor model fit may well explain the differences noted. Further exploration of the pathways among stress, coping, self-esteem, and eating behavior is needed.

In the current study, stress did not have a direct effect on eating behavior, whereas previous researchers have identified an association between stress and eating patterns (Cartwright et al., 2003). The stress scale used in the current study may have been too general to capture stressors associated with eating. In addition, the stress scale asked respondents to rate their stress levels over the past 3 months. Stressors that lead to stress-induced eating may be more short-term in nature and were not captured using a 3-month period of time.

Low self-esteem and increased stress were directly related to depressive mood, which is consistent with prior research (Southall & Roberts, 2002). Depressive mood emerged as a significant potential health problem in this study. The mean depressive mood score was higher than that reported in prior studies of adolescents (Eisenberg et al., 2004; Fulkerson et al., 2004; Paxton, Valois, Watkins, Huebner, & Drane, 2007). Thirty-five percent of the current sample had levels of depressive mood scores that have
been correlated with the diagnosis of depression (Kandel & Davies, 1982). Fifty percent of the current sample was at-risk for overweight or overweight by definition, and adiposity has been associated with depression in adolescents (Erermis et al., 2004). This may explain the high levels of depressive mood reported in this sample. Low self-esteem and avoidant coping were predictors of unhealthy eating behavior in this ethnically/racially diverse sample of male and female adolescents. Although the sample was comprised of primarily Black females, no significant differences in the model variables were noted by demographic variables. This is an important initial finding because previous studies of coping and eating behavior were conducted with White female adolescents. Despite known cultural differences in eating patterns, these psychological factors may influence eating behavior across racial, ethnic, and gender groups and should be considered when designing strategies to promote healthy eating patterns.

**Limitations**

Because the data were collected at one point in time, using a cross-sectional, correlational design, causation can only be inferred, and stability of variables over time is unknown. The sample size also may have been a limiting factor. Although an adequate sample size was obtained based on the prospective power analysis, observed effect sizes were actually smaller than expected, which reduced the ability to detect mediating effects of avoidant coping. Indeed, mediating effects are often small in magnitude (MacKinnon, Lockwood, West, & Sheets, 2002). In the present study, the six mediating effects of coping through which the antecedent variables of self-esteem, stress, and social support influenced the outcome variables of unhealthy eating behavior and depressive mood ranged in absolute standardized value from .01 to .05 (median absolute value = .015). Assuming a standardized mediation effect size of .015, the present sample of 102 adolescents provided a statistical power of only .33 to detect mediation at two-tailed $p < .05$. This retrospective power analysis reveals that the present study was twice as likely to miss small mediation effects as to detect them.

A large sample of both normal-weight and above normal-weight adolescents would have been beneficial to more adequately test for associations with body weight. The sample also had a small number of males (21%), even though male recruiters were used in both school sites to help increase the number of male participants. Very little is known about the factors that affect eating behavior in males, therefore further study of eating behavior in male adolescents is needed. Recruitment strategies and study procedures that will successfully attract males need to be considered in future study designs.

The instruments demonstrated acceptable psychometric properties, although the eating behavior measure had a reliability level that was slightly low. Eating behavior is a diverse and multidimensional construct, thus scales that measure various dimensions of eating patterns from a normative eating behavior perspective are needed. In addition, a major limitation is that BMI percentile was calculated from self-reported heights and weights, thus BMI would have been more accurate if actually measured.

**Nursing Implications**

Low self-esteem and avoidant coping emerged as significant predictors of unhealthy eating behavior, and thus may influence the use of emotional eating to cope with stress among adolescents. It may be important for nurses to assess adolescents for this practice and to suggest alternative stress management strategies. Adolescents with low self-esteem and high stress levels also may be at risk for depressive mood. Early identification of these individuals allows for assessment for depression, anxiety, and other signs of psychological maladjustment that may affect eating behavior.

It has been suggested that healthy eating behavior is part of a larger construct of health promoting behavior; and that high self-esteem and approach-oriented coping are associated with healthy behaviors in general. Further investigation is needed into the causal factors of health promoting behaviors in adolescents with the premise that these behaviors do not occur in isolation.

**REFERENCES**


Southall, D., & Roberts, J.E. (2002). Attributional style and self-esteem in vulnerability to adolescent...