

UNDERSTANDING PARENTS' DECISIONS ABOUT SERVING VEGETABLES
TO THEIR CHILDREN

A Thesis

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ABSTRACT

With the increasing rate of childhood obesity it is important to examine obesity prevention programs and strategies. The theory of planned behavior (TPB) has been identified as a successful framework to examine and understand human behavior and obesity prevention research. However, there is limited support for the TPB regarding its use and efficacy for understanding parents' influence on the health behavior of their children. The purpose of this study was to: (a) describe the most common behavioral, normative, and control beliefs of parents' serving vegetables to their children; (b) examine the social cognitive correlates of parents' intentions to serve vegetables to their children; and (c) to determine the social cognitive correlates of parents' behavior. Children in grades three to five were assessed for height and weight to generate Body Mass Index (BMI) reports. The BMI report was issued to the parents of 72 children along with a questionnaire assessing demographic information, nutrition beliefs, and social cognitive correlates. The results revealed attitude ($r = .56$) had the strongest relationship with intention, followed by perceived behavioral control (PBC, $r = .52$) and subjective norm ($r = .35$). Additionally, intention ($r = .57$) had the strongest association with behavior, followed by PBC ($r = .53$). Nutrition beliefs emphasized parents' knowledge regarding the health benefits of vegetables as well as the difficulty serving vegetables because of busy schedules, time constraints, and children's reluctance to eat vegetables. The findings indicate that strategies to enhance parents' intentions to serve vegetables to their children should include education about the benefits, identification of barriers, development of strategies to address barriers, and elicitation of social influence from important others. In addition, methods to encourage parents' to serve vegetables should include ways to enhance motivation and strategies to overcome

barriers. Overall, the findings of the study supported the use of the TPB for understanding parents' decisions regarding the health behavior of their children.

INTRODUCTION AND LITERATURE REVIEW

Obesity is positively associated with several chronic illnesses including coronary artery disease, hypertension, and diabetes mellitus (United States Department of Health and Human Services [USDHHS], 1996). About 31% of the adults in the United States are considered to be obese, and the prevalence of overweight children and adolescents has doubled during the past two decades (American Academy of Pediatrics, 2003; USDHHS, 1996, 2002). Furthermore, overweight children and adolescents have a high risk of becoming obese adults. Thus, overweight and obesity is an important public health issue.

Poor diet and physical inactivity contribute to the increase in overweight and obesity in the United States (Dietary Guidelines for Americans, 2005). In addition, poor diet and physical inactivity are the leading causes of preventable death in the United States; second only to tobacco use (Mokdad, Marks, Stroup, & Gerberding, 2005). The American Academy of Pediatrics (2003) states that early recognition of overweight and obesity should be the primary means of combating childhood obesity. In addition, the American Academy of Pediatrics recommends the use of body mass index (BMI) as an indicator of adiposity in children and adolescents and working with schools and parents to develop primary obesity prevention strategies.

Chomitz, Collins, Kim, Frammer, and McGowan (2003) evaluated a school-based health report card prevention program that examined the ability of parents to influence children's weight status by encouraging protective behaviors such as increasing fruit and vegetable consumption, decreasing television-viewing time, and promoting physical activity. BMI and fitness test results were issued to the parents of 1396 kindergarten through eighth grade school children. Among overweight children, the health report card successfully increased parental awareness and

concern for children’s weight status with the majority of these parents requesting annual weight and health information. More research is needed to examine the efficacy of this type of obesity prevention program, and to understand the correlates of parental decisions about promoting healthy behaviors in children. Baranowski, Cullen, Nicklas, Thompson, and Baranowski (2003) evaluated several health behavioral change models used to understand health behaviors. They concluded that the theory of planned behavior was a successful framework to use for obesity prevention research.

Overview of Theoretical Framework: Theory of Planned Behavior

The theory of planned behavior (TPB; Ajzen, 1985, 1991; see Figure 1) is a theoretical framework used to explain and understand human behavior. The TPB was developed from the theory of reasoned action (Ajzen & Fishbein, 1980), and it is based on the assumption that people make conscious decisions by considering information and potential consequences of their behavior. Intention is the immediate determinant of behavior and it reflects an individual’s motivation to perform a behavior.

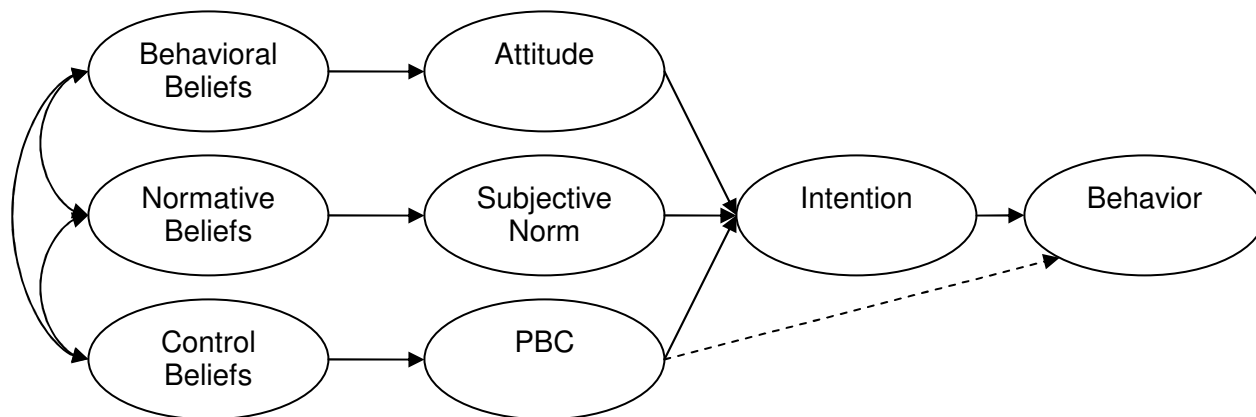


Figure 1. The theory of planned behavior. Adapted from Ajzen, 2002b.

Intention is determined by the following three constructs: attitude, subjective norm, and perceived behavioral control (Ajzen & Fishbein, 1980; Ajzen, 1991). Attitude reflects the

positive or negative evaluation an individual makes about performing a behavior. It is a function of behavioral beliefs, which represent the perceived consequences of performing a behavior and the evaluation of the potential outcomes. Subjective norm describes the perceived social pressure to perform or not perform a behavior and it is formed by normative beliefs. Normative beliefs are the product of the perceived pressure from important referents to perform a behavior and the motivation of to comply with these referents. Perceived behavioral control (PBC) represents elements of self-efficacy (i.e., the ease or difficulty of performing the behavior) and controllability (i.e., the beliefs about the extent to which the performance of the behavior is up to the individual; Ajzen, 2002b). It is a function of control beliefs, which are the product of any factors that may facilitate (e.g., resources, opportunities) or inhibit (e.g., obstacles) the performance of the behavior and the perceived power of these factors. PBC can influence behavior directly or indirectly through intention. Therefore, the hypotheses of the TPB are that: (a) an individual's intention to perform a behavior will be strong if the behavior is evaluated positively (attitude), if there is perceived pressure from significant others to perform the behavior (subjective norm), and if there are strong beliefs about the ease or difficulty of performing the behavior (PBC), and (b) an individual is more likely to execute a behavior when motivation is high (intention), and the behavior is perceived to be controllable (PBC; Ajzen, 1985, 1991).

Narrative and Statistical Reviews of the Theory of Planned Behavior

Several narrative and meta-analytic reviews have provided support for the TPB for predicting a variety of behaviors including health-related behaviors (Armitage & Conner, 2001; Blue, 1995; Godin & Kok, 1996; Hagger, Chatzisaratis, & Biddle, 2002; Hausenblas, Carron, & Mack, 1997; Notani, 1998; Sutton, 1998; Symons Downs & Hausenblas, 2005). Three of these reviews analyzed the ability of the TPB to perform across multiple behavior categories (e.g., physical

activity, smoking cessation, limiting infant sugar intake, teaching methods, voting, attending class; Armitage & Conner; Notani; Sutton). The results of these studies found attitude to be the best predictor of intention, followed by PBC, and finally subjective norm. For example, Armitage and Conner examined 185 studies of multiple behaviors including physical activity, smoking cessation, traffic planning, and teaching methods. The results showed that across behaviors the TPB explained 39% of the variance in intention. The attitude-intention ($r = .49$) and PBC-intention ($r = .43$) associations were significantly stronger than the subjective norm-intention ($r = .34$) correlation.

Meta-analyses that included multiple behavioral categories also examined the predictors of behavior (Armitage & Conner, 2001; Notani, 1998; Sutton, 1998). Intention consistently performed as the strongest predictor of behavior, followed by PBC (Armitage & Conner; Notani). For example, Notani reviewed the TPB in 36 studies involving multiple behavior categories (e.g., study behaviors, gift giving behavior, voting, alcohol consumption, weight loss, physical activity). The results of the meta-analysis revealed that intention had the strongest association with behavior ($r = .47$), followed by PBC ($r = .25$). Furthermore, the intention-behavior ($p < .01$) and PBC-behavior ($p < .10$) structural paths were significant, although the latter was the weakest.

The TPB also performs well among health-related behaviors (Godin & Kok, 1996). Godin and Kok qualitatively analyzed 56 studies of the TPB that included health behaviors such as oral health, cancer screenings, diet, and exercise. Attitude, PBC, and subjective norm accounted for 32% of the variance for eating behaviors and up to 46.8% for oral hygiene. The average

explained variance across all behaviors was 40.9%. PBC and attitude were significant in 85.5% and 81.6% of the studies, respectively, and subjective norm was only significant in 47.4% of the applications.

The ability of the TPB to explain behavior varied across health categories as well. The average R^2 for behavior across all studies was .34, ranging from .16 for screening behavior to .42 for HIV/AIDS-related behavior. PBC was additionally found to make a significant contribution to behavior above intention in approximately half of the applications, and the additional explained variance averaged 11.5%. It was concluded that the TPB is a useful framework for evaluating health-related behaviors, but results vary across health categories.

The results of the reviews of the TPB have revealed that across a variety of behaviors, attitude and PBC are the strongest correlates of intention, and intention is the strongest predictor of behavior. These findings support the application of the TPB for understanding health-related behaviors, including diet-related behavior.

Theory of Planned Behavior Studies of Parents' Influence on the Health Behavior of Children

Several studies have used the TPB to examine parents' decisions regarding their child's health (Avery, Duckett, Dodgeson, Savik, & Henly, 1998; Beale & Manstead, 1991; Khoury, Moazzem, Jarjoura, Carothers, & Hinton, 2005; Rempel, 2004; Richard, Dedobbeleer, Champagne, & Potvin, 1994; Saundere-Golson & Edwards, 2004; Wambach & Koehn, 2004). These investigations have included mothers' decisions about breastfeeding (Avery et al.; Koury et al.; Rempel; Saundere-Golson & Edwards; Wambach & Koehn), mothers' decisions to limit the sugar intake of their infants (Beale & Manstead), and parents' decisions about child restraint device use in automobiles (Richard et al.). Overall, the results of these studies are inconsistent. Two of these studies reported that attitude, PBC, and subjective norm were significant predictors

of intention (Avery et al.; Richard et al). For example, Richard and colleagues examined the correlates of parents' use of automobile, child restraint devices. Brief interviews were conducted with 442 parents of 3 to 5-year-old children that were intercepted while driving. Attitude, subjective norm, and PBC were all significant correlates of intention. PBC was the strongest predictor of intention ($\beta = .50, p < .05$), followed by attitude ($\beta = .35, p < .05$) and subjective norm ($\beta = .13, p < .05$).

Likewise, Avery et al., (1998) compared breastfeeding intentions with actual feeding duration (i.e., behavior) among 602 new mothers who decided to breastfeed. The TPB variables were collected via an interview during hospitalization, and they were reassessed at 1, 3, 6, 9, and 12 months postpartum. Together, attitude (i.e., towards breast-feeding and bottle-feeding), subjective norm, and PBC explained approximately 36% of the variance in intention. PBC was the best predictor of intention ($\beta = .29, p < .001$), followed by attitude towards breast-feeding ($\beta = .22, p < .001$), attitude towards bottle-feeding ($\beta = -.22, p < .001$), and subjective norm ($\beta = .09, p < .05$).

In contrast, Beale and Manstead (1991) and Rempel (2004) found only attitude and PBC to be significant predictors of intention. Beale and Manstead used the TPB to explain mothers' intentions to limit their infant's sugar intake for improved dental health. Two interviews that were related to dental health were conducted with 140 mothers of 5 to 7-month old babies. One group of 74 mothers received dental health education after the first interview, while another group of 66 mothers did not. Overall, attitude, subjective norm, and PBC explained 15.6% of the variance in intention at the first interview and 27.1% at the second interview. Furthermore, at both interviews, attitude ($\beta = .26, p < .01$ first interview; $\beta = .35, p < .001$ second interview) and PBC ($\beta = .22, p < .01$ first interview; $\beta = .27, p < .01$ second interview) were significant

predictors of intention; however, subjective norm was not ($\beta = .09, p > .05$ first interview; $\beta = .08, p > .05$ second interview).

Rempel (2004) analyzed long-term breastfeeding behavior among 80 mothers. Women were categorized into the following two samples: prenatal-full sample and 9-month breastfeeding sample. The TPB variables were assessed at both time intervals. Within the prenatal-full sample of mothers, attitude, subjective norm, and PBC accounted for 24% of the variance in intention, but only attitude ($\beta = .29, p < .001$) and PBC ($\beta = .26, p < .001$) made unique contributions.

In Rempel's (2004) sample of mothers breastfeeding at 9 months, attitude, subjective norm, and PBC explained 20% of the variance in intention, but PBC ($\beta = .40, p < .001$) was the only significant correlate. Similarly, Saundere-Goldson and Edwards (2004) assessed breastfeeding intentions among 95 African American women and found that PBC ($r = .32, p < .01$), subjective norm ($r = .24, p < .05$), age ($r = .26, p < .05$), and education ($r = .24, p < .05$) had significant associations with intention. However, PBC was the only TPB variable that was a significant predictor of intention and when combined with age, explained 17% of the variance in intention.

Little is known about the predictors of behavior in this area because several of the studies did not assess these relationships (Avery et al., 1998; Beale & Manstead, 1991; Rempel, 2004; Saunder-Goldson & Edwards, 2004). However, Khoury et al. (2005) measured the infant feeding method of 733 mothers. These researchers reported that attitude (i.e., knowledge of benefits) and subjective norm (i.e., health care system support, family support) were associated with breastfeeding, whereas attitude (i.e., embarrassment about breast-feeding) was associated with bottle-feeding. Richard et al. (1994) found that intention was a significant predictor of behavior ($\beta = .33, p < .05$), but PBC was not in his investigation of child restraint device usage.

Although there is preliminary evidence that the TPB is sufficient for predicting parent's intention about influencing their children's health across a variety of behaviors, little is known about the correlates of parents' actual behavior. In addition, no such TPB studies were located for dietary behaviors; therefore, research examining parental intentions and behaviors that influence children's health behavior is warranted as childhood obesity-related diseases continue to increase.

Limitations of the Theory of Planned Behavior

Despite the support of the TPB for predicting health behaviors, it is not without limitations. The main limitations of the TPB are: (a) the lack of scale correspondence, (b) the operationalization and measurement of PBC, and (c) the operationalization and measurement of subjective norm. Each of these limitations will be discussed further.

First, to increase the accuracy of the prediction of behavior, the TPB constructs must correspond according to the concepts of action, target, context, and time (Ajzen & Fishbien, 1980; Courneya, 1994; Courneya & McAuley, 1993). Action pertains to the behavior to be examined (e.g., exercise or diet); target refers to the purpose or reason for performing a behavior (e.g., to improve health); context is the location where the behavior will be executed (e.g., home or school); and time refers to when the behavior will be completed (e.g., morning, during the next week, over the next few months).

The lack of scale correspondence occurs when the measurements of intention and behavior differ in magnitudes, frequencies, or response formats (Courneya, 1994; Courneya & McAuley, 1993). Courneya and McAuley identified the following five types of scales that are commonly used to assess intention and behavior:

- Continuous-open ("I intend to engage in physical activity ___ times during the next month").

- Continuous-closed numerical (“I intend to engage in physical activity during the next month the following number of times”: 1[0-4], 2 [5-9], 3[10-14], 4[15-19], 5[20-24], 6[25-29], 7[30+]).
- Continuous-closed verbal (“I intend to engage in physical activity during the next month with the following regularity”: 1[not at all] to 7[everyday]).
- Dichotomous-yes/no (“I do ___ do not ___ intend to engage in physical activity during the next month”).
- Dichotomous-graded (“I intend to engage in physical activity during the next month”: 1[definitely] to 7[definitely not]).

The most common violation of scale correspondence occurs when a dichotomous-graded scale is used to measure intention and a continuous-open scale is used to determine behavior (Courneya, Courneya & McAuley). Courneya recommends the continuous-open or continuous-closed numerical scales for both intention and behavior to strengthen the intention-behavior association. It has been found that studies without scale correspondence violate the theoretical assumptions of the TPB and a lack of scale correspondence causes inconsistent predictions between the TPB constructs and behavior (Courneya & McAuley).

The operationalization and measurement of PBC is a second limitation of the TPB. PBC is inconsistently operationalized throughout the literature. For instance, studies have measured PBC as perceived barriers (Fylan, Grunfeld, Turvey, & Desallais, 2005), perceived control (Kerner & Kalinski, 2002), and perceived difficulty (Pessoa-Silva, Posfay-Barbe, Pfister, Touveneau, Perneger, Pittet, 2005). Ajzen (2002a) proposed that the operationalization and measurement of PBC should include self-efficacy and controllability. Self-efficacy is defined as the perceived ease or difficulty of performing a behavior, whereas controllability is the belief about the extent to which the performance of the behavior is up to the individual (Ajzen).

The operationalization and measurement of subjective norm is the third limitation. The usefulness of the subjective norm construct is questioned because of its weak relationship with intention in exercise and diet related research (Armitage & Conner, 2001). One possible explanation for this weak relationship is that social pressure may not be an important determinant for exercise and diet behavior as compared to other health behaviors such as contraceptive use (Culos-Reed, Gyurcsik, & Brawley, 2001). The weak association of subjective norm may also be secondary to measurement issues. A review by Armitage and Conner (2001) demonstrated that multiple-item measurements showed stronger associations than single-item measurements of subjective norm. This indicates that the prediction of intention from subjective norm may be inconsistent because of a measurement issue.

Purpose of the Study

The TPB has been used to study a number of health-related behaviors in a variety of populations. However, limited research has been undertaken to understand the social cognitive correlates of parents' intentions and behaviors that influence their children's healthy behavior, particularly diet behavior. Furthermore, minimal information has been gathered regarding the effectiveness of the BMI and health report card for influencing parents' promotion of their children's healthy behaviors. Therefore, the purpose of this study was to examine the social cognitive correlates of predicting parents' intention and behavior to provide recommended servings of vegetables following the receipt of their child's BMI report card. The specific objectives of this study were to: (a) describe the most common behavioral, normative, and control beliefs of parents serving vegetables to their children; (b) determine the social cognitive correlates of parents' intentions to serve vegetables to their children; and, (c) to determine the social cognitive correlates of parents' self-reported behavior (i.e., serving vegetables to their

children). It was hypothesized that attitude, subjective norm, and PBC would be positively associated with intention to serve at least four daily portions of vegetables with attitude and PBC having the strongest relationships with intention (Ajzen, 1991; Armitage & Conner, 2001; Godin & Kok, 1996; Notani, 1998). Additionally, it was hypothesized that intention and PBC would be positively associated with behavior, with intention having the strongest relationship with behavior followed by PBC (Armitage & Conner; Godin & Kok; Notani). Finally, no hypotheses were made regarding the beliefs, as these were elicited to gain a better understanding of the population and the TPB constructs (Ajzen, 2002b).

METHOD

Participants

A power analysis was conducted with power estimated at .80, a large effect size, and a significance of $p < .05$. It was determined that a minimum of 26 subjects was necessary to reject the null hypothesis if it was false. Participants were parents of 3rd, 4th, and 5th grade students attending a local, private school. Use of these participants for the study was reviewed and granted by the institutional review board (see Appendix A).

Measures

Body Mass Index (BMI). BMI is an anthropometric measurement of height and weight (kg/m^2) that is used for classification of body fatness in adults (Keys, Fidanza, Karvonen, Kimura, & Taylor, 1972). The Centers for Disease Control recommends using BMI-for-age charts for children aged 2-20 as a screening tool to assess risk of overweight and obesity in children and adolescents. Because children's growth patterns affect BMI, the BMI-for-age charts are both gender and age specific (Hammer, Kraemer, Wilson, Ritter, & Dornbusch, 1991; Pietrobelli, Faith, Allison, Gallagher, Chiumello, & Heymsfield, 1998). The BMI-for-age charts reflect the nutritional status of children in the form of percentages. Children and adolescents at or above the 95th percentile are classified as overweight, those between the 85th and 95th percentile are classified as at risk of overweight (Himes & Dietz, 1994), and those below the 5th percentile are classified as underweight (World Health Organization, 1996). BMI is an indirect measure of adiposity. It is not intended for diagnostic use, but is useful as a screening tool because it corresponds with other measures of adiposity and it is correlated with health risks in adulthood (Freedman, Dietz, Srinivasan, & Berenson, 1999; Mei, Grummer-Strawn, Pietrobelli, Goulding, Goran, & Dietz, 2002; NHANES III). The primary limitation in the measurement of BMI

includes its low sensitivity to identify at risk for overweight and overweight children; however, it has high specificity (Bedogni, Lughetti, Ferrari, Malavolti, Poli, Bernasconi, et al., 2003). In the guidelines for preventing overweight in adolescents, Himes and Dietz (1994) stated that a high specificity minimizes those inaccurately considered overweight and that specificity was a more essential component than sensitivity.

A computer software tool (Tuuri, Solmon, Chen, Laird, Kosma, & Vuppala, 2005) was used to generate BMI reports (see Appendices B & C). The program computes the child's BMI-for-age percentage and displays the value in chart format. The BMI report is directed to parents and it provides a general explanation of BMI-for-age. Additionally, information to encourage healthy weight in children was provided, such as engaging in physical activity and serving proper amounts of fruits and vegetables. The student BMI Report has been found to be an appropriate tool for notifying parents of their child's weight status (Tuuri et al.).

Descriptive Measures

Demographics. Parents' name, age, gender, height, weight, marital status, education, family income, race and ethnicity, employment status, and the child's name and birth date were collected (see Appendix D). In addition, the student sample was assessed for age and gender (see Appendix F).

Nutrition Beliefs

Following the procedures of Ajzen and Fishbein (1980) and the scale development recommendations of Ajzen (2002a), the participants recorded their beliefs about nutrition by responding to open-ended questions. Four double-spaced lines followed each statement for participants to record their responses. Participants were encouraged to report multiple beliefs. Behavioral beliefs were measured by the following two open-ended questions: (a) What do you

believe are the advantages of serving your child at least four portions of vegetables on a typical weekend day? and (b) What do you believe are the disadvantages of serving your child at least four portions of vegetables on a typical day? The following two open-ended questions were used to assess parents' normative beliefs of serving vegetables: (a) Are there any individuals or groups who would disapprove of you serving your child at least four portions of vegetables on a typical weekend day? and (b) Are there any individuals or groups who would approve of you serving your child at least four portions of vegetables on a typical weekend day? Control beliefs for serving vegetables to their children were measured with the following two open-ended questions: (a) What factors or circumstances would enable you to serve your child at least four portions of vegetables on a typical weekend day? and (b) What factors or circumstances would make it difficult or impossible for you to serve your child at least four portions of vegetables on a typical weekend day?

Social Cognitive Correlates of Nutrition

Direct measures of the TPB constructs were developed according to Ajzen's (2002a) recommendations for achieving correspondence between constructs on target, action, context, and time and previous research (Ajzen, 1991; Ajzen & Fishbein, 1980; Courneya, Blanchard, & Laing, 2001).

Attitude. To assess attitude the statement "serving my child at least four portions of vegetables on a typical weekend day is" was rated on 7-point Likert scales (1 to 7) with each of the statements attached to eight adjective pairs (Ajzen & Fishbein, 1980). Four pairs were used to measure affective attitude (i.e., boring-interesting, unpleasant-pleasant, unenjoyable-enjoyable, stressful-relaxing) and four pairs assessed instrumental attitude (i.e., useless-useful, harmful-beneficial, foolish-wise, bad-good). The scores of the eight items were averaged to produce a

composite attitude score, and a higher score represents a favorable attitude. Internal consistency (α) for the 8-item attitude scale was 0.85.

Subjective Norm. Subjective norm was assessed using the following three items on 7-point scales (1= strongly disagree, 7= strongly agree): (a) Most people who are important to me think I should serve my child at least four portions of vegetables on a typical weekend day, (b) Most people who are important to me support me serving my child at least four portions of vegetables on a typical weekend day, and, (c) Most people who are important to me approve of me serving my child at least four portions of vegetables on a typical weekend day (Courneya et al., 2001). The scores of the three items were averaged to produce a composite score for subjective norm and a higher score represents a stronger subjective norm. Internal consistency (α) for the 3-item subjective norm scale was 0.89.

Perceived Behavioral Control (PBC). PBC was measured with 7-point scales. The items used to assess PBC were: (a) If I wanted to, I could easily serve my child at least four portions of vegetables on a typical weekend day (1= strongly disagree, 7= strongly agree), (b) How much control do you have over serving your child at least four portions of vegetables on a typical weekend day? (1= very little control, 7= complete control), and (c) For me to serve my child at least four portions of vegetables on a typical weekend day is (1= extremely difficult, 7= extremely easy; Courneya et al., 2001). The results of the three items were averaged to produce a composite PBC score, and a higher score represents stronger perceptions of control. Internal consistency (α) for the 3-item PBC scale was 0.77.

Intention. A continuous-open scale was used to assess intention of parents to serve at least four servings of vegetables on a typical weekend day. The item stated: (a) "I intend to serve my child

_____ portions of vegetables on a typical weekend day” (Ajzen, 1991). One item to measure intention is consistent with the TPB (Ajzen, 1991).

Behavior. To measure behavior a continuous-open statement was used: “I serve my child _____ portions of vegetables on a typical weekend day.”

Procedure

Parents of 123 students in grades three, four, and five who attend a local private school were recruited to participate. Parents consented to the measurement of their children’s height and weight, and the completion of the demographics and TPB questions (see Appendices F & G). After the children’s height and weight data were gathered, BMI reports were generated via a computer software program. Consenting parents were issued a report of their child’s weight status via mail. The TPB questionnaire was sent with the BMI report. The instructions on the TPB questionnaire requested that the parent or guardian who is primarily responsible for the decisions regarding what food was served at mealtime in the home on a typical weekend day complete the questionnaire and that the responses reflect only their opinion and not the opinion of other parents or guardians. Parents were asked to return the completed surveys to the researchers through the mail. Methods used to increase response rate included reasonable questionnaire length, increasing trust of researchers showing university and elementary school sponsorship, stamped, preaddressed return envelopes, as well as assuring confidentiality. In addition, reminder phone calls were placed to parents who had not returned the questionnaire within two weeks (Ransdell, 1996).

Data Analyses

A five-step process, as recommended by Ajzen and Fishbein (1980), was used to assess the beliefs of the participants. First, the nutrition beliefs were organized into belief categories of

behavioral, normative, and control. Second, following the guidelines of Patton (1990), the beliefs were placed into higher-order themes. Third, using frequency counts, the most frequent beliefs that were identified by at least 10% of the sample were the most accessible beliefs (Ajzen, 1991). Fourth, the beliefs were analyzed to indicate consistency in classification by two raters (i.e., one expert on the TPB and one Kinesiology graduate student). Lastly, to rank-order the beliefs, they were placed from the most to the least accessible.

Cronbach's alpha was calculated to examine the reliability of the scales and descriptive statistics were used to analyze the sample characteristics. Pearson correlation was used to establish the associations between the TPB constructs. Chi-square analysis was employed to analyze the difference in BMI classifications of the children whose parents completed the survey to the children whose parents did not complete the survey. Alpha was set a priori at $p < .05$ for all statistical analyses (see Appendix H).

RESULTS

Descriptive Statistics for Student Sample

One hundred and twenty-three students in grades three, four, and five at a local private school were available for measurement of height and weight; however, only the parents of 74 students consented to their child's participation in the study (60.2% response rate). Two students were absent from class on the test date, thus the final sample of students measured for height and weight included 72 students between the ages of 7 and 11 (M age = 8.1 years, SD = 0.9; 54% female). The mean BMI of the students was 17.7 (SD = 2.9; Range = 13.1-26.1). The children's BMI-for-age percentiles revealed 2.7% were underweight, 69.3% were of normal weight, 17.3 % were at risk for being overweight, and 10.7 % were overweight.

Descriptive Statistics for Parent Sample

BMI reports and questionnaires were mailed to 72 parents and 46 questionnaires were returned within 2 weeks. After the initial return period, a minimum of three attempts were made to contact the participants. Phone call reminders were attempted for 26 parents to increase the response rate. As a result of the phone call reminders, three BMI reports and surveys were resent because parents reported forgetting to complete and mail the survey. In response to the phone call reminders, four additional questionnaires were returned. Therefore, 50 questionnaires were returned that resulted in a good response rate (69.4%). However, two of the 50 participants that completed and returned the survey were duplicates in that one parent was surveyed for two children. In these instances, only one survey was used. The participant's surveys were compared to each other and for different responses the more conservative response was chosen. Another parent also had two children who were measured, but initially only sent one questionnaire. Thus,

the final sample of completed parental surveys was 48 and these surveys were sent in response to BMI measurements of 51 children.

The 48 parents who completed and returned the survey were between the ages of 29 and 51 (M age= 39.6 years, SD = 4.8). Most of the respondents were female (95.8%) and they identified themselves as the mother of the child that was measured for height and weight (93.8%). Most of the participants were married (89.6%), were White European American (100%), completed a university or college degree (54.2%), and reported an estimated annual family income of greater than \$100,000 (71.1%). The average BMI of the parents was 24.2 (SD = 4.2). The student sample of 51 students whose parents submitted a survey, were between the ages of 7 and 11 years (M = 8.9 years, SD = 0.9, 52.9% female). Their mean BMI was 17.7 (SD = 2.8; Range = 13.5 – 26.0). The children's BMI-for-age percentiles revealed that 3.9% of the children were classified as underweight, 68.6% were classified as normal weight, 11.8% were classified as at risk for overweight, and 15.7% were classified as overweight.

To have sufficient numbers per group, children whose BMI was classified as underweight and healthy weight were collapsed into one group and those whose BMI was classified as at risk of overweight and overweight were collapsed into a second group for the Chi-square analysis. Results indicate that there were no group differences between the frequency of children in the underweight/healthy classification and the at risk of overweight/overweight classifications for parents who completed and did not complete the survey ($p = .923$; see Table 1). A detailed list of descriptive characteristics of both the student and parent samples can be found in Table 1 and 2, respectively.

Table 1 Frequencies of Children's Body Mass Index Classifications by Group

	National Average	Total ($N = 72$)	Survey ($n = 51$)	No Survey ($n = 21$)
Underweight & Healthy Weight	66.4	72.2	72.5	71.4
At Risk of Overweight & Overweight	33.6	27.8	27.5	28.6

Table 2 Frequencies of Parent Characteristics

Characteristic	n	%
Gender		
Male	2	4.2
Female	46	95.8
Relation to Child		
Mother	45	93.8
Father	2	4.2
Stepmother	1	2.1
Marital Status		
Married	43	89.6
Separated	1	2.1
Divorced	3	6.3
Living with partner	1	2.1
Educational Background		
Completed high school	1	2.1

Table 2 (continued).

Characteristic	n	%
Post high school business or trade school	1	2.1
Some college/No degree	6	12.5
Completed college	26	54.2
Some graduate school/No degree	1	2.1
Completed graduate school	13	27.1
Income		
\$20,001-40,000	1	2.2
\$40,001-60,000	3	6.7
\$60,001-80,000	2	4.4
\$80,001-100,000	7	15.6
\$100,000 and above	32	71.1
Did not report	3	6.3
Employment		
Part-time	5	10.6
Full-time	20	42.6
Homemaker	21	44.7
Other	1	2.1
Did not report	1	2.1

Most Common Nutrition Beliefs

The most accessible behavioral advantages of parents serving their child at least four portions of vegetables were: (a) contributes to overall health, (b) provides a healthy diet, (c) provides nutrition, (d) encourages good eating habits, and (e) decreases junk food intake. The most accessible behavioral disadvantages of parents serving their child at least four portions of vegetables were: (a) children do not like vegetables; (b) preparation, planning, and cooking; and (c) lack of time, too busy, and eating out.

The two most accessible individuals or groups that approve of parents serving their child at least four portions of vegetables included: (a) family and (b) health associations and health professionals. Children were identified to be the most accessible individuals or groups who would disapprove of parents serving their child at least four portions of vegetables.

The most accessible factors that enable parents to serve their child at least four portions of vegetables included: (a) eating at home and not eating out, (b) more time and not as busy, (c) if child would eat vegetables and if child would eat more variety, and (d) availability of vegetables. The most accessible obstructing factors that make it difficult or impossible for parents to serve their child at least four vegetables were: (a) too busy and lack of time, (b) child and family being away from home, (c) child will not eat vegetables, and (d) poor planning.

Table 3 Type, Number (N), and Percent (%) of Beliefs

Higher Order Theme	Raw Data Theme(s)	n	%
Behavioral Beliefs (Advantages)			
Contributes to overall health	Stays healthy, healthy organs, better health, healthy body, healthy mind	22	46.8

Table 3 (continued).

Higher Order Theme	Raw Data Theme(s)	n	%
Provides good nutrition	Better nutritional balance, provides variety, improved nutritional intake	17	36.2
Provides nutrients	Vitamins intake, provides source of vitamins and minerals	15	31.9
Encourages good eating habits	Good eating habits formed early, create lifestyle of good choices	11	23.4
Decreases junk food intake	Will take the place of snack food, less processed snacks, fill up on good foods so eat less junk	7	14.9
Assists with weight management	Weight control, leaner bodies	3	6.4
Helps prevent disease	Lower cancer risk, decrease risk of illness and disease	3	6.4
Increases energy	Energy on daily basis, stays active with plenty of energy	2	4.3
Provides Satiety	Gets fuller fast, will feel fuller faster	2	4.3
Behavioral Beliefs (Disadvantages)			
Children do not like vegetables	He does not like them, my child does not want to eat them	11	23.4

Table 3 (continued).

Higher Order Theme	Raw Data Theme(s)	n	%
Preparation, planning, and cooking	More work, inconvenient, planning is difficult, takes more time to plan	9	19.4
Lack of time, too busy, eating out	Time, not always home for meals, weekends are busy not a lot of time for cooking	8	17.0
Normative Beliefs (Approve)			
Family	Family, father, all family, my mother, my husband, extended family	24	54.5
Health associations and health professionals	Doctors, dietitians, AHA, American Academy of Pediatrics	5	11.4
Everyone in general/All	All individuals and groups, all, every group	4	9.1
Friends	Friends, all friends	3	6.8
Teachers	Teachers, school educators	2	4.5
Other parents	All moms, other parents	2	4.5
Normative Beliefs (Disapprove)			
Children	Most children, kids, my children	8	17.0

Table 3 (continued).

Higher Order Theme	Raw Data Theme(s)	n	%
Control Beliefs (Enabling Factors)			
Eating out/not eating at home	Eating at home, cooking at home, eating at home rather than eating out	18	40.0
Not as busy	More time, more time to prepare, not being overscheduled,	16	35.6
Better planning/preparation	Better advanced planning on my part, plan ahead when grocery shopping	14	31.1
If child would eat vegetables/more variety	If he would eat them, openness to try new food, if she liked more variety	8	17.8
Availability of vegetables	Have them available, having them on hand that he will eat	7	15.6
Control Beliefs (Obstructing Factors)			
Too busy/Lack of time	Busy schedule, lack of time, having to eat quickly	23	50.0
Child/Family away from home	Being away from home, traveling	17	37.0
Child won't eat vegetables	He won't eat them, picky eating habits	9	19.6
Poor Planning	Failure to plan ahead, poor planning	6	13.0

Note. Percentages may not add up to 100% because participants reported multiple beliefs.

Social Cognitive Correlates of Nutrition

Four participants were eliminated from the analyses because they were missing at least 10% of the TPB data (George & Mallery, 2003), therefore, the analyses of the social cognitive correlates were conducted with 44 participants. The participants reported favorable attitudes and subjective norms, and moderate PBC towards serving at least four portions of vegetables to their child on a typical weekend day. Parents reported that they intended to serve their child an average of 2.9 (SD = 1.1) vegetables on a typical weekend day and that they do serve their child an average of 2.1 portions of vegetables on a typical weekend day (see Table 4).

Table 4 Mean (M), Standard Deviation (SD), Skewness, and Kurtosis for TPB constructs and Parents' Age and BMI

	<u>n</u>	<u>M</u>	<u>SD</u>	Skewness	Kurtosis
Attitude	43	5.21	0.93	-0.21	-0.75
Subjective Norm	43	5.50	1.36	-0.67	-0.49
PBC	44	4.69	1.44	-0.50	-0.08
Intention	43	2.90	1.12	-0.39	-0.98
Behavior	44	2.13	1.28	2.20	9.25
Age	44	39.61	4.82	0.28	0.06
BMI	43	24.18	4.24	2.03	6.59

Pearson correlation was used to establish associations between the TPB constructs. Attitude ($r = .56, p < .01$), subjective norm ($r = .35, p < .05$), and PBC ($r = .52, p < .01$) were significantly associated with intention. In addition, intention ($r = .57, p < .01$) and PBC ($r = .53, p < .01$) were significantly correlated with behavior (see Table 5).

Table 5 Pearson Correlations for TPB constructs

	Subjective Norm	PBC	Intention	Behavior
Attitude	.61**	.78**	.56**	.51**
Subjective Norm	-	.47**	.35*	.27
PBC		-	.52**	.53**
Intention			-	.57**

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

DISCUSSION

The specific objectives of this study were to: (a) describe the most common behavioral, normative, and control beliefs of parents serving vegetables to their children; (b) determine the social cognitive correlates of parents' intention to serve vegetables to their children; and (c) determine the social cognitive correlates of parents' self-reported behavior (i.e., serving vegetables to their children). Consistent with the TPB, attitude, subjective norm, and PBC were significantly correlated with intention, and intention and PBC were significantly associated with behavior. In addition, parent's beliefs about serving vegetables to their children were identified, which could be targeted in interventions to promote this behavior.

The average BMI for the total student sample ($n = 72$) was 17.7 and the children's BMI-for-age percentile classifications revealed 2.7% were underweight, 69.3% were of normal weight, 17.3% were at risk for overweight, and 10.7% were overweight. The student sample achieved a healthier weight as compared to the national estimates for overweight and obesity among children and adolescents. Most recent data obtained from NHANES survey revealed approximately 17.1% of children and adolescents in the United States were classified as overweight (Ogden, Carroll, Curtin, McDowell, Tabak, & Flegal, 2006). Among the student sample whose parents submitted a survey ($n = 51$), 72.5% of the students were classified as underweight or normal weight and 27.5% were classified as at risk for overweight or overweight. The total student sample ($n = 72$) had 72.2% of the students classified as underweight or normal weight and 27.8% classified as at risk for overweight or overweight revealing no significant differences between the two student samples with equal representation of classifications. Additionally, there were no significant differences found between responders and non-responding participants.

The study sample included parents (M parent age = 39.6 years, SD = 4.8) of children in grades 3, 4, and 5 (M child age = 8.1 years, SD = 0.9). Most studies examining parents' intentions and behaviors regarding the health of their child involved parents of infants or those whose child is unborn (Avery et al., 1998; Beale & Manstead, 1991; Koury et al., 2005; Rempel, 2004; Saundere-Golson & Edwards, 2004; Wambach & Koehn, 2004) with the exception of Richard et al. (1994), who analyzed parents' intentions and behavior regarding child restraint device use for their toddlers. Consistent with other studies, the majority of the participants surveyed were women (95.8%), displayed a wide range of ages (29-51 years), and maintained varied work status (10.6% part-time, 42.6% full-time, 44.7% homemaker; Avery et al; Koury et al.; Rempel et al; Saundere-Golson & Edwards). However, most of the participants in similar studies were from multiple ethnic backgrounds, had achieved lower levels of education, and reported lower levels of income; whereas participants in the present study were White-European American, non-Hispanic (100%), most had at least a college education (83.4%), and most reported an annual family income of at least \$100,000 (71.1%). Therefore, the generalizability of these findings is limited to similar populations.

The first objective of this study was to describe the most common behavioral, normative, and control beliefs of parents serving vegetables to their children to better understand the population and the TPB constructs. Unfortunately, there are no other elicitation studies that can be used to compare these results to determine if these represent unique beliefs. Parents of the present study identified the most common behavioral advantages (i.e., behavioral beliefs) of serving vegetables to their children as: (a) contributes to overall health, (b) provides a healthy diet, and (c) provides nutrients. The most common behavioral disadvantages reported by parents were (a) increased planning and cooking, (b) child does not like vegetables, and (c) eating out and busy schedules.

Based on these findings, future prevention programs should aim to educate parents about the health benefits of serving vegetables and provide quick, time efficient methods of preparing and serving vegetables that children enjoy. This strategy may enhance parents' attitude towards this behavior, and subsequently increase their intention to serve their children vegetables, which could ultimately change their behavior. In addition, it may be beneficial to emphasize to parents that there are not many disadvantages of serving vegetables to their children.

According to the reported normative beliefs, family, health professionals, and health associations were listed as individuals and groups that approved of parents serving the recommended portions of vegetables to their children. In addition, children were reported as the most common individual or group that discouraged parents from serving vegetables. Future prevention programs should consider utilizing family, health professionals, and health associations to increase social influence among parents to serve vegetables to their children. Furthermore, creative ways to serve vegetables that are pleasing to children should also be a priority for future programs aiming to increase the amount of vegetables that parents serve to their children. Based on the hypotheses of the TPB, these strategies may strengthen the parents' subjective norm, which would increase their intention to serve their children the recommended portions of vegetables, and eventually, influence their behavior.

Parents listed eating at home and not eating out as much, not being as busy, and better planning and preparation as the most common factors that would enable them to serve vegetables to their children. Parents identified being too busy and lack of time, the family or child being away from home, and children not eating vegetables as the most common factors that prevent them from serving vegetables to their children. Based on this information, families may benefit from programs that instruct parents on easy ways to serve vegetables in a time efficient manner.

Additional efforts should be made to help parents find convenient ways to serve vegetables to their children when away from home. These strategies may enhance parents' perceptions of control over the behavior, thus increasing their intention to serve the vegetables, and making it more likely that they actually will serve their children vegetables.

Regarding the second study objective, the results revealed that attitude was the strongest correlate of intention ($r = .56, p < .01$), followed by PBC ($r = .52, p < .01$), and subjective norm ($r = .35, p < .05$). These findings support the study hypotheses and they are also consistent with the hypotheses of the TPB (Ajzen, 1985, 1991). Furthermore, they are consistent with other TPB studies of parents' influence on health behavior of children and several meta-analyses (Armitage & Conner, 2001; Avery et al., 1998; Beale & Manstead, 1991; Notani, 1998; Rempel, 2004; Richard et al., 1994). For instance, Beale and Manstead found attitude to be the strongest predictor of parents' intention to limit the sugar intake of their infants followed by PBC (subjective norm was not measured). Similarly, Rempel found that attitude was a predictor of breastfeeding intention followed by PBC and subjective norm. Finally, in studies examining breastfeeding and child restraint device use, Avery et al. and Richard et al., respectively, found that all three TPB constructs were significant predictors of intention, but that PBC was the strongest, followed by attitude, and then subjective norm. Therefore, the results of this study indicate that educating or counseling parents about the benefits of serving vegetables to their children, identifying barriers to serving vegetables to their children and developing strategies to address the barriers, and eliciting social influence from important others may be important areas to target for future prevention programs.

As to the third objective of the study, the results indicate that intention was the strongest correlate of behavior ($r = .57, p < .01$) followed by PBC ($r = .53, p < .01$). These findings support

the study hypotheses and they are consistent with the hypotheses of the TPB (Ajzen, 1985, 1991). In addition, these findings are consistent with statistical reviews of the TPB (Armitage & Conner, 2001; Notani, 1998, Sutton, 1998). However, these results are not consistent with TPB studies of parents' influence of the health behavior of their children (Khoury et al., 2005; Richard et al., 1994). Richard et al. found that intention was a significant predictor of behavior (i.e., child restraint device use), but PBC was not. Khoury et al. analyzed mothers' feeding methods for infants, and they found that attitude and subjective norm were correlated with breast-feeding and attitude was associated with bottle-feeding. Although the results of this study are inconsistent with similar TPB studies, this may simply reflect the variety of behaviors that were investigated. Therefore, the findings from this study suggest that intention and perceptions of control have important implications for parents serving vegetables to their children. Thus, strategies to enhance motivation, as well as to overcome barriers, will possibly enable parents to serve their children vegetables.

Limitations

Although support for the hypotheses was achieved, some limitations should be taken into consideration when interpreting the findings of this study. One limitation was the homogeneity of the sample. Most participants were Caucasian, well educated, and reported annual family incomes greater than \$100,000, thus limiting generalizations of these findings to those populations of different racial backgrounds, less educated, or less affluent. The use of a convenience sample is the primary reason for the demographics of the sample. Therefore, research is warranted on the social cognitive correlates of diet-related behavior for parents of children who are of different races, who are less educated, and who are less affluent because they have a higher risk for obesity.

In addition, the number of participants and motivation of the participants were also limitations of the study. The results of the study were only able to show associations between the TPB constructs as opposed to multiple regressions because of a small sample size (i.e. insufficient power). Additionally, consent forms were sent home to 123 parents with only 74 agreeing to participate (60.2% participation rate). It is possible that increased motivation existed among the parents that agreed to participate and that these individuals also had more favorable attitudes toward serving vegetables to their child, had stronger perceptions of control, and stronger subjective norm than a randomly selected sample.

The subjective nature of the survey was a limitation and this could have produced inaccurate estimations of vegetables served because of social desirability bias and underestimating portion sizes. Although vegetable serving sizes were provided, individuals often have difficulty accurately approximating food portions (Blake, Guthrie, & Smiciklas-Wright, 1989). Furthermore, participants were surveyed regarding the amount of vegetables they served during the weekend and these estimations may not be applicable to the rest of the week. Because the weekend does not represent a typical day, it may therefore not represent typical vegetable intake.

A final limitation of this study is that the TPB constructs were not assessed prior to issuing the BMI reports. Because the TPB constructs were assessed only after the reports were issued, the influence of the BMI report on parents' beliefs, attitudes, subjective norms, perceptions of control, intentions, and behavior cannot be determined. Therefore, no conclusions can be drawn regarding the efficacy of the BMI report card to encourage parents to improve the health of their child including increasing vegetable consumption.

Conclusion

In summary, the TPB was a useful framework for the purpose of understanding the social cognitive correlates of parents' intention and behavior to serve vegetables to their children. The findings of this study support the use of the TPB to examine parents' influence on the health behavior of children. With the increasing rate of childhood obesity, it may be important for prevention programs to incorporate strategies that target parents' beliefs about serving vegetables, which according to the TPB, will influence their attitude, subjective norm, and PBC, in turn, increasing intentions to serve vegetables and the likelihood that they will actually serve the recommended portions of vegetables. Overall, the TPB provided useful information to help understand parents' decisions to serve vegetables to their children; however, more research is required to determine if the issue of the BMI report card can influence parents' beliefs about healthy behaviors and specifically, serving recommended portions of vegetables.

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APPENDIX A: INSTITUTIONAL REVIEW BOARD APPROVAL



Institutional Review Board
203 B-1 David Boyd Hall
Louisiana State University and A&M College
Baton Rouge LA 70803

(225) 578-6692
FAX: 578-6792
irb@lsu.edu

INSTITUTIONAL REVIEW BOARD

ACTION ON PROTOCOL APPROVAL REQUEST

TO: Rebecca Ellis Gardner
Department of Kinesiology
FROM: Robert C. Mathews
Chair, Institutional Review Board for Research with Human Subjects
DATE: November 9, 2005
RE: IRBF 2579
TITLE: "The Theory of Planned Behavior: Understanding Parents' Decisions About Serving Fruits and Vegetables to Their Children"

New Protocol/Modification/Continuation: X

Review type: Full ___ Expedited X Review date: 11/09/2005

Risk Factor: Minimal X Uncertain ___ Greater Than Minimal ___

Approved X Disapproved ___

Approval Date: 11/10/2005 Approval Expiration Date: 11/10/2006

Re-review frequency: (annual unless otherwise stated): ___

Number of subjects approved: 120

By: Robert C. Mathews, Chairman [Signature]

PRINCIPAL INVESTIGATOR: PLEASE READ THE FOLLOWING -- Continuing approval is CONDITIONAL on:

- 1. Adherence to the approved protocol, familiarity with, and adherence to the ethical standards of the Belmont Report, and LSU's Assurance of Compliance with DHHS regulations for the protection of human subjects.*
2. Prior approval of a change in protocol, including revision of the consent documents or an increase in the number of subjects over that approved.
3. Obtaining renewed approval (or submittal of a termination report), prior to the approval expiration date, upon request by the IRB office (irrespective of when the project actually begins); notification of project termination.
4. Retention of documentation of informed consent and study records for at least 3 years after the study ends.
5. Continuing attention to the physical and psychological well-being and informed consent of the individual participants including notification of new information that might affect consent.
6. A prompt report to the IRB of any adverse event affecting a participant potentially arising from the study.
7. Notification of the IRB of a serious compliance failure.
8. SPECIAL NOTE:

*All investigators and support staff have access to copies of the Belmont Report, LSU's Assurance with DHHS, DHHS (45 CFR 46) and FDA regulations governing use of human subjects, and other relevant documents in print in this office or on our World Wide Web site at http://www.fda.lsu.edu/irb/irb

APPENDIX B: BMI REPORT

BMI Report

Wednesday, May 25, 2005

Student's Name : test test

Student ID : 999015054

Sex F

Birth Date 07/21/1998

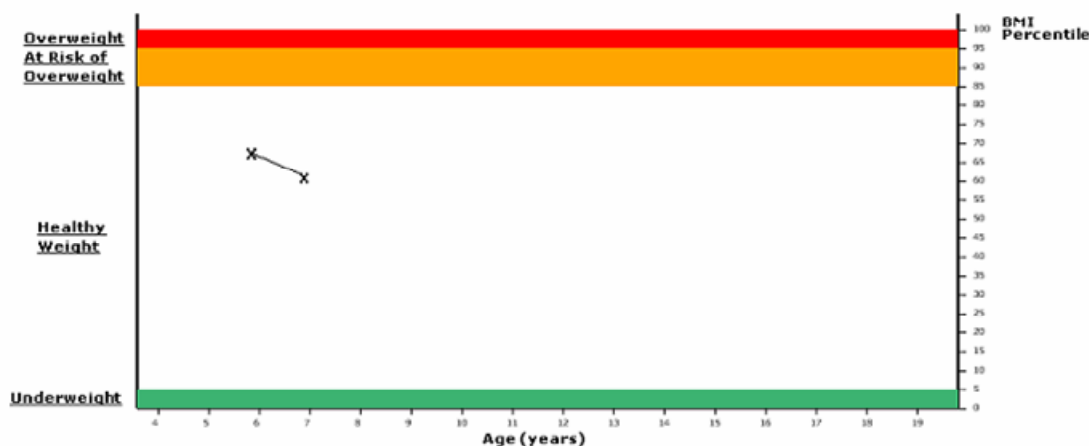
Age 6 years and 10 months

Height 3 feet 11 inches

Weight 50 lbs.

BMI-for-Age Percentile 61.77

BMI Percentile vs Age Chart:



Dear Parent,

This picture shows your child's Body Mass Index (BMI)-for-age percentile and risk for being overweight or underweight. It is calculated from his/her height and weight. A bigger number means that your child weighs more than other children the same age and a smaller number means the opposite.

The American Academy of Pediatrics says that the BMI-for-age percentile is a good way to look at your child's health. A number between the 85th and 95th percentile means that your child is at risk for becoming overweight. A number above the 95th percentile means that your child is overweight. Doctors worry because overweight children are more likely to get sick from type 2 diabetes and heart disease. Overweight children often become overweight adults.

Please talk to your doctor about this report. Whatever his/her BMI-for-age number, we want you and your family to be fit and healthy. We hope you:

Set a good example of healthy behaviors.

Limit family TV and video game time.

Help everyone in your family be physically active every day.

Eat right by serving lots of fruits and vegetables, healthy snacks, low-fat dairy foods, and whole grain breads and cereals.

For more information about healthy weights for children contact the American Academy of Pediatrics at:

<http://www.aap.org> or the National Center for Chronic Disease Prevention at:

<http://www.cdc.gov/nccdphp/dnpa/bmi/bmi-for-age.htm>.

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APPENDIX C: COPYRIGHT PERMISSION

Hey Dr Tuuri! I've learned from the graduate school that I need permission to use your BMI report in my paper. I think I need some documentation of consent from you regarding this document. Please let me know if you think you might be able to help with this. Thanks so much. Alissa

TO: Alissa Villarrubia
FROM: Georgianna Tuuri, PhD, RD
Assistant Professor
DATE: 7/10/06
RE: Student BMI Health Report©

Please note that Alissa Villarrubia had my permission to use the Student BMI Health Report© software tool (Student BMI Health Report, Louisiana State University, Baton Rouge, LA) as part of her graduate thesis. She had permission to enter student heights and weights and to generate parent BMI-for-age percentile reports for students and parents enrolled in her research study.

APPENDIX D: SURVEY

Instructions: The parent or guardian completing this questionnaire should be the parent or guardian who is primarily responsible for the decisions regarding what food is served at mealtime in the home **ON A TYPICAL WEEKEND DAY** to the child whose BMI report you received. Please make sure that the responses reflect your opinion **ONLY**, and not the opinions of other parents or guardians.

Part A. Please write or circle the most appropriate response.

1. Your Name _____
2. Your Child's Name _____
3. Your Child's Birthday _____
4. Your **RELATIONSHIP** to the child: Please circle only one answer or write in the correct response.
 1. MOTHER
 2. FATHER
 3. STEPMOTHER
 4. STEPFATHER
 5. OTHER (PLEASE INDICATE) _____
5. Your **SEX**: Please circle only one answer.
 1. FEMALE
 2. MALE
6. Your **AGE** _____
7. Your **HEIGHT** _____ ft _____ in
8. Your current **WEIGHT** _____ lbs
9. Your **CURRENT MARITAL STATUS**: Please circle only one answer.
 1. SINGLE, NEVER MARRIED
 2. MARRIED
 3. SEPARATED
 4. DIVORCED
 5. WIDOWED
 6. LIVING WITH PARTNER
10. Your **HIGHEST LEVEL OF EDUCATION**: Please circle only one answer.
 1. COMPLETED SOME HIGH SCHOOL, BUT NO DEGREE
 2. COMPLETED HIGH SCHOOL OR EQUIVALENT (GED)
 3. POST HIGH SCHOOL, BUSINESS OR TRADE SCHOOL
 4. COMPLETED SOME UNIVERSITY/COLLEGE, BUT NO DEGREE
 5. COMPLETED UNIVERSITY/COLLEGE

6. SOME GRADUATE/PROFESSIONAL SCHOOL, BUT NO DEGREE

7. COMPLETED GRADUATE/PROFESSIONAL SCHOOL

11. **ESTIMATE YOUR ANNUAL FAMILY INCOME:** Please circle only one answer.

1. LESS THAN \$20,000

2. \$20,001-\$40,000

3. \$40,001-\$60,000

4. \$60,001-\$80,000

5. \$80,001-\$100,000

6. \$100,001 AND ABOVE

12. Your **RACIAL/ETHNIC BACKGROUND:** Please circle only one answer or write in the correct response.

1. AMERICAN INDIAN OR ALASKAN NATIVE

2. ASIAN OR ASIAN AMERICAN

3. BLACK, AFRICAN AMERICAN, NONHISPANIC

4. HISPANIC OR LATINO AMERICAN

5. MIDDLE EASTERN OR MIDDLE EASTERN AMERICAN

6. PACIFIC ISLANDER

7. WHITE, EUROPEAN AMERICAN, NONHISPANIC

8. OTHER (SPECIFY) _____

13. **CURRENT EMPLOYMENT STATUS:** Please circle only one answer or write in the correct response.

1. UNEMPLOYED

2. PART-TIME

3. FULL-TIME

4. RETIRED

5. HOMEMAKER

6. OTHER (PLEASE INDICATE) _____

Part B. Instructions: The following questions relate to your beliefs about **SERVING YOUR CHILD AT LEAST 4 PORTIONS OF VEGETABLES ON A TYPICAL WEEKEND DAY**

as defined below. List as many answers as you can in the spaces provided below.

******PORTION SIZES******

1 portion of vegetable = 1 cup raw leafy vegetable, ½ cup cooked vegetable, 6 oz vegetable juice

1. What do you believe are the **advantages** of serving your child at least 4 portions of vegetables on a typical weekend day?

2. What do you believe are the **disadvantages** of serving your child at least 4 portions of vegetables on a typical weekend day?

3. What factors or circumstances would **enable** you to serve your child at least 4 portions of vegetables on a typical weekend day?

4. What factors or circumstances would make it **difficult or impossible** for you to serve your child at least 4 portions of vegetables on a typical weekend day?

5. Are there any **individuals or groups** who would **approve** of you serving your child at least 4 portions of vegetables on a typical weekend day?

6. Are there any **individuals or groups** who would **disapprove** of you serving your child at least 4 portions of vegetables on a typical weekend day?

Part C Instructions. The following questions pertain to you **SERVING** your child at least 4 portions of vegetables on a typical weekend day. Choose your answer by circling the number that most appropriately answers the statement for you.

1. If I wanted to, I could easily serve my child 4 portions of vegetables on a typical weekend day.	Strongly Disagree 1	2	3	4	5	6	Strongly Agree 7
2. Most people who are important to me think I should serve my child 4 portions of vegetables on a typical weekend day.	Strongly Disagree 1	2	3	4	5	6	Strongly Agree 7
3. Serving my child 4 portions of vegetables on a typical weekend day is:	Extremely Useless 1	2	3	4	5	6	Extremely Useful 7
4. Serving my child 4 portions of vegetables on a typical weekend day is:	Extremely Boring 1	2	3	4	5	6	Extremely Interesting 7
5. How much control do you have over serving your child 4 portions of vegetables on a typical weekend day?	Very Little Control 1	2	3	4	5	6	Complete Control 7
6. Most people who are important to me approve of me serving my child 4 portions of vegetables on a typical weekend day.	Strongly Agree 1	2	3	4	5	6	Strongly Disagree 7
7. Serving my child 4 portions of vegetables on a typical weekend day is:	Extremely Harmful 1	2	3	4	5	6	Extremely Beneficial 7
8. Serving my child 4 portions of vegetables on a typical weekend day is:	Extremely Unpleasant 1	2	3	4	5	6	Extremely Pleasant 7
9. For me to serve my child 4 portions of vegetables on a typical weekend day is:	Extremely Difficult 1	2	3	4	5	6	Extremely Easy 7
10. Most people who are important to me support me serving my child 4 portions of vegetables on a typical weekend day.	Strongly Disagree 1	2	3	4	5	6	Strongly Agree 7

11. Serving my child 4 portions of vegetables on a typical weekend day is:	Extremely Foolish 1 2 3 4 5	Extremely Wise 6 7
12. Serving my child 4 portions of vegetables on a typical weekend day is:	Extremely Unenjoyable 1 2 3 4 5	Extremely Enjoyable 6 7
Please insert a number in the blank. 13. I intend to serve my child _____ portions of vegetables on a typical weekend day.		
14. Serving my child 4 portions of vegetables on a typical weekend day is:	Extremely Bad 1 2 3 4 5	Extremely Good 6 7
15. Serving my child 4 portions of vegetables on a typical weekend day is:	Extremely Stressful 1 2 3 4 5	Extremely Relaxing 6 7
Please insert a number in the blank. 16. I serve my child _____ portions of vegetables on a typical weekend day.		

THANK YOU FOR ANSWERING OUR QUESTIONS.

APPENDIX E: CHILD ASSENT FORM

Page 1 of 1

CHILD ASSENT FORM

Title of Project: The Theory of Planned Behavior: Understanding Parents' Decisions About Increasing Physical Activity and Serving Fruits and Vegetables to their Children.

I, _____, agree to be in a study that measures my height and weight. I know that I do not have to agree to have my height and weight measured if I do not want to. I know I can decide to stop being in the study at any time without getting in trouble or it influencing my grade in this class.

Student's Signature _____ Date _____

Student's Grade _____ Student's Gender _____

Student's Birth Date _____

Parents' Names _____

Witness * _____ Date _____

*Witness must be present for the assent process, not just the signature by the minor.

APPENDIX F: LETTERS TO PARENTS

Louisiana State University
112 Long Fieldhouse
Baton Rouge, LA 70803

Tel: (225) 578-5954
Fax: (225) 578-3680
E-mail: rgardner@lsu.edu

Rebecca Ellis Gardner
Assistant Professor
Department of Kinesiology



Dear Parent or Guardian:

Your child's physical education teacher has agreed to assist us in a project that will help us learn more about how students and parents feel about fruits and vegetables and health behaviors. This project will take place during your child's PE classes during December 1st –9th.

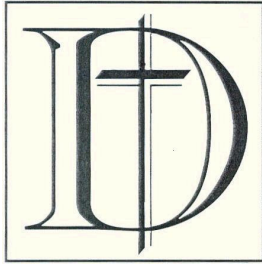
The research team includes myself and my graduate student, Alissa Villarrubia, from the Department of Kinesiology at LSU, as well as several Kinesiology students. This study has been approved by the Institutional Review Board (IRB) at LSU.

Attached you will find a copy of a parental consent form, which explains the study's procedures and the benefits and risks associated with participation. The consent form should be for you to sign and for your child to return to Mrs. Odendahl on Wednesday, December 1st. A child without a consent form will not participate in the project.

We truly appreciate your cooperation and willingness to participate in LSU research.

Sincerely,

Rebecca Ellis Gardner, Ph.D.



Dear Parent or Guardian:

You agreed to assist us in a project that will help us learn more about how parents feel about their child's vegetable consumption.

Enclosed you will find a report of your child's weight status and a survey. We ask that you read the report first and then complete the survey.

Please place the survey into the stamped envelope included and mail by December 20th.

We truly appreciate your cooperation and willingness to participate in LSU research.

Sincerely,

Deedra LaPlace

Gina Odendahl

Rebecca Ellis Gardner, Ph.D.

Alissa Villarrubia

APPENDIX G: PARENT CONSENT FORM

Page 1 of 2

PARENT/GUARDIAN INFORMED CONSENT FORM

Title of Project: The Theory of Planned Behavior: Understanding Parents' Decisions About Increasing Physical Activity and Serving Fruits and Vegetables to their Children

Dear Parent/Guardian,

We would like for you and your child to participate in a study. The purpose of this study is to look at your feelings about your child's weight status.

Procedures: You will be asked to complete a questionnaire and your child will be asked to consent to measurement of height and weight. These measurements will be obtained during one or two health and gym classes. Your child's health and/or gym teacher will be in the room during this time. These teachers will never see your child's measurements. Your child's height and weight will be private. Only the research team, you, and the principal will see your child's measurements. Both a report of your child's weight status and a questionnaire will be sent home with your child in a sealed envelope. You will be asked to review the report of your child's weight status and then complete the questionnaire. Only the questionnaire should be returned to school with your child and given to his or her PE/health teacher. It is okay if you or your child does not want to be in this study. On the day of measuring, their teacher will give them an alternate assignment to work on while the other students complete the measurements. Your child's grade in health and gym will not be affected by their participation.

Benefits: Both you and your child may learn more about his or her health by consenting to this research study.

Discomforts and risks: There are no risks in participating in this research beyond those experienced in everyday life. It is possible some students may feel uncomfortable during the measurement of height and weight. If you or your child has any questions about his or her height or weight, feel free to contact any of the researchers listed at the end of this document.

Right to Refuse: Participation in this study is voluntary. You or your child can withdraw at any time. He/she has the right to not to be measured for height and weight. Your child can end his/her participation at any time by telling the LSU Researchers.

Statement of confidentiality and privacy: Only the LSU researchers will know your child's measurements. Parents, teachers, coaches, and all others will NOT see your child's measurements. Absolutely no information that would identify your child will be reported.

Compensation: There is no pay (e.g., money, gifts, extra credit) for participating in this study.

Signatures:

The study has been discussed with me and all my questions have been answered. I may direct additional questions regarding study specifics to the investigators listed below. If I have questions about my or my child's rights as a research participant, I can contact Robert C. Matthews, Chairman, LSU Institutional Review Board, (225) 578-8692. I give permission for my child to participate in the study described above and acknowledge the researchers' obligation to provide me with a copy of this consent form if signed by me.

"I give permission for my child, _____, (please print his/her full name) to participate in this research project."

Student's Grade _____

Parent/Guardian Signature

Date

My signature above indicates that the informed consent procedure has been followed.

The parent/guardian has indicated to me that he/she is unable to read. I certify that I have read this consent form to the parent/guardian and explained that by completing the signature line above he/she has given permission for the child to participate in the research study.

Signature of Reader _____

Date _____

Principal Investigator:

Dr. Rebecca Ellis Gardner
112 HP Long Field House, Department of Kinesiology, Baton Rouge, LA 70803, (225) 578-5954,
rgardner@lsu.edu

Co-Investigator:

Alissa Villarrubia
Graduate Student, Department of Kinesiology, Baton Rouge, LA 70803, (504) 251-5612,
avilla2@lsu.edu

id#	chdbday	relation	sex	age	srht	srwt	marital	educ	income	race	employ	tpb1	tpb2	tpb3	tpb4	tpb5	tpb6	tpb7	tpb8	tpb9	tpb10	tpb11	tpb12	tpb13	tpb14	tpb15	tpb16	
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5	1071997	1	1	37	67	125	2	5	6	7	7	5	7	4	5	5	7	6	7	6	7	6	7	6	2	7	6	2
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18	1131996	1	1	36	66	120	4	7	3	7	7	3	7	7	4	7	4	7	7	5	5	4	6	5	4	7	4	2
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50	7311996	1	1	34	63	230	4	5	2	7	7	3	4	4	6	4	4	7	7	4	3	6	7	2	4	7	3	2

survey	height	weight	sex	chdbday	age	htin	BMI	bmigp	bmigp2	
1	148.5	83.2		1 6091995		10	58.46	17.11	1	1
1	166.5	156.6		2 12101994		10	65.55	25.62	3	2
1	136	60.4		2 1071997		8	53.54	14.81	1	1
1	138	71.8		1 7121996		9	54.33	17.1	1	1
1	136	67		1 7301996		9	53.54	16.43	1	1
1	143.5	87.2		1 11191996		9	56.5	19.21	2	2
1	130.5	61.4		2 10281996		9	51.38	16.35	1	1
1	140.5	65.8		2 5221996		9	55.31	15.12	1	1
1	139.7	92.4		2 6191997		8	55	21.47	3	2
1	146.5	73		1 5311996		9	57.68	15.43	1	1
1	148	70.8		2 7101995		10	58.27	14.66	1	1
1	140.5	77.2		2 6221997		8	55.31	17.74	1	1
1	136	71		2 6151995		10	53.54	17.41	1	1
1	132	59		2 1071997		8	51.97	15.36	1	1
1	141.5	82.4		2 1151995		10	55.71	18.67	1	1
1	145	99.6		1 9201996		9	57.09	21.49	3	2
1	136.5	66.8		1 8131997		8	53.74	16.26	1	1
1	134.4	53.6		2 10121995		10	52.91	13.46	4	1
1	125.5	55.2		1 1241997		8	49.41	15.9	1	1
1	139	77		2 3071997		8	54.72	18.08	1	1
1	134	65.8		2 7071997		8	52.76	16.62	1	1
1	138	70.6		1 10141995		10	54.33	16.81	1	1
1	143	78.8		1 8111995		10	56.3	17.48	1	1
1	134	59.4		2 1171996		9	52.76	15	1	1
1	134.7	68		1 12301996		8	53.03	17	1	1
1	129	83		1 2211997		8	50.79	22.62	3	2
1	140.5	70.2		2 7301995		10	55.31	16.13	1	1
1	136	88.6		2 4091997		8	53.54	21.73	3	2
1	135	67.8		2 1041996		9	53.15	16.87	1	1
1	134.5	59.8		1 2271996		9	52.95	14.99	1	1
1	135.5	65.4		1 4081997		8	53.35	16.16	1	1
1	133.5	64.6		1 5271997		8	52.56	16.44	1	1
1	135	92.6		2 12261996		8	53.15	23.04	3	2
1	140.5	79.2		2 8111995		10	55.31	18.2	1	1
1	144	92		2 2091996		9	56.69	20.12	2	2
1	127	60.6		2 2271997		8	50	17.04	1	1
1	146	97.4		1 1181995		10	57.48	20.72	2	2
1	148.5	86.6		2 8031994		11	58.46	17.81	1	1
1	132.1	63.6		2 12131996		8	52.01	16.53	1	1
1	133.5	78.2		2 7311996		9	52.56	19.9	2	2
1	131	57.8		1 5051997		8	51.57	15.28	1	1
1	137	69.6		1 5161995		10	53.94	16.82	1	1
1	142	62.8		1 11231995		10	55.91	14.13	4	1
1	140	69.6		2 1151995		10	55.12	16.11	1	1
1	153.5	135.2		1 4111995		10	60.43	26.02	3	2
1	142	92.4		1 11131996		9	55.91	20.78	2	2
1	133	64.2		2 3271996		9	52.36	16.46	1	1
1	140	69.4		2 8261996		9	55.12	16.06	1	1
1	134	74.2		1 11131996		9	52.76	18.74	2	2
1	132	56		1 1071997		8	51.97	14.58	1	1
1	145.5	95.6		1 4171997		8	57.28	20.48	3	2
2	153.5	99.2		2 5011995		10	60.43	19.09	1	1
2	146.5	80.8		1 9151996		9	57.68	17.07	1	1
2	143.5	93.8		1 3121996		9	56.5	20.66	2	2
2	146	101.2		1 10081995		10	57.48	21.53	2	2
2	132	56.6		1 4271997		8	51.97	14.73	1	1
2	143.5	68.6		2 12171996		8	56.5	15.11	1	1
2	146	100.2		1 6151994		11	57.48	21.32	2	2
2	132.5	69		1 3161994		11	52.17	17.83	1	1
2	149.5	114.2		1 10131994		11	58.86	23.17	2	2
2	142.5	78.8		2 6041996		9	56.1	17.6	1	1
2	138	76.2		2 8081995		10	54.33	18.15	1	1
2	142.5	79.2		2 5211995		10	56.1	17.69	1	1
2	142	75		2 6041995		10	55.91	16.87	1	1
2	133.5	56.4		2 5171996		9	52.56	14.35	1	1
2	130	66.8		1 9041996		9	51.18	17.93	1	1
2	136	70.4		2 11011995		10	53.54	17.26	1	1
2	136	63.4		1 3191995		10	53.54	15.55	1	1
2	131	61		2 7261996		9	51.57	16.12	1	1
2	129	77.4		2 10161996		9	50.79	21.1	2	2
2	131	81.2		2 7211997		8	51.57	21.46	3	2
2	137	75.6		1 9101994		11	53.94	18.27	1	1

Parent Survey

variable	definition	range of expected values
partname	Parent's name	
chdname	Child's name	
chdbday	Child's birthday	
relation	relationship to child	1 = mother; 2 = father; 3=stepmother; 4=stepfather; 5=other
sex	parent's gender	1=female; 2= male
age	parent's age	
srht	parent's self reported height	feet, inches
srwt	parent's self reported weight	lbs
marital	marital status	1= single, never married; 2= married; 3= separated; 4= divorced; 5= living with partner
educ	highest level of education	1=completed some highschool, but no degree; 2= completed high school or equivalent; 3= post highschool, business or trade school; 4= completed some university/college, but no degree; 5= completed university/college; 6= some graduate/professional school, but no degree; 7= completed graduate/professional school
income	estimate annual family income	1=less than \$20,000; 2= \$20,001-40,000; 3= \$40,001-60,000; 4= \$60,001-80,000; 5= \$80,001-100,000; 6= 100,001- and above
race		1= American Indian or alaskan native; 2= Asian or asian american; 3= Black, African American, Nonhispanic; 4= Hispanic or Latino American; 5= Middle Eastern or Middle Eastern American; 6= Pacific Islander; 7= White, EuropeanEuropean American, Nonhispanic ; 8= Other
employ	Current employment status	1=Unemployed; 2= Part-time; 3= Full-time; 4= Retired; 5= Homemaker; 6= Other
tpb1	pbc	higher value = stronger pbc (1= strongly disagree, 7= strongly agree)
tpb2	sn	higher value= stronger pbc (1=strongly disagree, 7= strongly agree)
tpb3	att	higher value= stronger att (1= Extremely useless, 7= Extremely Useful)
tpb4	att	higher value= stronger att (1= Extremely boring, 7= Extremely interesting)
tpb5	pbc	higher value= stronger pbc (1=very little control, 7= complete control)
tpb6	sn	higher value= stronger sn (1= strongly disagree, 7= strongly agree)
tpb7	att	higher value = stronger att (1= extremely harmful, 7= extremely beneficial)
tpb8	att	higher value= stronger att (1= extremely unpleasant, 7= extremely pleasant)
tpb9	pbc	higher value = stronger pbc (1=extremely difficult, 7= extremely easy)
tpb10	sn	higher value = stronger sn (1=strongly disagree, 7=strongly agree)
tpb11	att	higher value = stronger att (1=extremely foolish, 7=extremely wise)
tpb12	att	higher value = stronger att (1=extremely unenjoyable, 7=extremely enjoyable)
tpb13	intention	continuous open; higher value = higher intention
tpb14	att	higher value= stronger att (1= extremely bad, 7= extremely good)
tpb15	att	Higher value = stronger (1= extremely stressful, 7= extremely relaxing)
tpb16	behavior	continuous open; higher value = higher freq of beh

BMI data

chdname	Child's name	
survey	If parent responded to the survey	1 = parent completed survey; 2 = parent did not complete survey
height	Child's measured height in cm	
weight	Child's measured weight in pounds	
sex	Child's gender	1 = male; 2 = female
chdbday	Child's birthday	
age	Child's age in years at time of measurement	
htin	Child's height converted to inches	
BMI data	Child's BMI calculated from measured height and weight	
bmigp	BMI-age-classifications	1 = normal weight; 2 = risk of overweight; 3 = overweight; 4 = underweight
bmigp2	BMI-age-classifications collapsed	1 = underweight/normal weight; 2 = risk of overweight/overweight

VITA

Alissa Villarrubia spent her childhood in Metairie, Louisiana. After high school graduation from Archbishop Chapelle High School, she entered the didactic program in dietetics offered by the Human Ecology Department at Louisiana State University. Community involvement during her undergraduate curriculum included nutrition advising at the Corps of Engineers and performing as a nutrition guest speaker at local elementary and high schools. Upon completion of her Bachelor's of Science in 2002, Alissa entered the master's program in the Kinesiology Department with focus on exercise physiology. Research emphases included functional assessment in geriatric populations, development of the BMI Report Card for assessment within elementary schools, and the TPB. During her graduate curriculum, Alissa completed a dietetic internship at St Dominic Hospital in Jackson, Mississippi. Finally, during the last year of her graduate program, Alissa accepted a Clinical Dietitian position at Baptist Memorial Hospital in Memphis, Tennessee.