Correlates Among Healthy Lifestyle Cognitive Beliefs, Healthy Lifestyle Choices, Social Support, and Healthy Behaviors in Adolescents: Implications for Behavioral Change Strategies and Future Research

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ABSTRACT

Introduction: The foundation for healthy lifestyle behaviors begins in childhood. As such, the relationships among cognitive beliefs, healthy lifestyle choices, and healthy lifestyle behaviors in adolescents have been explored. The purpose of this study was to assess the relationships among cognitive variables, social support, and healthy lifestyle behaviors in adolescents.

Method: A descriptive correlational design was used for this study. Students from two high schools in the Southwest United States were recruited to participate (N = 404).

Results: Significant correlations existed among cognitive variables, social support, behavioral skills, and healthy lifestyle behaviors.

Discussion: This study demonstrated that cognitive beliefs about leading a healthy lifestyle, including attitudes and intended choices, are related to physical activity as well as the intake of fruits and vegetables. In working with adolescents on healthy lifestyle behavior change, it is important to implement strategies to strengthen their cognitive beliefs about their ability to make healthy choices and engage in healthy lifestyle behaviors. Strengthening these beliefs...
should lessen their perception that these behaviors are difficult to perform, which ultimately should result in healthy behaviors. J Pediatr Health Care. (2010).  

**KEY WORDS**
Adolescent, correlation studies, lifestyle, health, cognition

The foundation for healthy lifestyle choices and behaviors in adulthood begins in childhood and adolescence. Adolescents rely less on their caregivers to provide avenues for healthy living and begin to make independent decisions about healthy lifestyle behaviors, including physical activity and nutrition. National data from the Youth Risk Behavioral Surveillance Survey indicates that only 34.7% of youth in grades nine through 12 engaged in the recommended amount of physical activity (i.e., physical activity that increases the heart rate and requires one to breathe hard for 60 minutes 4 or more days during the past 7 days) (Centers for Disease Control and Prevention, 2008). Additionally, only 21.4% of teens eat five fruits and/or vegetables a day (Centers for Disease Control and Prevention [CDC], 2008). When adolescents do not meet national recommendations in one health behavior, other health behavior recommendations often are not met as well. For example, in a study of 878 teens aged 11 to 15 years, 80% had multiple risk behaviors, including: (a) watching television more than 120 minutes per day, (b) engaging in physical activity less than 60 minutes per day, and (c) eating a fat intake of greater than 30% calories per day or a fruit/vegetable intake of less than five servings per day (Sanchez et al., 2007).

A number of studies have supported factors that influence healthy lifestyle choices and behaviors in adolescence, including peers, parental healthy lifestyle behaviors, and the school environment (Luttikhuis et al., 2009). However, relationships among cognitive beliefs, healthy lifestyle choices, and healthy lifestyle behaviors in adolescents have only begun to be explored (Melnyk et al., 2006). Therefore, the purpose of this descriptive correlational study was to assess the relationships among cognitive variables (i.e., healthy lifestyle beliefs and attitude, perceived difficulty in leading a healthy lifestyle, and intent to make healthy lifestyle choices), social support, and healthy lifestyle behaviors (i.e., nutrition and physical activity) in adolescents.

**BACKGROUND AND LITERATURE REVIEW**
One outcome of lifestyle choices and behaviors is body mass index (BMI) percentile, which evaluates a child’s weight and height compared with other children their age and gender. Overweight (previously termed at risk for overweight) in children and adolescents is defined as a BMI greater than or equal to the 85th percentile and less than the 95th percentile (Barlow & Committee, 2007). Obesity (previously termed overweight) in children and adolescents is defined as a BMI greater than or equal to the 95th percentile (Barlow & Committee, 2007). In the United States, 17.6% of teens are overweight (Ogden, Carroll, & Flegal, 2008). Furthermore, the prevalence of overweight in adolescents tripled between 1980 and 2002 (Ogden et al., 2006). Since that time, there has been no significant change in the number of adolescents who are overweight (Ogden et al., 2008).

Data from the Youth Risk Behavioral Survey indicates that 28.8% of adolescents in the 9th to 12th grade are overweight or obese, with discrepancies between males and females and by ethnicity (CDC, 2008). Nationally, the total percentage of persons who are overweight or obese in high school is as follows: male, 32.7; female, 24.7; White, 25.1; Black, 35.6; and Hispanic, 34.7 (CDC, 2008).

Obese adolescents spend significantly less time in light-to-moderate physical activity and significantly more time being inactive than do non-obese adolescents (Page et al., 2005). It is estimated that obese teenagers consume between 700 and 1000 excess calories a day (Wang, Gortmaker, Sobol, & Kuntz, 2006).

The enactment of healthy lifestyle behaviors requires a complex interaction of factors from numerous determinants. Correlates of physical activity and dietary behaviors in adolescents have been studied, including cognitive factors (e.g., beliefs and intentions), barriers, and behavioral skills (Larson et al., 2008; Rasmussen et al., 2006; Sallis, Prochaska, & Taylor, 2000; Van der Horst, Paw, Twisk, & Van Mechelen, 2007). Additionally, social support has been evaluated for its impact on lifestyle behaviors in adolescents and has been found to be positively correlated with more than 50% of adolescents who are sufficiently physically active (Spink et al., 2006).

Beliefs primarily have been identified as self-efficacy in the literature and defined as “the conviction that one can successfully execute the behavior required to produce the outcomes” (Bandura, 1977, p. 193). Self-efficacy has been positively related to physical activity and fruit and vegetable intake in adolescents (Petosa, Hortz, Cardina, & Suminski, 2005; Sharma, Wagner, & Wilkerson, 2005-2006).

The influence of intentions on behaviors has been well studied in the literature, primarily through theory testing with the Theory of Reasoned Action and the Theory of Planned Behavior. In three meta-analytic reviews in children and adults, intentions were found to be a strong predictor of exercise behavior (Hagger, Chatzisarantis, & Biddle, 2002; Hausenblas, Carron, & Mack, 1997; Sharma, Wagner, & Wilkerson, 2005-2006; Symons Downs & Hausenblas, 2005). A meta-analysis of meta-analysis was completed, which indicated that intentions explain, on average, 28% of the variance of future behaviors in all populations (Sheeran, 2002). Intentions likewise have been
predictive of fruit and vegetable intake in adults (Povey & Conner, 2000).

Barriers to healthy lifestyle behaviors in adolescents also have been well studied. A commonly reported barrier to physical activity in teens is lack of time or time constraints (Dwyer et al., 2006; O’dea, 2003; Sharma et al., 2005-2006). Barriers for the consumption of fruits and vegetables include less healthy alternatives being readily available, food preferences, and reward driven or mood enhancement of less healthy foods (O’dea, 2003).

In addition, change/self-management strategies, which are similar to cognitive behavioral skills, have been associated with healthy lifestyle behaviors of limiting dietary fat intake, increasing fruit and vegetable intake, and increasing physical activity in adolescents (Dishman et al., 2005; Zabinski et al., 2006).

Social support, both parental and peer, also repeatedly has been shown to influence adolescents’ lifestyle behaviors, with both physical activity and fruit and vegetable intake being positively associated (Pugliese & Tinsley, 2007; Sallis et al., 2000; Villard, Ryden, & Stahle, 2007).

Although a multitude of factors have been associated with healthy lifestyle behaviors in teens and multi-component interventions that mostly included behavior modification, education, and physical activity have produced some short-term positive outcomes, interventions in teens have not had more long-term positive sustainable effects. Therefore, it is important to continue to determine key variables that influence healthy lifestyle choices and behaviors that are amenable to change through interventions.

CONCEPTUAL FRAMEWORK
Cognitive behavioral theory was the conceptual framework that guided the selection of variables in this study. Cognitive behavioral theory is based on the premise that how a person cognitively structures the world largely determines a person’s affects and behaviors (Beck, Rush, Shaw, & Emery, 1979). The theory would predict that a person who tends to have negative beliefs about the ability to lead a healthy lifestyle and cognitively appraises healthy lifestyle behaviors as difficult to perform would make less healthy choices and engage in less healthy behaviors. Therefore, it was hypothesized that there would be significant positive relationships among healthy lifestyle beliefs, attitudes, and choices and significant negative relationships between perceived difficulty and healthy lifestyle beliefs, attitudes, and choices.

METHODS
Design
A descriptive correlational design was used for this study using Pearson’s r correlations.

Institutional Review Board
The Institutional Review Board at Arizona State University and the participating school districts approved this study prior to the recruitment of subjects. Additionally, the study was approved through the school board of the participating district. Student assent and parental consent were obtained prior to data collection.

Measures
Healthy Lifestyle Beliefs Scale
The Healthy Lifestyle Beliefs Scale is a 16-item instrument that was adapted from other beliefs scales used by Melnyk in prior studies (Melnyk & Small, 2003c; Melnyk et al., 2006). The Healthy Lifestyle Beliefs Scale taps beliefs/confidence about various facets of maintaining a healthy lifestyle (e.g., “I believe that I can be more active” and “I am sure that I will do what is best to lead a healthy life”). Subjects respond to each item on a 5-point Likert scale that ranges from 1 “strongly disagree” to 5 “strongly agree.” Scores from each item are summed for a total score ranging from 16 to 80. Face validity was established with 10 teens. Content validity was established by eight adolescent health specialists. The Cronbach’s α for this scale with this sample was .94.

Healthy Lifestyles Perceived Difficulty Scale
The Healthy Lifestyles Perceived Difficulty Scale instrument is a 10-item questionnaire that measures one’s perceived difficulty in living a healthy lifestyle. It was adapted from a similar scale used with teens in an HIV-prevention intervention study (Melnyk & Small, 2003a; Morrison-Beedy, Nelson, & Volpe, 2005). Subjects respond to each item on a 5-point Likert scale that ranges from 1, “very hard to do,” to 5, “very easy to do” (e.g., eat healthy, exercise regularly, and cope/deal with stress), with a range of scores from 10 to 50. Items are reverse scored for analysis, with higher scores indicating greater perceived difficulty in leading a healthy lifestyle. The Cronbach’s α with this sample of teens was .88.

Healthy Lifestyle Choices Scale
The Healthy Lifestyle Choices Scale is a 16-item instrument that taps intentions to engage in healthy lifestyle behaviors, including nutrition, exercise, and goal setting (Melnyk & Small, 2003d). Subjects respond to each item on a 5-point Likert scale that ranges from 1, “strongly disagree,” to 5, “strongly agree.” Examples of questions include, “I will make healthy food choices,” “I will exercise on a regular basis,” and “I will set goals I can accomplish.” A higher score on the scale indicates greater intentions of engaging in healthy lifestyle behaviors, with a possible range of scores between 16 and 80 for the summed items. Face validity was established with 10 teens and content validity
was established by eight adolescent health experts. The Cronbach’s α for this scale was .92 for this sample of teens.

Healthy Lifestyles Attitude Scale
The Healthy Lifestyles Attitude Scale is a 14-item instrument that taps attitudes toward living a healthy lifestyle (e.g., “My weight does not matter to me; Exercise is fun”) (Melnyk & Small, 2003b). Subjects respond to each item on a 5-point Likert scale that ranges from 1, “strongly disagree,” to 5, “strongly agree.” Negative items toward living a healthy lifestyle are reverse scored, and then all items are summed. Face validity was established with 10 teens. Content validity was established by eight adolescent health specialists. The Cronbach’s α for this scale with this sample of teens was .84.

Social support—family
Family influence/support for physical activity, fruit and vegetable intake, and dietary fat habits was measured with a previously published instrument with subscales for fruit and vegetable intake, fat intake, and physical activity (Hagler, Norman, Radick, Calfas, & Sallis, 2005). Each sub-scale has four questions and is scored on a 5-point Likert scale ranging from “Never” to “Every day” (e.g., “During a typical week, how often has a member or your household encouraged you to eat fruits and vegetables?”). Items are summed for a total score ranging from 12 to 60. In this sample, the Cronbach’s α was .92.

Behavioral skills: physical activity and fruit and vegetable intake
Behavioral skills were measured with two scales tapping change strategies relating to physical activity and fruit and vegetable intake (Hagler et al., 2005). Each scale has 14 items scored on a 5-point Likert scale ranging from “Never” to “Many times” (e.g., “The following are activities, thoughts and feelings people use to help them change their dietary fat intake. Think of any similar experiences you may have had or have had in the past month. Then rate how often you do each of the following: I set goals to eat low-fat foods.”). The total score is calculated by summing each item and can range from 14 to 70. Cronbach’s α in this sample for the physical activity scale was .93 (n = 393) and .95 for the fruit and vegetable scale (n = 398).

Recruitment
The inclusion criteria for this study were that the student was enrolled in a health/physical education class and was 13 to 18 years of age. The exclusion criteria for the study were inability to read and comprehend English at the 6th-grade level and pregnancy.

At the beginning of the semester, 1 week prior to data collection, research team members approached all students in two schools enrolled in a health/physical education course (20 classes) (see Figure). During the first 30 minutes of class, the details of the study were reviewed and students were able to ask questions pertaining to the study. Students were then asked to complete assent forms. After assent forms were completed, consent forms were distributed to interested students to obtain permission for participation in the study from a parent or legal guardian. A phone number was provided on the consent for parent(s) to call and ask questions if desired. Teachers collected consent forms during the remainder of the week. Consent forms were collected from the teachers a few days prior to data collection to organize and assign study numbers because all data collected were de-identified.

Sample
A convenience sample of 404 teens (Table 1) was recruited from two high schools within the same district in a large urban city in the southwestern United States. The two schools varied by ethnicity and socioeconomic status. High school No. 1 comprised 2008 students who were 51.6% female, 88.5% White, 5.6% Hispanic, 2.5% African American, and 3.1% Asian (Arizona Department of Education, 2007). High school No. 2 comprised 2495 students who were 50% female, 63% White, 25% Hispanic, 4.8% African American, and 4.9% Asian.

The percentage of students who were overweight and obese was assessed in this sample (Table 2). Percentages of overweight or obese were highest among male and non-White students and were higher than the national average (Ogden et al., 2008) at high school No. 1.

Analytic Strategy
Pearson’s r correlations were conducted to test the hypothesized relationships among the study variables.

RESULTS
The demographic characteristics of the participating adolescents are listed in Table 1.

Beliefs about healthy lifestyles in the adolescents were significantly related to their attitude, choices (intentions), social support, and behavioral skills in living a healthy lifestyle (Table 3). For example, the stronger a teen’s beliefs about the ability to live a healthy lifestyle, the higher were his or her attitudes, social
support, and behavioral skills in living a healthy lifestyle. Perceived difficulty was significantly negatively correlated to beliefs, choices, attitudes, social support, and behavioral skills use, such that if a person viewed living a healthy lifestyle as difficult, the score on his or her beliefs, attitude toward, choices, perceived social support, and behavioral skills use was less (Table 4).

**DISCUSSION**

Research has demonstrated a relationship between healthy lifestyle behaviors and overweight/obesity (Gordon Larsen, 2001; Page et al., 2005; Wang, Gortmaker, Sobol, & Kuntz, 2006). Therefore, it is important to understand factors affecting healthy lifestyle behaviors that are amenable to change through interventions. This study demonstrated that cognitive beliefs about leading a healthy lifestyle, including attitudes and intended choices, are related to physical activity as well as the intake of fruits and vegetables. Teens who reported greater behavioral skills related to fruit and vegetable intake ate more servings of fruits and vegetables. Teens who reported greater behavioral skills for physical activity also reported being more physically active. Teens who perceived healthy lifestyle behaviors as more difficult to perform had fewer healthy lifestyle behaviors. Furthermore, teens who had stronger beliefs about their ability to engage in healthy lifestyle behaviors, better attitudes toward living a healthy lifestyle, and stronger intentions to make healthy lifestyle choices perceived healthy behaviors as less difficult to perform.

The findings from this study support cognitive-behavior theory as well as our earlier work with a small sample of overweight teens in which the same pattern of relationships among these variables were found (Melnyk et al., 2006). The way in which adolescents think is related to their intention to make healthy lifestyle choices and their healthy lifestyle behaviors. Therefore, in working with adolescents on healthy lifestyle behavior change, it is important to implement strategies to strengthen their cognitive beliefs about their ability to make healthy choices and engage in healthy lifestyle behaviors. Strengthening these beliefs should lessen their perception that these behaviors are difficult to perform, which ultimately should result in healthy behaviors.

Current interventions for the prevention and or treatment of overweight/obesity have had limited success in

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**TABLE 1. Sample demographics**

<table>
<thead>
<tr>
<th>Demographic</th>
<th>Sample</th>
<th>High school No. 1</th>
<th>High school No. 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>404</td>
<td>146</td>
<td>258</td>
</tr>
<tr>
<td>Mean age (y)</td>
<td>15.1</td>
<td>15.0</td>
<td>15.2</td>
</tr>
<tr>
<td>Male (%)</td>
<td>47.5</td>
<td>47.3</td>
<td>47.7</td>
</tr>
<tr>
<td>Female (%)</td>
<td>52.5</td>
<td>52.7</td>
<td>52.3</td>
</tr>
<tr>
<td>9th grade (%)</td>
<td>89.1</td>
<td>94.5</td>
<td>86.4</td>
</tr>
<tr>
<td>10th grade (%)</td>
<td>4.2</td>
<td>3.4</td>
<td>4.7</td>
</tr>
<tr>
<td>11th grade (%)</td>
<td>4.2</td>
<td>1.4</td>
<td>5.8</td>
</tr>
<tr>
<td>12th grade (%)</td>
<td>2.2</td>
<td>0.7</td>
<td>3.1</td>
</tr>
<tr>
<td>White (%)</td>
<td>69.1</td>
<td>43.8</td>
<td>83.3</td>
</tr>
<tr>
<td>American Indian (%)</td>
<td>3.0</td>
<td>4.8</td>
<td>1.9</td>
</tr>
<tr>
<td>Asian (%)</td>
<td>5.0</td>
<td>6.2</td>
<td>4.3</td>
</tr>
<tr>
<td>Hispanic (%)</td>
<td>16.6</td>
<td>32.9</td>
<td>7.4</td>
</tr>
<tr>
<td>Other (%)</td>
<td>6.9</td>
<td>8.2</td>
<td>6.2</td>
</tr>
</tbody>
</table>
sustaining healthy behaviors (Kelly & Melnyk, 2008; Luttikhuis et al., 2009). Many of these intervention studies with adolescents have used multi-component interventions that include physical activity, nutrition education, and behavior modification (Kelly & Melnyk, 2008; Luttikhuis et al., 2009). Because of the pattern of relationships found in this study, cognitive restructuring through cognitive behavior skills building may be a promising strategy to promote behavior change (Luttikhuis et al., 2009). In a recent cluster randomized controlled pilot study, implementation of a cognitive-behavior skills-building intervention program through the Creating Opportunities for Parent Empowerment (COPE) Healthy Lifestyles Thinking, Emotions, Exercise and Nutrition (TEEN) Program with Hispanic high school adolescents resulted in an increase in healthy lifestyle beliefs and choices as well as a decrease in depressive and anxiety symptoms (Melnyk et al., 2009).

Social support from family and friends also was related to healthy lifestyle beliefs and perceived difficulty in leading a healthy lifestyle. Specifically, as both types of support increased, beliefs about leading a healthy lifestyle increased and perceived difficulty decreased.

Therefore, whenever feasible, interventions should be targeted to adolescents and their families.

**IMPLICATIONS FOR CLINICAL PRACTICE**

Although cognitive-behavior therapy is conducted by mental health professionals who are trained in this treatment modality, cognitive-behavior skills building is a strategy that can be learned by clinicians who can teach these skills to adolescents. In cognitive-behavioral skills building, adolescents are taught that how they think affects how they feel and how they behave (Melnyk et al., 2009). Teens also are taught how to monitor their thinking, how to identify triggers of negative thinking, and how to turn negative thoughts into positive ones. In addition, problem-solving, self-affirmations (i.e., I can make healthy choices), goal setting, and stress-reduction strategies are strategies used in cognitive-behavior skills building. Furthermore, helping the teen set weekly goals for nutrition, physical activity, and positive thinking should be incorporated in this approach to healthy lifestyle behavior change.

Encouraging parents to model healthy lifestyle behaviors and to support their teens in making healthy choices is another important component in facilitating healthy behaviors in adolescents. Because the peer group also influences beliefs about and perceived difficulty in making healthy lifestyle choices, clinicians should consider group interventions when working on behavior change with teens.

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**TABLE 2. Body mass index percentile by school**

<table>
<thead>
<tr>
<th></th>
<th>High school No. 1</th>
<th></th>
<th>High school No. 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non-white</td>
<td>White</td>
<td>Non-white</td>
</tr>
<tr>
<td></td>
<td>Frequency</td>
<td>%</td>
<td>Frequency</td>
</tr>
<tr>
<td>Girls</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMIP &lt;85</td>
<td>28</td>
<td>65.1</td>
<td>28</td>
</tr>
<tr>
<td>BMIP ≥85</td>
<td>14</td>
<td>32.6</td>
<td>4</td>
</tr>
<tr>
<td>Missing</td>
<td>1</td>
<td>2.3</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>43</td>
<td>100</td>
<td>34</td>
</tr>
<tr>
<td>Boys</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BMIP &lt;85</td>
<td>21</td>
<td>53.8</td>
<td>20</td>
</tr>
<tr>
<td>BMIP ≥85</td>
<td>17</td>
<td>43.6</td>
<td>10</td>
</tr>
<tr>
<td>Missing</td>
<td>1</td>
<td>2.6</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>39</td>
<td>100</td>
<td>30</td>
</tr>
</tbody>
</table>

BMIP, Body mass index percentile.

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**TABLE 3. Relationships among healthy lifestyle beliefs and other study variables**

<table>
<thead>
<tr>
<th>Measures</th>
<th>Pearson’s r correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthy attitudes</td>
<td>0.52*</td>
</tr>
<tr>
<td>Healthy choices</td>
<td>0.54*</td>
</tr>
<tr>
<td>Perceived difficulty</td>
<td>-0.49*</td>
</tr>
<tr>
<td>Social support—family</td>
<td>0.26*</td>
</tr>
<tr>
<td>Social Support—friends</td>
<td>0.20*</td>
</tr>
<tr>
<td>Behavioral skills—physical activity</td>
<td>0.46*</td>
</tr>
<tr>
<td>Behavioral skills—fruits and vegetables</td>
<td>0.21*</td>
</tr>
</tbody>
</table>

*P < .01.
One limitation in this research is that it was a convenience sample. Despite recruitment from an ethnically diverse high school, the majority of the sample was White. Further study is needed to assess adolescents from a more ethnically and socioeconomically diverse group. Additionally, testing programs such as the COPE/Healthy Lifestyles TEEN Program that utilize cognitive skills building for the promotion of healthy lifestyle behaviors are urgently needed to determine if these types of interventions can lead to both short-term and more long-term positive changes in adolescent healthy lifestyle behaviors.

REFERENCES


