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# An Investigation of the Factors that Influence Maternal Encouragement of Healthy Diets for Preadolescent Daughters

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AN INVESTIGATION OF THE FACTORS THAT INFLUENCE MATERNAL ENCOURAGEMENT OF HEALTHY DIETS FOR PREADOLESCENT DAUGHTERS

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Dr. Lauren M. Hamel<sup>α</sup> & Prof. Sandi W. Smith<sup>σ</sup>

**Abstract** - Childhood overweight has reached epidemic levels in the United States. Twenty percent of U.S. children are overweight or obese. This problem is likely to carry into adulthood with increased risk of certain cancers and cardiovascular problems. It has also been demonstrated that diets of preadolescent girls are strongly influenced by their mothers in terms of communication, modeling, and regulation. Using the Theory of Planned Behavior as a framework, the factors that influence mothers to communicate encouragement of a healthy diet for their preadolescent daughters were studied in an effort to reduce female child overweight and subsequent negative consequences. A web-survey (N = 104) with mothers with at least one preadolescent daughter was conducted. Attitude toward encouraging their daughters to eat healthily, the most likely subjective norm, and perceived behavioral control all significantly influenced intention to communicate encouragement to daughters to eat healthily. Implications of these findings are discussed.

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## I. INTRODUCTION

The prevalence of childhood obesity is dramatically increasing in the United States (Jolliffe, 2004; Ogden, Carroll, Curtin, Lamb, & Flegal, 2008; Ogden & Carroll, 2010). In 2010 the Centers for Disease Control and Prevention (CDC) reported that overall prevalence of obesity in children between the ages of 6 and 11 had increased from 6.5 percent in 1980 to 19.6 percent in 2008. The immediate and long-term health effects of being overweight are numerous. Among the most well known serious effects are the increased risk of certain types of cancers, such as colon and breast cancers, an increased risk for type-two diabetes, cardiovascular disease as well as high blood pressure and high cholesterol levels (CDC, 2007; Dietz, 1998). A main factor that influences childhood weight problems is the diet of the child (CDC, 2007). A child who consumes high fat, high calorie foods is more likely than a child

who does not consume as much fat or high caloric foods to incur a large number of negative health conditions.

The biological and physical consequences of childhood overweight and obesity are typically more severe in girls than in boys (Dietz, 1998), and although children as young as seven have been shown to diet, have concerns over weight, and exhibit body dissatisfaction, this is more common in girls than boys (Collins, 1991; Rolland, Farnill, & Griffiths, 1996; Thompson, Corwin, & Sargent, 1997). In addition to physical health maladies, overweight children tend to also suffer psychosocially. More specifically, overweight children, again especially female children, tend to experience discrimination more so than normal size children (Reilly, et al., 2003) especially in adolescence (Strauss 2000). This discrimination can result in decreased self esteem among overweight children which can then lead to other problems including decreased academic achievement (Rosenberg, Schooler, & Schoenbach, 1989) and social isolation (CDC, 2007). These effects can also progress into adulthood (CDC, 2007; Reilly et al., 2003).

Mothers play a crucial role in the eating behavior of young children of both genders (Cutting, Fisher, Grimm-Thomas, & Birch, 1999; Fisher & Birch, 1999), including through direct instruction about what is good to eat and what is not good to eat (Hays, Power, & Olvera, 2001). It has been demonstrated that girls as young as five have ideas about dieting that are strongly influenced by their mothers (Abramovitz & Birch, 2000). The most successful point of intervention for weight problems is during childhood when the problem is still developing or before the problem develops (Guo et al., 2000). Due to the findings that female children are more likely to experience immediate and prolonged psychosocial and physical effects of being overweight, the current research effort focuses on this population rather than grouping girls and boys together. Similarly, because mothers have been shown to have a great deal of influence on eating perceptions and behaviors of girls, the current effort focuses on mothers rather than grouping both parents together.

What follows is a summary of literature regarding maternal influence on the eating habits of preadolescent daughters, a description and rationale for

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the theoretical framework utilized, the predications based on the theory and previous research, a description of the web survey that was conducted, the results of the analysis, and a discussion of the findings.

*a) Maternal Influence on Food Consumption*

The eating habits of young girls are strongly influenced by their mothers in a variety of ways. This includes the mothers' own eating habits, food restriction and regulation (Birch & Fisher, 2000; Cutting et al., 2007; Hill et al., 1990), and the type of communication that occurs between mothers and daughters. Communication research has established that when communication between mother and daughter is more positive and open, daughters are less likely to suffer from disordered eating (Vidovic, Juresa, Begovac, Mahnik & Tocil, 2005). Conversely, it is also been found that negative maternal communication is related to disordered eating attitudes and behavior in daughters (Kicher & Crowter, 2001; Prescott & Le Poire, 2002). The current study was undertaken in an effort to gain greater understanding of the predictors of positive, maternal communication with daughters regarding diet.

The findings reported here can be utilized in future efforts to craft messages aimed at mothers with preadolescent daughters to inform and persuade them that they hold great influence over their daughters' diets. Moreover, it can be communicated to mothers that they should use that influence by communicating their desires for their daughters to make healthy choices for food. Finally, that communication should be in a constructive and encouraging manner rather than in a destructive and restrictive manner.

*b) Theory of Planned Behavior*

As the previous section demonstrates mothers have a great deal of influence on the eating habits of their preadolescent daughters. In an effort to determine what influences a mother to encourage a healthy diet for her preadolescent daughter, the Theory of Planned Behavior (TPB) (Ajzen, 1985; 1991) was utilized as the guiding framework for this research. Succinctly put, the TPB predicts that behavioral intentions and subsequent behavior, are determined by attitude toward that behavior, normative perceptions about what important others think about performing the behavior, and perceived barriers to performing that behavior. This theory is particularly well suited for the current issue because it has been shown to be a reliable predictor of intentions and behavior over time for a variety of behaviors (Albarracin, Johnson, Fishbein, & Muellerleile, 2001; Armitage & Conner, 1999; Hausenblas, Carron, & Mack, 1997). In particular, it has found to be useful in predicting communication behavior within the family context – which is the focus of the current study (Park & Smith, 2007). Moreover, recent research has indicated that the TPB is well suited for predicting maternal intention to discuss safe sex issues with their daughters

(Askelson, et al., 2011). Given the theory's history of consistently predicting behavioral intent, and specifically maternal intent to communicate, it was utilized in this case as well.

Attitude is the extent to which a person is favorable or unfavorable regarding engagement in a particular behavior. Favor or disfavor is determined by taking into account the anticipated outcomes (behavioral beliefs) of the behavior and whether those are positive or negative (outcome evaluations). Beliefs are created through associations with certain attributes of attitude toward the behavior. According to the TPB, an individual will favor behaviors with positive and desired outcomes and disfavor behaviors with negative or undesirable outcomes. In addition, favor and disfavor of a behavior is also determined by the likelihood of the expected outcomes occurring. Attitude has been found to significantly influence eating behaviors in a variety of populations (Backman, Haddad, Lee, Johnston, & Hodgkin, 2002; Gracey et al., 1996; Patrick & Nicklas, 2005; Schifter & Ajzen, 1985). A previous focus group study in this area indicated that mothers think encouraging their daughters to eat healthily is important and worthwhile but that it can be a difficult and unpleasant process (Hamel, 2009; Hamel & Smith, 2009).

Subjective norm is the function of one's normative beliefs. Normative beliefs are the perceptions an individual holds of whether important referent others in his or her life believe that he or she should engage in the behavior of interest (Ajzen, 1985; 1991; Park & Smith, 2007). In addition to identifying these important people, the level at which an individual feels motivated to comply with these referents must be understood. This is the degree to which the individual is likely to follow what he or she perceives the important referents would want them to do and/or do themselves. This perception of what behaviors others expect them to perform results in a perceived social pressure to act in accordance with those others. Subjective norm has been found to significantly influence eating intentions and behaviors (Backman et al., 2002; Schifter & Ajzen, 1985). Previous research indicated that this population viewed their mothers, mothers-in-law, pediatricians, and mothers of their daughters' schoolmates as their most influential subjective norm referents. Their husbands, their own fathers, siblings, fathers-in-laws, close friends, and dentists were mentioned somewhat less often (Hamel, 2009; Hamel & Smith, 2009).

The traditional conceptualization of the source of the subjective norm component of the TPB is someone who is seen as trustworthy or experienced regarding the behavior of interest. However, previous research revealed a different source of normative influence at work in this situation. Although certain sources were seen as trustworthy and preferred by the participants (such as their own mothers and

pediatricians), other reported sources were described as being more common or more likely referents (such as mothers in law and mothers of daughters' schoolmates), but not necessarily the most valued. Focus group discussions in previous research focused on some of these 'more likely referents' and found that despite not being a preferred source of subjective norms by the participants, they may nonetheless possess normative influence (Hamel, 2009; Hamel & Smith, 2009). The current research is designed to further investigate the relative influence of both types of referents found in previous studies.

Perceived behavioral control (PBC) is determined by what the individual perceives to be a barrier(s) to performing the behavior in question. In addition, his or her control beliefs will determine how likely the barrier(s) will be to deter the individual from performing the behavior. The individual's control belief strength or the extent to which an individual believes something will act as a barrier to a behavior; and his or her control belief power or the extent to which an individual believes a barrier will make it more difficult to enact a behavior, will determine the individual's overall PBC. These perceived barrier beliefs can be the result of individual past experiences and are often influenced by second-hand information from others. PBC has been found to significantly influence eating intentions and behaviors (Backman et al., 2002; Gracey et al., 1996; Patrick & Nicklas, 2005; Schifter & Ajzen, 1985) The barriers reported in previous research were mothers' own schedules, their daughters' schedules, the cost of healthy foods, the time needed to prepare healthy foods, and their daughters' dislike of healthy foods or preference for unhealthy foods. The barriers discussed were not direct barriers to encouragement; however they were barriers to providing a nutritional environment that allowed this type of encouragement (Hamel, 2009; Hamel & Smith, 2009).

Finally, the behavioral intention component of the model has to do with how likely the individual is to perform the behavior in question. It is predicted that an individual's attitude, subjective norm, and PBC should result in one's intention to engage in a particular behavior. In this context the behavior of concern is encouraging one's daughter to eat a healthy diet.

To gain further understanding of this population and as a measure to determine the generalizability of the qualitative data obtained from the focus group study (Hamel, 2009; Hamel & Smith, 2009), a Web survey was conducted. Based on the previous study findings and previous research on the TPB (Albarracín, et al., 2001; Armitage & Conner, 1999; Askelson, et al., 2011; Hamel, 2009; Hamel & Smith, 2009; Babrow, Black, & Tiffany, 1990; Courneya, 1995; Hausenblas, Carron, & Mack, 1997; Park & Smith, 2007) the following hypotheses were posed:

H1: Mothers' attitude toward healthy eating will be a significant positive predictor of their behavioral intention to encourage a healthy diet for their preadolescent daughter(s).

H2: Mothers' subjective norm regarding healthy eating will be a significant positive predictor of their behavioral intention to encourage a healthy diet for their preadolescent daughter(s).

H3: Mothers' perceived behavioral control regarding healthy eating will be a significant positive predictor of their behavioral intention to encourage a healthy diet for their preadolescent daughter(s).

## II. METHOD

### a) Participants

A sample of 104 mothers with at least one daughter between the ages of 6 and 11 participated in the study. The mean age of participants was 38.8 years and the standard deviation was 5.7. The sample was comprised of 84.6% Caucasian, 7.7% Latin, 4.8% African, 1.0% Asian, and 1.9% other. In terms of education 39.4% completed graduate school, 13.5% had some graduate school, 26.9% completed college or other post high school training, 15.4% had some college or post high school training, 3.8% completed high school, and 1.0% had some high school. This sample was recruited through a snowball sampling method through a health and risk communication research center and also through personal contacts of the authors. Specifically, an invitation email was sent to potential participants that included a summary of the study and a link to the web survey. There was also a message at the end of the email requesting women forward the invite on to others they knew that fit the inclusion criteria.

### b) Measures

All scales were comprised of seven-item Likert response scales. Items were adapted from Ajzen (2007) and created to validate the responses of the focus groups regarding attitude, subjective norm, and PBC of encouraging one's daughter to eat healthily.

Attitude. Based on the direction provided by Ajzen (2007), the attitude variable was based on measures of behavioral beliefs multiplied by outcome evaluations. The potential behavioral beliefs were based on previous research (Hamel, 2009; Hamel & Smith, 2009). The scales created to assess behavioral beliefs and outcome evaluations were adapted from Ajzen (2007). Behavioral beliefs items included "encouraging your daughter to eat a healthy diet will: (1) help your daughter have good overall health now; (2) make your daughter less likely to become overweight/obese; (3) help your daughter choose healthy foods to eat instead of unhealthy foods; (4) help prevent her from getting a serious disease, such as cancer, as an adult; (5) place heavy focus on health that will make her too concerned

with her body image". The outcome evaluation scale presented the same five behavioral beliefs set to a 7-point scale from 'good' to 'bad' so participants could evaluate these potential outcomes. These responses were submitted to a confirmatory factor analysis (CFA; Hamilton & Hunter, 1988) to determine if the items were measuring the constructs reliably. After the analysis the fifth item from each scale was removed. The final behavioral belief scale ( $M = 6.27$ ,  $SD = .79$ ,  $\alpha = .82$ ) and the outcome evaluation scale ( $M = 6.84$ ,  $SD = .47$ ,  $\alpha = .84$ ) were each comprised of four items.

**Subjective norms.** Based on the direction provided by Ajzen (2007), the subjective norm variable was based on measures of normative beliefs multiplied by motivation to comply. Based on findings from the previous research (Hamel, 2009; Hamel & Smith, 2009) subjective norm was measured for two different referents, the person whose opinion the participants' valued most and the person the participant thought would most likely to talk with them about encouraging their daughters to eat healthily.

Two scales were developed because although an individual may serve as one's more important referent, this person may not be the person most likely to comment or give advice on this behavior. Focus group data provided information to develop the list of normative referents (Hamel, 2009; Hamel & Smith, 2009): mother, father, mother-in-law, father-in-law, sister(s), brother(s), daughter's father, husband, pediatrician, dentist, close friends, other mothers, or other. Participants chose from this list for their 1) most valued referent and 2) most likely referent.

Eight items were adapted from Ajzen (2007) assessing the subjective norms (e.g. this person thinks/expects you should encourage your daughter to eat a healthy diet), and motivation to comply with important others (e.g. when it comes to encouraging your daughter to eat a healthy diet, you want to do what this person thinks you should). The responses to each of the subjective norm scales were submitted to CFA. All items were retained for both. The final subjective norm scale for most valued referent ( $M = 6.51$ ,  $SD = .74$ ;  $\alpha = .84$ ) and for the most likely referent ( $M = 6.56$ ,  $SD = .58$ ;  $\alpha = .83$ ) were comprised of three items each. The motivation to comply with the most valued referent ( $M = 5.97$ ,  $SD = 1.05$ ) and motivation to comply with the most likely referent ( $M = 5.53$ ,  $SD = 1.30$ ) were both one-item scales.

**Perceived behavioral control.** Based on the direction provided by Ajzen (2007), the PBC variable was based on measures of control belief strength multiplied by control belief power. Participants were presented with a list of behavioral barriers (mom's schedule, daughter's schedule, the cost of healthy foods, time, daughters' taste, inability to cook healthy food), pulled from previous research (Hamel, 2009;

Hamel & Smith, 2009). They were then asked to assess their control belief strength (e.g. I expect that the most major barrier I selected will prevent me from encouraging my daughter to eat a healthy diet), control belief power (e.g. my most major barrier will make it more difficult to encourage my daughter to eat a healthy diet) for that barrier. The control belief strength measure ( $M = 3.67$ ,  $SD = 1.84$ ) and control belief power measure ( $M = 4.69$ ,  $SD = 1.67$ ) were both one-item scales.

**Behavioral intention.** Intention to encourage a healthy diet for one's daughter was measured by a four-item scale (e.g. I plan to encourage my daughter to eat a healthy diet) adapted from Ajzen (2007). The scale was submitted to CFA and it was fully retained ( $M = 6.64$ ,  $SD = .57$ ,  $\alpha = .97$ ). See Table 1 for a summary of the means, standard deviations, and reliabilities of the variables assessed. Also see Table 3 for a correlation matrix of the relationships among the five variables: attitude, the most valued referent, the most likely referent, PBC, and behavioral intent.

### III. RESULTS

#### a) Analysis

Using hierarchical regression analysis, age, education, and ethnicity were entered in the first block as control variables, then the main predictor variables from the TPB (attitude, both subjective norms, and PBC) were entered in the second block with all possible interactions entered into the third block. According to Ajzen (2007) attitude is product of behavioral beliefs and evaluations of those outcomes, subject norm is the product of the normative measures and the motivation to comply, and perceived behavioral control is the product of control belief strength and control belief power, and that formula was followed here. To guard against nonessential multicollinearity the independent variables were mean-centered before they were entered into the equations (Cohen, Cohen, West, & Aiken, 2003). The results are presented in Table 2.

#### b) Regression Model

The analyses indicated that the overall model was significant,  $F(7, 91) = 12.62$ ,  $p < .001$ ,  $R_2 = .49$ , adjusted  $R_2 = .45$ . Block 1 demographics did not contribute significantly to the variance in maternal intent to communicate. When the four main TPB components (attitude, two types of norms, and PBC) were entered into the regression analysis in Block 2, attitude toward the behavior (standardized beta weight:  $\beta = .54$ ,  $p < .001$ ), the subjective norm of the person most likely to provide a message regarding the behavior ( $\beta = .18$ ,  $p < .05$ ) and PBC ( $\beta = -.22$ ,  $p < .01$ ) were statistically significant predictors of maternal intention to communicate with daughters about diet. Block 3 interactions were not significant 'thus' the product terms

did not add to the variance in intent to encourage explained by the independent variables.

These data are consistent with hypothesis one and partially consistent with hypothesis two. Mothers' attitude and their most likely subjective norm are both significant, positive predictors of intent to encourage a healthy diet for their daughters. However, their most valued subjective norm had little influence on intent ( $\beta = .09$ , ns). Last, the findings are in the opposite direction of hypothesis three such that the more control mothers perceive the less they intend to talk with their daughters. The adjusted  $R^2$  of the analysis was .45, indicating that 45% of the variance in intent to encourage a healthy diet in one's daughter is explained with the TPB components.

### c) *Subjective Norms and Barriers*

Based on the data analysis from previous research (Hamel, 2009; Hamel & Smith, 2009) which indicated that common normative referents might not be the most valued referent, participants in this study were asked to provide the normative referent whose opinion they valued most in regards to them encouraging their daughters to eat healthily, and also the normative referent they thought would be most likely to talk with them about encouraging their daughters to eat healthily. The referent most frequently cited as the person whose opinion the participants value most was their daughter's father ( $N = 33$ , 32.7%) and the second most common was their daughter's pediatrician ( $N = 25$ , 24.8%).

The referent most frequently cited as the person most likely to send a message regarding their encouragement of their daughters to eat a healthy diet was their own mother ( $N = 21$ , 20.6%) and the second most common referent was close friends ( $N = 16$ , 15.7%).

The barrier most frequently cited was their daughters' taste for healthy foods ( $N = 31$ , 29.8%) and the second most common barrier was the time needed to prepare healthy foods ( $N = 22$ , 21.2%).

## IV. DISCUSSION

Currently the United States is experiencing a weight problem of epidemic proportion. Decades of evidence indicate that more of U.S. children are heavier than ever before, and that this childhood weight gain is not something that they will grow out of (CDC, 2007; Reilly, 2003). Moreover, not only will an overweight child be more likely to be an overweight adult but that childhood overweight has influence over some major adulthood health concerns such as breast and colon cancers, type two diabetes, and cardiovascular problems (CDC, 2007; Guo, et al, 1994). These consequences are documented for both sexes but girls are more likely to experience the biological and psychological deleterious adulthood problems (Guo, et al., 2000; Strauss, 2000). This problem needs to be

targeted either before it develops or while it is still developing during childhood. Once a girl reaches puberty the negative effects of an overweight childhood are much harder to reverse (Guo et al., 2000). While girls are still in their preadolescent years (between 6 and 11) they are greatly influenced by their mothers in terms of modeling, restriction, regulation (Birch & Fisher, 2000; Cutting et al., 2007; Hill et al, 1990) and communication (Kicher & Crowter, 2001; Prescott & Le Poire, 2002; Vidovic, et al., 2005). The aim of the current research was to determine what influences mothers to communicate their encouragement to eat a healthy diet for their preadolescent daughters. The data from this line of research demonstrates that future persuasive attempts focused on mothers and their influential power regarding their daughters' dietary behaviors could hold promise as an avenue to reduce female childhood overweight/obesity.

### a) *Theory of Planned Behavior*

The findings from this study demonstrate the applicability and suitability of the TPB as a framework to approach this problem. Because the hypotheses broke down the three main predictions into their individual components, it is clear to see that this theoretical perspective is ideal for examining a variety of factors that might influence mothers to encourage a healthy diet for their daughters. The findings in this case are in line with what has been found in previous research that has utilized the TPB to assess maternal intention to communicate to their daughters (Askelson et al., 2011).

More specifically, mothers held a strong, positive attitude toward encouraging a healthy diet for their daughters, and attitude was shown to be a positive predictor of intent. These findings are similar to what has been found in related research (Askelson et al., 2011; Backman, et al., 2002; Gracey et al., 1996; Patrick & Nicklas, 2005). In this case, mothers who perceived that encouraging their daughters to eat healthily would lead to better health for their daughters now, help them to choose healthy foods over unhealthy foods, help prevent them from becoming overweight or obese, and help prevent serious conditions such as cancer, were significantly more likely to report they intended to encourage their preadolescent daughters to eat healthily. This finding is important as a foundation for future persuasive attempts. Specifically, this group already believes that encouraging their daughters to eat well is important for a variety of reasons. What is needed now are efforts to influence either the onset or maintenance of that behavior.

This study approached the subjective norm component of the TPB in an innovative way. Based on a previous focus group study (Hamel, 2009; Hamel & Smith, 2009) another norm type in addition to the traditional most valued referent was added. This particular situation involved possible influential referents

who were not necessarily the most valued, but the most likely to offer their opinion on the topic. It was predicted that the perception of what important others do themselves and what the respondent perceives them to expect to do will have an effect on one's behavioral intention. The findings differed based on the type of referent. The most valued referent was not found to predict intent to encourage, contrary to what has been found previously (Backman et al., 2002; Schifter & Ajzen, 1985). However, the referent participants felt they were most likely to get a message from about their daughters' diet did significantly predict intent to encourage. This suggests that the most likely referent can be more influential than the most valued in particular situations. The narrow conceptualization of the subjective norm component of the theory is a common critique of the TPB (Terry & Hogg, 1996). The findings in this case offer a more nuanced picture of the normative influence that could be extended to other behaviors.

Perceived behavioral control negatively predicted intent to encourage. This contrary finding may suggest that this group has a great deal of perceived control over the behavior of encouraging a healthy diet. For instance, the most frequently cited barrier was their daughters' taste for healthy foods and the second most common barrier was the time needed to prepare healthy foods. The greatest barriers found in past research have typically been lack of availability to healthy foods or the higher price of healthy foods (Gracey et al., 1996). Based on self-reported education, this sample was relatively affluent and perhaps did not view lack of availability or high prices as barriers. It could be the case the barriers here are not as severe as barriers as in past research.

In sum, all of the components of the TPB were significant predictors of mothers' intent to encourage a healthy diet. Clearly personal attitude has a strong impact on whether or not this population will intend to encourage their daughters to eat healthily. This has been found in previous research concerning nutritional behavior. What is surprising is the result of including both the most valued and the most likely normative referents. Although it seems intuitive to assume the most valued person would have the greater effect, in this case it was the most common normative referent who significantly influenced intent. In the case of PBC, the negative relationship between PBC and intent indicates that the more likely a barrier is perceived to act as a barrier and the more severely it is perceived the less likely one will intend to encourage a healthy diet. Statistically speaking, nearly half of the variance of intent was accounted for by the TPB and offers evidence of the suitability of the framework for this research area.

#### *b) Practical Implications*

There appear to be several factors which have substantial influence over mothers' intent to encourage

a healthy diet in their daughters. These data are evidence that mothers already have a positive attitude toward encouraging their daughters to eat well and that attitude has great influence over that intent. An area that could be utilized in more practical terms is the use of normative referents, especially in terms of the most likely referents which have more predictive power than most valued referents. In this case the most commonly cited most likely referent was a woman's own mother. This information could be used in educational campaigns especially toward close-knit families informing maternal grandmothers that they have a very important influence over their families.

In addition, the two most valued referents were daughters' fathers and pediatricians. Although they may not have as much predictive power as the most likely referent, they are valued for a reason and campaigns targeting fathers and informing them of their importance in this context as well as reinforcing to pediatricians how their advice is seen as expert and objective and likely to be followed.

The barriers identified in previous research and investigated further in this study were not necessarily barriers to encouragement per se, but more structural in nature. For instance, scheduling and cost barriers for certain foods will not prevent a mother from verbally encouraging her daughter but they do prevent an ideal environment for such encouragement to be likely and effective. Given that the data and findings presented here are meant to inform future persuasive messages, it is important for these future endeavors to take this contextual and structural reality into account.

#### *c) Limitations*

The current research is important, but its limitations should be acknowledged. The main drawback is that the dependent variable was the behavioral intention to encourage preadolescent daughters to eat a healthy diet rather than the actual behavior of encouragement. This is a starting point, but the end goal should be able to determine actual encouraging behavior. An improvement upon this research endeavor would be to determine if mothers' attitude, subjective norm, PBC, and intent lead to actually encouraging their daughters to eat healthily.

Additionally, the sample utilized in this case was highly educated and therefore may offer a biased view into mothers' perceptions of encouraging a healthy diet for their preadolescent daughters. Specifically, it could be the case that because these mothers have more training and education than average (and presumably a high socioeconomic status) they may have more nutritional knowledge than average and greater resources to provide a better diet than mothers from lower socioeconomic classes.

## V. CONCLUSION

This study offers a solid foundation for future efforts striving to persuade mothers to encourage a healthy diet for their daughters. It was determined that mothers already have a strong, positive attitude toward this behavior and that attitude has a great deal of influence on their intent to encourage. In addition, there is evidence to suggest that normative referents should be utilized as possible sources of persuasive messages. Specifically, the most likely sources to offer their opinions such as mothers and close friends appear to hold the most influence on this population. As a group mothers hold a great deal of influence on their daughters, especially at a young age, and this study is a starting point for future endeavors that can continue to focus on this maternal position as a means to reduce female childhood overweight and obesity.

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*Table 1* : Means, Standard Deviations and Reliabilities of the Components of the Theory of Planned Behavior

Variable	Mean	Std. Dev.	Alpha
Subjective Norm 1	6.51	.74	.84
Subjective Norm 2	6.56	.58	.83
Motivation to Comply 1	5.97	1.05	*
Motivation to Comply 2	5.53	1.30	*
Control Belief Strength	3.67	1.84	*
Control Belief Power	4.69	1.67	*
Behavioral Beliefs	6.27	.79	.82
Outcome Evaluation	6.84	.47	.84
Behavioral Intention	6.64	.57	.97

*Table 2 :* Regression Analysis for Behavioral Intent to Encourage Daughter to Eat a Healthy Diet

Predictors	B	SE	$\beta$	T	sr
Ethnicity	.14	.07	.17	2.17	.22
Education	.003	.04	.01	.10	.01
Age	.0	.01	-.01	-.07	-.01
Attitude	0.05	.01	<b>.54</b>	6.8**	.58
MV_ Subjective Norm	.004	.004	.09	1.11	.12
ML_ Subjective Norm	.01	.004	<b>.18</b>	2.14*	.22
Perceived Behavioral Control	-.01	.003	<b>-.22</b>	-2.87*	-.29

$F(7, 91) = 12.62, p < .001, R^2 = .49, \text{adjusted } R^2 = .45$

\*\*  $p < .001$

\*  $p < .05$

MV = most valued referent

ML = most likely referent

*Table 3 :* Correlation Matrix of Theory of Planned Behavior Components

	Attitude	Most Valued Subjective Norm	Most Likely Subjective Norm	PBC
Attitude				
Most valued Subjective Norm	.19*			
Most Likely Subjective Norm	.29**	.34**		
Perceived Behavioral Control	.02	.06	-.01	
Intent to Encourage	.62**	.26**	.36**	-.19*

\*  $p < .05$

\*\*  $p \leq .01$



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