

## FRUIT AND VEGETABLES CONSUMPTION AS SNACKS AMONG YOUNG PEOPLE. THE ROLE OF DESCRIPTIVE NORM AND HABIT IN THE THEORY OF PLANNED BEHAVIOR

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In this paper we test the efficacy of the Theory of Planned Behavior (TPB), extended with descriptive norm and habit, to predict the behavior of consuming fresh fruit and vegetables as snacks. A longitudinal study was carried out. In a one-month period, 162 students, from University of Padova and senior high schools in the North-East of Italy, were surveyed. Data were analyzed by using structural equation models. The inclusion of habit improved the predictive power of TPB and the expanded model explained a large amount of variance in intention (76%) and a moderate amount (28%) in behavior. Affective attitude, subjective norm, perceived behavioral control, and habit were significantly related to intention; behavior was affected by intention and habit. Results support the efficacy of the TPB in predicting the target behavior: they also suggest strategies that can be followed to promote this healthy eating behavior.

**Keywords:** Fruit and vegetables snacks; Theory of Planned Behavior; Habit; Descriptive norm; Healthy eating.

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According to World Health Organization 2008 estimates, 54.1% of the Italian adult population (aged more than 20 years) is overweight and 19.8% obese. Moreover, the adult population in Italy assumes 11.3% of their total calorie intake from saturated fatty acids, while the FAO recommendation is maximum 10% (World Health Organization, 2013). Almost all the public authorities that deal with health recommend fruit and vegetables intake as one of the most important preventive health measures (World Health Organization, 2003), associated with decreased all-causes mortality, and ability to prevent, for instance, heart disease, certain types of cancers, Type 2 diabetes, stroke, chronic obstructive pulmonary disease, cataracts, hypertension, diverticulosis, cognitive decline among older adults (Oyebode, Gordon-Dseagu, Walker, & Mindell, 2014). So a healthy diet rich in fruit and vegetables is essential to prevent many diseases that endanger people's health and well-being.

Snack consumption in Italy is growing while the consumption of fresh fruit and vegetables is decreasing in contrast to the prescriptions of the Mediterranean diet. At the same time, the number of Italians who prefer quick meals eaten outside the home is increasing (Censis-Coldiretti, 2010). The phenomenon of the disintegration of main meals (breakfast, lunch, and dinner) involves mostly young people and is contributing to the growth of the Italian snack market. Many snacks have a high content of saturated fat, salt, and refined sugar; these components could

have negative health consequences (Lloyd-Williams, Mwatsama, Ireland, & Capewell, 2009). Replacing unhealthy snacks, namely those with high-energy density, with healthier snacks, for instance fruit and vegetables, is a possible target for public health interventions (Branscum & Sharma, 2014). Increasing consumption of fruit and vegetables between meals is also one of the potential means of controlling body weight and shape (Conner & Norman, 1996).

Our research, based on a longitudinal design, aimed to investigate the factors influencing young people's choice to consume fruit and vegetables as snacks. Our reference theoretical model was the Theory of Planned Behavior (TPB; Ajzen, 1991). This model, which is an extension of the Theory of Reasoned Action (TRA; Ajzen & Fishbein, 1980), predicts that the stronger the intention to engage in a behavior, the more likely its performance should be. In turn, people develop the intention to perform a behavior when they evaluate it positively (attitude), they perceive social pressure to perform the behavior (subjective norm), and perceive that the behavior is easy to perform (perceived behavioral control). Fishbein and Ajzen (2010) claimed that intention is the best predictor of behavior but it is also important to consider skills and abilities as well as environmental factors (i.e., perceived behavioral control). Indeed people "perform a behavior because they intend to do so, they have the requisite skills and abilities, and there are no environmental constraints to prevent them from carrying out their intentions (i.e., they have favorable intentions and actual behavioral control)" (p. 21). Ajzen (1991) argued that TPB could be considered an exhaustive theory of behavior, as any other variable, not included in the theory, would affect behavior through the constructs of TPB itself.

The Theory of Planned Behavior has been successfully applied to a range of behaviors, including healthy eating (e.g., Conner, Norman, & Bell, 2002; Louis, Davies, Smith, & Terry, 2007), eating dietary behaviors (e.g., Armitage & Conner, 1999; Conner & Norman, 1996), fruit and vegetables consumption (e.g., Ding, Mullan, & Xavier, 2014; Emanuel, McCully, Gallagher, & Updegraff, 2012; Povey, Conner, Sparks, James, & Shepherd, 2000), snacking behavior (e.g., Branscum & Sharma, 2011; de Bruijn, Kremers, Schaalma, van Mechelen, & Brug, 2005; Shahanjarini, Rashidian, Majdzadeh, Omidvar, & Shojaezadeh, 2010), and healthy snack choice (e.g., Weijzen, de Graaf, & Dijksterhuis, 2009).

Guillaumie, Godin, and Vézina-Im (2010) in their review revealed that the predictive power of the TPB in explaining adults' healthy eating intentions was superior to that of other decision-making theories. In their meta-analysis, McEachan, Conner, Taylor, and Lawton (2011) found that TPB constructs explained 50.3% of the variance in dietary behaviors intention and 21.2% of variance of these eating behaviors. Attitudes and perceived behavioral control were often the strongest predictors of healthy eating intentions (Povey et al., 2000; Sjoberg, Kyungwon, & Reicks, 2004); while subjective norm showed low or no relationships with this construct (Louis, Chan, & Greenbaum, 2009; Paisley & Sparks, 1998). The intention was often the only significant predictor of fruit and vegetables eating behavior (e.g., Blanchard, Fisher, et al., 2009; Blanchard, Kupperman, et al., 2009; Kothe, Mullan, & Butow, 2012) and seldom both the intention and perceived behavioral control (de Bruijn, 2010) turned out to be significant predictors.

The original TPB model has been extended into two directions: a) the main constructs, for instance attitude and subjective norm, have been decomposed into two or more dimensions; b) new predictors have been added. As regards attitudes, two attitude dimensions have been distinguished: cognitive (or instrumental) and affective (or experiential) (see Fishbein & Ajzen, 2010). Some studies in the context of eating choice have supported the bidimensionality of atti-

tude. For example, Blanchard, Fisher, et al. (2009) and Blanchard, Kupperman, et al. (2009) differentiated affective attitude (e.g., eating five servings of fruit and vegetables per day is enjoyable) and cognitive attitude (e.g., eating five servings of fruit and vegetables per day is beneficial) showing that the affective dimension was the only attitudinal predictor of intention.

Social norms can be distinguished into injunctive norm (i.e., perceptions of significant others' approval/disapproval) and descriptive norm (i.e., perceptions of the quantity and frequency of a specific behavior performed by others) (Cialdini, Reno, & Kallgren, 1990). Injunctive norm is included in the original TPB model, descriptive norm is not. Descriptive norm does not include the explicit social feedback implied in the injunctive norm but provides information regarding important people's behavior. Individuals can use this information to identify what is the correct behavior (Cialdini, Kallgren, & Reno, 1991). The reviews by Manning (2009) and Ravis and Sheeran (2003) showed that descriptive norm had an effect on intention to perform a wide range of behaviors, explaining a further 3%-5% of this construct variance.

Concerning eating behavior, descriptive norm was able to predict intentions independently from injunctive norm in several studies (i.e., Nejad, Wertheim, & Greenwood, 2004; Povey et al., 2000; Tuu, Olsen, Thao, & Anh, 2008; Yun & Silk, 2011). For instance, Lally, Bartle, and Wardle (2011) found that for adolescents (mean age: 16.9 years) descriptive norm alone accounted for 21% of the variance in unhealthy snack consumption, and, accounted for 22% of the variance in fruit and vegetables consumption. In conclusion, distinguishing between descriptive and injunctive norm could be necessary in order to disentangle the effects of social norms and to improve the predictive power of the TPB (Staunton, Louis, Smith, Terry, & McDonald, 2014).

With regard to the second area of TPB expansion, that is, the integration in the model of additional variables able to improve the TPB predictive power, McEachan et al.'s (2011) meta-analysis showed, for instance, that the introduction of past behavior added an additional 2.1% of variance in the explanation of dietary behavior intentions and 3.4% of variance in the explanation of these eating behaviors. Recent findings showed that fruit consumption may not only be the result of planned intentions, but it may also be habitual (Brug, Van Lenthe, & Kremers, 2006; de Bruijn, 2010; de Bruijn et al., 2007). It can be assumed that eating behaviors are habitual, because meals are generally consumed at the same place and time from day to day (van't Riet, Sijtsema, Dagevos, & de Bruijn, 2011). Moreover, given the high frequency of snacking, a habitual response is likely, namely a response that does not require deliberation and mediation by intention (Tam, Bagozzi, & Spanjol, 2010).

Gardner (2015) and West and Brown (2013) defined habit as a process by which a cue automatically generates an impulse toward action, based on learned stimulus-response associations. Habit is thus a key automaticity-based determinant of action acquired through context-dependent repetition (Lally, van Jaarsveld, Potts, & Wardle, 2010). According to some authors, frequent performance can establish strong habits and yield to relatively automatic repetition of behavior with minimal intentional and reasoned considerations or minimal awareness (Aarts, Paulussen, & Schaalma, 1997; Ouellette & Wood, 1998). When people possess moderate or strong habits, their intentions may have little influence on their subsequent behaviors (Gardner, Abraham, Lally, & de Bruijn, 2012). Therefore habit often competes with intention in regulating action. Food or dietary behaviors are repetitive by nature and, for this reason, habit may play an important role also in fruit and vegetables consumption (Allom & Mullan, 2012; Guillaumie et al., 2010). Verplanken and Orbell (2003) proposed a measure of habit, the Self-Reported Habit

Index (SRHI), that comprises 12 items representing three facets of habit: automaticity (i.e., lack of awareness and of conscious intent), frequency (i.e., repetition), and relevance to self-identity. SRHI is the most popular measure of habit strength; it is unidimensional and reliable, and exhibits content and discriminant validity (Orbell & Verplanken, 2015; Verplanken, 2006). In the context of fruit consumption, some studies, incorporating SRHI measure in the TPB model, tested its addictive and interactive effects: habit was found to be a good predictor of future behavior for fruit consumption (Brug, de Vet, de Nooijer, & Verplanken, 2006; de Bruijn, 2010; de Bruijn et al., 2007) and unhealthy snacking behavior (Verplanken, 2006). Habit significantly increased the explained variance in fruit intake and fruit intake intention (Brug, de Vet, et al., 2006). For example, in the Italian context, Menozzi and Mora (2012) found that habit strength, measured with the SRHI, was the strongest determinant of university students' fruit consumption. These results confirmed that fruit consumption is not a completely conscious decision-making process and shows habitual components.

## PRESENT STUDY

The first aim of this study was to test the validity of TPB applied to the consumption of fresh fruit and vegetable as snacks. To our knowledge no study has tested the TPB model for this behavior amongst young adults. In the hypothesized model we distinguished two attitude components (cognitive and affective). We expected that the two attitude components, subjective norm, and perceived behavioral control would be associated with snacking intention; perceived behavioral control and intention should, in addition, affect behavior.

The second aim was to test an extended TPB model with two additional predictors: descriptive norm and habit. This extended model should have a greater predictive power with regard to intention and behavior, with descriptive norm and habit increasing the explained variance in behavioral intention. Furthermore, habit and perceived behavioral control should have a direct effect on behavior.

In this study the target population was represented by students attending senior high school or university courses. We choose this population because young people at this age may start to be independent from parents and may engage in unhealthy food choices that could result in unfavorable consequences for health.

## METHOD

### Participants and Procedure

Participants completed, on a voluntary basis, a structured questionnaire (Time 1); it included measures of the constructs considered in the extended model, and sociodemographic variables. One month later (Time 2), participants completed a second questionnaire which included behavior measures.<sup>1</sup>

The convenience sample consisted of students from the University of Padova and from senior high schools in the North-East of Italy. Respondents did not receive course credits or other

rewards for participation. They were recruited by trained researchers in classrooms, and informed their participation was free. Anonymity was guaranteed.

The first phase of the study involved 250 students over 18. Of these participants, 162 (64.8%) also completed the second questionnaire. The final sample included 162 participants: mean age was 19.85 ( $SD = 1.40$ ; range 18-27); 118 were females (73.3%) and 43 males (26.7%), one student did not indicate his/her gender. One hundred-thirty-seven participants were university students and 25 were students attending senior high school. The majority of respondents lived in the North-East of Italy (83.9%).

### Measures

Measures of TPB constructs were adapted from the literature (e.g., Ajzen 2002; Conner & Sparks, 2005). The target behavior was the consumption of fresh fruit and vegetables as snacks over the following month.

*Attitude.* Eleven 7-point semantic differential scales were used to assess the two attitude components. The statement “My consuming fruit and vegetables as snacks in the next month would be...” was used as the introductory phrase. To measure the cognitive component of attitude we used four items: harmful-beneficial, negative-positive, stupid-intelligent, unhealthy-healthy; the affective component was measured by seven items: unvaluable-valuable, sad-joyful, bad-good, undesirable-desirable, disagreeable-agreeable, distasteful-tasteful, unpleasant-pleasant. The 7-step scale was anchored by 1 (negative pole) and 7 (positive pole). Cronbach’s alpha was .71 and .88, for cognitive and affective attitude, respectively.

*Subjective norm.* Four items were used to assess this construct. The first was: “On a scale from 1 to 7, please indicate the degree to which most people who are important to you (family, friends, acquaintances, partner) would *disapprove* (1)/*approve* (7) your consumption of this snack type in the next month.” The second was: “Most people who are important to me (family, friends, acquaintances, partner) would like me to consume this type of snack in the next month.” The response scale ranged from 1 (*false*) to 7 (*true*). The third was: “Most of the people who are important to me (family, friends, acquaintances, partners) think *I should not* (1)/*I should* (7) consume this type of snack in the next month.” The last was: “Most of the people who are important to me (family, friends, acquaintances, partner) support my eating this type of snack.” The response scale ranged from 1 (*false*) to 7 (*true*). Cronbach’s alpha was .77.

*Descriptive norm.* This construct was measured using three items. The first was: “Most of people like me consume this type of snack.” The response scale ranged from 1 (*false*) to 7 (*true*). The second was: “Most people who are important to me (family, friends, acquaintances, partner) consume this type of snack.” The response scale ranged from 1 (*false*) to 7 (*true*). The third was: “How many of the people who are important to you (family, friends, acquaintances, partner) consume this type of snack?” The response scale ranged from 1 (*none*) to 7 (*all*). Cronbach’s alpha was .83.

*Perceived behavioral control.* It was measured by six items. The first was: “Please indicate how much consuming this type of snack in the next month is for you a behavior easy or difficult to achieve.” The response scale ranged from 1 (*extremely difficult to achieve*) to 7 (*extremely easy to achieve*). The second item asked “To what extent do you think that consuming

this type of snack in the next month is a behavior under your control?" The response scale ranged from 1 (*not at all*) to 7 (*very much*). Another item asked the participant "How much control do you think you have on eating or consuming this type of snack in the next month?" Response scale ranged from 1 (*no control*) to 7 (*complete control*). The last three items were: "I think I will be able to consume this type of snack in the next month," "I'm sure I will be able to consume this type of snack in the next month," and "It depends entirely on me whether or not I will be able to consume this type of snack in the next month." For all three items the response scale ranged from 1 (*strongly disagree*) to 7 (*strongly agree*). Cronbach's alpha was .90.

*Intention.* Four items were used to measure this variable. In the first, participants were asked: "I intend to consume this type of snack in the next month." The response scale ranged from 1 (*strongly disagree*) to 7 (*strongly agree*). In the next item participants were asked to indicate "How strong is your intention to consume this type of snack in the next month?" Response scale ranged from 1 (*not at all strong*) to 7 (*very strong*). The last two items asked "How likely is it that you will develop the intention to consume this type of snack in the next month?" and "How likely is it that you will actually consume this type of snack in the next month?" The response scale ranged from 1 (*very unlikely*) to 7 (*very likely*). Cronbach's alpha was .92.

*Habit.* A short form of SRHI (Verplanken & Orbell, 2003) with items regarding automaticity and frequency was used; the scale was adapted to the present behavior. It included nine items, introduced by the sentence: "Consuming this type of snack is something that..." "I do frequently," "I do automatically," "I do without thinking," "It would require effort not to do it," "It belongs to my routine," "I start doing before I realize I'm doing it," "I would find hard not to do," "I have no need to think about doing," "I have been doing for a long time." Response scale ranged from 1 (*completely disagree*) to 7 (*completely agree*). Cronbach's alpha was .96.

In the second phase of the study (Time 2), participants were asked to report their actual consumption behavior.

*Self-reported actual behavior.* Two items were used: "How often, in the previous month, did you consume as snack fresh fruits?" and "How often, in the previous month, did you consume as snack fresh vegetables?" The response scale ranged from 1 (*never*) to 5 (*everyday or almost*) ( $r = .38, p < .0001$ ).

## DATA ANALYSIS

Firstly, confirmatory factor analysis was used to analyze the relationships between the latent variables (i.e., the constructs of the TPB extended model) and their indicators. The analysis was performed by using the maximum likelihood method applied to covariance matrix (LISREL 8.80; Jöreskog & Sörbom, 2007). For each latent variable two indicators were created by aggregating the items; the aims of parcelling were: to reduce the number of parameters to be estimated; to increase the accuracy of estimates; and to decrease measurement error (the partial disaggregation model was proposed by Bagozzi and Heatherton in 1994, and by Bandalos in 2008).

Structural equation models (SEMs) were used to test the hypothesized models. The goodness of fit of the models was evaluated by  $\chi^2$  test. Satisfactory fits are obtained when  $\chi^2$  is nonsignificant, or the  $\chi^2/df$  is less than 3 (Kline, 1998). But, given the dependency of  $\chi^2$  on sample size, further indices were used: the comparative fit index (CFI), the root mean square error of

approximation (RMSEA), the standardized root mean square residual (SRMR). Satisfactory model fits are indicated by CFI values greater than or equal to .95, RMSEA values equal to or less than .06, and SRMR values equal to or less than .08 (Hu & Bentler, 1999).

## RESULTS

### Preliminary Analyses

Confirmatory factor analysis showed that the measurement model had an acceptable fit:  $\chi^2(63) = 87.64$ ,  $p = .022$ ;  $\chi^2/df = 1.39$ ; RMSEA = .049; CFI = .99; SRMR = .036. Each indicator was highly loaded on the respective factors, and all factor loadings were significant and higher than .75. The correlations ( $\phi$  coefficients) between latent constructs are reported in Table 1. The highest correlations were those between intention and affective attitude ( $\phi = .75$ ), between perceived behavioral control and intention ( $\phi = .72$ ), and between perceived behavioral control and habit ( $\phi = .75$ ). However, all correlations were significantly lower than 1 (95% confidence interval).

Composite scores for each construct were computed (Table 1). Respondents stated that there was a slight chance they would consume fruit and vegetables as snacks in the next month (intention). The evaluation of the act (cognitive attitude) was definitely positive, while affective reactions (affective attitude) were only slightly favorable. Participants stated they had moderate control over consuming fruit and vegetables in the next month (perceived behavioral control), and that they felt a quite strong social pressure exerted by important others (subjective norm), but the behavior was not very common in their social environment (descriptive norm). Participants claimed not to be used to consuming fruit and vegetables as snacks (habit).

### Model Testing

As regards the original TPB model (Model 1), the fit indices suggested that the model fit the data well (Table 2). The direct effects of the two attitude dimensions, subjective and descriptive norm on behavior were not estimated. The model explained 74% of variance in intention and 22% of variance in fruit and vegetables consuming behavior. The inspection of the standardized regression coefficients showed that intention was significantly associated with affective attitude ( $\gamma = .42$ ,  $p < .0001$ ), subjective norm ( $\gamma = .30$ ,  $p < .001$ ), and perceived behavioral control ( $\gamma = .39$ ,  $p < .0001$ ). Cognitive attitude was not related to intention ( $\gamma = -.06$ ,  $p = .38$ ). Behavior was affected only by intention ( $\beta = .39$ ,  $p < .002$ ). No modification indices suggested the estimation of other paths.

Then, in order to establish if further constructs (i.e., descriptive norm and habit) are able to improve the amount of variance of intention and behavior, two extended models were tested in which the predictors were introduced one at a time into the original TPB model. Model 2 (Table 2) provided satisfactory fit indices, but accounted variance in intention and behavior did not improve compared to the previous model. In this model affective attitude ( $\gamma = .39$ ,  $p < .0001$ ), subjective ( $\gamma = .22$ ,  $p < .003$ ) and descriptive ( $\gamma = .16$ ,  $p < .03$ ) norm, and perceived behavioral control ( $\gamma = .36$ ,  $p < .0001$ ) were significantly associated with intention; intention significantly affected behavior ( $\beta = .39$ ,  $p < .002$ ), and cognitive attitude was not related to intention ( $\gamma = -.05$ ,  $p = .47$ ).



TABLE 1  
Means, standard deviations, and correlations ( $\phi$  coefficients) between latent constructs

Constructs	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8
1. Affective attitude <sup>a</sup>	4.90	1.14	–							
2. Cognitive attitude <sup>a</sup>	6.11	1.06	.52 (.07)	–						
3. Subjective norm <sup>a</sup>	5.71	0.98	.39 (.08)	.34 (.09)	–					
4. Descriptive norm <sup>a</sup>	3.91	1.23	.42 (.08)	.25 (.08)	.51 (.08)	–				
5. Perceived behavioral control <sup>a</sup>	4.69	1.41	.65 (.06)	.29 (.08)	.30 (.09)	.38 (.08)	–			
6. Habit <sup>a</sup>	3.45	1.70	.61 (.06)	.26 (.08)	.26 (.09)	.42 (.08)	.75 (.04)	–		
7. Intention <sup>a</sup>	4.44	1.51	.75 (.05)	.37 (.08)	.55 (.07)	.56 (.07)	.72 (.05)	.68 (.05)	–	
8. Behavior <sup>b</sup> (Time 2)	2.88	1.20	.39 (.07)	.13 (.08)	.23 (.09)	.29 (.08)	.37 (.07)	.50 (.06)	.46 (.07)	–

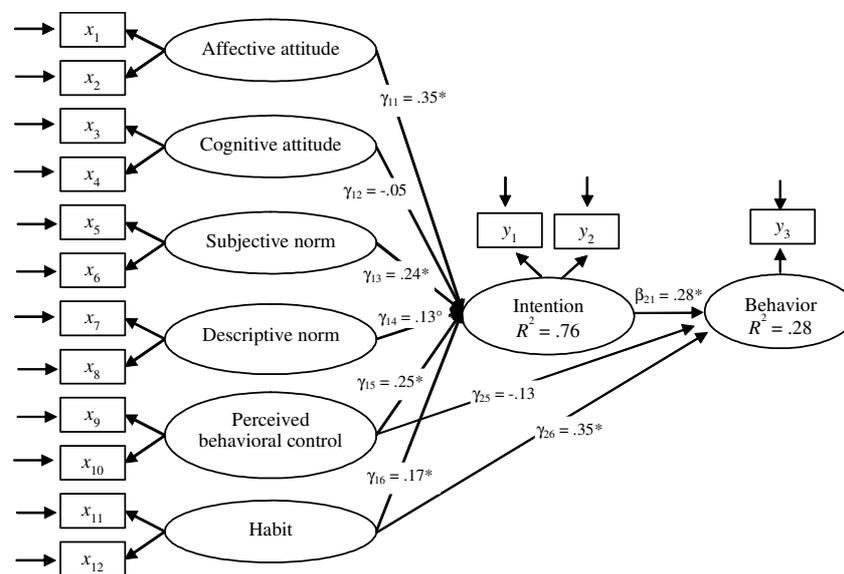
Note. *N* = 162. Standard errors in parentheses. <sup>a</sup> Response scale from 1 to 7. <sup>b</sup> Response scale from 1 to 5. All correlations are significant ( $p < .05$ ), except for the  $\phi$  coefficient between behavior and cognitive attitude.

TABLE 2  
Goodness-of-fit indices for the tested models

Models	$\chi^2$	df	$p \cong$	$\chi^2/df$	CFI	RMSEA	SRMR	$R^2_{\text{Intention}}$	$R^2_{\text{Behavior}}$
Model 1: TPB	45.19	33	.077	1.37	.99	.048	.033	.74	.22
Model 2: TPB + Descriptive norm	64.77	49	.045	1.32	.99	.045	.035	.74	.22
Model 3: TPB + Descriptive norm + Habit	87.42	67	.048	1.31	.99	.044	.034	.76	.28

Note.  $N = 162$ . TPB = Theory of Planned Behavior. CFI = comparative fit index; RMSEA = root mean square error of approximation; SRMR = standardized root mean square residual.

The final extended model (Model 3) fitted the data well and accounted for 76% of the variance in intention and 28% of variance in behavior. Habit to consume fruit and vegetables explained an additional 2% of variance in intention and 6% of variance in behavior, compared to the previous model tested (Model 2). Affective attitude, subjective norm, perceived behavioral control, and habit were significantly related to intention. Descriptive norm was associated with intention in a marginally significant way, again cognitive attitude was not related to intention ( $\gamma = -.05$ ,  $p = .74$ ). Behavior was affected by intention and habit (Figure 1); perceived behavioral control did not have significant effects on behavior ( $\gamma = -.13$ ,  $p = .34$ ).



\*  $p < .05$ ; °  $p < .06$ .

FIGURE 1

Test for the Theory of Planned Behavior extended with descriptive norm and habit.  
 $N = 162$ . Parameters are completely standardized.

The direct effects of two attitude dimensions and subjective and descriptive norms on behavior were not estimated. Loading of  $y_3$  was fixed to 1, and its error was fixed to 0.

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## DISCUSSION

This study used TPB theoretical framework to explore a healthy eating practice among young people: consuming fruit and vegetables as snacks. Since many snacks have components (i.e., saturated fat and refined sugar) which could have negative health consequences, it becomes relevant to understand the cognitive and motivational determinants of the choice to consume healthier snacks, particularly fruit and vegetables. To date, to our knowledge, while many studies have investigated fruit and vegetables eating behavior in general (for example a particular amount of fruit or vegetables per day), no one has considered the specific behavior of consuming fresh fruit and vegetables as snacks.

We considered the original TPB model and two expanded models that integrated descriptive norm and habit. The results showed the validity of the original TPB for predicting the consumption of fruit and vegetables as snacks, providing further evidence of the efficacy of this theory in the domain of healthy food choice. The constructs of the original TPB explained 74% of intention variance, which is higher than the value commonly reported by studies in dietary behavior context. This high percentage of accounted variance could be due to the fact that in our research we focused on a highly specific behavior, such as “to consume fruit and vegetable as snacks in the next month” which may be not open to various interpretations; therefore, the possibility of incompatibility between the person’s representation of the attitude target and the actual target, toward which the attitude and intention are directed, was very low. Regarding behavior, the original TPB model explained 22% of variance, a percentage similar to that found in other studies on dietary behavior (i.e., McEachan et al., 2011).

The inclusion of descriptive norm did not improve the predictive power of the model, while adding habit increased the portion of variance explained in both intention (2%) and behavior (6%). The relatively low explained variance of snacking consumption (28%) indicates that other motivational, volitional, and/or environmental factors need to be taken into account for the prediction of this snacking behavior. However, low explained variance is not uncommon in the case of dietary behaviors and few studies reported amounts of 30% or higher (van Osch et al., 2009).

Considering the model expanded with descriptive norm and habit, our study showed that intention was a proximal predictor of actual behavior; a direct effect of habit on behavior also emerged. In turn, intention came from a positive affective evaluation of the behavior, the perception of social pressure to perform it (i.e., the subjective norm), the consideration of having opportunities and resources to do it (i.e., perceived behavioral control), and from the strength of the habit.

Only the affective component of attitude was associated with intention and, indirectly, with behavior. Pleasantness of foods is usually considered the most important determinant of food choice (Drewnowski, 1997; Mela, 2001), as consumption of highly liked food usually leads to enjoyment. Moreover, this result, in line with those of Blanchard, Fisher, et al. (2009) and Blanchard, Kupperman, et al. (2009), supports the position that the two components of attitude have differential relationships with intention in the context of eating choice. The fact that the cognitive component of attitude was not associated with intention may be due to the young age of the participants. They may be well aware of the benefits of eating fruit and vegetables as snacks, but they may be convinced that this behavior is not necessary at the moment for their health and prefer snacks which give instant pleasure. Collins and Mullan (2011) defined fruit and vegetable

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consumption as distal benefit behavior, that is, a behavior from which the individual may not immediately obtain a profit, and snacking (such as, chips, nuts, cakes, chocolate, biscuits) as immediate hedonic behavior, that is, an eating behavior that provides instant pleasure but may worsen future physical or psychological well-being.

Contrary to other studies concerning food choice where subjective norm resulted an inadequate predictor of intention (Menozzi & Mora, 2012), our research showed that subjective norm was significantly associated with intention. Furthermore, we showed that including descriptive norm did not significantly improve the explanatory power of the model; so present results indicate that subjective norm was more effective than descriptive norm in forming intention and indirectly determining the behavior.

Perceived behavioral control was associated with intention, but perception of control did not directly influence behavior, in line with other research evidence on eating behaviors (Kothe, Mullan, & Amaratunga, 2011; Kothe et al., 2012; Wong & Mullan, 2009). In the literature, the overall evidence concerning the efficacy of perceived behavioral control in predicting behavior is not consistent (Godin et al., 2010). The results of our research suggest that the consumption of fruit and vegetables as snacks is a behavior under control of the individual (Armitage & Conner, 1999; Onwezen, Bartels, & Antonides, 2014) and that people are able to translate the intention into action. In the Italian context, people can buy fruit and vegetables in many places, and this might result in a perception of high behavioral control as in Onwezen et al.'s study on fruit consumption.

In sum, the results of this study suggest that the integration of the TPB model with other constructs, especially habit, is important to improve the model predictive power. In fact, our study confirms that habit strength can have an additive effect in the explanation of dietary-related behaviors (de Bruijn, Kroeze, Oenema, & Brug, 2008). Our results are consistent with those by de Bruijn et al. (2008) and de Bruijn (2010), where habit strength increases the amount of explained variance in eating at least two pieces of fruit per day by 3% (in our data, the improvement is 6%). Findings regarding the effects of habit showed that fruit and vegetables consumption as snacks, over and above the influence of intention, was also determined by habitual factors. Thus, in line with Brug, de Vet, et al. (2006), to promote healthy food consumption, it is important that healthy acts become habits in everyday life.

This study has some limitations that should be considered in generalizing its results and in choosing directions for future research and interventions. Firstly, we interviewed a convenience sample of young people from the Italian population, with the prevalence of females. University and high school students constitute a primary target population for the promotion of fruit and vegetables consumption but future research should also consider samples of older adults who are likely to have an established routine and lifestyle. Some TPB antecedents may have different effects for them; for instance, subjective norm could be associated with intention to a lesser extent compared to young people. Second, all data were derived from self-report measures and, especially in the case of behavior, the use of these measures can be influenced by biases (over-reporting or under-reporting); objective consumption measures would improve the methodological quality of research in this context (Mullan, Allom, Brogan, Kothe, & Todd, 2014). Also self-report measures of habit have been criticized, due to the claim that it is impossible to consciously remember something that occurs without awareness (Snihotta & Pesseau, 2012). However, the SRHI is based on the notion that behavior may be initiated automatically, but not necessarily car-

ried out without conscious awareness. So, as sustained by Orbell and Verplanken (2015), people are able to provide valid information on their habits using SRHI items. Finally, underlying beliefs associated with the target behavior were not included in our research. The reasoned action approach (Fishbein & Ajzen, 2010) assumes that human behavior follows reasonably and often spontaneously from the information or beliefs people possess about the considered behaviors. So, future studies should examine the associations between these beliefs and TPB antecedents in order to fully understand consumption decisions and to guide the development of interventions to promote the consumption of fruit and vegetables as snacks among students.

However, our study has indicated the cognitive and motivational determinants which should be considered in promoting consumption of fruit and vegetables as snacks among young adults through psychosocial interventions. These interventions could try to form intentions by reinforcing the affective component of attitude and not the cognitive one. To modify affective attitudes toward this behavior, dietitians and health educators could help young adults advocate potential hedonic consequences of eating fruit and vegetables as snacks. At the same time, the food industry should develop novel healthy but pleasant snack products, based on fresh fruit and vegetables, and targeted at adolescents and young people (Nørgaard, Sørensen, & Brunsø, 2014; Weijzen et al., 2009). Moreover, individuals should be supported to overcome specific obstacles and barriers (e.g., cost of fruit and vegetables; not having a place to store or prepare fruit and vegetables especially outside the home). Facilitating factors or favorable conditions (e.g., increasing fruit and vegetables shops close to University campuses; providing a variety of fruit and vegetables in cafeterias, vending machines) should be introduced to support the development of intention and habit to consume fruit and vegetables as snacks.

#### NOTE

1. This research was approved by the Ethical Committee for the Psychological Research of the University of Padova - Record 1160.

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