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THE INFLUENCE OF PERSUASIVE MESSAGES
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A TEST OF THE THEORY OF REASONED ACTION

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THE INFLUENCE OF PERSUASIVE MESSAGES ON ATTITUDE AND SUBJECTIVE NORM: A TEST OF THE THEORY OF REASONED ACTION

By

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ABSTRACT

THE INFLUENCE OF PERSUASIVE MESSAGES ON ATTITUDE AND SUBJECTIVE NORM: A TEST OF THE THEORY OF REASONED ACTION

By

Lisa L. Massi Lindsey

The Theory of Reasoned Action (TRA) predicts that a person's attitude and subjective norm both impact behavioral intent which subsequently predicts behavior (Ajzen & Fishbein, 1970, 1974, 1980; Fishbein & Ajzen, 1975). One limitation to extant TRA research, however, is that it has not examined the impact of persuasive messages on the TRA's predictions. Given that attitudes and subjective norms are subject to change, and given that people are exposed frequently to messages designed to change their attitudes and subjective norms, the current study examined the predicted relationships outlined by the TRA within two systems of change: 1) when attitudes and 2) subjective norms were influenced by a persuasive message. These predictions were tested by examining 276 undergraduate students' eating behaviors (i.e., fruit and vegetable consumption and the number of meals skipped per day). Participants were assigned randomly to one of three conditions: 1) a no-message control group, 2) an attitude message group, and 3) a subjective norm message group. The results related to fruit and vegetable consumption indicated that when respondents' attitude or subjective norm was influenced by a persuasive message the TRA's predictions were not consistent with the data. The test of the TRA when no change was present, however, provided evidence that its predictions were consistent with the control

group data. These results were not replicated, however, with the second topic (skipping meals). Specifically, the TRA's predictions were not consistent with the data from any group. Interestingly, the only model to predict accurately the number of meals participants skipped every day was a simple causal string such that attitudes impacted intentions which predicted behavior. The implications of these results, limitations of the current investigation, and directions for future research are discussed in detail.

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INTRODUCTION AND RATIONALE

The nature and direction of the relationship between attitudes and behavior has been the subject of debate among scholars from varying fields of inquiry. In brief, scholars have taken four differing positions with regards to the casual priority of attitudes and behaviors: attitudes are predictive of behaviors (McGuire, 1976), behaviors cause attitudes (Bem, 1972), attitudes and behaviors impact each other (Kelmen, 1974), and attitudes and behaviors are related weakly (Wicker, 1969). Recent meta-analytic studies have noted that a strong attitude-behavior relationship indeed exists (r = .79, Kim & Hunter, 1993a), and that behavioral intent mediates that relationship (Kim & Hunter, 1993b). A theory commonly employed to explain this relationship is the Theory of Reasoned Action (TRA).

The TRA elucidates the attitude-behavior relationship such that a person's attitude (defined in the TRA as the summative evaluation of a person's beliefs) and subjective norm (the sum of normative beliefs and a person's motivation to comply with them) both impact behavioral intent which subsequently predicts behavior (e.g., Ajzen & Fishbein, 1970, 1974, 1980). Moreover, the accuracy of the TRA predictions is strongly influenced by the degree to which the attitude being assessed conceptually matches the behavior being predicted. For example, meta-analytic results indicate that the average correlation between attitudes and behavior is stronger when the attitude being assessed is relevant (i.e., a conceptual match) to the behavior under scrutiny (mean r = .86, Kim & Hunter, 1993a).

One limitation to the body of TRA research, however, is that it has ignored the influence persuasive messages may have on the attitude-behavior relationship.

Specifically, extant research has treated components of the TRA as static and has not examined the effect of changes in attitude or subjective norm on the model's predictions. For example, Nucifora, Gallois, and Kashima (1993) examined the degree to which condom use was predicted accurately by intentions to use condoms, and intentions were predicted accurately by attitudes and subjective norm, as an application of the TRA to AIDS-preventative behavior, but did not examine the effect of safe-sex or AIDS-preventative messages on these predictions. To this end, the current study proposes a test of the TRA that will focus on the impact of persuasive messages on the TRA's predictions.

It is important to provide such a test of the TRA for two reasons. First, attitudes and subjective norms rarely are held constant; therefore, any static test of the TRA may not elucidate fully the process by which attitudes and subjective norms affect behavior. Second, people are presented continually with persuasive messages aimed to change their attitudes, subjective norms, and behavior. Thus, it is important to understand how such messages will affect the predictive power of the TRA. In order to better understand the relationships proposed here, the TRA will be discussed in greater detail and a model will be proposed.

REVIEW OF LITERATURE

The Theory of Reasoned Action

As noted previously, the TRA predicts that both a person's attitude and subjective norm influence the degree to which a person will intend to engage in a specific behavior and that this intent subsequently predicts volitional behavior (e.g., Ajzen & Fishbein, 1970, 1974, 1980). In order to better understand these relationships, the attitude and subjective norm components of the TRA must be addressed individually.

Attitudes

Although there is some debate regarding the origin and structure of attitudes (see Hunter, Levine, & Sayers, 1976; Schwarz & Bohner, 2001) the TRA posits that an attitude toward any given behavior is a function of how people evaluate their beliefs about the behavior and the strength with which they hold those beliefs (Fishbein & Ajzen, 1975; Hale, Householder, & Greene, 2002). Mathematically, one's attitude toward a behavior (A_B) is equal to the sum of the evaluations (e_i) and assessments of strength (s_i) one makes for all relevant beliefs about a focal behavior, and can be expressed as $A_B = \Sigma e_i s_i$ (Fishbein, 1967a, 1967b).

The beliefs on which an attitude is based are cognitions that link a given attribute with a behavior (Hale et al., 2002). For example, the cognition "Eating a balanced diet is healthy" is a belief that links an attribute (health) with a behavior (a decision to eat regular, balanced meals). Belief *evaluation* is the degree to which a person judges the attribute (health) as positive or negative, and belief *strength* refers to the degree of certainty with which a person holds the belief. Therefore, if a person evaluates the belief "Eating a balanced diet is healthy" as strongly positive (.90) and is certain that eating a

balanced diet will ensure good health (.80), the resulting attitude will be strongly favorable toward healthy eating behaviors (.72). It should be noted here that this example represents only the evaluation and strength of one belief about a focal behavior, where people have a series of beliefs that are summed to form an attitude.

The resulting attitudes, according to the TRA, predict behavioral intention insofar that people intend to act in ways consistent with their attitudes (Fishbein & Ajzen, 1975). Consistent with this, Kim and Hunter (1993b) found that attitudes and intent were strongly correlated (corrected mean $r = .87$, $K = 92$). Attitudes, however, are not the only predictor of behavioral intentions according to the TRA, and it is important to understand the predictive role of the subjective norm.

Subjective Norm

The TRA proposes that the subjective norm is a function of normative beliefs about focal behaviors (how people perceive the expectations of others who are important to them with regard to how they should act) and motivation to comply with the normative belief (the perceived pressure people feel to act in accordance with others' expectations). Mathematically, one's subjective norm (S) is equal to the sum of the normative beliefs (n_i) and motivation to comply (m_i), and can be expressed as $S = \Sigma n_i m_i$ (Fishbein, 1967a, 1967b).

With regards to the eating behavior example used previously, one might have a normative belief (e.g., "My parents think that eating a balanced diet is a good idea") and more or less motivation to comply with the normative belief (e.g., "As far as controlling my eating habits, I don't want to do what my parents say"). Therefore, if one strongly perceives the normative belief "My parents think that eating a balanced diet is a good

idea" (.75) but has little motivation (.20) to act in accordance with the normative belief (e.g., "I do not want to do what my parents say"), one's subjective norm will not be in favor of healthy eating (.15). Conversely, if one strongly and negatively perceives the normative belief "My friends think that eating a balanced diet is necessary to lose weight" (-.80) and perceives a great deal of pressure, either real or imagined, to act in accordance with that normative belief (e.g., "I want to do what my friends say is a good thing to do when it comes to weight management") the motivation to comply will be high (.90) and the subjective norm will be strongly out of favor with healthy eating behavior (-.72). As noted previously with regard to attitudes, this example examines one's motivation to comply with only one normative belief where subjective norm is a sum of one's motivation to comply with any number of normative beliefs held by different important others.

In order to understand the degree to which one's normative beliefs about healthy eating behaviors are based on our close relationships, an examination of the literature focused on both familial and peer relationships as predictors of eating behaviors will be discussed.

Familial predictors of eating behaviors. A great deal of research has sought to determine the degree to which one's familial relationships predict both healthy and unhealthy eating habits. This line of research has found a number of factors which contribute to such eating behaviors. Strong predictors of one's eating habits are the degree to which people perceive both parental pressure to diet and parental dissatisfaction with one's physical appearance (Haworth-Hoeppner, 2000; Moreno & Thelen, 1993; Schur, Sanders, & Steiner, 2000; Striegel-Moore & Kearney-Cooke, 1994; Thelen &

Cormier, 1995). For example, Moreno and Thelen (1993) found that people who perceive a great deal of parental pressure to lose weight are more likely to suffer from eating disorders than those whose parents do not pressure them (see also Twamley & Davis, 1999, who found that familial pressure moderated the relationship between exposure to thinness norms and eating pathology). Also, people with healthy eating behaviors perceive their parents to be more caring and warm, less overprotective (Calam, Waller, Slade, & Newton, 1990), and more helping, trusting, and nurturing (Humphrey, 1987) than people with eating disorders. Other predictors include defense styles and parental bonding (Humphrey, 1986; Steiger, Van der Feen, Goldstein, & Leichner, 1989), attachment and separation difficulties (Armstrong & Roth, 1989; Humphrey, 1989; O'Kearney, 1996), weight-related teasing and criticism by family (Haworth-Hoeppner, 2000; Humphrey, 1987; Levine, Smolak, & Hayden, 1994), parental supervision (Young & Fors, 2001), and family dysfunction (Scalf-McIver & Thompson, 1989).

These predictors necessarily will affect one's subjective norm. For example, if one perceives that his or her parents value eating a healthy, balanced diet and is motivated to comply with the parents' pressure for healthy eating, one should develop a subjective norm that favors eating behaviors that will result in following a balanced diet. Conversely, one who is motivated to comply with parents who value idealized thinness are likely to engage in unhealthy eating behaviors to attain the desired thinness (e.g., eliminating all fat from the diet, reducing caloric intake to dangerously low levels).

Although a number of familial predictors exist with regard to eating behaviors, most researchers argue that a number of other influences must also be examined to understand healthy eating behaviors and eating disorders (see Sanftner, Crowther,

Crawford, & Watts, 1996). One such alternate predictor is one's peer relationships. The influence of peer relationships on eating behaviors is discussed subsequently.

Peer influence and eating behaviors. Research has shown that peer concerns with weight and body shape serve as important modeling cues for weight management efforts and that people who are more committed to weight management are highly attuned to similar behavior in their peers (Levine, Smolak, Moodey, et al., 1994). For example, peers' weight-loss and eating behaviors have been found to be substantial predictors of people's own behaviors (Paxton, Schutz, Wertheim, & Muir, 1999). Furthermore, Vincent and McCabe (2000) found that direct influence of peers predicted eating behaviors, and that the quality of those peer relationships, were less important in predicting such behaviors. Oliver and Thelen (1996), however, found that likability was a major predictor of eating concerns. Therefore, although the overall quality of peer relationships may not be as important as the direct influence they can have on behaviors, the more liked the peer, the more likely the peer's influence with regard to behavior. For example, a college student may be strongly influenced to adopt different eating habits when subjected to ridicule from other students about her weight. This student likely does not have a relationship of high quality with these ridiculing students, but she may be motivated to comply with their normative beliefs about idealized body shapes nonetheless. The student is more likely, however, to comply with the normative beliefs of a person she holds in high regard.

It is also important to note that not all peer influence on eating behaviors is negative. Whereas most research has focused on the effect that peer pressure has on the development of eating disorders such as anorexia nervosa and bulimia nervosa,

Hausenblas & Carron (1998) found that college students report more positive peer influences on their eating and dieting behaviors (e.g., support for following a balanced diet) than negative influences (e.g., recommendations of binging and purging). Therefore, one's peer relationships, just as with familial relationships, will likely affect subjective norms. For example, if one is motivated to comply with beliefs of a peer who values eating a balanced diet, the resulting subjective norm will affect subsequent intentions and behaviors to adopt healthy eating patterns.

Other influences on one's subjective norm exist (e.g., exposure to idealized body images in the media: Levine, Smolak, & Hayden, 1994; Levine, Smolak, Moodey, et al., 1994; Polivy & Herman, 2002; and trait and social anxiety and depression: Evans & Wertheim, 1998; Graber, Brooks-Gunn, Paikoff, & Warren, 1994) and some people will weigh their own attitudes more heavily than they will their subjective norm when contemplating a given behavior. The TRA does briefly address differential weight given to attitudes and subjective norms, although some scholars believe this issue is addressed inadequately (see Burgoon, Birk, & Coker, 1998). To better understand how attitudes and subjective norms influence intentions and subsequent volitional behavior it is necessary to now turn to an explanation of the TRA as a whole.

Understanding the Theory of Reasoned Action

The predicted TRA relationships among attitudes, subjective norm, and behavioral intent have been traditionally understood as the mathematical function:

$$I = (A)W_1 + (S)W_2$$

where intent (I) is a function of one's attitude toward the behavior (A) and subjective norm related to the behavior (S) and the weight of each (W_1 and W_2, respectively).

Moreover, behavioral intentions are posited to be the strongest predictor of behavior (Fishbein & Ajzen, 1975). Consistent with this, meta-analytic results indicate that behavioral intentions and behavior are related strongly (corrected mean $r = .82$, $K = 47$, Kim & Hunter, 1993b; see Hale et al., 2002 for a summary of all meta-analytic findings), and research across a wide range of domains have provided evidence consistent with the predictions made by the TRA.

It should be noted, however, that there is a substantial gap in existing TRA research; namely, the TRA has been tested traditionally as a static model. That is to say, existing attitudes and subjective norm were simply measured and change was not induced in order to test systematically the effect of attitude or subjective norm change on intentions and subsequent behavior. In order to determine the effectiveness of the TRA in explaining the attitude-behavior relationship, it must also be studied when attitudes and subjective norms are influenced by a persuasive message. To this end, change and the TRA are discussed next.

Examining the Theory of Reasoned Action When Change Occurs

Introducing change can occur in a number of ways. One method communication scholars can use is to aim persuasive messages at people's attitudes and subjective norm. For example, introducing a persuasive message can initiate change by impacting an attitude by moving it from its current state to a more favorable or unfavorable attitude. Changes in attitude and subjective norm may thereby result in changes in behavioral intent and subsequent behavior. The effect of such persuasive messages on the TRA predictions can be examined systematically by influencing change in either attitudes or subjective norm. Each will be addressed subsequently.

Influencing change through attitudes. The linear discrepancy model (see Boster, Fryrear, Mongeau, & Hunter, 1892; Boster, Mayer, Hunter, & Hale, 1980; Hunter et al., 1976) indicates that attitude change as a result of a persuasive message is a function of the impact of the message and the discrepancy between the original attitude and the position advocated by the message. According to the linear discrepancy model, arguments advocate a specific attitudinal position that can be arranged on the same continuum as attitudes. Consequently, people will compare their own attitudes to the attitude advocated in a persuasive message and attitudes should shift in the direction of the message (Boster & Cruz, 2001). Mathematically, the linear discrepancy model predicts that

$$\Delta A = \alpha(M - A_0)$$

where attitude change (ΔA) is a function of the difference between one's initial attitude (A_0) and the message (M) multiplied by the impact or persuasability of the message (α; how much one changed their attitude). Given this, if one is exposed to a persuasive message, and the message is successful, attitude change should occur (in the direction outlined by the message).

Influencing change through subjective norms. Just as one can influence attitudinal change with persuasive messages, so might subjective norms change as the result of a message. Applying the logic of the linear discrepancy model to subjective norm, one might expect that

$$\Delta S = \beta(M - S_0)$$

where change in subjective norm (ΔS) is a function of the difference between one's initial subjective norm (S_0) and the message (M) multiplied by the impact of the message (β).

As noted previously, if one is exposed to a successful persuasive message changes in subjective norm should occur (in the direction outlined by the message).

Given the predictions of the Theory of Reasoned Action and the rationale for how change can occur as a result of persuasive messages, the current study proposes to examine the predicted relationships outlined by the TRA within two systems of change. First, the TRA will be examined when attitude change results from a persuasive message. Second, the TRA will be examined when subjective norm changes as a result of a persuasive message. These predictions will be tested by examining college students' eating behaviors.

In order to assess the effectiveness of the persuasive messages used for the current study, a pilot study was conducted to examine a number of dimensions including message realism, message credibility, and advocated message position. The pilot study is presented subsequently.

PILOT STUDY

Method

Participants

Participants were 137 undergraduate students recruited from introductory communication courses at a large Midwestern university. Respondents mean age was 21.23 years old (*SD* = 2.16), 1% were freshmen, 13% were sophomores, 44% were juniors, and 42% were seniors. Women comprised 74.5% of the sample and 85.4% of the respondents self-reported their ethnicity as Caucasian, 7.3% were African American, 3.6% were Hispanic American, 1.5% were Asian American, .7% were Native American, .7% were of Middle Eastern descent, and .7% declined to state their ethnicity. Additionally, 19.7% of the participants reported that they were currently living in university dorms, 11.7% lived in an on-campus apartment, 2.2% lived with their parents, and 66.4% lived off campus by themselves or with roommates.

Participants were informed that they were being asked to participate in a survey related to student life and the use of university facilities such as nutrition counseling and student health clinics. Respondents received research credit for their participation.

Design

The pilot study utilized a single-factor, control group design such that participants were assigned randomly to one of 3 conditions: 1) a control, no-message condition, 2) an attitude-message condition in which participants were presented with a persuasive message designed to result in favorable attitudes toward eating up to nine servings of fruits and vegetables a day and not skipping meals, and 3) a subjective norm-message condition in which participants were exposed to a persuasive message designed to result

in perceptions of subjective norms in favor of the same eating behaviors. Each message was pilot tested in order to ensure 1) that the position advocated by the messages was rated highly on the same scale participants would use to measure their attitudes and subjective norms, and 2) that the message position was substantially higher than the mean attitude and subjective norm for the control group.

Procedure

Participants were first asked to answer a number of background questions including self-report measures of how many servings of fruit and vegetables they eat every day and how many meals they skip a day. They were then instructed to read one of the persuasive messages (attitude or subjective norm) and subsequently completed a questionnaire. Participants in the control group completed only the questionnaire. All pilot measures used Likert-type scales ranging from -3 (strongly disagree) to +3 (strongly agree) unless otherwise noted.

All participants were initially asked to provide information regarding their current behaviors on a number of open-ended questions (see Appendix A). These items provided baseline information with regards to the behaviors of interest. Specifically, respondents reported that they, on average, eat 1.43 servings of fruit per day (SD = 1.01), 1.69 servings of vegetables per day (SD = 1.14), skip 4.82 meals per week (SD = 3.23), and skip .81 meals per day (SD = .56).

Respondents who were exposed to one of the persuasive messages (n = 97) were asked to rate their perceptions of message realism and message credibility. Message realism was assessed with five items and had a mean of 1.28 (SD = .96) and standardized

item alpha ($SI\alpha$) was .81 for this scale (see Appendix B). Message credibility was assessed with four items and had a mean of 1.27 (SD = 1.00, $SI\alpha$ = .89; see Appendix C).

Participants who were exposed to one of the persuasive messages were also asked to rate their perceptions of the advocated position of the message they read. Specifically, respondents who were exposed to the attitude message (n = 39) were asked to rate the degree to which the message was in favor of 1) eating up to nine servings of fruit and vegetables every day and 2) skipping meals. The message position for fruit and vegetable consumption was assessed with three items (see Appendix D) and had a mean of 1.72 (SD = 1.41, $SI\alpha$ = .83). Message position for skipping meals was assessed with three items (see Appendix E) and had a mean of -2.07 (SD = 1.46, $SI\alpha$ = .94).

Approximately half of the respondents who were exposed to the subjective norm message (n = 28) were asked to rate their perceptions of the family normative beliefs presented in the message. Perceptions of the advocated family normative beliefs about fruit and vegetable consumption were measured with three items and had a mean of 1.89 (SD = .96, $SI\alpha$ = .92; see Appendix F). Perceptions of family normative beliefs about skipping meals were measured with three items and had a mean of -2.00 (SD = 1.02, $SI\alpha$ = .93; see Appendix G).

Approximately half of the respondents who were exposed to the subjective norm message (n = 30) were asked to rate their perceptions of the close friends' normative beliefs presented in the message. Perceptions of the advocated close friends' normative beliefs about fruit and vegetable consumption were measured with three items and had a mean of 1.83 (SD = .81, $SI\alpha$ = .90; see Appendix H). Perceptions of close friends'

normative beliefs about skipping meals were measured with three items and had a mean of -1.78 (SD = .92, $SI\alpha$ = .89; see Appendix I).

Respondents in the control group (n = 40) completed scales to assess 1) their attitude about eating up to nine servings of fruits and vegetables a day, 2) their attitude about skipping meals, 3) their perceptions of their family's normative beliefs about eating up to nine servings of fruits and vegetables every day, 4) their perceptions of their family's normative beliefs about skipping meals, 5) their perceptions of their close friends' normative beliefs about eating up to nine servings of fruits and vegetables every day, and 6) their perceptions of their close friends' normative beliefs about skipping meals.

Control participants' fruit and vegetable attitudes were assessed with five items and had a mean of .81 (SD = 1.39, $SI\alpha$ = .90; see Appendix J), and meal skipping attitudes were assessed with five items and had a mean of -1.69 (SD = 1.16, $SI\alpha$ = .91; see Appendix K). Perceptions of families' normative beliefs about fruit and vegetable consumption were assessed with four items and had a mean of .44 (SD = 1.42, $SI\alpha$ = .97; see Appendix L), and families' normative beliefs about skipping meals were assessed with five items and had a mean of -.73 (SD = 1.28, $SI\alpha$ = .94; see Appendix M). Perceptions of close friends' normative beliefs about fruit and vegetable consumption were assessed with four items and had a mean of -.54 (SD = 1.19, $SI\alpha$ = .93; see Appendix N), and close friends' normative beliefs about skipping meals were assessed with five items and had a mean of .45 (SD = 1.39, $SI\alpha$ = .96; see Appendix O).

Results

As noted previously it was important that 1) each message was rated highly (significantly different from the midpoint of the scale) in terms of message realism and message credibility, 2) that participants perceived the advocated message position as favorable toward eating up to nine servings of fruit and vegetables and unfavorable toward skipping meals (significantly different from the midpoint of the scale), and 3) that the message position was significantly different from the mean attitude and subjective norm for the control group. The following analyses assess these issues.

Instrumentation

As noted previously, measures were comprised of seven-point, Likert-type items on a scale ranging from -3 (Strongly Disagree) to +3 (Strongly Agree). Given that specific items were specified a priori to measure only one factor, confirmatory factor analysis was employed to test the measurement model (Hunter & Gerbing, 1982). The data were found to be consistent with the proposed factors. Internal consistency tests showed that the errors calculated between items measuring the same construct were within sampling error. Likewise, the parallelism test indicated that the errors calculated between items measuring different constructs also were within sampling error.

Message Ratings

Message realism. For the attitude message, perceptions of realism had a mean of 1.69 (SD = .84) which was significantly greater than the midpoint (zero) of the scale, $t(38) = 12.51$, $p < .001$, two-tailed, $r = .90$. For the subjective norm message, perceptions of realism had a mean of .99 (SD = .94) which was significantly greater than the midpoint (zero) of the scale, $t(56) = 7.95$, $p < .001$, two-tailed, $r = .73$. Given these results and the

magnitude of the effects, the probability that the observed means would have been as different, or more different, from the midpoint of the scale is less than one in 1,000. Thus, these data are strong grounds for doubting the viability of the null hypothesis (that perceptions of message realism did not differ from the midpoint of the scale) and it is rejected (see Abelson, 1995 for a more complete explanation of statistical significance).

Message credibility. For the attitude message, perceptions of message credibility had a mean of 1.74 (SD = .73) which was significantly greater than the midpoint (zero) of the scale, $t(38) = 14.79$, $p < .001$, two-tailed, $r = .92$. For the subjective norm message, perceptions of message credibility had a mean of .97 (SD = 1.04) which was significantly greater than the midpoint (zero) of the scale, $t(57) = 7.06$, $p < .001$, two-tailed, $r = .68$. Given these results and the magnitude of the effects, the probability that the observed means would have been as different, or more different, from the midpoint of the scale is less than one in 1,000. Thus, these data are strong grounds for doubting the viability of the null hypothesis (that perceptions of message credibility do not differ from the midpoint of the scale) and it is rejected.

Attitude Message Position

With regards to fruit and vegetable consumption, participants perceived the advocated position of the message as favorable toward eating up to nine servings of fruits and vegetables every day (M = 2.75, SD = .72). Participants perceived that the message position was significantly above the midpoint (zero) of the scale, $t(38) = 23.73$, $p < .001$, two-tailed, $r = .97$. Additionally, respondents perceived the message position to be significantly more favorable than the control group's attitude toward eating up to nine servings of fruit and vegetables a day (M = .58, SD = 1.18), $t(77) = 9.89$, $p < .001$, two-

tailed, $r = .75$. Given these results and the magnitude of the effects, these data are strong grounds for doubting the validity of the null hypotheses (that perceptions of the advocated position do not differ from the midpoint of the scale or from baseline attitudes) and they are rejected.

With regards to skipping meals, participants perceived the advocated position of the message as unfavorable toward skipping meals ($M = -2.88$, $SD = .51$). Respondents perceived that the message position was significantly below the midpoint (zero) of the scale, $t(38) = -35.60$, $p < .001$, two-tailed, $r = -.99$. Additionally, participants perceived the message position to be significantly less favorable than the control group's attitude toward skipping meals ($M = -1.26$, $SD = 1.17$), $t(77) = -8.01$, $p < .001$, two-tailed, $r = -.67$. Given these results and the magnitude of the effects, these data are strong grounds for doubting the validity of the null hypotheses (that perceptions of the advocated position do not differ from the midpoint of the scale or from baseline attitudes) and they are rejected.

Subjective Norm Message Position

With regards to fruit and vegetable consumption, participants perceived the overall advocated position of the subjective norm message as favorable toward eating up to nine servings of fruits and vegetables every day ($M = 1.01$, $SD = 1.32$). Participants perceived that the message position was significantly above the midpoint (zero) of the scale, $t(56) = 5.77$, $p < .001$, two-tailed, $r = .61$.

With regards to skipping meals, participants perceived the overall advocated position of the message as unfavorable toward skipping meals ($M = -1.53$, $SD = 1.63$). Respondents perceived that the message position was significantly below the midpoint

(zero) of the scale, $t(57) = -7.11$, $p < .001$, two-tailed, $r = -.69$. Given these results and the magnitude of the effects, these data are grounds for doubting the validity of the null hypotheses (that perceptions of the advocated position do not differ from the midpoint of the scale or from baseline attitudes) and they are rejected.

Perceptions of family normative beliefs. With regards to fruit and vegetable consumption, participants perceived that the message presented family normative beliefs that were favorable toward eating up to nine servings of fruits and vegetables every day ($M = 1.89$, $SD = .96$). Participants perceived that these normative beliefs presented in the message were significantly more favorable than control participants' ($M = .60$, $SD = 1.35$) perceptions of their families' normative beliefs, $t(66) = 5.68$, $p < .001$, two-tailed, $r = .57$.

With regards to skipping meals, participants perceived the message presented family normative beliefs that were unfavorable toward skipping meals ($M = -2.00$, $SD = 1.02$). Respondents perceived that these normative beliefs presented in the message were significantly less favorable than control participants' ($M = -.96$, $SD = 1.15$) perceptions of their families' normative beliefs, $t(66) = -4.61$, $p < .001$, two-tailed, $r = .49$. Given these results and the magnitude of the effects, these data are grounds for doubting the validity of the null hypotheses (that perceptions of the advocated normative beliefs do not differ from baseline perceptions of normative beliefs) and they are rejected.

Perceptions of close friends' normative beliefs. With regards to fruit and vegetable consumption, participants perceived that the message presented close friend normative beliefs that were favorable toward eating up to nine servings of fruits and vegetables every day ($M = 1.83$, $SD = .81$). Participants perceived that these normative

beliefs presented in the message were significantly more favorable than control participants' (M = -.33, SD = 1.13) perceptions of their close friends' normative beliefs, $t(68) = 12.01, p < .001$, two-tailed, $r = .82$.

With regards to skipping meals, participants perceived the message presented family normative beliefs that were unfavorable toward skipping meals (M = -1.78, SD = .92). Respondents perceived that these normative beliefs presented in the message were significantly less favorable than control participants' (M = .39, SD = 1.38) perceptions of their close friends' normative beliefs, $t(68) = -10.07, p < .001$, two-tailed, $r = -.77$. Given these results and the magnitude of the effects, these data are grounds for doubting the validity of the null hypotheses (that perceptions of the advocated normative beliefs do not differ from baseline perceptions of normative beliefs) and they are rejected.

Summary of Pilot Results

It was important that 1) each message was rated as highly realistic and credible, 2) that participants perceived the advocated message position as favorable toward eating up to nine servings of fruit and vegetables and unfavorable toward skipping meals (significantly different from the midpoint of the scale), and 3) that the message position was significantly different from the mean attitude and subjective norm for the control group. The pilot results indicated that both messages were consistent these criteria and were used subsequently in the main experiment.

MAIN EXPERIMENT

Method

Participants

Participants were recruited from undergraduate communication courses at a large Midwestern university. Eight hundred seventy-two students were recruited from these classes. Specifically, these 872 students received an email directly from the researcher asking them to participate in the study. Of the 872 students who were recruited, 452 (51.8%) completed Survey 1. These 452 respondents received an email directly from the researcher asking them to participate in the second survey 7-10 days later. Of the 452 participants who completed Survey 1, 380 (84.1%) completed Survey 2. These 380 respondents received an email directly from the researcher asking them to participate in the third and final survey 7-10 days later. Of the 380 participants who completed Survey 2, 334 (87.9%) completed Survey 3. Although 334 respondents completed all three surveys, 25 were dropped from the main experiment because they had participated in the pilot study, and 33 more were dropped because they submitted one or more surveys that were largely incomplete. Therefore, all analyses are based on the remaining 276 participants.[1]

Respondents' mean age was 20 years old (SD = 1.86), 29.7% were freshmen, 27.5% were sophomores, 27.2% were juniors, and 15.6% were seniors. Women comprised 67.4% of the sample and 81.2% of the respondents self-reported their ethnicity as Caucasian, 9.9% were African American, 2.9% were Hispanic American, 2.1% were Asian American, 1.8% were of Middle Eastern descent, .7% were Native American, .7% were Indian (from India), and .7% were Pacific Islanders. Additionally, 52.5% of the

participants reported that they were currently living in university dorms, 14.5% lived with their parents, and 33% lived off campus by themselves or with roommates.

Participants were informed that they were being asked to participate in a survey related to student life and the use of university facilities such as nutrition counseling and student health clinics. Respondents received research credit for their participation.

Design

This study utilized a single-factor, control group design such that participants were assigned randomly to one of 3 conditions: 1) a control, no-message condition, 2) an attitude-message condition in which participants were presented with a persuasive message designed to result in favorable attitudes toward eating up to nine servings of fruits and vegetables a day and not skipping meals (see Appendix P), and 3) a subjective norm-message condition in which participants were exposed to a persuasive message designed to result in perceptions of subjective norms in favor of the same eating behaviors (see Appendix Q). These messages are the result of the pilot test reported previously.

Procedure

Students enrolled in Communication courses were notified initially about the study through an in-class announcement made by the researcher. Specifically, they were told that the study entailed completing three different Student Life Surveys online. Respondents were informed that they would earn class credit for their full participation. The students were told to expect an email from the researcher notifying them that the first survey was online and ready for them to complete. Those students who chose not to

participate voluntarily were provided with an alternative assignment worth equal credit (determined by course instructors).

Participants received an email from the researcher indicating that the first survey was online. The email provided the URL of the website and informed participants that the first survey would remain online 24 hours a day for 3 days so that they could complete the survey at a time that was most convenient for them. When participants logged on to the website the server assigned automatically each respondent a random, personalized number that was used to code each participant's data so that each time a respondent returned to the website their data was compiled by the web server and avoided the need for personal identifiers to match surveys. After the final survey, the server created a list of email addresses of those respondents who participated in the study and the researcher matched the list of emails generated by the computer to the class lists provided by the respondents' instructors in order to determine who earned the research credit. The email list was in no way connected to respondents' questionnaire responses. Therefore, all identifying information was kept separate from participants' self-report answers.

When participants went to the website for the first survey (see Appendix R for the Time One Survey) they first read a brief introduction to the study and were asked to read carefully the consent form. Upon completion of reading the consent form participants were instructed that "By clicking the AGREE button you indicate your voluntary participation in this study." Respondents were offered the choice to click "AGREE" or "I DO NOT AGREE." If participants clicked "AGREE" they were directed to the first survey. If they clicked "I DO NOT AGREE" they were directed to a page that thanked them for their time.

Once logged on to the first survey, participants were asked to answer a series of questions about their knowledge and use of university facilities, their eating habits, their extra-curricular activities, study habits, and other general questions about their health and lifestyles. Many of these questions were filler items designed to avoid priming respondents prior to reading a message. Next they were assigned randomly to one of three message conditions. In one condition they received no message (control group). The rest of the participants were assigned to either (1) a message designed to increase their favorable attitudes toward eating up to 9 servings of fruit and vegetables a day and not skipping meals, or (2) increase perceptions that their family and close friends are in favor of those same healthy eating behaviors. Subsequently, participants were asked to answer a series of questions designed to measure their attitudes and beliefs about eating fruits and vegetables and skipping meals, their perceptions of their family's and close friends' attitudes and beliefs about the same topics, and participants' behavioral intention regarding these specific eating behaviors.

After respondents completed the questionnaire they were instructed to click on a "SUBMIT" button to submit their completed survey. Once they clicked "SUBMIT" they were directed to a page that thanked them for their time and reminded them that in 7-10 days they would receive an email notifying them that the second survey was online and ready for them to complete. This email was sent to only those students who completed the first survey.

Approximately 7-10 days after the first survey was taken offline participants received an email message notifying them that the second survey was online and ready for them to complete (see Appendix S for the Time Two Survey). The second survey

asked participants a series of follow-up questions regarding their eating habits, use of university facilities, exercise, and other general behaviors within the last week. After completing the second survey participants were instructed to click on the "SUBMIT" button to submit their completed survey and were directed to a page that thanked them for their time.

Instrumentation

All scales, unless otherwise noted, were similar to those designed for the pilot study. Specifically, measures were comprised of seven-point, Likert-type items on a scale ranging from -3 (Strongly Disagree) to +3 (Strongly Agree). The measurement reported here is from the Time One Survey unless otherwise noted.

Attitudes. Participants' attitudes toward eating up to nine servings of fruits and vegetables every day were measured two different ways. The first was an attitude scale comprised of four items (see Appendix J). The mean attitude toward eating up to 9 servings of fruit and vegetables a day was 1.01 (SD = 1.68) and standardized item alpha was .96. The second method of measuring participants' attitudes was a belief scale that was consistent with Fishbein and Ajzen's (1975) conceptualization. Specifically, participants were asked first to rate the degree to which they held 8 different beliefs about eating up to 9 servings of fruit and vegetables everyday (see Appendix T) and subsequently rated how important each belief was to them (see Appendix U). Importance was scaled 0 (not at all important) to 7 (very important). Each belief was multiplied by the importance ascribed to it and the resulting evaluative beliefs were summed to form the second attitude measure (this scale ranged from -21 to +21). The mean attitude toward eating up to 9 servings of fruit and vegetables every day on the Fishbein and

Ajzen belief scale was 5.53 (*SD* = 6.08, range = -12.0 to 21.0) and standardized item alpha was .86.

Respondents' attitudes toward skipping meals were also measured in two ways. The first was an attitude scale comprised of four items. The mean attitude toward skipping meals was -1.75 (*SD* = 1.12) and standardized item alpha was .93 (see Appendix K). The second method of measuring participants' attitudes was consistent with Fishbein and Ajzen's (1975) conceptualization and was comprised of eight items (this scale ranged from -21 to +21; see Appendix V for the belief items and Appendix U for the importance items). The mean attitude toward skipping meals on the Fishbein and Ajzen scale was -9.79 (*SD* = 6.48, range = -21.0 to 7.0) and standardized item alpha was .83.

Subjective norm: Family. Participants' familial subjective norms regarding fruit and vegetable consumption were measured two different ways. The first was a subjective norm scale comprised of four items (see Appendix L). The mean family subjective norm toward eating up to 9 servings of fruit and vegetables a day was .48 (*SD* = 1.75) and standardized item alpha was .93. The second method of measuring familial subjective norms was consistent with Fishbein and Ajzen's (1975) conceptualization. Specifically, participants were asked first to rate the degree to which they perceived their families held 8 different beliefs about eating up to 9 servings of fruit and vegetables everyday (normative beliefs; see Appendix W) and subsequently rated how important it was for them to do what their family thought they should do (motivation to comply; see Appendix X). Importance was scaled 0 (not at all important) to 7 (very important). Each normative belief was multiplied by the motivation to comply and the resulting scores were summed to form the second familial subjective norm scale (this scale ranged from

-21 to +21). The mean familial subjective norm toward eating up to 9 servings of fruit and vegetables every day on the Fishbein and Ajzen scale was 1.77 (*SD* = 5.14, range = -13.0 to 16.0) and standardized item alpha was .81.

Respondents' familial subjective norms about skipping meals were also measured two different ways. The first was a subjective norm scale comprised of four items (see Appendix M). The mean family subjective norm toward eating up to 9 servings of fruit and vegetables a day was .48 (*SD* = 1.75) and standardized item alpha was .93. The second method of measuring familial subjective norms was consistent with Fishbein and Ajzen's (1975) conceptualization and included eight items (this scale ranged from -21 to +21; see Appendix Y for the belief items and Appendix X for motivation to comply). The mean familial subjective norm toward skipping meals on the Fishbein and Ajzen scale was -7.54 (*SD* = 6.18, range = -21.0 to 7.0) and standardized item alpha was .80.

Subjective norm: Close friends. Participants' close friends subjective norm regarding fruit and vegetable consumption was measured two different ways. The first was a subjective norm scale comprised of four items (see Appendix N). The mean close friend subjective norm toward eating up to 9 servings of fruit and vegetables a day was -.68 (*SD* = 1.56) and standardized item alpha was .98. The second method of measuring familial subjective norms was consistent with Fishbein and Ajzen's (1975) conceptualization. Specifically, participants were asked first to rate the degree to which they perceived their close friends held 8 different beliefs about eating up to 9 servings of fruit and vegetables everyday (normative beliefs; see Appendix Z) and subsequently rated how important it was for them to do what their close friends thought they should do (motivation to comply; see Appendix AA). Importance was scaled 0 (not at all important)

to 7 (very important). Each normative belief was multiplied by the motivation to comply and the resulting scores were summed to form the second close friend subjective norm scale (this scale ranged from -21 to +21). The mean close friend subjective norm toward eating up to 9 servings of fruit and vegetables every day on the Fishbein and Ajzen scale was -.06 (*SD* = 5.30, range = -21.0 to 18.0) and standardized item alpha was .85.

Respondents' close friends subjective norm about skipping meals was also measured two different ways. The first was a subjective norm scale comprised of four items (see Appendix O). The mean close friends subjective norm toward skipping meals was .28 (*SD* = 1.53) and standardized item alpha was .97. The second method of measuring close friend subjective norms was consistent with Fishbein and Ajzen's (1975) conceptualization and included eight items (this scale ranged from -21 to +21; see Appendix BB for belief items and Appendix AA for motivation to comply). The mean close friend subjective norm toward skipping meals on the Fishbein and Ajzen scale was -3.61 (*SD* = 4.92, range = -19.0 to 9.0) and standardized item alpha was .83.

Intentions. Participants' intent to eat up to 9 servings of fruit and vegetables a day was measured with 4 items and had a mean of -.57 (*SD* = 1.50) and standardized item alpha was .93 (see Appendix CC). Respondents' intent to skip meals was measured with 3 items and had a mean of -1.01 (*SD* = 1.44) and standardized item alpha was .93 (see Appendix DD). In order to be consistent with the position advocated by the message, participants' intent to increase fruit and vegetable consumption should be positive and their intent to skip meals should be negative.

Behavior: Fruit and vegetable consumption. Fruit and vegetable consumption was assessed at two points in time. First, it was measured at the beginning of Survey 1 prior to

any exposure to a persuasive message and was assessed with two open-ended questions that asked "On average, how many servings of fruit do you eat *per day* (one serving ~ 1 cup of fresh fruit)?" and "On average, how many servings of vegetables do you eat *per day*, not including starchy vegetables like potatoes and corn (one serving ~ 1 cup of raw vegetables)?" The answers to both items were summed to create an assessment of fruit and vegetable consumption. The average number of fruit and vegetable servings consumed per day had a mean of 2.97 (SD = 2.45) at the time of Survey 1. Approximately 7-10 days later participants were asked the same two open-ended questions in order to determine how many daily servings of fruit and vegetables they had eaten in the past week and results indicated that participants ate an average of 4.09 servings of fruit and vegetables (SD = 2.08).

Behavior: Skipping meals. The number of meals people skip per day also was assessed at two points in time. First, it was measured at the beginning of Survey 1 prior to any exposure to a persuasive message and was assessed with one open-ended question that asked "On an average day, how many meals do you skip?" On average, participants were skipping .77 meals per day (SD = .67) at the time of Survey 1. Approximately 7-10 days later participants were asked the same open-ended question in order to determine how many meals they had been skipping in the past week. Results indicated that participants skipped an average of .74 meals a day (SD = .70).

Overview of Analyses

Confirmatory factor analysis (Hunter & Gerbing, 1982) was employed to test the measurement model and path analytic techniques were used to test the Theory of Reasoned Action within the two systems of change. The confirmatory factor analysis

results will be presented first, followed by a test of the TRA models. Because the current study examined two behaviors, the results for fruit and vegetable consumption will be presented first and those for skipping meals will be presented subsequently.

Results

Instrumentation

Given that specific items were specified a priori to measure only one factor, confirmatory factor analysis was employed to test the measurement model (Hunter & Gerbing, 1982). The data were not consistent with the Fishbein and Ajzen measurement models. Specifically, the attitude belief scale, the familial normative belief scale, and the close friends normative belief scale for both the fruit consumption and skipped meals topics were not consistent with the proposed measurement models. Internal consistency tests showed that the errors calculated between items measuring the same construct were larger in magnitude than one would expect from sampling error alone. Additionally, the tests of parallelism also showed that the errors calculated between items measuring different constructs were larger in magnitude than one would expect from sampling error alone. Therefore, these scales were all dropped from further analyses.[2]

The remaining four scales (attitude, family subjective norm, close friends subjective norm, and behavioral intent) for each topic were found to be consistent with the proposed factors. Internal consistency tests showed that the errors calculated between items measuring the same construct were within sampling error. Likewise, the parallelism test indicated that the errors calculated between items measuring different constructs also were within sampling error. Therefore, these scales were retained for all further analyses (see Tables 1 and 2 for a report of descriptive statistics by topic).[3]

Table 1

Means and Standard Deviations (in parentheses) for Fruit and Vegetable Consumption by Experimental Condition

Condition	Attitude	Family Subjective Norm	Close Friend Subjective Norm	Intent	Consumption Time 1	Consumption Time 2
Control Group	.02	-.06	-1.06	-1.15	2.74	4.15
	(1.58)	(1.75)	(1.48)	(1.36)	(2.22)	(5.44)
Attitude Message	1.63	.40	-.49	-.32	3.21	4.18
	(1.41)	(1.79)	(1.55)	(1.38)	(2.20)	(2.50)
Subjective Norm Message	1.49	1.13	-.49	-.18	3.01	3.95
	(1.01)	(1.51)	(1.60)	(1.56)	(2.86)	(3.61)

Note. Attitude, Family Subjective Norm, Close Friend Subjective Norm, and Intent were scaled -3 (Strongly Disagree) to +3 (Strongly Agree). The measure of Consumption was open-ended.

Table 2

Means and Standard Deviations (in parentheses) for Skipping Meals Topic by Experimental Condition

Condition	Attitude	Family Subjective Norm	Close Friend Subjective Norm	Intent	Skipped Time 1	Skipped Time 2
Control Group	-1.81	-1.36	-.03	-1.53	.78	.72
	(1.14)	(1.42)	(1.81)	(1.61)	(.71)	(.73)
Attitude Message	-1.85	-.99	.39	-1.49	.75	.78
	(1.03)	(1.70)	(1.65)	(1.47)	(.66)	(.58)
Subjective Norm Message	-1.76	-1.27	.35	-1.26	.78	.71
	(1.36)	(1.54)	(1.59)	(1.47)	(.65)	(.78)

Note. Attitude, Family Subjective Norm, Close Friend Subjective Norm, and Intent were scaled -3 (Strongly Disagree) to +3 (Strongly Agree). The measure of Skipped Meals was open-ended.

Evaluation of the Models

To test each of the following models the least squares criterion was used to estimate the parameters, parameter size was examined, and the fit of the model was assessed. Parameter size was determined in the path diagram by performing a simple

regression of each endogenous variable onto its causal antecedent and model fit was tested by comparing the estimated parameter size to the reproduced correlations (see Hunter & Gerbing, 1982 for information on reproducing correlations in path analysis). To the extent that the path coefficients are substantial and the differences between parameter estimates and reproduced correlations (errors) are attributable to sampling error, the model is said to be consistent with the data. If errors are larger than what is expected from sampling error, the model is said to be inconsistent with the data.

Fruit and Vegetable Consumption Results

Influencing change through attitudes. This first model posited that when people read a message persuading them to increase their fruit and vegetable consumption they are more likely to have favorable attitudes toward increased consumption (compared to a control group). Additionally, consistent with the TRA, the more favorable one's attitude toward increased fruit and vegetable consumption, and the more favorable one perceives family and close friends to be toward the same behavior (subjective norm), the greater one's intention will be to increase consumption of fruit and vegetables and will subsequently engage in such behavior. The correlations employed to estimate the fit of the model parameters are presented in Table 3, and the path coefficients are presented in Figure 1.

Table 3

Zero-order Correlations Used to Calculate Parameter Estimates in Model 1

	1	2	3	4	5	6
1. Message	*1.00*					
2. Attitude	.47**	*.96*				
3. Family Subjective Norm	.14	.51**	*.98*			
4. Close Friends Subjective Norm	.17*	.41**	.46**	*.98*		
5. Behavioral Intent	.28**	.57**	.51**	.42**	*.93*	
6. Fruit &Vegetable Consumption	-.03	-.02	.04	.08	.19*	*1.00*

Note. Message was coded such that 1 = Attitude Message and 0 = Control Group. Standardized item alpha appears in the diagonal. ** indicates $p < .01$, two-tailed, and * indicates $p < .05$, two-tailed.

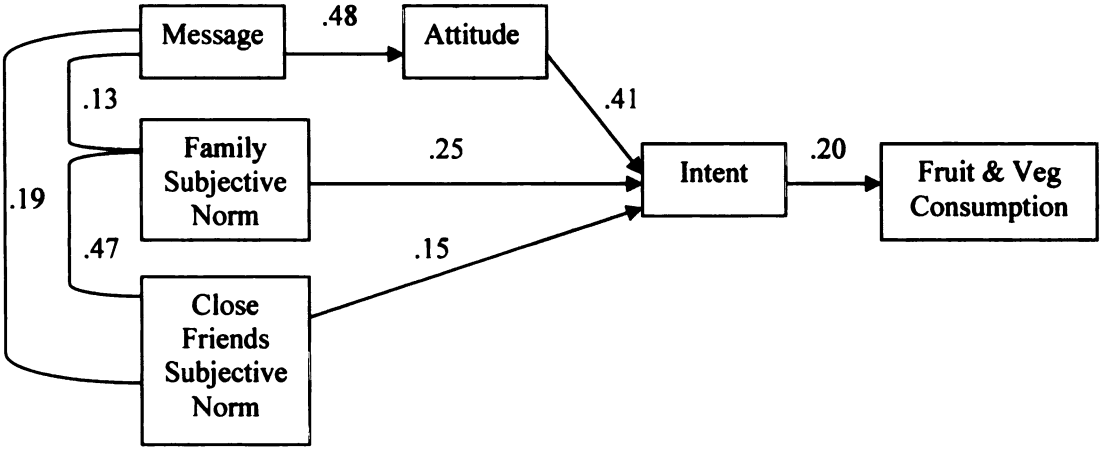

Figure 1. Model depicting the TRA when a persuasive message is aimed at attitudes with path coefficients corrected for attenuation due to measurement error.

One may observe from Figure 1 that all of the path coefficients are in the direction predicted but not all paths are ample. The coefficient linking the message and attitude was .48, $P(.36 \leq \rho \leq .60) = .95$, indicating that the message induction had a substantial effect on attitudes toward eating up to 9 servings of fruit and vegetables per

day. Attitudes, in turn, affected behavioral intentions (path coefficient = .40) such that the more favorable participants' attitude toward increasing fruit and vegetable consumption, the greater participants' intentions to engage in the behavior, $P(.26 \leq \rho \leq .54) = .95$. The coefficient linking family subjective norm and intent was .25, $P(.09 \leq \rho \leq .41) = .95$, indicating the more favorable participants perceive their family to be toward increasing fruit and vegetable consumption, the more likely they are to intend to engage in such behavior. The coefficient linking behavioral intent and behavior was .20, $P(.04 \leq \rho \leq .36) = .95$ demonstrating that intentions to eat more fruit and vegetables resulted in subsequent increases in fruit and vegetable consumption. The coefficient linking close friends subjective norm and intent, however, was .15, $P(-.01 \leq \rho \leq .31) = .95$ and was within sampling error of zero. Although this path is not large in magnitude, the fit of the overall model was tested nonetheless.

The differences between predicted and obtained correlations for all unconstrained bivariate relationships in the model were examined and three of the 7 differed substantially from what was expected from sampling error. These largest errors were -.11 (between attitude and behavior), .34 (between attitude and close friend subjective norm) and .46 (between attitude and family subjective norm). Further, the global test for goodness of fit indicated that the data were not consistent with the model, $\chi^2(7) = 27.84$, $p < .001$. Given that not all of the path coefficients were large in magnitude, and that the model and parameter estimates did not predict accurately the unconstrained correlations, the data were judged to be inconsistent with the model. Consequently, a post hoc search for an alternative model that fit the data was undertaken.

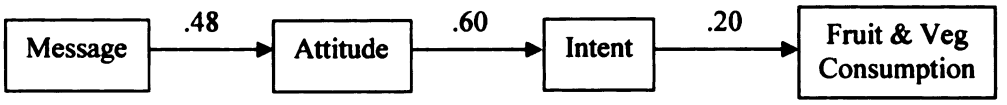

Figure 2. Revised model with path coefficients corrected for attenuation due to measurement error.

Results indicated that the data were consistent with a revised model (see Figure 2). Specifically, the coefficient linking the message and attitude was .48, $P(.36 \leq \rho \leq .60) = .95$, indicating that the message induction had a substantial effect on attitudes toward eating up to 9 servings of fruit and vegetables per day. Attitudes predicted one's intent to eat up to nine servings of fruit and vegetables per day [.60, $P(.50 \leq \rho \leq .70) = .95$] which subsequently predicted behavior [.20, $P(.04 \leq \rho \leq .36) = .95$]. All path coefficients were ample and were in the direction predicted. Additionally, an examination of the differences between predicted and obtained correlations for all the unconstrained bivariate relationship revealed that the errors did not differ substantially from what was expected from sampling error. Further, the global test for goodness of fit indicated that the data were consistent with the model, $\chi^2(3) = 2.26, p = .52$. Given that the path coefficients were ample, and that the model and parameter estimates predicted accurately the unconstrained correlations, the data were judged to be consistent with the alternative model.

Influencing change through subjective norms. This second model posited that when people read a message persuading them that their family and close friends want them to increase their fruit and vegetable consumption they are more likely to perceive familial and close friend subjective norms as favorable toward increased consumption (compared to a control group). Additionally, consistent with the TRA, the more favorable

one's attitude toward increased fruit and vegetable consumption, and the more favorable one perceives family and close friends to be toward the same behavior (subjective norm), the greater one's intention will be to increase consumption of fruit and vegetables and will subsequently engage in such behavior. The correlations employed to estimate the fit of the model parameters are presented in Table 4, and the path coefficients are presented in Figure 3.

Table 4

Zero-order Correlations Used to Calculate Parameter Estimates in Model 3

	1	2	3	4	5	6
1. Message	*1.00*					
2. Attitude	.42**	*.96*				
3. Family Subjective Norm	.34**	.52**	*.98*			
4. Close Friends Subjective Norm	.19*	.38**	.43**	*.98*		
5. Behavioral Intent	.29**	.55**	.45**	.38**	*.93*	
6. Fruit &Vegetable Consumption	-.07	-.04	.01	.06	.15	*1.00*

Note. Message was coded such that 1 = Subjective Norm Message and 0 = Control Group. Standardized item alpha appears in the diagonal. ** indicates $p < .01$, two-tailed, and * indicates $p < .05$, two-tailed.

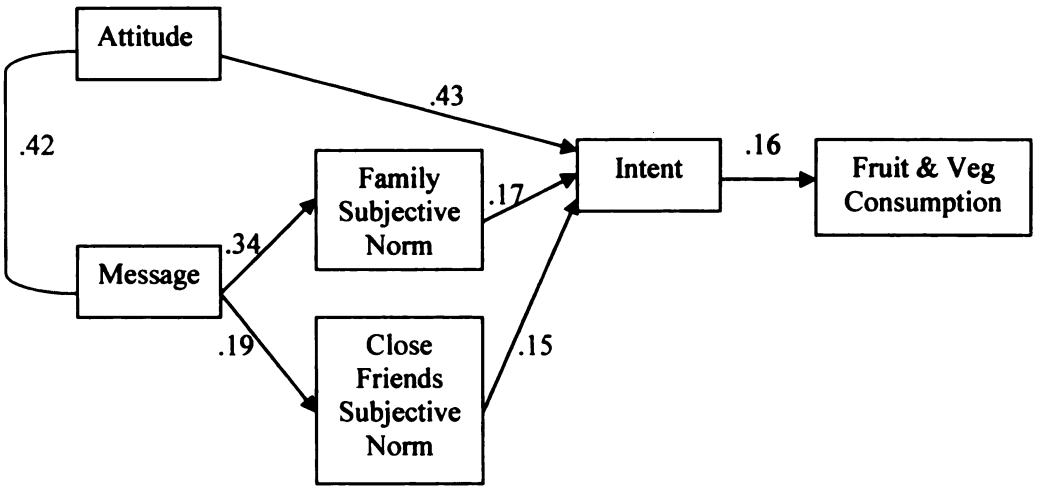

Figure 3. Model depicting the TRA when a persuasive message is aimed at subjective norm with path coefficients corrected for attenuation due to measurement error.

The OLS estimates shown in Figure 3 indicate that all of the path coefficients are in the direction predicted but not all paths are large in magnitude. The coefficient linking the message and family subjective norm was .34, $P(.20 \leq \rho \leq .48) = .95$, indicating that the message induction had a substantial effect on participants' perceptions that their family was in favor of eating up to 9 servings of fruit and vegetables per day. The path coefficient from message to close friends subjective norm was .19, $P(.05 \leq \rho \leq .33) = .95$, also indicating that the message induction had an effect on participants' perceptions that their close friends were in favor of increased fruit and vegetable consumption. The coefficient linking attitude to intent was .43, $P(.27 \leq \rho \leq .59) = .95$ such that the more favorable participants' attitude toward increasing fruit and vegetable consumption, the greater participants' intentions to engage in the behavior.

The coefficients linking family subjective norm and intent [.17, $P(-.01 \leq \rho \leq .35) = .95$], close friends subjective norm and intent [.15, $P(-.01 \leq \rho \leq .31) = .95$], and intent

and behavior [.16, $P(.00 \leq \rho \leq .32) = .95$] were within sampling error of zero. Although these paths are not ample, the fit of the overall model was tested.

The differences between predicted and obtained correlations for all unconstrained bivariate relationships in the model were examined and five of the 7 differed substantially from what was expected from sampling error. These errors were -.11 (between message and behavior), -.11 (between attitude and behavior), .39 (between attitude and family subjective norm), .31 (between attitude and close friend subjective norm), and .37 (between family and close friend subjective norms). Further, the global test for goodness of fit indicated that the data were not consistent with the model, $\chi^2(8) = 34.36, p < .001$. Given that not all of the path coefficients were large in magnitude, and that the model and parameter estimates did not predict accurately the unconstrained correlations, the data were judged to be inconsistent with the model. A subsequent post hoc search for an alternative model that fit the data was undertaken, but the data were not consistent with an alternative model.

The model with no change. In order to determine if the TRA could predict accurately people's fruit and vegetable consumption when no message was present, the TRA was tested using only the control group. As noted previously, the TRA predicts that the more favorable one's attitude toward increased fruit and vegetable consumption, and the more favorable one perceives family and close friends to be toward the same behavior (subjective norm), the greater one's intention will be to increase consumption of fruit and vegetables and will subsequently engage in such behavior. The correlations employed to estimate the fit of the model parameters are presented in Table 5, and the path coefficients are presented in Figure 4.

Table 5

Zero-order Correlations Used to Calculate Parameter Estimates in Model 4

	1	2	3	4	5
1. Attitude	*.96*				
2. Family Subjective Norm	.36**	*.98*			
3. Close Friends Subjective Norm	.37**	.38**	*.98*		
4. Behavioral Intent	.43**	.41**	.37**	*.93*	
5. Fruit &Vegetable Consumption	.05	.05	.09	.23*	*1.00*

Note. Standardized item alpha appears in the diagonal. ** indicates $p < .01$, two-tailed, and * indicates $p < .05$, two-tailed.

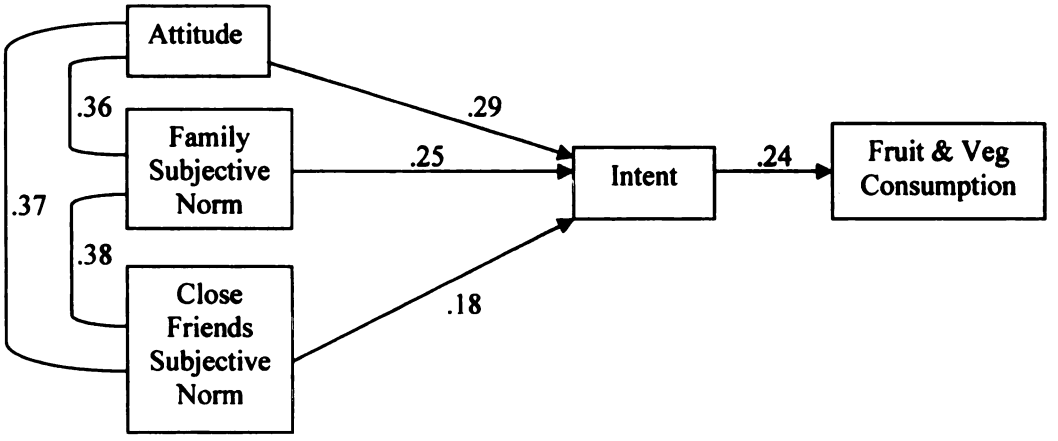

Figure 4. Model depicting the TRA when no persuasive message is present with path coefficients corrected for attenuation due to measurement error.

One may observe from Figure 4 that all of the path coefficients are in the direction predicted but that the relationship between close friends subjective norm and intent is not very large in magnitude. An examination of each link in the model revealed that the coefficient linking attitude and intent was .29, $P(.11 \leq \rho \leq .47) = .95$, indicating that the more favorable participants' attitude toward increasing fruit and vegetable

consumption, the greater participants' intentions to engage in the behavior. The path coefficient from family subjective norm to intent was .25, $P(.05 \leq \rho \leq .45) = .95$, indicating the more favorable participants perceive their family to be toward increasing fruit and vegetable consumption, the more likely they are to intend to engage in such behavior. The coefficient linking close friends subjective norm and intent (.18) was not within sampling error of zero, $P(.02 \leq \rho \leq .34) = .95$. This demonstrated that the more favorable participants perceive their close friends to be toward increasing fruit and vegetable consumption, the more likely they are to intend to engage in such behavior. The coefficient linking behavioral intent and behavior was .24, $P(.06 \leq \rho \leq .42) = .95$ indicating that intentions to eat more fruit and vegetables resulted in subsequent increases in fruit and vegetable consumption.

The differences between predicted and obtained correlations for all unconstrained bivariate relationships in the model were examined and none differed substantially from what was expected from sampling error. Further, the global test for goodness of fit indicated that the data were consistent with the model, $\chi^2(3) = .29, p = .96$. Given that the path coefficients were ample, and that the model and parameter estimates predicted accurately the unconstrained correlations, the data were judged to be consistent with the model.

Summary of fruit and vegetable results. The predicted relationships outlined by the TRA were examined when 1) attitudes were influenced by a persuasive message, 2) subjective norms were influenced by a persuasive message, and 3) no message was present. The results indicated that when people's attitude or subjective norm is influenced by a persuasive message the TRA's predictions are not consistent with the data. The test

of the TRA when no change is present, however, provided evidence that its predictions are consistent with the control group data. Therefore, the TRA's predictive power appears to lie in its ability to predict behavior when attitudes and subjective norms are measured in their current state but not when they are changing. To provide a second test of these relationships, an examination of skipping meals is reported subsequently.

Skipped Meals Results

Influencing change through attitudes. This first model posited that when people read a message persuading them to avoid skipping meals every day they are more likely to have unfavorable attitudes toward skipping meals (compared to a control group). Additionally, consistent with the TRA, the more unfavorable one's attitude toward skipping meals, and the more unfavorable one perceives family and close friends to be toward the same behavior (subjective norm), the less intent one will have to skip meals and will subsequently avoid such behavior. The correlations employed to estimate the fit of the model parameters are presented in Table 6, and the path coefficients are presented in Figure 5.

Table 6

Zero-order Correlations Used to Calculate Parameter Estimates in Model 5

	1	2	3	4	5	6
1. Message	*1.00*					
2. Attitude	-.04	*.93*				
3. Family Subjective Norm	.11	.42**	*.96*			
4. Close Friends Subjective Norm	.12	.26**	.46**	*.97*		
5. Behavioral Intent	.00	.62**	.51**	.27**	*.93*	
6. Number of Meals Skipped per Day	.04	.17*	.04	.06	.23*	*1.00*

Note. Message was coded such that 1 = Attitude Message and 0 = Control Group. Standardized item alpha appears in the diagonal. ** indicates $p < .01$, two-tailed, and * indicates $p < .05$, two-tailed.

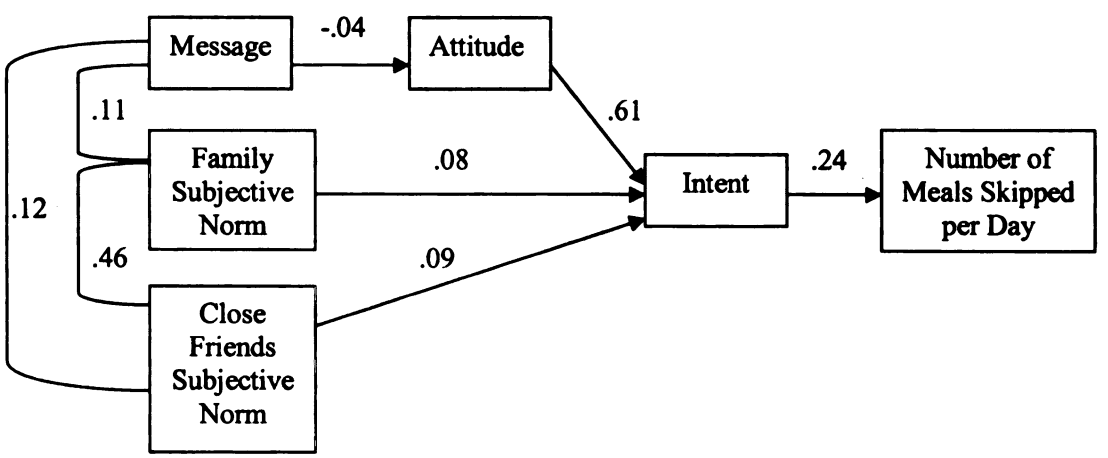

Figure 5. Model depicting the TRA when a persuasive message is aimed at attitudes with path coefficients corrected for attenuation due to measurement error.

One may observe from Figure 4 that all of the path coefficients are in the direction predicted but not all paths are ample. The coefficient linking attitude and intent was .61, $P(.49 \leq \rho \leq .73) = .95$, demonstrating that the less favorable one's attitude toward skipping meals the less intent one had to skip meals. The path between intent and behavior was .24, $P(.10 \leq \rho \leq .38) = .95$, indicating that the less intent one had to skip

meals, fewer meals were actually skipped (in other words, they avoided the behavior). The coefficients linking the message and attitude [-.04, $P(-.20 \leq \rho \leq .12) = .95$], family subjective norm and intent [.08, $P(-.10 \leq \rho \leq .26) = .95$], and close friends subjective norm and intent [.09, $P(-.07 \leq \rho \leq .25) = .95$] all were within sampling error of zero. Although these paths indicate that the data were not consistent with this model, the fit of the model was assessed subsequently.

The differences between predicted and obtained correlations for all unconstrained bivariate relationships in the model were examined and two errors differed substantially from what was expected from sampling error. These largest errors were .28 (between attitude and close friends subjective norm) and .45 (between attitude and family subjective norm). Further, the global test for goodness of fit indicated that the data were not consistent with the model, $\chi^2(7) = 22.25, p < .001$. Given that not all of the path coefficients were large in magnitude, and that the model and parameter estimates did not predict accurately the unconstrained correlations, the data were judged to be inconsistent with the model. Consequently, a post hoc search for an alternative model that fit the data was undertaken.

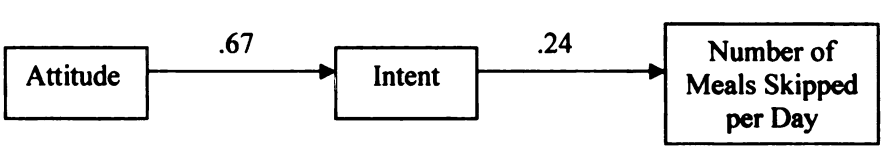

Figure 6. Revised model with path coefficients corrected for attenuation due to measurement error.

Results indicated that the data were consistent with a revised model (see Figure 6). Specifically, attitudes toward skipping meals predicted one's intent to skip meals [.67,

$P(.57 \leq \rho \leq .77) = .95]$ which subsequently predicted behavior [.24, $P(.10 \leq \rho \leq .38) = .95$]. Both path coefficients were ample and were in the direction predicted. Additionally, an examination of the differences between predicted and obtained correlations for all the unconstrained bivariate relationship revealed that the error did not differ substantially from what was expected from sampling error. Further, the global test for goodness of fit indicated that the data were consistent with the model, $\chi^2(1) = .03, p = .99$. Given that the path coefficients were ample, and that the model and parameter estimates predicted accurately the unconstrained correlation, the data were judged to be consistent with the alternative model. One should note, however, that because these data are consistent with the model in Figure 6 the data are also consistent with the reverse model and one should use caution when interpreting these results.

Influencing change through subjective norms. This second model posited that when people read a message persuading them that their family and close friends want them to avoid skipping meals they are more likely to perceive familial and close friend subjective norms as unfavorable toward increased consumption (compared to a control group). Additionally, consistent with the TRA, the more unfavorable one's attitude toward skipping meals, and the more unfavorable one perceives family and close friends to be toward the same behavior (subjective norm), the lesser one's intention will be to skip meals and will subsequently avoid such behavior. The correlations employed to estimate the fit of the model parameters are presented in Table 7, and the path coefficients are presented in Figure 7.

Table 7

Zero-order Correlations Used to Calculate Parameter Estimates in Model 7

	1	2	3	4	5	6
1. Message	*1.00*					
2. Attitude	.01	*.93*				
3. Family Subjective Norm	.03	.46**	*.96*			
4. Close Friends Subjective Norm	.12	.24**	.36**	*.97*		
5. Behavioral Intent	.07	.70**	.40**	.27**	*.93*	
6. Number of Meals Skipped per Day	-.01	.21**	.08	.06	.21**	*1.00*

Note. Message was coded such that 1 = Subjective Norm Message and 0 = Control Group. Standardized item alpha appears in the diagonal. ** indicates $p < .01$, two-tailed, and * indicates $p < .05$, two-tailed.

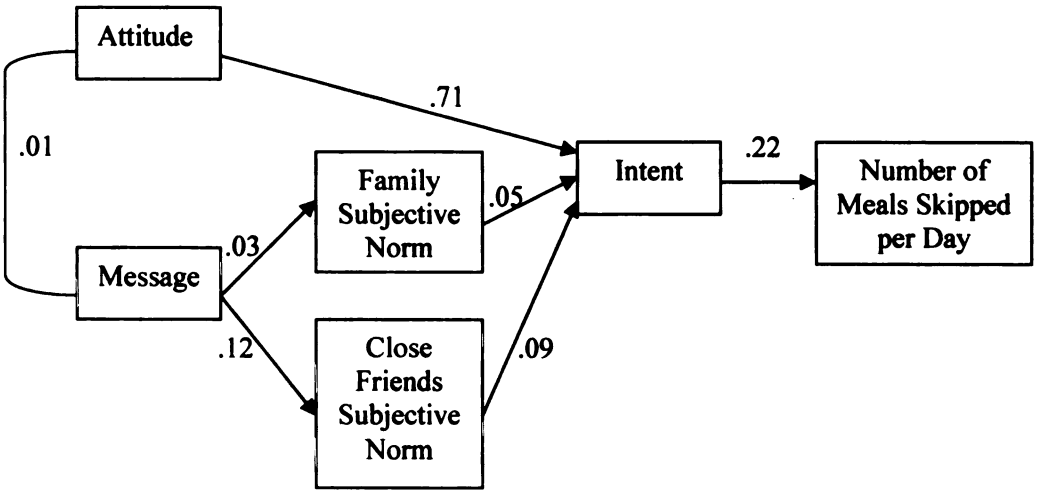

Figure 7. Model depicting the TRA when a persuasive message is aimed at subjective norm with path coefficients corrected for attenuation due to measurement error.

The OLS estimates shown in Figure 7 indicate that all of the path coefficients are in the direction predicted but not all paths are ample. The coefficient linking attitude and intent was .71, $P(.59 \leq \rho \leq .83) = .95$, demonstrating that the less favorable one's attitude toward skipping meals the less intent one had to skip meals. The path between intent and behavior was .22, $P(.08 \leq \rho \leq .36) = .95$, indicating that the less intent one had to skip

meals, fewer meals were actually skipped. The coefficients linking the message and family subjective norm [.03, $P(-.13 \leq \rho \leq .17) = .95$], message and close friends subjective norm [.12, $P(-.02 \leq \rho \leq .26) = .95$], family subjective norm and intent [.05, $P(-.13 \leq \rho \leq .23) = .95$], and close friends subjective norm and intent [.09, $P(-.07 \leq \rho \leq .25) = .95$] all were within sampling error of zero. Although these paths indicate that the data were not consistent with this model, the fit of the model was assessed subsequently.

The differences between predicted and obtained correlations for all unconstrained bivariate relationships in the model were examined and three errors differed substantially from what was expected from sampling error. These largest errors were .25 (between attitude and close friends subjective norm), .37 (between family and close friends subjective norms), and .49 (between attitude and family subjective norm). Further, the global test for goodness of fit indicated that the data were not consistent with the model, $\chi^2(8) = 36.78, p < .001$. Given that not all of the path coefficients were large in magnitude, and that the model and parameter estimates did not predict accurately the unconstrained correlations, the data were judged to be inconsistent with the model. Consequently, a post hoc search for an alternative model that fit the data was undertaken.

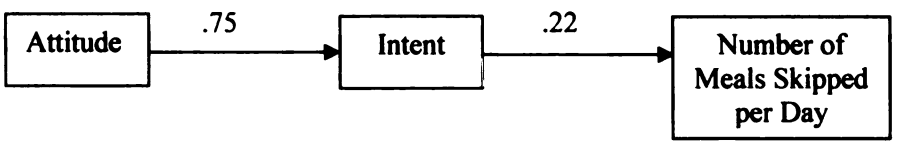

Figure 8. Revised model with path coefficients corrected for attenuation due to measurement error.

Results indicated that the data were consistent with a revised model (see Figure 8). Specifically, attitudes toward skipping meals predicted one's intent to skip meals [.75,

$P(.67 \leq \rho \leq .83) = .95]$ which subsequently predicted behavior [.22, $P(.08 \leq \rho \leq .36) = .95]$. Both path coefficients were ample and were in the direction predicted. Additionally, an examination of the differences between predicted and obtained correlations for all the unconstrained bivariate relationship revealed that the error did not differ substantially from what was expected from sampling error. Further, the global test for goodness of fit indicated that the data were consistent with the model, $\chi^2(1) = .26, p = .61$. Given that the path coefficients were ample, and that the model and parameter estimates predicted accurately the unconstrained correlation, the data were judged to be consistent with the alternative model. As noted previously, because these data are consistent with the model in Figure 8 the data are also consistent with the reverse model and one should use caution when interpreting these results.

The model with no change. In order to determine if the TRA could predict accurately the number of meals people skip a day when no message was present, the TRA was tested using only the control group. As noted previously, the TRA predicts that the more unfavorable one's attitude toward skipping meals, and the more unfavorable one perceives family and close friends to be toward the same behavior (subjective norm), the lesser one's intention will be to skip meals and will subsequently avoid such behavior. The correlations employed to estimate the fit of the model parameters are presented in Table 8, and the path coefficients are presented in Figure 9.

Table 8

Zero-order Correlations Used to Calculate Parameter Estimates in Model 9

	1	2	3	4	5
1. Attitude	*.93*				
2. Family Subjective Norm	.46**	*.96*			
3. Close Friends Subjective Norm	.31**	.36**	*.97*		
4. Behavioral Intent	.66**	.35**	.25*	*.93*	
5. Number of Meals Skipped per Day	.23*	-.02	.04	.24*	*1.00*

Note. Standardized item alpha appears in the diagonal. ** indicates $p < .01$, two-tailed, and * indicates $p < .05$, two-tailed.

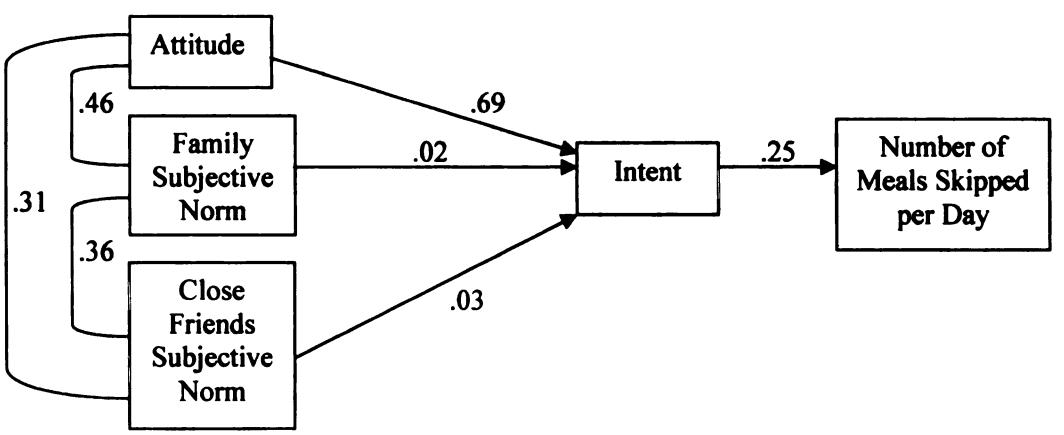

Figure 9. Model depicting the TRA when no persuasive message is present with path coefficients corrected for attenuation due to measurement error.

One may observe from Figure 9 that all of the path coefficients are in the direction predicted but that two paths are very small in magnitude. An examination of each link in the model revealed that the coefficient linking attitude and intent was .69, $P(.51 \leq \rho \leq .87) = .95$, indicating that the more unfavorable participants' attitude toward skipping meals, the lesser participants' intentions to engage in the behavior. The path coefficient from intent to behavior was .25, $P(.05 \leq \rho \leq .45) = .95$, such that the less

intent one had to skip meals, fewer meals were actually skipped. The OLS estimates also produced a path coefficient from family subjective norm to intent of .02, $P(-.23 \leq \rho \leq .27) = .95$, and from close friends subjective norm to intent of .03, $P(-.21 \leq \rho \leq .27) = .95$, which were within sampling error of zero indicating that the data were not consistent with the model.

The differences between predicted and obtained correlations for all unconstrained bivariate relationships in the model were examined and one error (-.11, between family subjective norm and behavior) differed substantially from what was expected from sampling error. The global test for goodness of fit indicated that the data were consistent with the model, $\chi^2(3) = .75, p = .86$, however, given that two of the path coefficients were essentially zero, the data were judged to be inconsistent with the model. Consequently, a post hoc search for an alternative model that fit the data was undertaken.

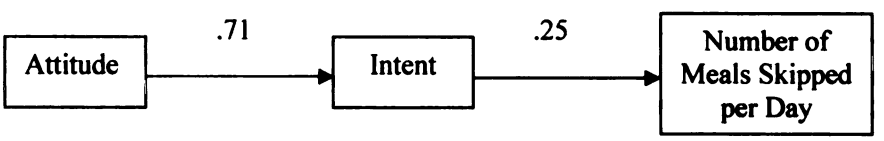

Figure 10. Revised model with path coefficients corrected for attenuation due to measurement error.

Results indicated that the data were consistent with a revised model (see Figure 10). Specifically, attitudes toward skipping meals predicted one's intent to skip meals [.71, $P(.59 \leq \rho \leq .83) = .95$] which subsequently predicted behavior [.25, $P(.05 \leq \rho \leq .45) = .95$]. Both path coefficients were ample and were in the direction predicted. Additionally, an examination of the differences between predicted and obtained correlations for all the unconstrained bivariate relationship revealed that the error (.06)

did not differ substantially from what was expected from sampling error. Further, the global test for goodness of fit indicated that the data were consistent with the model, $\chi^2(1) = .17, p = .68$. Given that the path coefficients were ample, and that the model and parameter estimates predicted accurately the unconstrained correlation, the data were judged to be consistent with the alternative model. Again, because these data are consistent with the model in Figure 10 the data are also consistent with the reverse model and one should use caution when interpreting these results.

Summary of skipped meals results. The predicted relationships outlined by the TRA were examined when a persuasive message influenced attitudes, subjective norms, and when no message was present. The results indicated that 1) unlike the effect of the persuasive message with the fruit and vegetable consumption topic, the message was unsuccessful in influencing attitudes or subjective norms, and 2) again unlike the fruit and vegetable topic, TRA's predictions were not consistent with the data from any group. Interestingly, the only model to predict accurately the number of meals participants skipped every day was a simple causal string such that attitudes impacted intentions which predicted behavior. These results, and those from the fruit and vegetable consumption topic, will be explored more fully in the discussion.

DISCUSSION

The current study sought to test an extension of Ajzen and Fishbein's (1970, 1974) Theory of Reasoned Action; namely, it provided a test of the predicted relationships outlined by the TRA within two systems of change: 1) when attitude change and 2) subjective norm change resulted from exposure to a persuasive message. This test of the TRA was important because attitudes and subjective norms rarely are held constant and because people often are presented with persuasive messages aimed to change their attitudes, subjective norms, and behavior. Thus, it was important to understand how such messages affect the predictive power of the TRA.

Findings and Implications

The first test examined fruit and vegetable consumption. The results indicated that when attitudes or subjective norm were affected by a persuasive message, the predictive power of the TRA was diminished. Specifically, the data were not consistent with the TRA when 1) attitude was impacted by a persuasive message or 2) subjective norms were influenced by a message. In contrast to these results, an examination of the static model (when no message influenced attitude or subjective norm) revealed that fruit and vegetable consumption was predicted by respondents' intentions, and intentions were predicted by attitude and subjective norms. Hence, the data were consistent with the TRA when no change was induced by a persuasive message. These results are interesting theoretically because they delineate the predictive scope of the TRA. Although the TRA may predict accurately intentions and subsequent behavior when attitudes and subjective norms are measured at a given point in time, the theory may be limited potentially insofar

as the TRA may not be able to predict accurately intentions and behaviors when attitudes or subjective norms are influenced by a persuasive message.

The first test of the TRA revealed that the theory may be limited such that it may not predict accurately behaviors when attitudes or subjective norms are influenced by a persuasive message. An additional test of the TRA was conducted, however, in order to determine if the findings from the first test could be replicated. Those results are discussed next.

The second test of the TRA examined the number of meals people skip every day. Two striking results emerged from this examination: 1) although the persuasive messages had some success influencing attitudes and subjective norms toward fruit and vegetable consumption, the effect of these same messages on attitudes and subjective norms toward skipping meals was miniscule (within sampling error of zero), and 2) the data were not consistent with the TRA even though attitudes and subjective norm were not influenced by a persuasive message. In fact, the best predictor of skipping meals was a simple causal string such that behaviors were predicted by intentions, and intent was predicted by attitude, regardless of the experimental condition. As noted previously, however, the results were also consistent with the reverse model (attitude predicted by intent and intent predicted by attitude). This possibility of reverse directionality will be discussed in more detail later.

Although the findings are interesting theoretically, a number of limitations exist in the current study. These limitations are discussed subsequently.

Limitations

A number of limitations to the current study exist. First, although the impact of the persuasive subjective norm message on respondents' perceptions of their family subjective norm ($r = .34$) and their close friends subjective norm ($r = .19$) toward fruit and vegetable consumption were ample, it should be noted that neither of these inductions was very powerful. This may simply be an artifact of the fruit and vegetable topic. Perhaps one's subjective norm regarding the increased consumption of fruit and vegetables is not susceptible to much change. A more likely explanation, however, lies in the difficulty of creating a persuasive message aimed at subjective norms.

The persuasive message used in the main experiment was the subject of three different modifications and pilot tests before it met adequately the criteria for inclusion in the study. Two difficulties were discovered when designing the subjective norm message: 1) a message cannot advocate what a person's actual family or friend believes (e.g., "Your parents want you to eat more fruits and vegetables," or "Your friends think that eating up to nine servings of fruit and vegetables a day will improve your health"), and 2) a message must use general claims about families and friends (e.g., "A recent survey found that parents with college-aged children want their children to incorporate more fruits and vegetables into their diet"). A message that tells its readers that their families or friends are in favor of a specific behavior is not credible or believable. After all, the message source does not know what the reader's family believes, and how could it (especially if the message source is not a family member)? Indeed, in focus groups conducted to aid message design during the pilot phase, messages with direct claims

about participants' families and friends resulted in anger and refusal to take the message seriously.

By using more general claims, a message may gain credibility and realism, but may fall short of influencing one's subjective norm to a great magnitude because 1) no evidence is presented to indicate how similar the generalized families in the message are to a reader's family and 2) a reader may not believe such generalized claims (especially when one's parents do not actually say "eat more fruit" or the parents' behaviors are not consistent with the message claims). Therefore, although the current study employed generalized claims which were judged to be credible, realistic, and which advocated the desired perceptions of subjective norm, the strength of the subjective norm message was less than optimal and therefore may have provided a weak test of the model.

Second, one should note that the persuasive fruit and vegetable subjective norm message had a substantial effect on participants' attitudes ($r = .42$), in addition to its impact on family ($r = .34$) and close friends ($r = .19$) subjective norms. This may have been due to the evidence used in the subjective norm message. Specifically, the messages were designed such that they were equivocal in many aspects; hence, many of the claims and pieces of evidence in the subjective norm message were identical or similar to that used in the persuasive attitude message. Although the focus of the subjective norm message was to persuade participants that their families and close friends want them to eat more fruits and vegetables, the nature of the evidence and claims may have resulted in the message impacting attitudes as well. One should not conclude, however, that scholars and practitioners should abandon the use of persuasive subjective norm messages in favor of messages aimed only at attitudes because 1) as noted previously, more research is

needed in order to perfect subjective norm messages and 2) if subjective norm messages do, indeed, affect attitudes positively, the messages may result in the desired behavior change. Therefore, it is important to continue to examine persuasive subjective norm messages.

Third, an examination of mean fruit and vegetable consumption by condition (see Table 1 for reference) indicated that participants in the control group increased their consumption by 1.41 servings per day, compared to participants in the attitude and subjective norm message groups who increased their consumption by .97 and .94 servings per day, respectively. Therefore, participants in the control group showed evidence of increased consumption without exposure to an experimental induction. It is possible that exposure to the 54 questions about fruit and vegetable consumption during the Time One survey may have served as a persuasive message. Specifically, reading and answering questions about one's attitude, intent, and what one's family and close friends think about fruit and vegetable consumption may have likely had an effect on behavior. It is also possible that such questions may have resulted in participants recalling actual messages from their family and friends. Additionally, because control group participants may have reasonably concluded that the researcher was interested in increased fruit and vegetable consumption after exposure to the questions at Time One, demand effects may have been present such that respondents answered the consumption behavior consistent with that they believed the researcher would expect from them. Therefore, mere exposure to the instrument may have resulted in increased fruit and vegetable consumption, or this change in behavior could have been due to simple demand effects.

Fourth, the attitude-behavior correlations obtained in the current study diverge greatly from that those found in previous research and, most notably, Kim and Hunter's (1993a) meta-analysis. For example, the largest correlation obtained between attitudes toward fruit and vegetable consumption and behavior (r = .05), and that between attitudes toward skipping meals and behavior (r = .23), deviate from meta-analytic findings (mean r = .79). Measurement error is one possible explanation for the current findings. Because the behaviors were assessed with single items, it is likely that unreliability attenuated the attitude-behavior correlations. Although it is not possible to assess the reliability of a single item, therefore making it necessary to assume perfect measurement when testing a model, such single-item measures are highly unreliable and can attenuate relationships. If one assumed the reliability for the single-item behavioral measures to be .40, the corrected fruit and vegetable (r = .08) and skipping meals (r = .38) attitude-behavior correlations would be larger. The corrected relationships, however, remain substantially weaker than the previous meta-analytic findings.

Restriction in range is another statistical artifact that may be responsible for attenuating the attitude-behavior relationships. Specifically, the distributions for both fruit and vegetable consumption (kurtosis = 20.62) and number of meals skipped per day (kurtosis = 25.52) were highly leptokurtic. That is, little variance was present with regards to participants' behavior. Given that such restriction in range can attenuate relationships, it is likely that this, in addition to the measurement error associated with the use of single items, may account for the divergent findings of the current study.

Fifth, the relationships found with the skipping meals topic (that attitudes predict intentions and intent predicts behavior) may be consistent with the reverse model because

both models are equivalent statistically (see Kim & Hunter, 1993a, 1993b). Given that the current study examined these relationships using cross-sectional data it is impossible to distinguish the direction of the attitude-behavior relationship found with regards to skipping meals. Although one cannot be sure with the data available here, it is plausible that respondents' meal-skipping behavior may predict intentions and subsequent attitudes toward meal skipping.

Recent research from the National Center for Health (2003) indicated that nearly forty percent of people in the United States skip one meal every day, and that meal is breakfast typically. People may have a routine, or habit, of skipping breakfast in order to get to work or school on time, because they don't feel hungry in the morning, or because at a young age they skipped breakfast before school and have continued that habit into adulthood (NCH, 2003). This behavior may result ultimately in attitudes that are favorable toward skipping meals (e.g., "I think skipping breakfast is okay because I skip it almost every day") or unfavorable toward the behavior (e.g., "I eat breakfast every morning so I think that eating breakfast is a good idea"). Because one cannot be certain about the direction of the relationship found in the current investigation, one should be cautious when interpreting these results.

In sum, the present investigation has a number of limitations. Namely, the current study had problems related to 1) the persuasive subjective norm message induction, 2) possible repeated exposure and demand effects, 3) the weak attitude-behavior relationship found with both topics, and 4) the inability to decipher the directionality of the attitude-behavior relationship with regards to the skipping meals topic. Given these

limitations, scholars should address these concerns in future research. Ideas for future research are discussed next.

Directions for Future Research

Given that previous research has shown that one's family can have an effect on eating behaviors (Haworth-Hoeppner, 2000; Humphrey, 1987; Levine et al., 1994; Schur et al., 2000), and that one's peers and close friends also impact eating behaviors (Hausenblas & Carron, 1998; Levine, Smolak, Moodey, et al., 1994; Paxton et al., 1999), future research should focus on how to design an effective message to influence people's perceptions of subjective norms. Although the persuasive subjective norm message met the criteria necessary for inclusion in the current study, future research should focus on how to improve the induction. Specifically, future messages should be sure to include claims that make the message seem less divergent from one's experience in order to strengthen the subjective norm induction (e.g., "Although your parents may not tell you, and even though they may not eat enough fruit and vegetables themselves, your parents would still want you to increase your consumption to ensure you are healthy").

Additionally, one is likely influenced by people other than family and friends (Sanftner et al., 1996). People are influenced by their romantic partners and co-workers, for example, and future research should examine 1) the degree to which these subjective norms predict intentions and subsequent behavior and 2) message strategies to influence such subjective norms. For example, one's desire to act consistent with a romantic partner's beliefs may influence intentions and behavior to a greater magnitude than friends or family members. Furthermore, this differential effect may be bound by the specific behavior being examined. Therefore, future research should also examine which

subjective norms (e.g., family, friends, partners, teachers) best predict different behaviors.

Another line of research should aim to examine the degree to which the results of the current study generalize to other topics. Future research should test change and the TRA model by focusing on other health and non-health topics (e.g., students' time spent studying every week, condom use, exercise behavior, workplace performance). Such tests will help to determine the boundaries of the TRA's predictive abilities and will provide further evidence of the effectiveness (or ineffectiveness) of the TRA when attitudes and subjective norms are influenced by persuasive messages.

Finally, scholars should focus on providing a longitudinal test of the TRA. First, because two models are plausible with regards to the skipping meals topic, future research should examine these relationships longitudinally in order to decipher the direction of the attitude-behavior relationship. A longitudinal investigation could address the problems inherent in deciphering directionality of the attitude-behavior relationship. Specifically, as Kim and Hunter (1993a, 1993b) noted, although it is commonly believed that attitudes precede behavior, the reverse is also plausible. The TRA also allows for this possibility; when the correlation between attitude and subjective norm is equal to the product of the intention-attitude and intention-subjective norm correlations, the TRA cannot distinguish the direction of the attitude-behavior relationship. For example, given the data presented in Table 9 the TRA model is consistent with the data (see Figure 11a). Additionally, the reverse TRA model is consistent with these same data (see Figure 11b). Therefore, given certain data, the TRA may not be able to assess the directionality of the attitude-behavior relationship.

Table 9

Hypothetical TRA Data

	1	2	3	4
1. Attitude				
2. Subjective Norm	.25			
3. Behavioral Intent	.50	.50		
4. Behavior	.25	.25	.50	

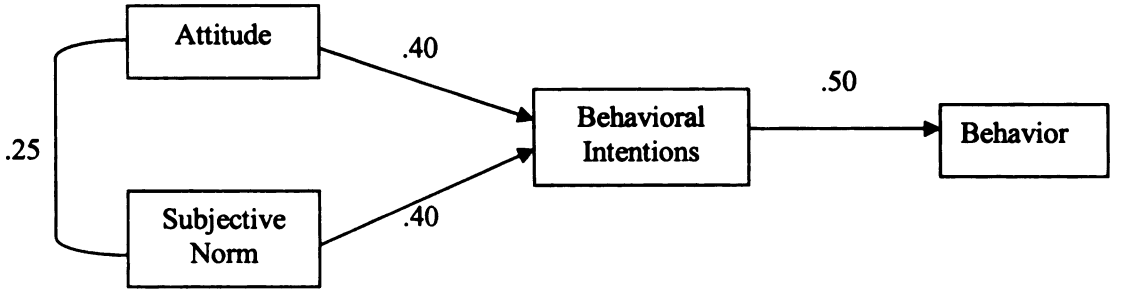

Figure 11a. Condition under which the TRA cannot assess directionality.

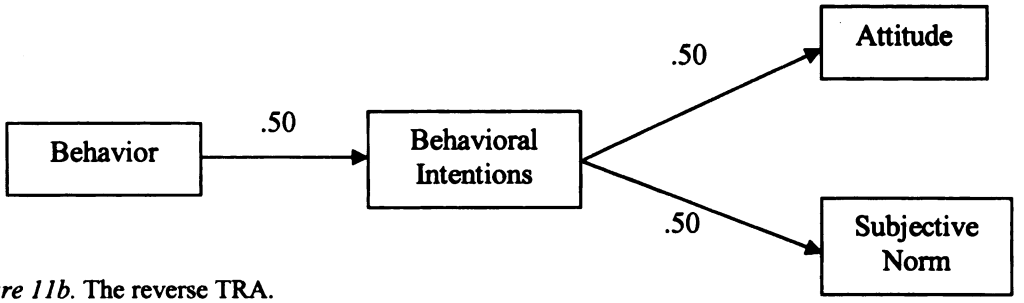

Figure 11b. The reverse TRA.

Note. If the obtained correlation between attitude and subjective norm is equal to the product of the intention-attitude and intention-subjective norm correlations (here, $r = .25$) behaviors are equally as predictive of attitudes as attitudes are of behavior.

Existing cross-lagged research has done little, however, to make a firm determination of the directionality of the relationship. Although this body of research appears to be consistent with the TRA such that attitudes and subjective norm predict intentions and subsequent behavior (Bentler & Speckart, 1981; Kahle & Berman, 1979),

some evidence has shown that behaviors can have causal priority over attitudes and subjective norms (Bentler & Speckart, 1981). Unfortunately, these findings are downplayed and little has been done to address the degree to which the reverse TRA may be true and the conditions under which this may occur.

Because the current investigation is limited insofar as it provides a test of the TRA when persuasive messages impact components of the model but examines those effects at only one point in time, this cross-sectional snapshot should not be the final investigation of the TRA models tested here. Future endeavors to understand the effect of persuasive messages on the TRA's predictions should also undertake a longitudinal approach.

As noted previously, a few scholars have examined the TRA over time, but the existing cross-lagged research has only tested the static model (e.g., Bentler & Speckart, 1981; Kahle & Berman, 1979). That is to say, existing attitudes, subjective norm, intent, and behaviors were measured at more than one point in time, but persuasive message inductions were not used in order to test systematically the longitudinal effect of attitude or subjective norm change on intentions and subsequent behavior. A single-exposure, persuasive message may influence attitudes or subjective norms immediately (as found in the present study), but the long term implication of this influence on intentions and behaviors, and the predictive power of the TRA, is not clear. Therefore, longitudinal research is needed in order to determine if the TRA's predictions are accurate over time. It is possible that, consistent with the current investigation, the predictions are not accurate at one point in time, but over time the theory may have increased predictive power. This is an empirical question that should be addressed in future research.

Conclusion

The current study addressed core functional questions about influence and the TRA. As noted previously, the answers to these questions clearly hold theoretical and practical import. Although the ability of the present investigation to answer these questions was limited insofar that message design was less than optimal in one condition and the current analyses used only cross-sectional data, the findings reported here begin to outline potential limitations with regards to the predictive power of the TRA. The future research suggested here will address these limitations and provide an important, expanded test of the TRA.

Footnotes

[1]The data collected for the current study were taken from a larger program of research conducted over the course of approximately one month. Although all analyses reported for the current study come from Survey 1 and Survey 2, only those respondents who participated fully in all three surveys were included in the final analyses. Therefore, all participant information reported here refers to respondents who completed all three surveys.

[2]Given that Fishbein and Ajzen (1975) claim that attitudes are the sum of one's evaluative beliefs, they make an assumption that each of these beliefs is related linearly. Therefore, Confirmatory Factor Analysis was employed to test the attitude belief and both subjective norm belief measurement models.

[3]One should be careful to note that because the measurement used in the current study differs from that advocated by Fishbein and Ajzen (1975) it may be a limitation when comparing these results to other TRA studies.

APPENDICES

APPENDIX A

Pilot Behavioral Questions

1. On average, how many hours *per week* do you exercise? _____

2. On average, how many hours *per week* do you work? _____

3. On a scale of 1 to 10, how physically strenuous is your job?

not strenuous 1 2 3 4 5 6 7 8 9 10 very strenuous

4. Do you smoke cigarettes? Yes No

5. On average, how many cigarettes do you smoke *per day*? _____

6. On average, how many servings of fruit do you eat per day (one serving ~ 1 cup of fruit)? _____ *

7. On average, how many servings of vegetables do you eat per day, not including starchy vegetables like potatoes and corn (one serving ~ 1 cup of vegetables)? _____ *

8. On average, how many grams of fat do you eat per day? _____

9. Are you currently in a romantic relationship? Yes No

10. For how many months have you been with your current romantic partner? (For example, if you have been with your partner for 2 years, you would answer 24). _____

11. In an average week, how many times do you skip meals? _____

12. On an average day, how many *meals* do you eat? _____

13. On an average day, how many *snacks* do you eat? _____

14. On an average day, how many meals do you skip? _____ *

15. Do you live in an on-campus dorm? Yes No

16. Do you live in an on-campus apartment? Yes No

17. Do you live with your parent(s)? Yes No

18. Do you live off campus (separate from your parents)? Yes No

19. Do you play intercollegiate sports? Yes No

Note. * indicates questions about the behaviors of interest for the current study. All other items were filler items.

APPENDIX B

Message Realism Scale

1. This message was believable.

Strongly **Disagree**	-3	-2	-1	0	+1	+2	+3	Strongly **Agree**

2. This message was fake.

Strongly **Disagree**	-3	-2	-1	0	+1	+2	+3	Strongly **Agree**

3. This message was exaggerated.

Strongly **Disagree**	-3	-2	-1	0	+1	+2	+3	Strongly **Agree**

4. This message was plausible.

Strongly **Disagree**	-3	-2	-1	0	+1	+2	+3	Strongly **Agree**

5. This message was realistic.

Strongly **Disagree**	-3	-2	-1	0	+1	+2	+3	Strongly **Agree**

APPENDIX C

Message Credibility Scale

1. The information presented in the message is credible.

Strongly **Disagree**	-3	-2	-1	0	+1	+2	+3	Strongly **Agree**

2. The message is reliable.

Strongly **Disagree**	-3	-2	-1	0	+1	+2	+3	Strongly **Agree**

3. I think that the message is a believable one.

Strongly **Disagree**	-3	-2	-1	0	+1	+2	+3	Strongly **Agree**

4. The information presented in the message is trustworthy.

Strongly **Disagree**	-3	-2	-1	0	+1	+2	+3	Strongly **Agree**

APPENDIX D

Message Position Scale (Fruit and Vegetables Topic)

1. This message is in favor of eating up to 9 servings of fruit and vegetables a day.

Strongly **Disagree** -3 -2 -1 0 +1 +2 +3 Strongly **Agree**

2. The message portrayed eating up to 9 servings of fruit and vegetables a day as a positive thing.

Strongly **Disagree** -3 -2 -1 0 +1 +2 +3 Strongly **Agree**

3. The message indicates that eating up to 9 servings of fruit and vegetables a day is bad. **R**

Strongly **Disagree** -3 -2 -1 0 +1 +2 +3 Strongly **Agree**

APPENDIX E

Message Position Scale (Skipping Meals Topic)

1. This message is in favor of skipping meals.

Strongly **Disagree**	-3	-2	-1	0	+1	+2	+3	Strongly **Agree**

2. The message portrayed skipping meals as a positive thing.

Strongly **Disagree**	-3	-2	-1	0	+1	+2	+3	Strongly **Agree**

3. The message indicates that skipping meals is bad. **R**

Strongly **Disagree**	-3	-2	-1	0	+1	+2	+3	Strongly **Agree**

APPENDIX F

Perceptions of Advocated Familial Subjective Norm (Fruit and Vegetables Topic)

1. According to this message, my family thinks that I should eat up to 9 servings of fruits and vegetables every day.

Strongly **Disagree** -3 -2 -1 0 +1 +2 +3 Strongly **Agree**

2. This message indicates that it is important to my family that I eat up to 9 servings of fruits and vegetables every day.

Strongly **Disagree** -3 -2 -1 0 +1 +2 +3 Strongly **Agree**

3. According to this message, my family believes that it is important for me to eat up to 9 servings of fruits and vegetables every day.

Strongly **Disagree** -3 -2 -1 0 +1 +2 +3 Strongly **Agree**

APPENDIX G

Perceptions of Advocated Familial Subjective Norm (Skipping Meals Topic)

1. According to this message, my family thinks that I should skip meals.

Strongly **Disagree** -3 -2 -1 0 +1 +2 +3 Strongly **Agree**

2. This message indicates that it is important to my family that I skip meals.

Strongly **Disagree** -3 -2 -1 0 +1 +2 +3 Strongly **Agree**

3. According to this message, my family believes that it is important for me to skip meals.

Strongly **Disagree** -3 -2 -1 0 +1 +2 +3 Strongly **Agree**

APPENDIX H

Perceptions of Advocated Close Friends Subjective Norm (Fruit and Vegetable Topic)

4. According to this message, my close friends think that I should eat up to 9 servings of fruits and vegetables every day.

Strongly **Disagree** -3 -2 -1 0 +1 +2 +3 Strongly **Agree**

5. This message indicates that it is important to my close friends that I eat up to 9 servings of fruits and vegetables every day.

Strongly **Disagree** -3 -2 -1 0 +1 +2 +3 Strongly **Agree**

6. According to this message, my close friends believe that it is important for me to eat up to 9 servings of fruits and vegetables every day.

Strongly **Disagree** -3 -2 -1 0 +1 +2 +3 Strongly **Agree**

APPENDIX I

Perceptions of Advocated Close Friends Subjective Norm (Skipping Meals Topic)

4. According to this message, my close friends think that I should skip meals.

Strongly **Disagree** -3 -2 -1 0 +1 +2 +3 Strongly **Agree**

5. This message indicates that it is important to my close friends that I skip meals.

Strongly **Disagree** -3 -2 -1 0 +1 +2 +3 Strongly **Agree**

6. According to this message, my close friends believe that it is important for me to skip meals.

Strongly **Disagree** -3 -2 -1 0 +1 +2 +3 Strongly **Agree**

APPENDIX J

Attitude Scale (Fruit and Vegetables Topic)

1. I should eat up to 9 servings of fruit and vegetables every day.

Strongly **Disagree** -3 -2 -1 0 +1 +2 +3 Strongly **Agree**

2. I believe that I should eat up to 9 servings of fruit and vegetables every day.

Strongly **Disagree** -3 -2 -1 0 +1 +2 +3 Strongly **Agree**

3. It is important for me to eat up to 9 servings of fruit and vegetables every day.

Strongly **Disagree** -3 -2 -1 0 +1 +2 +3 Strongly **Agree**

4. Every day I should eat up to 9 servings of fruit and vegetables.

Strongly **Disagree** -3 -2 -1 0 +1 +2 +3 Strongly **Agree**

5. It is not crucial that I eat up to 9 servings of fruit and vegetables every day. **R** *

Strongly **Disagree** -3 -2 -1 0 +1 +2 +3 Strongly **Agree**

Note. * indicates item was deleted from measurement model for main experiment.

APPENDIX K

Attitude Scale (Skipping Meals Topic)

1. I support skipping meals.

Strongly **Disagree** -3 -2 -1 0 +1 +2 +3 Strongly **Agree**

2. I should skip meals.

Strongly **Disagree** -3 -2 -1 0 +1 +2 +3 Strongly **Agree**

3. I think that skipping meals is a good idea.

Strongly **Disagree** -3 -2 -1 0 +1 +2 +3 Strongly **Agree**

4. I am in favor of skipping meals.

Strongly **Disagree** -3 -2 -1 0 +1 +2 +3 Strongly **Agree**

5. It is not a good idea for me to skip meals. **R** *

Strongly **Disagree** -3 -2 -1 0 +1 +2 +3 Strongly **Agree**

Note. * indicates item was deleted from measurement model for main experiment.

APPENDIX L

Perceptions of Familial Subjective Norm (Fruit and Vegetables Topic)

1. My family thinks that I should eat up to 9 servings of fruit and vegetables every day.

Strongly **Disagree** -3 -2 -1 0 +1 +2 +3 Strongly **Agree**

2. It is important to my family that I eat up to 9 servings of fruit and vegetables every day.

Strongly **Disagree** -3 -2 -1 0 +1 +2 +3 Strongly **Agree**

3. My family believes that it is important for me to eat up to 9 servings of fruit and vegetables every day.

Strongly **Disagree** -3 -2 -1 0 +1 +2 +3 Strongly **Agree**

4. According to my family, every day I should eat up to 9 servings of fruit and vegetables.

Strongly **Disagree** -3 -2 -1 0 +1 +2 +3 Strongly **Agree**

APPENDIX M

Perceptions of Familial Subjective Norm (Skipping Meals Topic)

1. My family thinks that it is acceptable skip meals.

Strongly **Disagree** -3 -2 -1 0 +1 +2 +3 Strongly **Agree**

2. It is okay with my family to skip meals.

Strongly **Disagree** -3 -2 -1 0 +1 +2 +3 Strongly **Agree**

3. According to my family, it is acceptable to skip meals.

Strongly **Disagree** -3 -2 -1 0 +1 +2 +3 Strongly **Agree**

4. It is not acceptable to my family to skip meals. **R** *

Strongly **Disagree** -3 -2 -1 0 +1 +2 +3 Strongly **Agree**

5. My family believes that it is acceptable to skip meals.

Strongly **Disagree** -3 -2 -1 0 +1 +2 +3 Strongly **Agree**

Note. * indicates item was deleted from measurement model for main experiment.

APPENDIX N

Perceptions of Close Friends Subjective Norm (Fruit and Vegetables Topic)

1. My close friends think that I should eat up to 9 servings of fruits and vegetables every day.

Strongly **Disagree** -3 -2 -1 0 +1 +2 +3 Strongly **Agree**

2. It is important to my close friends that I eat up to 9 servings of fruits and vegetables every day.

Strongly **Disagree** -3 -2 -1 0 +1 +2 +3 Strongly **Agree**

3. My close friends believe that it is important for me to eat up to 9 servings of fruits and vegetables every day.

Strongly **Disagree** -3 -2 -1 0 +1 +2 +3 Strongly **Agree**

4. According to my close friends, every day I should eat up to 9 servings of fruits and vegetables.

Strongly **Disagree** -3 -2 -1 0 +1 +2 +3 Strongly **Agree**

APPENDIX O

Perceptions of Close Friends Subjective Norm (Skipping Meals Topic)

1. My close friends think that it is acceptable skip meals.

Strongly **Disagree** -3 -2 -1 0 +1 +2 +3 Strongly **Agree**

2. It is okay with my close friends to skip meals.

Strongly **Disagree** -3 -2 -1 0 +1 +2 +3 Strongly **Agree**

3. According to my close friends, it is acceptable to skip meals.

Strongly **Disagree** -3 -2 -1 0 +1 +2 +3 Strongly **Agree**

4. It is not acceptable to my close friends to skip meals. **R** *

Strongly **Disagree** -3 -2 -1 0 +1 +2 +3 Strongly **Agree**

5. My close friends believe that it is acceptable to skip meals.

Strongly **Disagree** -3 -2 -1 0 +1 +2 +3 Strongly **Agree**

Note. * indicates item was deleted from measurement model for main experiment.

APPENDIX P

Attitude Message

Adopting a Healthy Lifestyle

The Importance of *Every 4 Hours*

Often times it is all too easy for us to skip breakfast or lunch because we simply do not have the time or money to stop and eat. Many people also skip meals to help them control their weight. Medical research has shown that when people skip meals it hurts them in many ways. Skipping meals slows down your metabolism which makes your body hang on to excess fat and can affect hormone levels in both men and women (for example, insulin) and lead to severe chronic illnesses like diabetes.

The National Institute of Health and the National Center for Health suggest that people should eat ***every 4 hours***. Indeed, research has shown that you shouldn't go more than 4 hours without eating. When you eat every 4 hours you maintain a healthy metabolism that will help you get and stay fit, normalize your hormone levels, and help you prevent chronic illness. ***Always remember to eat every 4 hours and don't be tempted to skip any meals!***

The Importance of *9 a Day*

Research from the Center for Disease Control and the National Institute of Health shows that 74% Americans, and 85% of college students, do not get enough fruits and vegetables in their diets. Did you know that every person needs to eat at least 5, and **up to 9 servings** of fruit and vegetables ***every day***? What constitutes a serving? One serving of fruit is approximately 1 cup of fresh fruit, and one serving of vegetables is approximately 1 cup of raw vegetables (not including starchy vegetables like potatoes).

Research has shown that people who consume at least ***4-5 servings of fruit*** and ***4-5 servings of vegetables every day*** as part of a balanced diet are at less risk for diseases such as diabetes, heart disease, cancer, and high blood pressure. In addition to preventing diseases, eating up to 9 servings of fruit and vegetables every day can help improve your overall health because they are rich in vitamins and antioxidants. ***So, make sure that you always eat up to 9 servings of fruit and vegetables every day.***

APPENDIX Q

Subjective Norm Message

Those Closest to You Want You to Adopt a Healthy Lifestyle

The Importance of *Every 4 Hours*

Often times it is all too easy to skip breakfast or lunch because we simply do not have the time or money to stop and eat. Many people also skip meals to help them control their weight. Recent studies have shown that 92% of family physicians believe that skipping meals can hurt you in many ways. Skipping meals slows down your metabolism which makes your body hang on to excess fat and can affect hormone levels in both men and women (for example, insulin) and lead to severe chronic illnesses like diabetes. To avoid such health complications the National Institute of Health and the National Center for Health suggest that people should eat ***every 4 hours***.

In fact, a recent survey found that 83% of parents with college-age children want their children to eat ***every 4 hours***, and do not want their children to skip meals. Also, studies done with college students indicate 76% think it is important to eat every 4 hours because when you maintain a healthy metabolism it will help you get and stay fit, normalize your hormone levels, and help you prevent chronic illness. We know that our family and friends love us, care about us, and want us to be healthy. ***So, remember that most families and college students are in favor of eating every 4 hours and don't want people to be tempted to skip meals!***

The Importance of *9 a Day*

Research from the Center for Disease Control and the National Institute of Health shows that 74% Americans, and 85% of college students, do not get enough fruits and vegetables in their diets. Did you know that every person needs to eat at least 5, and ***up to 9 servings*** of fruit and vegetables ***every day***? What constitutes a serving? One serving of fruit is approximately 1 cup of fresh fruit, and one serving of vegetables is approximately 1 cup of raw vegetables (not including starchy vegetables like potatoes). In a recent survey, 96% of parents with college-age children said they were worried that their children were not eating enough fruits and vegetables. In fact, most parents were in favor of eating ***up to 9 servings*** of fruit and vegetables a day.

According to 93% of family physicians, people who consume at least ***4-5 servings of fruit*** and ***4-5 servings of vegetables every day*** as part of a balanced diet are at less risk for diseases such as diabetes, heart disease, cancer, and high blood pressure. Research has also shown that, in addition to the many families who support increased fruit and vegetable consumption, 80% of college students think it is important that their friends eat ***9 servings*** of fruit and vegetables a day. In addition to preventing diseases, most family physicians assert that eating up to 9 servings of fruit and vegetables every day can help improve your overall health because they are rich in vitamins and antioxidants. Again, remember that our friends and family care about us and want us to live long and healthy lives. ***So, remember that most families and college students believe that eating up to 9 servings of fruit and vegetables every day is important!***

You should listen to your family and friends and adopt a healthy lifestyle by eating more fruits and vegetables and by avoiding the opportunity to skip meals.

APPENDIX R

Time One Survey

(Participants first logged on to the Introduction and Consent Form Page)

Student Life Survey

Thank you for your interest in the Student Life Survey. You will receive full credit for your participation once you have completed all three surveys. Before you begin the survey please read the consent form below.

Consent Form

The purpose of this study is to examine some of the issues surrounding student activities, lifestyle, eating habits, and students' use of university facilities. Full participation in the entire study (all three surveys) will take 90 minutes or fewer. Although participation in this study is not expected to produce discomfort or stress, please note that you may refuse to answer certain questions or withdraw from the study at any time without penalty. The information collected in this study will be treated with strict confidence. Your privacy will be protected to the maximum extent allowable by law. Your responses are totally anonymous and will not be linked to your identity in any way. If you have any questions about your role and rights as a participant in research, feel free to contact Dr. Ashir Kumar, the Chairperson of the University Committee on Research Involving Human Subjects at (517) 355-2180. The experimenter can answer any questions you have about the study to help you choose whether or not to participate. Contact Lisa Lindsey at (517) 432-1286 if you have any further questions or concerns regarding this study.

Thank you,

Lisa Lindsey

By clicking the AGREE button you indicate your voluntary participation in this study.

AGREE	I DO NOT AGREE

(If Ps clicked on AGREE they were directed to the survey. If Ps clicked on I DO NOT AGREE they were directed to a page thanking them for their time)

(If students clicked the I DO NOT AGREE button)

Thank You for Your Time

Only those people who agree to participate in the study voluntarily may complete the survey.

(If students clicked the AGREE button they were directed to this survey)

Thank you for volunteering to participate in this survey.

General Instructions

In the questionnaire you are about to complete you will be asked to answer questions related to eating habits, lifestyle, and your use of university facilities. **In order to indicate your response to each question, please click on the correct response or type your answer in the blank provided.**

Please be sure to read all instructions *very carefully* and to provide your honest answers. Remember, your answers are completely anonymous and confidential.

First, we'd like you to answer some questions about yourself, your experience with extra-curricular activities, and your experience with services offered on campus.

1. Do you live in an on-campus dorm? Yes No

2. Do you live with your parent(s)? Yes No

3. Do you live in an apartment (separate from your parents)? Yes No

4. Do you play intercollegiate sports? Yes No

5. In how many credits are you enrolled this semester? _____

6. On average, how many hours per night do you study for classes? _____

7. Did you know that Olin Health Center has a nutritionist available to work with students?
Yes No

8. Have you ever met with the nutritionist at Olin Health Center?
Yes No

9. Did you know that Olin Health Center has a *Life:Rx* program that provides fitness evaluations that test strength, flexibility, lung capacity, cardiovascular fitness, and cholesterol?
Yes No

10. Have you ever had a Life:Rx fitness evaluation?
Yes No

11. On average, how many hours *per week* do you exercise? _____

12. On average, how many hours *per week* do you work? _____

13. On average, how many cigarettes do you smoke *per day*? _____

14. On average, how many servings of fruit do you eat *per day* (one serving ~ 1 cup of fruit)? _____

15. On average, how many servings of vegetables do you eat *per day*, not including starchy vegetables like potatoes and corn (one serving ~ 1 cup of vegetables)? _____

16. In an average week, how many times do you skip meals? _____
17. On an average day, how many *meals* do you eat? _____

18. On an average day, how many *snacks* do you eat? _____

19. On an average day, how many meals do you *skip*? _____

Now we would like you to read the following message *very carefully*.
Please read the entire message because we will ask you questions about it later.

(the message to which participants were assigned would appear here)

(the contents of this box did *not* appear for participants in the control group)

Now we would like to ask you a series of questions about your eating habits.

Each of the questions below will ask you to rate your answer on a scale. The scale is from -3 to +3 and each number represents the degree to which you agree or disagree with a statement.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

Please click on the answer that *best* describes your opinion. For example, if you were to rate the weather in Michigan on such a scale, the scale should be interpreted as follows:

Winter weather in Michigan is cold.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

If you ***strongly agree*** that the winter weather in Michigan is cold, then you would click on your answer as follows:

Winter weather in Michigan is cold.

Strongly **Disagree**	O	O	O	O	O	O	◉	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

If you are *neutral* or *undecided*, then you ***neither agree nor disagree*** with the statement "Winter weather in Michigan is cold," and you would click on your answer as follows:

Winter weather in Michigan is cold.

Strongly **Disagree**	O	O	O	◉	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

If you ***moderately disagree*** with the statement "Winter weather in Michigan is cold," then you would click on your answer as follows:

Winter weather in Michigan is cold.

Strongly **Disagree**	O	◉	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

Again, please read each statement carefully and indicate the degree to which you agree or disagree with them. Please answer honestly.

What are your opinions about fruit and vegetables?

1. I should eat up to 9 servings of fruit and vegetables every day.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

2. I believe that I should eat up to 9 servings of fruit and vegetables every day.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

3. It is important for me to eat up to 9 servings of fruit and vegetables every day.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

4. Every day I should eat up to 9 servings of fruit and vegetables.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

5. Eating up to 9 servings of fruit and vegetables a day will help me *improve my appearance.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

6. Eating up to 9 servings of fruit and vegetables a day will help me *feel good about myself.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

7. Eating up to 9 servings of fruit and vegetables a day will help me *improve my overall health.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

8. Eating up to 9 servings of fruit and vegetables a day will help me *reduce my risk of disease.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

9. Eating up to 9 servings of fruit and vegetables a day will help me *lose weight.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

10. Eating up to 9 servings of fruit and vegetables a day will help me *be more attractive.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

11. Eating up to 9 servings of fruit and vegetables a day will help me *prevent cancer.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

12. Eating up to 9 servings of fruit and vegetables a day will *be expensive.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

13. Eating up to 9 servings of fruit and vegetables a day will *be convenient.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

14. I intend to incorporate up to 9 servings of fruit and vegetables into my diet every day.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

15. I plan to eat up to 9 servings of fruit and vegetables every day.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

16. Every day I aim to eat up to 9 servings of fruit and vegetables.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

17. I expect that I will eat up to 9 servings of fruit and vegetables every day.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

18. I do not intend to eat up to 9 servings of fruit and vegetables every day. R

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

19. Eating up to 9 servings of fruit and vegetables every day is easy for me.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

20. It is difficult for me to eat up to 9 servings of fruit and vegetables every day. R

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

21. It is simple for me to eat up to 9 servings of fruit and vegetables every day.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

22. It is feasible for me to eat up to 9 servings of fruit and vegetables every day.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

23. I have control over the amount of fruit and vegetables I eat every day.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

24. I cannot control the amount of fruit and vegetables I eat every day.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

25. I am in charge of how many servings of fruit and vegetables I eat every day.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

26. I have the power to determine how many servings of fruit and vegetables I eat every day.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

What do you think about skipping meals?

27. I support skipping meals.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

28. I should skip meals.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

29. I think that skipping meals is a good idea.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

30. I am in favor of skipping meals.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

31. It is not a good idea for me to skip meals. R

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

32. I believe that skipping meals will help me *improve my appearance.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

33. I think that skipping meals will help me *feel good about myself.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

34. Skipping meals will help me *improve my overall health.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

35. I believe that skipping meals will help me *reduce my risk of disease.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

36. I think that skipping meals will help me *lose weight.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

37. Skipping meals will help me *be more attractive.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

38. I think that skipping meals will help me *prevent cancer.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

39. Skipping meals will *be expensive.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

40. Skipping meals will *be convenient.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

41. I intend to skip meals.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

42. I plan to skip meals.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

43. I aim to skip meals.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

44. I expect that I will skip meals.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

45. I do not intend to skip meals. R

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

46. Skipping meals is easy for me.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

47. It is difficult for me to skip meals. R

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

48. It is simple for me to skip meals.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

49. It is feasible for me to skip meals.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

50. I have control over the number of meals I skip.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

51. I cannot control the number of meals I skip.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

52. I am in charge of the number of meals I skip.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

53. I have the power to determine the number of meals I skip.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

How important are each of the following to you?

1. Improving my appearance.

Not Important At All	O	O	O	O	O	O	O	O	Extremely **Important**
	0	1	2	3	4	5	6	7	

2. Feeling good about myself.

Not Important At All								Extremely **Important**
O	O	O	O	O	O	O	O	
0	1	2	3	4	5	6	7	

3. Improving my overall health.

Not Important At All								Extremely **Important**
O	O	O	O	O	O	O	O	
0	1	2	3	4	5	6	7	

4. Reducing my risk of disease.

Not Important At All								Extremely **Important**
O	O	O	O	O	O	O	O	
0	1	2	3	4	5	6	7	

5. Losing weight.

Not Important At All								Extremely **Important**
O	O	O	O	O	O	O	O	
0	1	2	3	4	5	6	7	

6. Increasing my attractiveness.

Not Important At All								Extremely **Important**
O	O	O	O	O	O	O	O	
0	1	2	3	4	5	6	7	

7. Preventing cancer.

Not Important At All								Extremely **Important**
O	O	O	O	O	O	O	O	
0	1	2	3	4	5	6	7	

8. Saving money.

Not Important At All								Extremely **Important**
O	O	O	O	O	O	O	O	
0	1	2	3	4	5	6	7	

9. Convenience.

Not Important At All								Extremely **Important**
O	O	O	O	O	O	O	O	
0	1	2	3	4	5	6	7	

10. Eating up to 9 servings of fruits and vegetables a day.

Not Important At All								Extremely **Important**
O	O	O	O	O	O	O	O	
0	1	2	3	4	5	6	7	

11. Skipping meals.

Not Important At All								Extremely **Important**
O	O	O	O	O	O	O	O	
0	1	2	3	4	5	6	7	

12. Generally speaking, doing what people important to me think I should do.

Not Important At All								Extremely **Important**
O	O	O	O	O	O	O	O	
0	1	2	3	4	5	6	7	

13. Generally speaking, doing what my family thinks I should do.

Not Important At All								Extremely **Important**
O	O	O	O	O	O	O	O	
0	1	2	3	4	5	6	7	

14. Generally speaking, doing what my close friends think I should do.

Not Important At All								Extremely **Important**
O	O	O	O	O	O	O	O	
0	1	2	3	4	5	6	7	

When you answer the next set of questions, think about your *family*.

What are your family's opinions about fruit and vegetable consumption?

1. My family thinks that I should eat up to 9 servings of fruit and vegetables every day.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

1. It is important to my family that I eat up to 9 servings of fruit and vegetables every day.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

2. My family believes that it is important for me to eat up to 9 servings of fruit and vegetables every day.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

3. According to my family, every day I should eat up to 9 servings of fruit and vegetables.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

4. My family believes that eating up to 9 servings of fruit and vegetables a day will help me *improve my appearance.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

5. My family thinks that eating up to 9 servings of fruit and vegetables a day will help me *feel good about myself.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

6. According to my family, eating up to 9 servings of fruit and vegetables a day will help me *improve my overall health.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

7. My family believes that eating up to 9 servings of fruit and vegetables a day will help me *reduce my risk of disease.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

8. My family thinks that eating up to 9 servings of fruit and vegetables a day will help me *lose weight.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

9. According to my family, eating up to 9 servings of fruit and vegetables a day will help me *be more attractive.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

10. My family thinks that eating up to 9 servings of fruit and vegetables a day will help me *prevent cancer.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

11. My family thinks that eating up to 9 servings of fruit and vegetables a day will *be expensive.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

12. My family believes that eating up to 9 servings of fruit and vegetables a day will *be convenient.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

What are your family's opinions about skipping meals?

1. My family thinks that it is acceptable skip meals.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

2. It is okay with my family to skip meals.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

3. According to my family, it is acceptable to skip meals.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

4. It is not acceptable to my family to skip meals. R

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

5. My family believes that it is acceptable to skip meals.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

6. My family believes that skipping meals will help me *improve my appearance.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

7. My family thinks that skipping meals help me *feel good about myself.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

8. According to my family, skipping meals will help me *improve my overall health.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

9. My family believes that skipping meals will help me *reduce my risk of disease.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

10. My family thinks that skipping meals will help me *lose weight.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

11. According to my family, skipping meals will help me *be more attractive.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

12. My family thinks that skipping meals will help me *prevent cancer.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

13. My family thinks that skipping meals will *be expensive.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

14. My family believes that skipping meals will *be convenient.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

When you answer the next set of questions, think about your *close friends.*

What do your close friends think about fruits and vegetables?

1. My close friends think that I should eat up to 9 servings of fruits and vegetables every day.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

2. It is important to my close friends that I eat up to 9 servings of fruits and vegetables every day.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

3. My close friends believe that it is important for me to eat up to 9 servings of fruits and vegetables every day.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

4. According to my close friends, every day I should eat up to 9 servings of fruits and vegetables.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

5. My close friends believe that eating up to 9 servings of fruits and vegetables a day will help me *improve my appearance.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

6. My close friends think that eating up to 9 servings of fruits and vegetables a day will help me *feel good about myself.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

7. According to my close friends, eating up to 9 servings of fruits and vegetables a day will help me *improve my overall health.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

8. My close friends believe that eating up to 9 servings of fruits and vegetables a day will help me *reduce my risk of disease.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

9. My close friends think that eating up to 9 servings of fruits and vegetables a day will help me *lose weight.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

10. According to my close friends, eating up to 9 servings of fruits and vegetables a day will help me *be more attractive.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

11. My close friends think that eating up to 9 servings of fruits and vegetables a day will help me *prevent cancer.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

12. My close friends think that eating up to 9 servings of fruit and vegetables a day will *be expensive.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

13. My close friends believe that eating up to 9 servings of fruit and vegetables a day will *be convenient.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

What do your close friends think about skipping meals?

14. My close friends think that it is acceptable skip meals.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

15. It is okay with my close friends to skip meals.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

16. According to my close friends, it is acceptable to skip meals.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

17. It is not acceptable to my close friends to skip meals. R

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

18. My close friends believe that it is acceptable to skip meals.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

19. My close friends believe that skipping meals will help me *improve my appearance.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

20. My close friends think that skipping meals will help me *feel good about myself.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

21. According to my close friends, skipping meals will help me *improve my overall health.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

22. My close friends believe that skipping meals will help me *reduce my risk of disease.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

23. My close friends think that skipping meals will help me *lose weight.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	**0**	+1	+2	+3	

24. According to my close friends, skipping meals will help me *be more attractive.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	**0**	+1	+2	+3	

25. My close friends think that skipping meals will help me *prevent cancer.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	**0**	+1	+2	+3	

26. My close friends believe that skipping meals will *be expensive.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	**0**	+1	+2	+3	

27. My close friends believe that skipping meals will *be convenient.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	**0**	+1	+2	+3	

Now we would like to ask you a few final questions about yourself

1. How old are you? _____

2. What is your sex? Female Male

3. What is your year in school?
   Freshman Sophomore Junior Senior Other

4. Are you an international student?
   Yes No

5. Which of the following *best* describes your ethnic or racial background?
   White/Caucasion Black/African American/African
   Chicano/Latino/Hispanic Native American
   Asian/Asian American Pacific Islander
   Indian (from India) Middle Eastern Descent

Please click on the SUBMIT button to submit your survey. SUBMIT

(After participants submitted Survey #1)

Thank you for completing the first survey!

In 7-10 days you will receive an email informing you that the second survey is online.

If you are interested in learning more about the facilities available to you on campus please click on the link below.

http://www.olin.msu.edu/navigation.php?id=99

(End Survey #1)

APPENDIX S

Time Two Survey

Thank you for returning to complete the second Student Life Survey.

Although this second survey is not as long as the first one, it is still formatted such that you will just scroll through all of the questions. Just keep scrolling down to answer all of the questions. **In order to indicate your response to each question, please click on the correct response or type your answer in the blank provided.**

Please be sure to read all instructions *very carefully* and to provide your *honest* answer. Remember, your answers are completely anonymous and confidential.

First, we'd like to ask you a few follow-up questions regarding your eating habits and use of university facilities.

1. During the past week, how many servings of fruit did you eat *per day* on average (one serving ~ 1 cup)? _____

2. During the past week, how many servings of vegetables did you eat *per day* on average (one serving ~ 1 cup)? _____

3. During the past week, how many days did you exercise? _____

4. During the past week, how many times did you skip a meal? _____

5. During the past week, how many meals did you skip *on an average day*? _____

6. During the past week, how many cigarettes did you smoke *on an average day*? _____

7. During the past week, did you make an appointment to see a nutritionist?
   Yes No

8. During the past week, did you make a Life:Rx appointment?
   Yes No

9. During the past week, did you actually see a nutritionist?
   Yes No

10. During the past week, did you actually have a Life:Rx evaluation?
    Yes No

11. During the past week, did you see or hear any messages (other than those related to this survey) about eating up to 9 servings of fruits and vegetables a day?
    Yes No

12. During the past week, did you see or hear any messages (other than those related to this survey) about skipping meals?
    Yes No

Now we would like to ask you a series of questions about your eating habits.

Each of the questions below will ask you to rate your answer on a scale. The scale is from -3 to +3 and each number represents the degree to which you agree or disagree with a statement.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

Please click on the answer that *best* describes your opinion. *Again, please read each statement carefully and indicate the degree to which you agree or disagree with them. Please answer honestly.*

What are your opinions about fruit and vegetables?

1. I should eat up to 9 servings of fruit and vegetables every day.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

2. I believe that I should eat up to 9 servings of fruit and vegetables every day.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

3. It is important for me to eat up to 9 servings of fruit and vegetables every day.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

4. Every day I should eat up to 9 servings of fruit and vegetables.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

5. Eating up to 9 servings of fruit and vegetables a day will help me *improve my appearance.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

6. Eating up to 9 servings of fruit and vegetables a day will help me *feel good about myself.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

7. Eating up to 9 servings of fruit and vegetables a day will help me *improve my overall health.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

8. Eating up to 9 servings of fruit and vegetables a day will help me *reduce my risk of disease.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

9. Eating up to 9 servings of fruit and vegetables a day will help me *lose weight.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

10. Eating up to 9 servings of fruit and vegetables a day will help me *be more attractive.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

11. Eating up to 9 servings of fruit and vegetables a day will help me *prevent cancer.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

12. Eating up to 9 servings of fruit and vegetables a day will *be expensive*.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

13. Eating up to 9 servings of fruit and vegetables a day will *be convenient*.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

14. I intend to incorporate up to 9 servings of fruit and vegetables into my diet every day.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

15. I plan to eat up to 9 servings of fruit and vegetables every day.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

16. Every day I aim to eat up to 9 servings of fruit and vegetables.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

17. I expect that I will eat up to 9 servings of fruit and vegetables every day.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

18. I do not intend to eat up to 9 servings of fruit and vegetables every day. R

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

19. Eating up to 9 servings of fruit and vegetables every day is easy for me.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

20. It is difficult for me to eat up to 9 servings of fruit and vegetables every day. R

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

21. It is simple for me to eat up to 9 servings of fruit and vegetables every day.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

22. It is feasible for me to eat up to 9 servings of fruit and vegetables every day.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

23. I have control over the amount of fruit and vegetables I eat every day.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

24. I cannot control the amount of fruit and vegetables I eat every day.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

25. I am in charge of how many servings of fruit and vegetables I eat every day.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

26. I have the power to determine how many servings of fruit and vegetables I eat every day.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

What do you think about skipping meals?

27. I support skipping meals.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

28. I should skip meals.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

29. I think that skipping meals is a good idea.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

30. I am in favor of skipping meals.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

31. It is not a good idea for me to skip meals. R

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

32. I believe that skipping meals will help me *improve my appearance.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

33. I think that skipping meals will help me *feel good about myself.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

34. Skipping meals will help me *improve my overall health.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

35. I believe that skipping meals will help me *reduce my risk of disease.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

36. I think that skipping meals will help me *lose weight.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

37. Skipping meals will help me *be more attractive.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

38. I think that skipping meals will help me *prevent cancer.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

39. Skipping meals will *be expensive.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

40. Skipping meals will *be convenient.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

41. I intend to skip meals.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

42. I plan to skip meals.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

43. I aim to skip meals.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

44. I expect that I will skip meals.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

45. I do not intend to skip meals. R

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

46. Skipping meals is easy for me.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

47. It is difficult for me to skip meals. R

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

48. It is simple for me to skip meals.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

49. It is feasible for me to skip meals.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

50. I have control over the number of meals I skip.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

51. I cannot control the number of meals I skip.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

52. I am in charge of the number of meals I skip.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

53. I have the power to determine the number of meals I skip.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

How important are each of the following to you?

1. Improving my appearance.

Not Important At All	O	O	O	O	O	O	O	O	Extremely **Important**
	0	1	2	3	4	5	6	7	

2. Feeling good about myself.

Not Important At All	O	O	O	O	O	O	O	O	Extremely **Important**
	0	1	2	3	4	5	6	7	

3. Improving my overall health.

Not Important At All	O	O	O	O	O	O	O	O	Extremely **Important**
	0	1	2	3	4	5	6	7	

4. Reducing my risk of disease.

Not Important At All	O	O	O	O	O	O	O	O	Extremely **Important**
	0	1	2	3	4	5	6	7	

5. Losing weight.

Not Important At All	O	O	O	O	O	O	O	O	Extremely **Important**
	0	1	2	3	4	5	6	7	

6. Increasing my attractiveness.

Not Important At All	O	O	O	O	O	O	O	O	Extremely **Important**
	0	1	2	3	4	5	6	7	

7. Preventing cancer.

Not Important At All	O	O	O	O	O	O	O	O	Extremely **Important**
	0	1	2	3	4	5	6	7	

8. Saving money.

Not Important At All	O	O	O	O	O	O	O	O	Extremely **Important**
	0	1	2	3	4	5	6	7	

9. Convenience.

Not Important At All	O	O	O	O	O	O	O	O	Extremely **Important**
	0	1	2	3	4	5	6	7	

10. Eating up to 9 servings of fruits and vegetables a day.

Not Important At All	O	O	O	O	O	O	O	O	Extremely **Important**
	0	1	2	3	4	5	6	7	

11. Skipping meals.

Not Important At All	O	O	O	O	O	O	O	O	Extremely **Important**
	0	1	2	3	4	5	6	7	

12. Generally speaking, doing what people important to me think I should do.

Not Important At All	O	O	O	O	O	O	O	O	Extremely **Important**
	0	1	2	3	4	5	6	7	

13. Generally speaking, doing what my family thinks I should do.

Not Important At All	O	O	O	O	O	O	O	O	Extremely **Important**
	0	1	2	3	4	5	6	7	

14. Generally speaking, doing what my close friends think I should do.

Not Important At All	O	O	O	O	O	O	O	O	Extremely **Important**
	0	1	2	3	4	5	6	7	

When you answer the next set of questions, think about your *family*.

What are your family's opinions about fruit and vegetable consumption?

1. My family thinks that I should eat up to 9 servings of fruit and vegetables every day.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

2. It is important to my family that I eat up to 9 servings of fruit and vegetables every day.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

3. My family believes that it is important for me to eat up to 9 servings of fruit and vegetables every day.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

4. According to my family, every day I should eat up to 9 servings of fruit and vegetables.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

5. My family believes that eating up to 9 servings of fruit and vegetables a day will help me *improve my appearance.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

6. My family thinks that eating up to 9 servings of fruit and vegetables a day will help me *feel good about myself.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

7. According to my family, eating up to 9 servings of fruit and vegetables a day will help me *improve my overall health.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

8. My family believes that eating up to 9 servings of fruit and vegetables a day will help me *reduce my risk of disease.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

9. My family thinks that eating up to 9 servings of fruit and vegetables a day will help me *lose weight.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

10. According to my family, eating up to 9 servings of fruit and vegetables a day will help me *be more attractive.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

11. My family thinks that eating up to 9 servings of fruit and vegetables a day will help me *prevent cancer.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

12. My family thinks that eating up to 9 servings of fruit and vegetables a day will *be expensive.* R

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

13. My family believes that eating up to 9 servings of fruit and vegetables a day will *be convenient.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

What are your family's opinions about skipping meals?

14. My family thinks that it is acceptable skip meals.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

15. It is okay with my family to skip meals.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

16. According to my family, it is acceptable to skip meals.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

17. It is not acceptable to my family to skip meals. R

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

18. My family believes that it is acceptable to skip meals.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

19. My family believes that skipping meals will help me *improve my appearance.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

20. My family thinks that skipping meals help me *feel good about myself.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

21. According to my family, skipping meals will help me *improve my overall health.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

22. My family believes that skipping meals will help me *reduce my risk of disease.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

23. My family thinks that skipping meals will help me *lose weight.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

24. According to my family, skipping meals will help me *be more attractive.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

25. My family thinks that skipping meals will help me *prevent cancer.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

26. My family thinks that skipping meals will *be expensive.* R

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

27. My family believes that skipping meals will *be convenient.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

When you answer the next set of questions, think about your *close friends.*

What do your close friends think about fruits and vegetables?

1. My close friends think that I should eat up to 9 servings of fruits and vegetables every day.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

2. It is important to my close friends that I eat up to 9 servings of fruits and vegetables every day.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

3. My close friends believe that it is important for me to eat up to 9 servings of fruits and vegetables every day.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

4. According to my close friends, every day I should eat up to 9 servings of fruits and vegetables.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

5. My close friends believe that eating up to 9 servings of fruits and vegetables a day will help me *improve my appearance.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

6. My close friends think that eating up to 9 servings of fruits and vegetables a day will help me *feel good about myself.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

7. According to my close friends, eating up to 9 servings of fruits and vegetables a day will help me *improve my overall health.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

8. My close friends believe that eating up to 9 servings of fruits and vegetables a day will help me *reduce my risk of disease.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

9. My close friends think that eating up to 9 servings of fruits and vegetables a day will help me *lose weight.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

10. According to my close friends, eating up to 9 servings of fruits and vegetables a day will help me *be more attractive.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

11. My close friends think that eating up to 9 servings of fruits and vegetables a day will help me *prevent cancer.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

12. My close friends think that eating up to 9 servings of fruit and vegetables a day will *be expensive.* R

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

13. My close friends believe that eating up to 9 servings of fruit and vegetables a day will *be convenient.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

What do your close friends think about skipping meals?

14. My close friends think that it is acceptable skip meals.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

15. It is okay with my close friends to skip meals.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

16. According to my close friends, it is acceptable to skip meals.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

17. It is not acceptable to my close friends to skip meals. R

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

18. My close friends believe that it is acceptable to skip meals.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

19. My close friends believe that skipping meals will help me *improve my appearance.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

20. My close friends think that skipping meals will help me *feel good about myself.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

21. According to my close friends, skipping meals will help me *improve my overall health.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

22. My close friends believe that skipping meals will help me *reduce my risk of disease.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

23. My close friends think that skipping meals will help me *lose weight.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

24. According to my close friends, skipping meals will help me *be more attractive.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

25. My close friends think that skipping meals will help me *prevent cancer.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

26. My close friends believe that skipping meals will *be expensive.* R

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

27. My close friends believe that skipping meals will *be convenient.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

Please click on the SUBMIT button to submit your survey. SUBMIT

(After participants submitted Survey #2)

Thank you for completing the second survey!

In 7-10 days you will receive an email informing you that the final survey is online.

If you are interested in learning more about the facilities available to you on campus please click on the link below.

http://www.olin.msu.edu/navigation.php?id=99

(End Survey #2)

APPENDIX T

Fruit and Vegetables Belief Scale

1. Eating up to 9 servings of fruit and vegetables a day will help me *improve my appearance.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

2. Eating up to 9 servings of fruit and vegetables a day will help me *feel good about myself.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

3. Eating up to 9 servings of fruit and vegetables a day will help me *improve my overall health.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

4. Eating up to 9 servings of fruit and vegetables a day will help me *reduce my risk of disease.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

5. Eating up to 9 servings of fruit and vegetables a day will help me *lose weight.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

6. Eating up to 9 servings of fruit and vegetables a day will help me *be more attractive.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

7. Eating up to 9 servings of fruit and vegetables a day will help me *prevent cancer.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

8. Eating up to 9 servings of fruit and vegetables a day will *be expensive.* **R**

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

APPENDIX U

Importance Scale

How important are each of the following to you?

1. Improving my appearance.

Not Important At All	O	O	O	O	O	O	O	O Extremely **Important**
	0	1	2	3	4	5	6	7

2. Feeling good about myself.

Not Important At All	O	O	O	O	O	O	O	O Extremely **Important**
	0	1	2	3	4	5	6	7

3. Improving my overall health.

Not Important At All	O	O	O	O	O	O	O	O Extremely **Important**
	0	1	2	3	4	5	6	7

4. Reducing my risk of disease.

Not Important At All	O	O	O	O	O	O	O	O Extremely **Important**
	0	1	2	3	4	5	6	7

5. Losing weight.

Not Important At All	O	O	O	O	O	O	O	O Extremely **Important**
	0	1	2	3	4	5	6	7

6. Increasing my attractiveness.

Not Important At All	O	O	O	O	O	O	O	O Extremely **Important**
	0	1	2	3	4	5	6	7

7. Preventing cancer.

Not Important At All	O	O	O	O	O	O	O	O Extremely **Important**
	0	1	2	3	4	5	6	7

8. Saving money.

Not Important At All	O	O	O	O	O	O	O	O Extremely **Important**
	0	1	2	3	4	5	6	7

APPENDIX V

Skipping Meals Belief Scale

1. I believe that skipping meals will help me *improve my appearance.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

2. I think that skipping meals will help me *feel good about myself.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

3. Skipping meals will help me *improve my overall health.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

4. I believe that skipping meals will help me *reduce my risk of disease.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

5. I think that skipping meals will help me *lose weight.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

6. Skipping meals will help me *be more attractive.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

7. I think that skipping meals will help me *prevent cancer.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

8. Skipping meals will *be expensive.* **R**

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

APPENDIX W

Family Normative Beliefs (Fruit and Vegetables Topic)

1. My family believes that skipping meals will help me *improve my appearance.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

2. My family thinks that skipping meals help me *feel good about myself.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

3. According to my family, skipping meals will help me *improve my overall health.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

4. My family believes that skipping meals will help me *reduce my risk of disease.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

5. My family thinks that skipping meals will help me *lose weight.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

6. According to my family, skipping meals will help me *be more attractive.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

7. My family thinks that skipping meals will help me *prevent cancer.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

8. My family thinks that skipping meals will *be expensive.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

APPENDIX X

Motivation to Comply with Family

How important is the following to you?

1. Generally speaking, doing what my family thinks I should do.

Not Important At All	○	○	○	○	○	○	○	○	Extremely **Important**
	0	1	2	3	4	5	6	7	

APPENDIX Y

Family Normative Beliefs (Skipping Meals Topic)

1. My family believes that skipping meals will help me *improve my appearance.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

2. My family thinks that skipping meals help me *feel good about myself.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

3. According to my family, skipping meals will help me *improve my overall health.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

4. My family believes that skipping meals will help me *reduce my risk of disease.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

5. My family thinks that skipping meals will help me *lose weight.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

6. According to my family, skipping meals will help me *be more attractive.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

7. My family thinks that skipping meals will help me *prevent cancer.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

8. My family thinks that skipping meals will *be expensive.* **R**

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

APPENDIX Z

Close Friends' Normative Beliefs (Fruit and Vegetables Topic)

1. My close friends believe that eating up to 9 servings of fruits and vegetables a day will help me *improve my appearance.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

2. My close friends think that eating up to 9 servings of fruits and vegetables a day will help me *feel good about myself.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

3. According to my close friends, eating up to 9 servings of fruits and vegetables a day will help me *improve my overall health.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

4. My close friends believe that eating up to 9 servings of fruits and vegetables a day will help me *reduce my risk of disease.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

5. My close friends think that eating up to 9 servings of fruits and vegetables a day will help me *lose weight.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

6. According to my close friends, eating up to 9 servings of fruits and vegetables a day will help me *be more attractive.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

7. My close friends think that eating up to 9 servings of fruits and vegetables a day will help me *prevent cancer.*

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

8. My close friends think that eating up to 9 servings of fruit and vegetables a day will *be expensive.* **R**

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

APPENDIX AA

Motivation to Comply with Close Friends

How important is the following to you?

1. Generally speaking, doing what my close friends think I should do.

Not Important At All	○	○	○	○	○	○	○	○	Extremely **Important**
	0	1	2	3	4	5	6	7	

APPENDIX BB

Close Friends' Normative Beliefs (Skipping Meals Topic)

1. My close friends believe that skipping meals will help me *improve my appearance.*

Strongly **Disagree**	O	O	O	O	O	O	O	**Strongly Agree**
	-3	-2	-1	0	+1	+2	+3	

2. My close friends think that skipping meals will help me *feel good about myself.*

Strongly **Disagree**	O	O	O	O	O	O	O	**Strongly Agree**
	-3	-2	-1	0	+1	+2	+3	

3. According to my close friends, skipping meals will help me *improve my overall health.*

Strongly **Disagree**	O	O	O	O	O	O	O	**Strongly Agree**
	-3	-2	-1	0	+1	+2	+3	

4. My close friends believe that skipping meals will help me *reduce my risk of disease.*

Strongly **Disagree**	O	O	O	O	O	O	O	**Strongly Agree**
	-3	-2	-1	0	+1	+2	+3	

5. My close friends think that skipping meals will help me *lose weight.*

Strongly **Disagree**	O	O	O	O	O	O	O	**Strongly Agree**
	-3	-2	-1	0	+1	+2	+3	

6. According to my close friends, skipping meals will help me *be more attractive.*

Strongly **Disagree**	O	O	O	O	O	O	O	**Strongly Agree**
	-3	-2	-1	0	+1	+2	+3	

7. My close friends think that skipping meals will help me *prevent cancer.*

Strongly **Disagree**	O	O	O	O	O	O	O	**Strongly Agree**
	-3	-2	-1	0	+1	+2	+3	

8. My close friends believe that skipping meals will *be expensive.* **R**

Strongly **Disagree**	O	O	O	O	O	O	O	**Strongly Agree**
	-3	-2	-1	0	+1	+2	+3	

APPENDIX CC

Behavioral Intent Scale (Fruit and Vegetables Topic)

1. I intend to incorporate up to 9 servings of fruit and vegetables into my diet every day.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

2. I plan to eat up to 9 servings of fruit and vegetables every day.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

3. Every day I aim to eat up to 9 servings of fruit and vegetables.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

4. I expect that I will eat up to 9 servings of fruit and vegetables every day.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

5. I do not intend to eat up to 9 servings of fruit and vegetables every day. **R** *

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

Note. * indicates item was deleted from measurement model in main experiment.

APPENDIX DD

Behavioral Intent Scale (Skipping Meals Topic)

1. I intend to skip meals.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

2. I plan to skip meals.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

3. I aim to skip meals.

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

4. I expect that I will skip meals. *

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

5. I do not intend to skip meals. **R** *

Strongly **Disagree**	O	O	O	O	O	O	O	Strongly **Agree**
	-3	-2	-1	0	+1	+2	+3	

Note. *indicates item was deleted from measurement model for main experiment.

REFERENCES

Abelson, R. P. (1995). *Statistics as principled argument.* Hillsdale, NJ: Lawrence Erlbaum.

Ajzen, I., & Fishbein, M. (1980). Prediction of goal-directed behavior: Attitudes, intentions, and perceived behavioral control. *Journal of Experimental Social Psychology, 22,* 453-474.

Ajzen, I., & Fishbein, M. (1974). Factors influencing intentions and the intention-behavior relation. *Human Relations, 27,* 1-15.

Ajzen, I., & Fishbein, M. (1970). The prediction of behavior from attitudinal and normative variables. *Journal of Experimental and Social Psychology, 6,* 466-487.

Armstrong, J. G., & Roth, D. M. (1989). Attachment and separation difficulties in eating disorders: A preliminary investigation. *International Journal of Eating Disorders, 8,* 141-155.

Bem, D. J. (1972). Self-perception theory. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 6, pp. xx-xx). New York: Academic Press.

Bentler, P. M., & Speckart, G. (1981). Attitudes "cause" behaviors: A structural equation analysis. *Journal of Personality and Social Psychology, 40*(2), 226-238.

Boster, F. J., & Cruz, M. G. (2001). Persuading in the small group context. In J. P. Dillard & M. Pfau (Eds.), *The persuasion handbook: Developments in theory and practice* (pp. 477-494). Thousand Oaks, CA: Sage.

Boster, F. J., Fryrear, J. E., Mongeau, P. A., & Hunter, J. E. (1982). An unequal speaking linear discrepancy model: Implications for the polarity shift. In M. Burgoon (Ed.), *Communication Yearbook 6* (pp. 395-418). Beverly Hills, CA: Sage.

Boster, F. J., Mayer, M. E., Hunter, J. E., & Hale, J. L. (1980). Expanding the persuasive arguments explanation of the polarity shift: A linear discrepancy model. In D. Nimmo (Ed.) *Communication Yearbook 4* (pp. 165-176). New Brunswick, NJ: Transaction Books.

Calam, R., Waller, G., Slade, P., & Newton, T. (1990). Eating disorders and perceived relationships with parents. *International Journal of Eating Disorders, 9,* 479-485.

Graber, J. A., Brooks-Gunn, J., Paikoff, R. L., & Warren, M. P. (1994). Prediction of eating problems: An 8-year study of adolescent girls. *Developmental Psychology, 30,* 823-834.

Hausenblas, H. A., & Carron, A. V. (1998). Group influences on eating and dieting behaviors in residence members. *College Students Journal, 32,* 585-589.

Haworth-Hoeppner, S. (2000). The critical shapes of body image: The role of culture and family in the production of eating disorders. *Journal of Marriage and the Family, 62,* 212-227.

Humphrey, L. L. (1986a). Family relations in bulimic-anorexic and nondistressed families. *International Journal of Eating Disorders, 5,* 223-232.

Humphrey, L. L. (1986b). Structural analysis of parent-child relationships in eating disorders. *Journal of Abnormal Psychology, 95,* 395-402.

Humphrey, L. L. (1987). Comparison of bulimic-anorexic and nondistressed families using structural analysis of social behavior. *Journal of the American Academy of Child and Adolescent Psychiatry, 26,* 248-255.

Humphrey, L. L. (1989). Observed family interactions among subtypes of eating disorders using structural analysis of social behavior. *Journal of Counseling and Clinical Psychology, 57,* 206-214.

Hunter, J. E., & Gerbing, D. W. (1982). Unidimensional measurement, second order factor analysis, and causal models. *Research in Organizational Behavior, 4,* 267-320.

Kahle, L. R., & Berman, J. J. (1979). Attitudes cause behaviors: A cross-lagged panel analysis. *Journal of Personality and Social Psychology, 37*(3), 315-321.

Kelman, H. C. (1974). Attitudes are alive and well and gainfully employed in the sphere of action. *American Psychologist, 29,* 310-324.

Kim, M-S., & Hunter, J. E. (1993a). Attitude-behavior relations: A meta-analysis of attitudinal relevance and topic. *Journal of Communication, 43,* 101-142.

Kim, M-S., & Hunter, J. E. (1993b). Relationships among attitudes, behavioral intentions, and behavior: A meta-analysis of past research, part 2. *Communication Research, 20*(3), 331-364.

Levine, M. P., Smolak, L. Hayden, H. (1994). The relation of sociocultural factors to eating attitudes and behaviors among middle school girls. *Journal of Early Adolescence, 14,* 471-490.

Levine, M. P., Smolak, L., Moodey, A. F., Shuman, M. D., & Hessen, L. D. (1994). Normative developmental challenges and dieting and eating disturbances in middle school girls. *International Journal of Eating Disorders, 15,* 11-20.

McGuire, W. J. (1976). The concept of attitudes and their relations to behaviors. In H. W. Sinaiko & L. A. Broedling (Eds.), *Perspectives on attitude assessment: Surveys and their alternatives* (pp. 7-31). Champaign, IL: Pendleton.

Moreno, A., & Thelen, M. H. (1993). Parental factors related to bulimia nervosa. *Addictive Behaviors, 18,* 681-689.

National Center for Health (2003). *Fruits and vegetables: Eat 5 to 9 a day for better health.* Retrieved June 4, 2003 from http://5aday.gov/index-about.shtml.

Nucifora, J., Gallois, C., & Kashima, Y. (1993). Influences on condom use among undergraduates: Testing the theory of reasoned action and planned behavior. In D. J. Terry, C. Gallois, & M. McCamish (Eds.), *The theory of reasoned action: Its application to AIDS-preventative behaviour* (pp. 47-64). Tarrytown, NY: Pergamon Press.

O'Kearney, R. (1996). Attachment disruption in anorexia nervosa and bulimia nervosa: A review of theory and empirical research. *International Journal of Eating Disorders, 20,* 115-127.

Oliver, K. K., & Thelen, M. H. (1996). Children's perceptions of peer influence on eating concerns. *Behavior Therapy, 27,* 25-39.

Paxton, S. J., Schutz, H. K., Wertheim, E. H., & Muir, S. L. (1999). Friendship clique and peer influence on body image concerns, dietary restraint, extreme weight-loss behaviors, and binge eating in adolescent girls. *Journal of Abnormal Psychology, 108,* 255-266.

Polivy, J., & Herman, C. P. (2002). Causes of eating disorders. *Annual Review of Psychology, 53,* 187-213.

Sanftner, J. L., Crowther, J. H., Crawford, P. A., & Watts, D. D. (1996). Maternal influence (or lack thereof) on daughters' eating attitudes and behaviors. *Eating Disorders, 4,* 147-159.

Scalf-McIver, L., & Thompson, J. K. (1989). Family correlates of bulimic characteristics in college females. *Journal of Child Psychology, 45,* 467-472.

Schur, E. A., Sanders, M., & Steiner, H. (2000). Body dissatisfaction and dieting in young children. *International Journal of Eating Disorders, 27,* 74-82.

Schlegel, R. P., D'Avernas, J. R., Zanna, M. P., DeCourville, N. H., & Manske, S. R. (1992). Problem drinking: A problem for the theory of reasoned action? *Journal of Applied Social Psychology, 22*(5), 358-385.

Steiger, H., Van der Feen, J., Goldstein, C., & Leichner, P. (1989). Defense styles and parental bonding in eating-disordered women. *International Journal of Eating Disorders, 8,* 131-140.

Streigel-Moore, R. H., & Kearney-Cooke, A. (1994). Exploring parents' attitudes and behaviors about their children's physical appearance. *International Journal of Eating Disorders, 15,* 377-385.

Thelen, M. H., & Cormier, J. F. (1995). Desire to be thinner and weight control among children and their parents. *Behavior Therapy, 26,* 85-99.

Twamley, E. W., & Davis, M. C. (1999). The sociocultural model of eating disturbance in young women: The effects of personal attributes and family environment. *Journal of Social and Clinical Psychology, 18,* 467-489.

Vincent, M. A., & McCabe, M. P. (2000). Gender differences among adolescents in family, and peer influences on body dissatisfaction, weight loss, and binge eating behaviors. *Journal of Youth and Adolescence, 29,* 205-221.

Wicker, A. W. (1969). Attitude versus action: The relationship of verbal and overt behavioral responses to attitude. *Journal of Social Issues, 25,* 41-78.

Young, E. M., & Fors, S. W. (2001). Factors related to the eating habits of students in grades 9-12. *The Journal of School Health, 71,* 483-488.