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# Determinants of consumption intention of fresh fruit and vegetable: The extended theory of planned behavior

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## Abstract

The consumption of fresh fruit and vegetable is low and remains below recommended intake in Iran. The purpose of this study was to determine the predictors of consumers' intention to consume fresh fruit and vegetable. This study investigated the relationship among attitude, subjective norm, perceived behavioral control, health involvement, subjective health, and Iranian consumption intention by using the Theory of Planned Behavior. The Partial Least Square-Structural Equation Modeling was applied to estimate the model. The results revealed that subjective health ($\beta = 0.463$; $p < 0.001$) as a self-rating of overall health was an important predictor of Iranian consumers' intention to eat fresh fruit and vegetable. Consumers' health involvement ($\beta = 0.198$; $p < 0.001$) that shows importance of health issues for individuals, had significant effect on consumption intention. Other variables such as subjective norms ($\beta = 0.175$; $p < 0.001$), positive attitude towards fresh fruit and vegetable consumption ($\beta = 0.125$; $p < 0.01$), and perceived behavioral control ($\beta = 0.110$; $p < 0.001$) were significant predictors of consumption intention, respectively. The results provide useful and important information about main determinants of consumption intention for policy-makers to create effective and well-functioning public health policies aimed at increasing the consumption of fresh fruit and vegetable. Providing useful information regarding the freshness, quality, and safety of fresh fruit and vegetable by awareness campaigns can positively influence the behavioral intention of Iranian consumers.

**Keywords:** Fresh fruit and vegetable, Health involvement, Subjective health, Theory of planned behavior.

## Introduction

Fruit and vegetable are rich in minerals, vitamins, antioxidants, and several other crucial micronutrients, which playing an important role in maintaining the immune system (Rondanelli et al., 2021). Fruit and vegetable are essential components of nutritious and healthy diet that reduce the risk of non-communicable diseases such as cardiovascular diseases, diabetes, obesity, stroke, and some cancers (Afshin et al., 2019; WHO, 2022). In addition, the adequate

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intake of fruit and vegetable plays an important role in increasing mental health and hence reducing depression and anxiety risk (Payne et al., 2012; Fann et al., 2022). While, inadequate consumption of fruit and vegetable can contribute to increase mortality, both from non-communicable diseases and infectious (Iddir et al., 2020; Smith et al., 2022). According to the World Health Organization (WHO, 2003) low fruit and vegetable intake was responsible for 19% of gastrointestinal cancers, 31% of ischemic heart diseases, and 11% of strokes. In this regard, WHO (2003) recommends the minimum intake of fruit and vegetable is 400 grams (i.e., 5 servings) per day to improve overall health.

The consumption of fruit and vegetable in Iran is low. Although the fruit and vegetable consumption increased to 205.2 kg/capita (316.7 g/capita/day) in 2021 compared to 71.5 kg/capita (137.4 g/capita/day) in 1961 (Figure 1), it remains below the minimum recommended intake level (FAO, 2023). In addition, a sharp decline in fruit and vegetable consumption is observed in the last decade. However, Iranians experienced an average consumption of 536.2 g/capita/day and 531.4 g/capita/day in 2005 and 2013, respectively. This suggests that fruit and vegetable consumption can be increased (FAO, 2023). Therefore, the understanding of determinants involved in regular consumption of fruit and vegetable in Iranians can be used to create appropriate policies to increase consumers' behavior intention. In this regard, this study purposes to predict the main determinants of behavioral intention to consume fresh fruit and vegetable in Iran. The findings are important for policy-makers and decision-makers to design public health policies to increase fresh fruit and vegetable consumption and to promote a healthy diet. To the best knowledge of the authors, no empirical research has been done to determine the study's purpose in Iran. Therefore, this study, using the extended theory of planned behavior, contributes to the growing body of literature to determine and predict the main factors influencing of consumption intention of fresh fruit and vegetable in Iran as a developing country with low intake of fruit and vegetable.

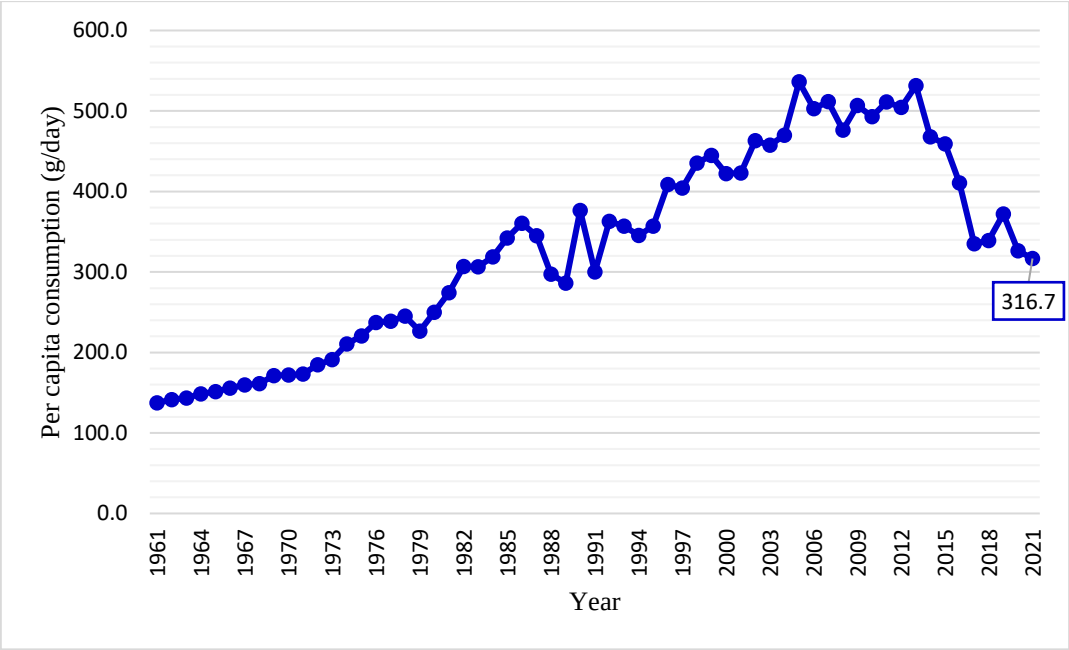


**Figure 1**- The per capita consumption of fruit and vegetable in Iran (Source: FAO, 2023).

The reminder of the study is structured as follows. Section 2 provides theoretical framework and literature review. Section 3 describes the methodology and data. Section 4 provides the results of estimating structural equation model. Section 5 discusses the empirical results. Section 6 presents conclusions, limitations and recommendations.

## Theoretical framework and literature review

One of the most important theories to understand and predict consumption intention and behavior is the theory of planned behavior (TPB) (Ajzen, 1991), which is widely accepted by scientific community. Based on TPB, people's behavioral intentions are predicted by attitude, subjective norm, and perceived behavior control. The TPB theory is extensively used to determine the consumption intentions of food products like seafood products (Menozzi et al., 2023; Aminizadeh et al., 2024), meat products (Llauger et al., 2021; Thangavelu et al., 2022), organic food (Yadav and Pathak, 2016; Bazhan et al., 2024), as well as other foods (Sun and Moon, 2024; Andrés-Sánchez et al., 2025).

Regarding the consumption of fruit and vegetable, some studies have applied TPB to analyze and determine the consumer's intention. Carfora et al. (2016) showed that Italian students' intention towards fruit and vegetable were influenced by consumers' attitude, perceived behavioral control, and self-identity. Their proposed TPB model explained 49% of the variance in consumers' behavioral intention. Similarly, Canova et al. (2020) revealed that subjective norms, perceived behavioral control, past behavior, and self-identity have had significant

influence on Italian intention towards eating fruit and vegetable in two samples of students and non-student adults. They found that proposed TPB model explained 78% of the variance in students' intention and 81% of the variance in non-student adults' intention. Jung and Bice (2019) revealed that Alabama college students' intention towards fruit and vegetable consumption significantly affected by attitude, perceived behavioral control, subjective norm, self-identity and past behavior. They showed that proposed TPB model accounted for 68% of the variance of behavioral intention towards consuming fruit and vegetable. Miguel et al. (2022) indicated that fruit and vegetable consumption intention influenced by attitude, perceived behavioral control, and consumer ethnocentrism in Portugal. Moreover, their TPB model accounted for 69% of the variance in consumers' behavioral intention.

Literature review revealed two important issues. First, previous empirical studies focus on determinants of consumption intention towards fruit and vegetable in developed countries that have health-oriented dietary patterns, and developing countries have received less attention. Therefore, determining Iranian intentions to consume fresh fruit and vegetable provide useful information for academics and policy-makers. Second, Guillaumie et al. (2010) and Canova et al. (2020) express the TPB model could explain 30% to 81% of the variance in behavioral intention. Therefore, TPB theory is a useful conceptual framework to determine consumers' behavioral intentions towards fruit and vegetable. Hence, this study applies the extended TPB model to predict Iranian intentions to consume fruit and vegetable.

**Research framework**

The TPB model is an advancement of the theory of reasoned action (TRA) (Fishbein and Ajzen, 1975). The TRA theory was used to analyze the relationships among belief, attitude, and behavior. The TPB framework is presented by adding the perceived behavior control construct. According to the TPB, an individual's intention is determined by three independent constructs: attitude, subjective norm, and perceived behavior control (Figure 2).

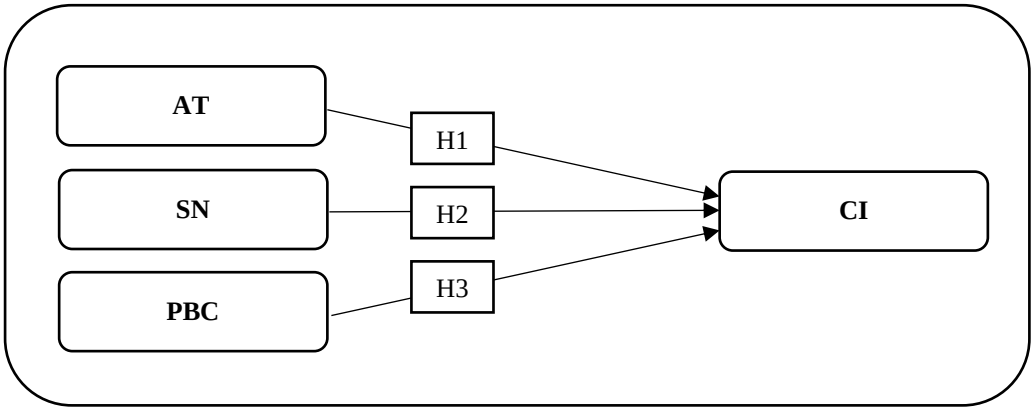


**Figure 2.** Theory of Planned Behavior (TPB). Notes. (1) CI, consumption intention; AT, attitude; SN, subjective norm, PBC, perceived behavioral control. (2) H1 to H3 are study hypotheses.

Attitude is one of the main determinants predicting consumers' intention, which indicates the beliefs of an individual about the likely consequences of conducting the behavior (Aminizadeh et al., 2024; Bahraseman et al., 2025). Previous research revealed that there is a strong association between consumers' positive attitudes and their intentions towards healthy food consumption (Bogers et al., 2004; Menozzi et al., 2023). Miguel et al. (2022) showed positive attitude has a significant influence on consumption intentions of domestic fruit and vegetable in Portugal. In addition, Carfora et al. (2016) revealed that attitude is a determinant of young people's intention to eat fresh fruit and vegetable in south of Italy. Similarly, Jung and Bice (2019) indicated positive attitudes plays a significant role in the college students' intention towards fruit and vegetable consumption. Thus, people with positive attitude more likely eat fresh fruit and vegetable. As a result, the following hypothesis is presented:

*H1*. Positive attitude influences consumers' intention towards consuming fresh fruit and vegetable.

Subjective norm is the second factor influencing consumption intention, which shows the perceived pressures from important people to a person to conduct a certain behavior (Ajzen, 2001). Most empirical studies showed that consumers' intention towards healthy food consumption like fruit and vegetable is influenced by subjective norm (Kothe et al., 2012; Jung and Bice, 2019; Dorce et al., 2021). However, some studies showed that there is no significant relationship between subjective norm and people's intention to consume fruit and vegetable (Emanuel et al., 2012; Carfora et al., 2016; Miguel et al., 2022). In case of Iran, Aminizadeh et al. (2024) revealed that recommendations from family and best friends have positive significant

influence on Iranian intention towards seafood consumption. Therefore, the subsequent hypothesis is proposed:

*H2.* Subjective norm positively influences consumers' intention towards consuming fresh fruit and vegetable.

Perceived behavioral control is an essential determinant predicting consumption intention, indicating an individual perceived difficulty or ease of performing a particular behavior. In fact, perceived behavioral control reflects anticipated impediments as well as experience (Aminizadeh et al., 2024; Castellini and Graffigna, 2024). Previous studies showed that perceived behavioral control plays a vital role in consumers' intention towards fruit and vegetable consumption. For instance, Carfora et al. (2016) showed that perceived behavioral control is the strongest predictor of Italian young consumers' intention towards fruit and vegetable consumption. Similarly, Canova et al. (2020) revealed that perceived behavioral control plays a significant role in consumption intention of fruit and vegetable in two samples of no-student adults and Italian university students. Miguel et al. (2022) found similar results in Portugal. Accordingly, the following hypothesis is proposed:

*H3.* Perceived behavioral control significantly influences consumers' intention towards consuming fresh fruit and vegetable.

Although the standard TPB is an appropriate tool for predicting food consumption intention, the variance could be better predicted by including additional constructs. Therefore, this study investigates the research purpose by extending the standard TPB model with additional constructs, including health involvement and subjective health.

Health involvement plays an important role in determining consumption intention of healthy food, which shows the importance of health issues for individuals, based on their values, needs, and interests (Saba and Vassallo, 2012). According to the literature, consumers' health involvement has a significant positive influence on their intentions towards healthy eating (Olsen, 2003; Tomic et al., 2016; Aminizadeh et al., 2024). Therefore, the subsequent hypothesis is suggested:

*H4.* Health involvement positively influences consumers' intention towards consuming fresh fruit and vegetable.

Subjective health is a self-rating of overall health, which considered as an important indicator of personal health to analyze the food consumer intention (Baron-Epel and Kaplan, 2001). Pieniak et al. (2010) showed that consumers with high subjective health were very interested in healthy eating. Similarly, Aminizadeh (2024) found that there is significant relationship

between subjective health and healthy food consumption. Accordingly, fifth hypothesis of this study is:

*H5.* Subjective health positively influences consumers' intention towards consuming fresh fruit and vegetable.

Figure 3 presents the relationship among the research constructs in the proposed study framework.

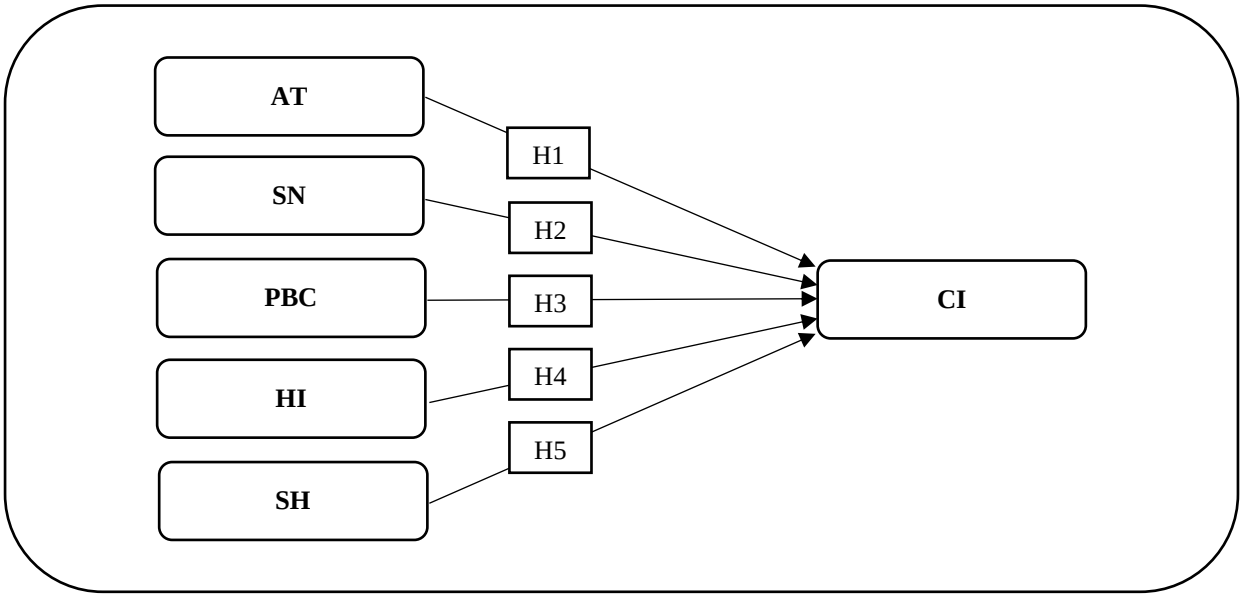


**Figure 3- Study framework.** Notes. (1) CI, consumption intention; AT, attitude; SN, subjective norm, PBC, perceived behavioral control; HI, health involvement; SH, subjective health. (2) H1 to H5 are study hypotheses.

## Materials and Methods

Constructs measure for consumption intention; attitude, subjective norm, perceived behavioral control, health involvement, and subjective health were based on previous empirical studies (Table 1). A five-point Likert scale is used for all research constructs, where 1 is "strongly disagree" and 5 is "strongly agree".

Two items were adopted from Tomic et al. (2016) to measure people's intention. Greater values indicate more consumption intention of fresh fruit and vegetable. Three items of attitude were adopted from Mitterer-Daltoé, et al. (2013) and Aminizadeh et al. (2024). Greater values indicate more positive consumers' attitude towards eating fresh fruit and vegetable. Four items were adopted from Aminizadeh, et al. (2024) to measure subjective norm. Greater values demonstrate greater perceived social pressures towards behavioral intention to consume fresh fruit and vegetable. Three items were adopted to measure perceived behavioral control taken from Tomic et al. (2016). Three items were adopted from Aminizadeh et al. (2024) to measure

health involvement. Greater values reveal more involvement of consumers in health. Three items were adopted to measure subjective health taken from Pieniak et al. (2010). Greater values demonstrate more physical and mental health.

**Table 1. Constructs and its items for analyzing the study hypotheses.**

| Construct | Item | Item texts | Reference |
|---|---|---|---|
| Attitude | AT1 | Eating fresh fruit and vegetable is healthy. | Mitterer-Daltoé, et al. (2013); Aminizadeh et al. (2024) |
| | AT2 | Eating fresh fruit and vegetable is nutritious. | |
| | AT3 | I feel good sense after eating fresh fruit and vegetable. | |
| Subjective Norm | SN1 | My family eats fresh fruit and vegetable. | Aminizadeh et al. (2024) |
| | SN2 | My family thinks that eating fresh fruit and vegetable is necessary for me. | |
| | SN3 | My friends eat fresh fruit and vegetable. | |
| | SN4 | My friends think that eating fresh fruit and vegetable is necessary for me. | |
| Perceived Behavioral Control | PBC1 | I have found it is easy for me to judge the quality and freshness of fresh fruit and vegetable. | Tomic et al. (2016) |
| | PBC2 | When I buy fresh fruit and vegetable, the chance of making a bad choice is low. | |
| | PBC3 | When I buy fresh fruit and vegetable, I know whether I make a good choice. | |
| Health involvement | HI1 | Healthy food is important for me. | Aminizadeh et al. (2024) |
| | HI2 | I care about health very much. | |
| | HI3 | I really appreciate food health. | |
| Subjective health | SH1 | Compared to people my age, my health is excellent. | Pieniak et al. (2010) |
| | SH2 | Compared to people my age, my current physical health is excellent. | |
| | SH3 | Compared to people my age, my current mental health is excellent. | |
| Consumption Intention | CI1 | I intend to eat fresh fruit and vegetable at home in next two days. | Tomic et al. (2016) |
| | CI2 | I will probably eat fresh fruit and vegetable at home in next two days. | |

***Data***

An online survey was designed and employed to collect data in 2022. Respondents were recruited by convenience and snowball sampling method via two popular and widely used social network applications: Instagram and Telegram. The use of convenience and snowball sampling method via social media were significantly increased in empirical research, particularly during and after the pandemic of COVID-19 (Folklore et al., 2021; Singh et al., 2023; Cramer et al., 2023). To minimize the sampling bias, this study used the sample seed diversity method (Etikan et al., 2016).

In total, 410 individual responses were received from survey participants. According to Kline (2011), 10-20 observations per parameter are adequate to estimate the model and to test the hypotheses. Due to the 18 measured items, this study needs180 respondent (18×10) to estimate the proposed model. Therefore, 410 questionnaires are adequate for analyzing the data.

The hypothesized relationships among the constructs were analyzed using the Partial Least Square-Structural Equation Modeling (PLS-SEM). The SmartPLS software version 3 (Ringle et al., 2015) was used to test the study hypotheses. To guarantee the stability of the data, this study conducts a complete bootstrapping procedure with 5000 subsamples (Hair et al., 2014). Table 2 presents the characteristics of research sample. The study sample is young, with more than 75% between the ages of 18 and 40. In addition, although a large number of study sample (91%) had academic education, only approximately 22% of sample had high income.

**Table 2.** Sample's demographic characteristics.

| Item | Group | Frequency (N = 410) | Percentage |
|---|---|---|---|
| Gender | Female | 226 | 55.1 |
| | Male | 184 | 44.9 |
| Marriage | Single | 246 | 60.0 |
| | Married | 164 | 40.0 |
| Age | 18-30 | 229 | 55.9 |
| | 31-40 | 82 | 20.0 |
| | 41-50 | 57 | 13.9 |
| | 51-60 | 32 | 7.8 |
| | +60 | 10 | 2.4 |
| Education | Elementary and high school | 37 | 9.0 |
| | University | 156 | 38.1 |
| | Master | 135 | 32.9 |
| | PhD | 82 | 20.0 |
| Number of household members | 1 | 28 | 6.8 |
| | 2 | 37 | 9.0 |
| | 3 | 92 | 22.5 |
| | 4 | 156 | 38.1 |
| | 5 | 71 | 17.3 |
| | >5 | 26 | 6.3 |
| Income | Very low (Income < 2880$) | 149 | 36.3 |
| | Low (2880$ < Income < 4320$) | 109 | 26.6 |
| | Average (4320$ < Income < 5760$) | 61 | 14.9 |
| | High (5760$ < Income < 7200$) | 43 | 10.5 |
| | Really high (Income > 7200$) | 48 | 11.7 |

Note. (1) 1 US dollar = 287,000 Iranian Rials.

## Results and discussion

The descriptive statistics of TPB constructs are presented in Table 3. Respondents showed high positive attitudes toward consuming fresh fruit and vegetable and high involvement in health. However, the respondent perception is moderate for the subjective norm, subjective health, and perceived behavioral control. Respondents' perceptions showed that they have high intention to eat fresh fruit and vegetable in the next two days.

**Table 3.** Descriptive statistics.

| Items | N | Mean | Standard deviation | Min | Max |
|---|---|---|---|---|---|
| AT1 | 410 | 4.8 | 0.5 | 2 | 5 |
| AT2 | 410 | 4.7 | 0.5 | 2 | 5 |
| AT3 | 410 | 4.5 | 0.7 | 1 | 5 |
| SN1 | 410 | 4.5 | 0.6 | 1 | 5 |
| SN2 | 410 | 4.1 | 0.9 | 1 | 5 |
| SN3 | 410 | 3.8 | 0.9 | 2 | 5 |
| SN4 | 410 | 3.2 | 0.7 | 1 | 5 |
| PBC1 | 410 | 3.9 | 0.9 | 1 | 5 |
| PBC2 | 410 | 4.0 | 0.9 | 1 | 5 |
| PBC3 | 410 | 3.9 | 0.9 | 1 | 5 |
| HI1 | 410 | 4.4 | 0.7 | 1 | 5 |
| HI2 | 410 | 4.2 | 0.8 | 1 | 5 |
| HI3 | 410 | 4.3 | 0.8 | 1 | 5 |
| SH1 | 410 | 4.3 | 0.8 | 1 | 5 |
| SH2 | 410 | 4.0 | 0.8 | 1 | 5 |
| SH3 | 410 | 3.7 | 0.9 | 1 | 5 |
| CI1 | 410 | 4.3 | 0.8 | 1 | 5 |
| CI2 | 410 | 4.3 | 0.9 | 1 | 5 |

Source: research findings.
Note. (1) Values 1 and 5 show strongly disagree and strongly agree, respectively.

Table 4 shows the results of the measurement model. The findings show that the factors loading for each item are higher than 0.6, indicating that constructs have a close relationship with their items (Hair et al., 2010). Cronbach's alphas for all research constructs are greater than 0.7, revealing acceptable internal consistency (Hair et al., 2021). The CR scores are greater than 0.7, the AVE scores are higher than 0.5, and the rho A scores are higher than 0.7, demonstrating that the reliability and validity for all constructs are satisfactory (Bagozzi and yi, 1988; Henseler et al., 2016; Hair et al., 2021). The findings reveal that the proposed research model explains 68.1% of the total variance in consumption intentions of fresh fruit and vegetable, indicating the model is a reasonably good fit. Moreover, the results show that there is a good discriminant validity between the research constructs based on Fornell and Larcker's criterion (Fornell and Larcker, 1981), and HTMT (Heterotrait–Monotrait) ratio (Table 5).

**Table 4.** Measurement model results.

| Constructs | Items | Factor Loading | P-Value | Cronbach's α | CR | AVE | rho_A |
|---|---|---|---|---|---|---|---|
| Attitude | AT1 | 0.826 | 0.000 | 0.758 | 0.860 | 0.672 | 0.763 |
| | AT2 | 0.817 | 0.000 | (0.000) | (0.000) | (0.000) | (0.000) |
| | AT3 | 0.815 | 0.000 | | | | |
| Subjective Norm | SN1 | 0.796 | 0.000 | 0.743 | 0.835 | 0.559 | 0.759 |
| | SN2 | 0.758 | 0.000 | (0.000) | (0.000) | (0.000) | (0.000) |
| | SN3 | 0.684 | 0.000 | | | | |
| | SN4 | 0.747 | 0.000 | | | | |
| Perceived Behavioral Control | PBC1 | 0.863 | 0.000 | 0.794 | 0.878 | 0.706 | 0.810 |
| | PBC2 | 0.811 | 0.000 | (0.000) | (0.000) | (0.000) | (0.000) |
| | PBC3 | 0.846 | 0.000 | | | | |
| Health involvement | HI1 | 0.894 | 0.000 | 0.886 | 0.929 | 0.814 | 0.889 |
| | HI2 | 0.887 | 0.000 | (0.000) | (0.000) | (0.000) | (0.000) |
| | HI3 | 0.925 | 0.000 | | | | |
| Subjective health | SH1 | 0.930 | 0.000 | 0.883 | 0.928 | 0.811 | 0.903 |
| | SH2 | 0.832 | 0.000 | (0.000) | (0.000) | (0.000) | (0.000) |
| | SH3 | 0.936 | 0.000 | | | | |
| Consumption Intention | CI1 | 0.937 | 0.000 | 0.853 | 0.932 | 0.872 | 0.855 |
| | CI2 | 0.931 | 0.000 | (0.000) | (0.000) | (0.000) | (0.000) |

Source: research findings

Notes. (1) CR= Composite Reliability; AVE = Average Variance Expected. (2) R-squared = 0.681, Adjusted R-squared = 0.677. (3) Model fit: SRMR = 0.068, NFI = 0.788

**Table 5.** Discriminant validity.

| Fornell-Lacker | | | | | | |
|---|---|---|---|---|---|---|
| | AT | CI | HI | PBC | SH | SN |
| AT | **0.820** | | | | | |
| CI | 0.501 | **0.934** | | | | |
| HI | 0.456 | 0.645 | **0.902** | | | |
| PBC | 0.232 | 0.442 | 0.414 | **0.840** | | |
| SH | 0.407 | 0.741 | 0.560 | 0.357 | **0.900** | |
| SN | 0.410 | 0.564 | 0.490 | 0.319 | 0.445 | **0.747** |
| HTMT (Heterotrait–Monotrait) ratio | | | | | | |
| | AT | CI | HI | PBC | SH | SN |
| AT | | | | | | |
| CI | 0.614 | | | | | |
| HI | 0.545 | 0.739 | | | | |
| PBC | 0.282 | 0.529 | 0.490 | | | |
| SH | 0.491 | 0.847 | 0.631 | 0.414 | | |
| SN | 0.507 | 0.684 | 0.579 | 0.399 | 0.530 | |

Source: research findings

Note. (1) The bold values indicate the square root of AVE.

Table 6 presents the findings of structural equation modelling. The results revealed that consumers' positive attitudes towards eating fresh fruit and vegetable have a significant influence on consumption intention ($\beta_{AT\text{-}CI}$ = 0.125; t = 2.993; p < 0.01) and so, the first hypothesis (H1) is confirmed. This finding is in line with previous research (Carfora et al., 2016; Jung and Bice, 2019; Pandey et al., 2021), and indicates that an increase in consumers'

attitudes towards eating fruit and vegetable will result in an increase in intention to consume fresh fruit and vegetable. Consumers who perceive fresh fruit and vegetable consumption to be healthy and nutritious had a stronger intention to eat fresh fruit and vegetable. Therefore, Increasing consumers' knowledge by providing more information regarding the importance of fresh fruit and vegetable consumption on people health may further contribute to more positive attitudes.

Subjective norm ($\beta_{SN\text{-}CI} = 0.175$; $t = 4.446$; $p < 0.001$), shows a positive and significant effect on people's intention to consume fresh fruit and vegetable, and supports the second hypothesis (H2). This means the behavior and opinions of close friends and family members influence the Iranian intentions to eat fresh fruit and vegetable. This result is consistent with the findings of Jung and Bice (2019) and Ubiparip Samek et al. (2023), showing that subjective norm has a significant positive influence on fruit and vegetable consumption intention. Moreover, Canova et al. (2020) showed that consumers' intention to consume fruit is significantly influenced by important people. Pandey et al. (2021) revealed that the consumption intention of vegetable is associated with individuals' perceived pressures from family members. However, Carfora et al. (2016) found that there is no significant relationship between subjective norm and intention towards fruit and vegetable. As a result, family and friends food patterns play an important role in consuming healthy foods. Thus, emphasizing the importance of fresh fruit and vegetable on meal planning by family members and friends may be beneficial for increasing the subjective norm.

Perceived behavioral control ($\beta_{PBC\text{-}CI} = 0.110$; $t = 3.610$; $p < 0.001$) has a significant influence on consumption intention of fresh fruit and vegetable, thereby confirming the third hypothesis (H3). Consumers who do not have enough information about the freshness and quality of fresh fruit and vegetable have a lower intention towards eating fresh fruit and vegetable. This finding confirmed the results of Carfora et al. (2016) and Canova et al. (2020), indicating that there is a significant relationship between perceived behavioral control and fruit and vegetable consumption intention. Considering these findings, providing new information about judging the quality and freshness of fruit and vegetable can contribute consumers in buying process and eating intention towards fresh fruit and vegetable.

Health involvement has a significant positive influence on the Iranian consumption intention of fresh fruit and vegetable ($\beta_{HI\text{-}CI} = 0.198$; $t = 4.804$; $p < 0.001$), thus confirms the fourth hypothesis (H4). This means Iranian intentions to consume fresh fruit and vegetable is influenced by health-related attributes of foods. Similar findings about the significant effect of

health involvement on intention towards healthy and nutritious food were observed in previous studies (Tomic et al., 2016; Aminizadeh et al., 2024). Creating the belief among people that consuming fruit and vegetable is a healthy food consumption pattern can play an effective role in increasing consumers' intention to eat fresh fruit and vegetable.

According to the results, subjective health is the most important predictor on the Iranian behavioral intention to consume fruit and vegetable. Subjective health has a significant positive effect on fresh fruit and vegetable consumption intention ($\beta_{SH\text{-}CI} = 0.463$; $t = 18.845$; $p < 0.001$), thus supporting hypothesis 5. The results suggest that people who consider themselves physically and mentally healthier than others have more intention to consume fresh fruit and vegetable. Therefore, it seems healthier people have a healthy food habit. Pieniak et al. (2010) showed that consumers with high subjective health were very interested in healthy eating and they evaluated themselves as very healthy and felt very satisfied with their lives.

**Table 6.** Structural model results.

| Paths | Estimated coefficient | Std. dev. | t-Value | p-Value | Results |
|---|---|---|---|---|---|
| AT => CI | 0.125 | 0.042 | 2.993 | 0.002 | Confirmed |
| SN => CI | 0.175 | 0.039 | 4.446 | 0.000 | Confirmed |
| PBC => CI | 0.110 | 0.030 | 3.610 | 0.000 | Confirmed |
| HI => CI | 0.198 | 0.041 | 4.804 | 0.000 | Confirmed |
| SH => CI | 0.463 | 0.043 | 10.845 | 0.000 | Confirmed |

Notes. (1) CI, consumption intention; AT, attitude; SN, subjective norm, PBC, perceived behavioral control; HI, health involvement; SH, subjective health.
Source: research findings

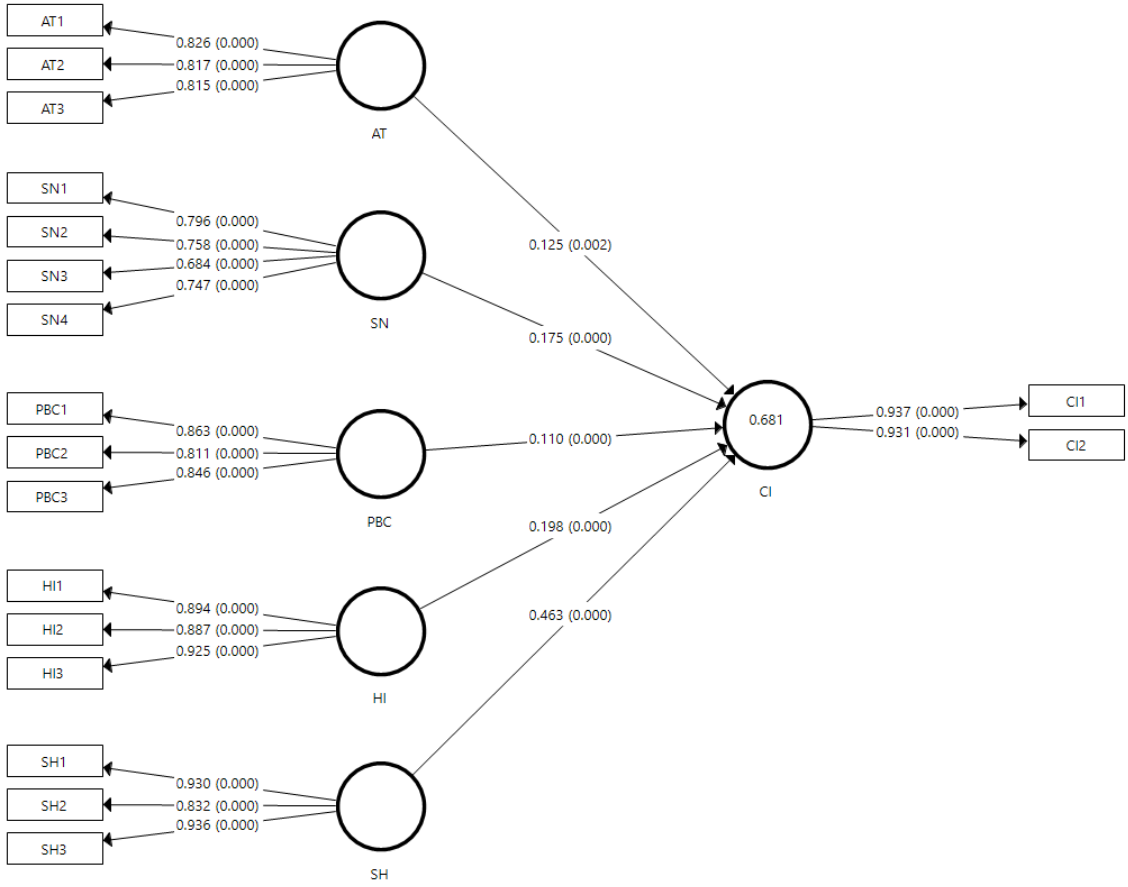


**Figure 4- Structural model path coefficients.** Notes. (1) CI, consumption intention; AT, attitude; SN, subjective norm, PBC, perceived behavioral control; HI, health involvement; SH, subjective health. (2) Number in the parentheses is the p-value. Source: research findings.

## Conclusions

The consumption of fresh fruit and vegetable is low and below the recommended intake in Iran. Therefore, this study has analyzed the applicability of TPB in predicting Iranian consumers' intention to consume fresh fruit and vegetable. The results confirmed that a positive attitude toward consuming fruits and vegetables directly increases consumption intention. In addition, consumers' intention positively and significantly affected by subjective norms. Perceived behavioral control of consumers significantly directly influenced the consumption intention towards fresh fruit and vegetable. This research has contributed to research literature in the context of developing nations with low consumption of fruit and vegetable through expanding the TPB by adding health involvement and subjective health constructs. The findings revealed that Iranian consumers' health involvement positively and significantly influenced the consumption intention of fresh fruit and vegetable. According to the results, the subjective health is an important predictor of consumers' intention to eating fresh fruit and vegetable.

According to the results, some policy recommendations are proposed. First, the findings reveal that attitude is a determinant of Iranian consumers' intention. Hence, creating useful information and knowledge about the nutrition and health benefits of fresh fruit and vegetable consumption can positively affect the consumers' intention. In this regard, educating programs about the nutritional benefits of fruits and vegetables through communication media like television and radio, as well as social media can useful for increasing public health knowledge. Second, considering the significant positive relationship between consumption intention and perceived behavioral control, providing clear information regarding the freshness, quality, and safety of fresh fruit and vegetable can positively affect the Iranian behavioral intention to eat fresh fruit and vegetable. For instance, social campaigns raising awareness about quality standards for fruit and vegetable can reduce mistakes in decision-making during in purchasing process. Third, this study suggest that health involvement and subjective health had significant positive effect on behavioral intention to consume fresh fruit and vegetable. These results provide important and useful information for policy-makers and decision-makers to implement effective and well-functioning public health policies to improve nutritional awareness and knowledge aimed at increasing fresh fruit and vegetable consumption.

Although this study provides new insights regarding the consumption intention of fresh fruit and vegetable, there are some limitations that need to be investigated in future studies. First, this study determined the predictors of consumption intention of fresh fruit and vegetable using TPB theory and PLS-SEM approach. However, future studies can use other popular theories to predict consumers' behavior such as information-motivation-behavioral skills model (see Fleary et al., 2020), and other useful methods such as discrete choice models (see Secer, 2023; Dharmayani et al., 2024; Chinyanga et al., 2024). Second, this study was investigated the effect of additional variables such as health involvement and subjective health on consumers' intention. However, there are some variables like moral obligation (Tomic et al., 2016; Aminizadeh et al., 2024) and price (Mitterer-Daltoé et al., 2013; Sun and Moon, 2024) that have not been examined and other researchers can determine their effect on intention of fresh fruit and vegetable consumption in future investigations. Third, considering factors influencing consumers' behavioral intention can be different between fruit and vegetable products, it is possible that health involvement and subjective health only explain the behavioral intention of fruit consumption but not vegetable consumption. Therefore, future research can predict the determinants of behavioral intention to consume fruit and vegetable products separately and

create a deeper understanding to provide appropriate practical recommendation to decision-makers and policy-makers.

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## عوامل تعیین کننده قصد مصرف میوه و سبزیجات تازه: توسعه نظریه رفتار برنامه ریزی شده

**افسانه نیکوکار، و میلاد امین زاده**

**چکیده**

مصرف میوه و سبزیجات تازه در ایران پایین و کمتر از میزان توصیه شده است. هدف از این مطالعه تعیین پیش‌بینی‌کننده‌های تمایل مصرف‌کنندگان به مصرف میوه و سبزیجات تازه است. این پژوهش با استفاده از نظریه رفتار برنامه‌ریزی شده به بررسی رابطه بین نگرش، هنجار ذهنی، کنترل رفتاری ادراک شده، درگیری با مسأله سلامت، سلامت ذهنی و قصد مصرف پرداخته است. برای برآورد الگوی مطالعه، از مدلسازی معادلات ساختاری- حداقل مربعات جزئی استفاده شد. نتایج نشان داد که سلامت ذهنی یک پیش‌بینی‌کننده مهم قصد مصرف‌کنندگان برای خوردن میوه و سبزیجات تازه است. درگیری مصرف‌کنندگان با مسأله سلامت، هنجارهای ذهنی، نگرش مثبت نسبت به مصرف میوه و سبزیجات تازه و کنترل رفتاری ادراک شده به ترتیب دیگر پیش‌بینی‌کننده‌های معنی‌دار قصد مصرف بودند. نتایج، اطلاعات مفید و مهمی را در اختیار سیاستگذاران قرار می‌دهد تا سیاست‌های بهداشت عمومی مؤثر و کارآمدی را با هدف افزایش مصرف میوه و سبزیجات تازه ایجاد کنند.