



Prediction of Eating Behaviors Among High-School Students Based on the Constructs of Theory of Planned Behavior

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Abstract

Background and Aim: Adolescence is among the most critical periods of growth and development. In this period, the quality of nutrition goes down with age. Thus, it is really important to pay special attention to adolescents' nutritional status. This study aimed at identifying the predictors of eating behaviors among high-school students based on the theory of planned behavior.

Methods: This descriptive-analytic study was conducted in 2013 - 2014 in Birjand, Iran, on 457 female students. Participants were selected through two-stage cluster random sampling. A three-part instrument was used for data collection. The instrument contained items on participants' demographic characteristics, TPB constructs (namely attitude, subjective norms, perceived behavioral control, and behavioral intention), and eating behaviors. The data were analyzed by employing SPSS software (v. 16) and through conducting Pearson correlation and multiple linear regression analyses at the significance level of less than 0.05.

Results: The constructs of the Theory of Planned Behavior predicted 53.8% and 30% of the variances of behavioral intention and eating behaviors, respectively. The strongest and the weakest predictors of behavioral intention were perceived behavioral control ($P < 0.001$ and $\beta = 0.56$) and subjective norms ($P < 0.005$ and $\beta = 0.05$), respectively. The construct of eating behaviors was significantly correlated with all constructs of the Theory of Planned Behavior. The strongest predictor of eating behaviors was behavioral intention.

Conclusions: The findings of the present study suggest that the Theory of Planned Behavior can successfully predict students' behavioral intention and eating behaviors. The power of the theory in predicting intention is greater than its power in predicting behavior. All constructs of the theory were significant predictors of behavioral intention and therefore, all these constructs need to be taken into account when developing interventions.

Keywords: Theory of Planned Behavior, Eating Behaviors, Students

1. Background

Adolescence is the period of rapid growth and puberty (1) and is associated with massive physical and mental changes and even crises (2). Such changes are among the factors behind adolescents' nutritional health. In this period, body mass index doubles and thus, adolescents' need for nutrients increases considerably (2). Thus, nutritional deficiencies can increase the likelihood of developing many illnesses, even cancers, among adolescents (1). These facts highlight the importance of paying special attention to the nutritional status of adolescents (2).

Unhealthy eating habits such as low fruit consumption, breakfast skipping, high intake of junk foods and in-nutritious snacks, and following strict weight-loss diets are very common among adolescents (3). Studies on Iranian adolescents have revealed their inferior nutritional status. For instance, a study in Isfahan showed that 90% of students had unhealthy eating behaviors (2). Another study on adolescents in Zanjan, Iran, also showed that adolescents in this province consumed inadequate amounts of different food groups (4).

An absolute prerequisite to healthy eating is the precise identification of influential factors on eating behav-

iors (5). Given the complexity of healthy eating behaviors, appropriate models and theories are needed for shaping and reinforcing them (6). One of these theories is the theory of planned behavior (TPB). This theory was developed in 1980 by Ajzen and Fishbein (7). It is among the most important theories in the area of food choice, the predictive power of which has been assessed and confirmed in many sociological and behavioral studies (3). For instance, Mullan et al. (2013) found that the constructs of TPB predicted 42.2% and 57% of the variances of intention and behavior, respectively (8).

TPB holds that behavioral intention is the most important predictor of behavior (3). Three main predictors of behavioral intention in TPB are attitude (i.e. perceived desirable or undesirable outcomes of behavior), subjective norms (i.e. perceived social pressure for a behavior), and perceived behavioral control (i.e. perceived easiness or difficulty of showing desired behaviors) (8).

TBP has been used to identify factors contributing to some eating behaviors such as the consumption of snacks, sugar, chocolate, potato chips, and fruits (9). The theory has successfully predicted most eating behaviors. Although previous studies provided a detailed understanding about food choice behaviors among adolescents, little is known about their eating behaviors. Studies in Iran also mainly focused on certain types of eating behaviors such as fruit and vegetable consumption (7, 10). Moreover, although studies in other countries indicated the effectiveness of TPB in predicting students' eating behaviors (11), their findings may not be generalizable to Iranian adolescents. Thus, this study was designed and undertaken to identify the predictors of eating behaviors among high-school students based on TPB.

2. Methods

This descriptive-analytic study was conducted in 2013 - 2014 in Birjand, Iran, on seventh- and eighth-year high-school female students in order to predict their healthy eating behaviors based on TPB.

The Cochran's formula and the findings reported by Stead et al. (2005) (12) were used for sample size calculation. Stead et al. (2005) reported that TPB predicted 40% of the variance of behavior. Thus, with a p of 0.4 and a d of 0.05, sample size was determined to be 368 persons. Nonetheless, we increased sample size to 457 students in order to compensate any probable attrition. Students were recruited through the two-stage cluster random sampling.

Initially, we obtained an introduction letter from Mashhad University of Medical Sciences, Mashhad, Iran, provided it to Birjand education office, Birjand, Iran, and

subsequently secured the permission of the office for conducting the study. Then, a complete list was compiled of the names, addresses, and phone numbers of all high schools for girls in Birjand. After that, six schools were selected through simple random sampling. Finally, three classes (one seventh-year and two eighth-year classes) were randomly selected from each school.

A researcher-made three-part instrument was used for data collection. The instrument was developed through reviewing relevant textbooks, articles, and theses. The first part was a demographic questionnaire while the second contained items on different constructs of TPB, namely attitude (12 items), subjective norms (13 items), perceived behavioral control (7 items), and behavioral intention (6 items). The 13 items of the subjective norms were related to the effects of parents, siblings, school health instructors, peers, books and magazines, physicians, and nutrition specialists on students' eating behaviors. For attitude and subjective norms measurement, we used the questionnaires developed in 2011 by Hazavehei et al. (2). We added two questions to their subjective norms questionnaire and evaluated its validity and reliability. All items of the questionnaire were scored using a four-point Likert scale from 1 to 4 which respectively stood as 'Completely agree' or 'Very much' and 'Completely disagree' or 'Very low'.

The third part of the study instrument was related to eating behaviors. Given the wide variety of eating behaviors, we limited the items of this part to four main food groups i.e. fruits and vegetables, meat and cereals, milk and dairy products, and whole-grain bread. This part contained seven items on the frequency of using different foods. The possible answers to these items were 'Everyday', '3 - 4 times a week', '1 - 2 times a week', and 'Never', which were scored from 3 to 0, respectively. The score of each construct was categorized as follows: 0 - 33.3: non-ideal; 33.4 - 66.6: relatively ideal; and 66.7 - 100: ideal (13).

The content validity of the study instrument was assessed via providing it together with the title and the aim of the study to a panel of fifteen nutrition and health education experts. Their comments were considered for revising the instrument. The reliability of the instrument was evaluated through internal consistency assessment, which showed that Cronbach's alpha values for the attitude, subjective norms, perceived behavioral control, intention, and behavior constructs were 0.72, 0.82, 0.74, 0.75, and 0.71, respectively. Study data were analyzed by employing SPSS software (v. 16) and through conducting Pearson correlation and linear regression analyses at the significance level of less than 0.05.

3. Results

This study was done on 457 high-school female students, among whom 126 (27.6%) were seventh-year and 331 (72.4%) were eighth-year students. The father of the students had either university education (38%), diploma (33.3%), guidance-school (14.5%), or primary educations (11.2%) and only 2.9% were illiterate. These values among their mothers were 27.8%, 33.1%, 16.2%, 19.2%, and 3.3%, respectively. Most mothers were housewives (76.2%) and 23.2% of them were employed. Moreover, most fathers were employees (50%) and others were either self-employed (34.3%), laborer (7.7%), or unemployed (2%). Around 80.2% of the students had good eating attitudes. The highest attitude-related score was related to the role of milk and dairy products in bone strength so much so that more than half of the students (56%) believed that consuming four glasses of milk and dairy products a day helps adolescents have strong bones.

Regarding subjective norms, the findings revealed that the most important significant others for the students were respectively their families, physicians, and nutrition specialists, while their peers' opinions were not as much important. Accordingly, most students answered a question relating to the importance of parents' and other family members' opinions about daily consumption of milk, meat, fruits and vegetables, bread, and cereals by selecting 'Extremely important' and 'Very important' options (43.7% and 37.5%, respectively). These values for physicians/specialists and peers were 78.8% and 21%, respectively. Moreover, most students had great score on perceived behavioral control (74.8%). The highest- and the lowest-scored items in the control dimension were related to the ability to use fruits and vegetables (with a mean score of 3.40 out of a possible total score of 4) and the ability to use food-stuffs that do not taste good (with a mean score of 2.66 out of a possible total score of 4).

The behavioral intention of most students was firm (82.1%) and only 0.7% of them had a weak behavioral intention. Contrarily, a large portion of the students (24.2%) had poor eating behaviors (Table 1). The findings revealed that eating behaviors and behavioral intention were positively correlated with all TPB constructs. Moreover, the strongest correlation of eating behaviors was with intention ($r = 0.49$; Table 2).

Multiple linear regression was used to predict behavioral intention using the attitude, subjective norms, and perceived behavioral control constructs. The findings revealed that all TPB constructs were significant predictors of behavioral intention with a total explained variance of 53.8%. The strongest and the weakest predictors of behavioral intention were perceived behavioral control and sub-

jective norms, respectively (Table 3).

On the other hand, the strongest predictors of eating behaviors were behavioral intention and attitude with the standardized beta values of 0.438 and 0.120, respectively. However, the subjective norms and the perceived behavioral control constructs were not significant predictors of eating behaviors (Table 4).

4. Discussion

This study assessed the predictors of students' eating behaviors based on TPB. The findings revealed that most students had good eating attitudes and believed that milk and dairy product consumption significantly improves bone strength. In line with our findings, about 62% of the students in a study conducted by Hazavehei et al. (2011) also believed that daily consumption of four glasses of milk and dairy products helps adolescents have strong bones (14). Delvarianzadeh et al. (2011) also reported that 55.2% of their participating students had healthy eating attitudes (15).

Our findings also indicated that parents had the most significant role in shaping students' eating behaviors. Shahjanjari et al. (2009) also used an integrative approach to identify the determinants of junk food consumption among adolescents and found parents as the strongest predictor of subjective norms (3). Similarly, Berg et al. (2000) and Pawlak and Malinauskas (2008) suggested the significant role of parents in breakfast eating (16) and intention to eat vegetables (17). All these findings highlight the significant role of parents in shaping the eating behaviors of their children. Yet, Yarmohammadi et al. (2014) reported that among subjective norms, friends had the most significant effect on fast food consumption (18).

Most of our participants (74.8%) had a good perceived behavioral control. Similarly, Yarmohammadi et al. (2014) showed that the mean score of perceived behavioral control was 80.5% (7). On the other hand, the lowest behavioral control mean score was related to the ability to use food-stuffs that do not taste good. Studies showed that taste is a significant factor behind adolescents' food choice (3). In agreement with our findings, Hosein-Nejad et al. (2008) reported that the lowest self-efficacy score was related to the use of the foods that do not taste good (19). Different studies supported that perceived behavioral control and self-efficacy may be similar constructs (20).

Study findings also evidenced students' firm behavioral intention. This finding can be attributed to the high scores of other TPB constructs (including attitude, subjective norms, and perceived behavioral control). TPB holds that these constructs can affect behavioral intention. Haz-

Table 1. The Mean Scores of TPB Constructs

TPB Constructs	Mean ± SD	Possible Score	Ideal	Moderate	Poor
Attitude	35.14 ± 5.14	12 - 48	321 (80.2)	79 (19.8)	-
Subjective norms	31.12 ± 6.48	13 - 52	121 (30.4)	274 (68.4)	5 (1.2)
Behavioral control	21.32 ± 4.93	7 - 28	299 (74.8)	98 (24.5)	3 (0.7)
Intention	21.22 ± 4.07	6 - 24	328 (82.1)	69 (17.2)	3 (7/0)
Behavior	11.75 ± 2.55	0 - 21	87 (21.8)	216 (54)	97 (24.2)

Table 2. Correlations Among TPB Constructs

Constructs	Attitude	Subjective Norms	Behavioral Control	Intention
Subjective norms	0.50 ^a	1		
Behavioral control	0.51 ^a	0.50 ^a	1	
Intention	0.57 ^a	0.55 ^a	0.64 ^a	1
Behavior	0.42 ^a	0.32 ^a	0.38 ^a	0.49 ^a

^aP < 0.001.

Table 3. Predicting Behavioral Intention Based on TPB Constructs

TPB Constructs	T-Raito	Standardized Beta	P Value	R ²
Attitude	5.952	0.260	0.000	0.538
Subjective norms	5.591	0.257	0.000	
Perceived behavioral control	8.670	0.388	0.000	

Table 4. Predicting Eating Behaviors Based on TPB Constructs

TPB Constructs	T-Raito	Standardized Beta	P Value	R ²
Attitude	2.093	0.120	0.037	0.30
Subjective norms	0.551	0.033	0.582	
Perceived behavioral control	0.344	0.021	0.731	
Intention	6.451	0.438	0.000	

avehei et al. (2011) also reported the relatively high score of behavioral intention among students (2).

Despite the high score of behavioral intention among study participants, only a small percentage of them had acceptable eating behaviors. Hazavehei et al. (2009) also found that 90% of their participating students had poor eating behaviors (14). An explanation for this finding is the fact that large increases in behavioral intention may be associated with moderate-level changes in behavior (8). In fact, the wide intention-behavior gap can be attributed to other internal and external factors contributing to the behavior as well as individuals' failure to act based on their intentions (17, 18).

Study findings revealed that the construct of eating behaviors was positively correlated with all other constructs of TPB. Mullan et al. (2013) and Sjoberg et al. (2004) also reported the same finding (8, 21). Our findings also showed that TPB constructs explained 53.8% of the total variance of behavioral intention and 30% of the total variance of eating behaviors. Similarly, most studies on eating behaviors have reported that TPB successfully predicts behavioral intention and eating behaviors (8, 22).

Different factors have varying roles in predicting intention and behavior. It is supposed that the predictive power of the three constructs of TPB (i.e. attitude, subjective norms, and perceived behavioral control) depends

on the type of behavior as well as on the immediate conditions (23). Our findings revealed that the strongest predictor of intention was perceived behavioral control while the predictive power of subjective norms was relatively low. These findings are in agreement with the findings reported by Bogers et al. (2004) (24). Mullan et al. (2013) also found perceived behavioral control as the strongest predictor of breakfast consumption intention among British adolescents (8). Contrarily, Huchting et al. (2008) reported that subjective norms construct was the strongest predictor of behavioral intention (25). Ayzenanf Fish (cited in Gerayllo, 2013) noted that the roles of subjective norms, attitude, and perceived behavioral control in predicting intention may vary according to the immediate context and the behavior (26).

Study findings also showed that the strongest predictor of eating behaviors was intention. This was an expected finding because TPB holds that the most significant predictor of behavior is intention to do the behavior (3). Mullan et al. (2013) also reported the same finding (8).

4.1. Conclusions

The findings of the present study suggest that TPB can successfully predict students' eating behaviors and thus, it can be used to develop interventions for promoting such behaviors. All TPB constructs were significant predictors of behavioral intention and therefore, all these constructs need to be taken into account when developing interventions. Moreover, as perceived behavioral control was the strongest predictor of behavioral intention, interventions for promoting students' behaviors need to be focused on promoting their sense of control. In addition, given the significant role of taste in predicting students' eating behaviors, adolescent health authorities in schools are recommended to develop strategies to manipulate this factor.

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