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RECOMMENDED FRUIT AND VEGETABLES CONSUMPTION AMONG STUDENTS IN BOSNIA AND HERZEGOVINA: IS THE THEORY OF PLANNED BEHAVIOUR A SUITABLE BASIS FOR MARKETING CAMPAIGNS?

POTROŠNJA PREPORUČENE KOLIČINE VOĆA I POVRĆA MEĐU STUDENTIMA U BOSNI I HERCEGOVINI: JE LI TEORIJA PLANIRANOG PONAŠANJA PRIKLADNA OSNOVA ZA MARKETINŠKE KAMPANJE?

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ABSTRACT

Although the Theory of Planned Behaviour (TPB) has been shown to be an effective framework for explaining various types of social behaviour, the extent to which the standard TPB model can be enhanced by incorporating additional variables across different markets and specific consumer groups has not yet been sufficiently investigated. The aim of this study was to investigate the factors influencing recommended fruit and vegetables consumption by adding the variable self-identity to the TPB. 450 questionnaires were distributed to the students and 407 completed questionnaires were collected. The results of the structural equation modelling showed that attitudes, subjective norms, and perceived behavioural control explained 61% of the variance in the intention to consume the daily recommended amounts of fruit and vegetables. Intention and self-identity explained 48% of the variance in behaviour (consumption) under acceptable model fit criteria, confirming the effectiveness of the extended TPB model in predicting fruit and vegetables consumption among university students. These results provide a strong basis for the development of public policies to promote F&V consumption. In addition, they contribute to the extensive literature on the effectiveness of TPB application.

Keywords: expanded theory of planned behaviour, fruit and vegetables consumption, university students, Bosnia and Herzegovina

SAŽETAK

Iako se Teorija Planiranog Ponašanja (TPP) pokazala kao učinkovit okvir za objašnjavanje različitih oblika društvenog ponašanja, još nije dovoljno istraženo koliko učinkovito se standardni TPP model može proširiti različitim dodatnim varijablama, uzimajući u obzir različita tržišta i određene skupine potrošača. Cilj ovog istraživanja bio je istražiti čimbenike koji utječu na preporučenu potrošnju voća i povrća koristeći teoriju planiranog ponašanja proširenu varijablom samo-identitet. 450 anketnih upitnika je podijeljeno studentima, od čega je 407 popunjenih upitnika skupljeno. Rezultati modeliranja strukturnim jednadžbama otkrili su da su stavovi, subjektivna norma i percipirana bihevioralna kontrola objasnili 61 % varijance namjere konzumacije dnevno preporučene količine voća i povrća. Namjera i samo-identitet objasnili su 48 % varijance ponašanja (konzumacije) pod prihvatljivim kriterijima valjanosti modela, potvrđujući učinkovitost proširenog modela TPP-a u predviđanju potrošnje voća i povrća među studentima. Ovi rezultati mogu poslužiti kao dobra osnova za kreiranje javnih politika za promociju potrošnje voća i povrća. Nadalje, oni predstavljaju doprinos bogatoj literaturi o učinkovitosti upotrebe TPP-a.

Ključne riječi: proširena teorija planiranog ponašanja, potrošnja voća i povrća, studenti, Bosna i Hercegovina

1. INTRODUCTION

Over the last three decades, numerous studies have been published reporting on the importance and positive effects of fruit and vegetables (hereafter also F&V) consumption on human health (e.g., Dauchet et al., 2006; Slavin and Lloyd, 2012; Fulton et al., 2016; Ramya and Patel, 2019; Gehlich et al., 2020; Papaioannou et al., 2022). Despite this fact, fruit and vegetables consumption is quite low in many countries around the world (Miller et al., 2017). Nevertheless, significant differences can be observed among the individual regions and countries of the world. Research has shown that the consumption of fruit and vegetables is significantly higher in economically developed and richer countries and significantly lower in developing and poor countries. Miller et al. (2017) examined daily fruit and vegetables consumption using data from the Prospective Urban Rural Epidemiology (PURE) study, which includes 18 countries with different income levels. They found that

the average total consumption of fruit and vegetables was 3.76 servings per day. Specifically, consumers in low-income countries consume an average of 2.14 servings of fruit and vegetables per day; in lower-middle-income countries 3.17 servings; those in upper-middle-income countries 4.31 servings; and in high-income countries 5.42 servings. Although income plays an important role in the frequency of F&V consumption, it is not the only important factor. Socio-demographic characteristics such as gender, education, and age significantly influence the frequency of fruit and vegetables consumption (Rekhy and McConchie, 2014). Women consume more fruit and vegetables than men (Azagba and Sharaf, 2011; Lutfiyya et al., 2012; Phulkerd et al., 2020), as well as people belonging to older age groups (Yen et al., 2011; Phulkerd et al., 2020) and those with higher levels of education (Azagba and Sharaf, 2011; Lutfiyya et al., 2012; Phulkerd et al., 2020). Various psychological factors also influence food choices (Asp, 1999). Therefore, factors such as attitudes and beliefs, perception or motivation must also be taken into account when studying F&V consumption.

To change negative consumption patterns, the World Health Organisation (WHO) is making great efforts to promote fruit and vegetables consumption at a global level (Rekhy and McConchie, 2014). It recommends consuming at least 400 g of fruit and vegetables per day, or five portions of 80 g each (Ashfield-Watt et al., 2004). This amount is the focus of various social campaigns aimed at increasing fruit and vegetables consumption. Progressive countries such as the USA, Canada, Australia, the United Kingdom and Denmark have already developed and launched campaigns to promote fruit and vegetables consumption in their societies (Rekhy and McConchie, 2014). Such social marketing campaigns are particularly successful in changing lifestyles when they are supported by appropriate theories and evidence (Maio et al., 2007). To test whether a particular theoretical model with its hypothesised relationships is suitable as a basis for social marketing, it is crucial to statistically examine its model fit (Peugh and Feldon, 2020). This fit is assessed using multiple indices, usually as part of the complex multivariate analyses (e.g., structural equation modelling).

One of the most commonly applied theories that uses psychological factors to explain different types of consumer behaviour - the theory of planned behaviour (Ajzen, 2015) - has proven to be an appropriate model in many previous studies. Depending on the aim of the study and the type of behaviour,

this theory can be extended by a combination of different variables (Conner and Armitage, 1998; Ajzen, 2020).

In particular, using structural equation modelling (hereafter SEM), the TPB has proven to be a statistically appropriate framework for explaining the consumption of different foods (e.g. Zhang et al., 2019; Tomić et al., 2016; Agnoli and Outreville, 2023; Miguel et al., 2022).

Although the theory of planned behaviour is one of the preferred social theories when it comes to explaining intention and F&V consumption (Guillaumie et at., 2010), and its variables have often been shown to be important determinants in this context, there is not yet enough evidence on how successfully it can be extended with different variables and how it works in different markets with different social groups. The aim of this study is to use TPB framework to explore the determinants of F&V consumption in order to develop interventions to change F&V consumption patterns in the student population. Students are an important research subject because they are not only consumers, but also those who can influence consumption patterns in their families (Thomson et al., 2007), and are also the future purchasing decision-makers (Pasta et al., 2023).

1.1. Research framework and hypotheses

A central variable in the TPB is the individual's intention to perform a certain behaviour (Ajzen, 1991). Attitudes toward behaviour, subjective norms, and perceived behavioural control are predictors of intention, whereas intention and perceived behavioural control are predictors of behaviour (Ajzen, 1991; Hrubes et al., 2001; De Leeuw et al., 2015; Steinmetz et al., 2016).

Previous studies have found a significant influence of attitudes (e.g. Carfora et al., 2016; Sjoberg et al., 2004; Kothe and Mullan, 2015; Blanchard et al., 2009), subjective norm (e.g. Kothe and Mullan, 2015; Sjoberg et al., 2004; Jung and Bice, 2019) and perceived behavioural control (e.g. Blanchard et al., 2009; Kothe and Mullan, 2015; Carfora et al., 2016; Sjoberg et al., 2004; Jung and Bice, 2019) on intention to consume F&V. Furthermore, a significant effect has been observed of intention to consume (e.g. Blanchard et al., 2009; Sjoberg et al., 2004) and perceived behavioural control (e.g. Sjoberg et al., 2004; Godin et al., 2010) on actual F&V consumption.

In their study, Sjoberg et al. (2004) reported that three standard TPB variables explained 40% of the variance in intention to consume F&V. In the same study, intention to consume and PBC explained 18% of the variance in F&V consumption. Kothe and Mullan (2015) found that attitude, subjective norm and PBC explained 45.5% of the variance in intention and intention explained 12.1% of the variance in F&V consumption, while PBC didn't contribute to the explanation of F&V consumption. Menozzi et al. (2015) found that three TPB variables explained 81% of the variance in intention to consume vegetables, and that intention to consume vegetables was the only significant predictor, explaining 68% of the variance in vegetables consumption. In light of these results, the following hypotheses are proposed (see Figure 1):

H1: Attitude toward consuming at least 5 portions of fruit and vegetables per day has a significant and positive influence on intention to consume at least 5 portions of fruit and vegetables per day.

H2: The subjective norm of consuming at least 5 portions of fruit and vegetables per day has a significant and positive influence on the intention to consume at least 5 portions of fruit and vegetables per day.

H3: Perceived behavioural control regarding the consumption of 5 portions of fruit and vegetables per day has a significant and positive influence on the intention to consume at least 5 portions of fruit and vegetables per day.

H4: The intention to consume at least 5 portions of fruit and vegetables per day has a significant and positive influence on the consumption of at least 5 portions of fruit and vegetables per day.

H5: Perceived behavioural control regarding the consumption of at least 5 portions of fruit and vegetables per day has a significant and positive influence on the consumption of at least 5 portions of fruit and vegetables per day.

As previously mentioned, the TPB can be augmented with additional constructs to increase the percentage of explained variance in intention or behaviour (Ajzen, 1991). Previous researchers have shown that self-identity (hereafter SI) influences person's intention and behaviour. „Self-identity refers to salient and enduring aspects of person's self-perception (Rise et al., 2010)". The construct SI has been applied and confirmed as a significant predictor in TPB related to household curbside recycling (e.g., Nigbur et al., 2010),

purchasing genetically modified foods (Cook et al., 2002), and choosing locally grown foods (e.g., Bissonnette and Contento, 2001). Dunn et al. (2011) found that the intention to consume fast food was negatively influenced by the construct SI as a healthy eater. Carfora et al. (2016) showed that SI was a significant predictor of intention to consume F&V and F&V consumption when using the TPB. After including this construct in the standard TPB constructs, the percentage of explained variance in intention and behaviour was increased. Based on these results, the following hypotheses are proposed (see Figure 1):

H6: Self-identity as a healthy eater has a significant and positive influence on the intention to consume at least 5 portions of fruit and vegetables per day.

H7: Self-identity as a healthy eater has a significant and positive influence on the consumption of at least 5 portions of fruit and vegetables per day.

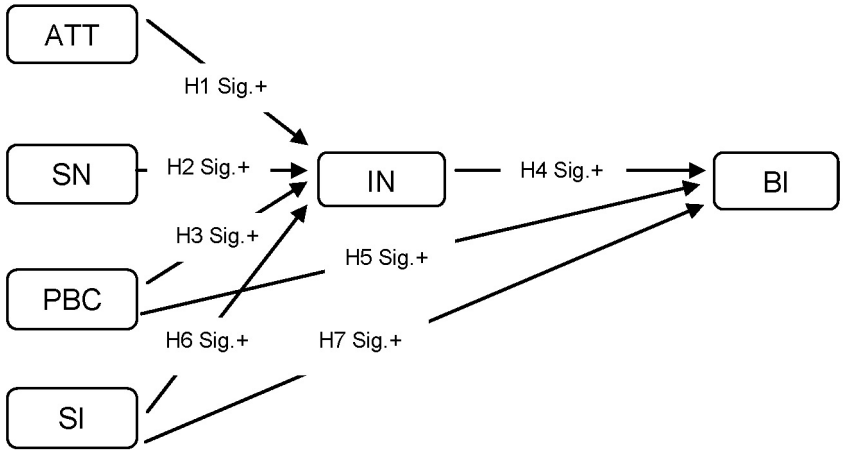

Figure 1 Research model

Slika 1. Istraživački model

Notes: ATT - attitudes towards consumption / ATT - stav prema potrošnji; SN – subjective norm / SN - subjektivna norma; PBC – perceived behavioral control / PBC - percipirana bihevioralna kontrola; SI – self-identity / SI - samo-identiet; IN – intention / IN – namjera; BI – behaviour (consumption) / BI - ponašanje (potrošnja); H indicates hypothesis / H označava hipotezu; Sig+ indicates significant positive influence / Sig+ označava značajan pozitivan utjecaj

2. MATERIAL AND METHODS

2.1. Data collection and sample

The survey was conducted in three university cities in Bosnia and Herzegovina: Sarajevo, Banja Luka, and Mostar. Through personal contacts, 150 printed questionnaires were distributed to students in each city. Participants were asked to complete and return the questionnaires. The data collection process began in November 2018 and ended in January 2019. 116 completed questionnaires were returned in Sarajevo, 141 in Banja Luka and 150 in Mostar. The final sample consisted of 407 participants (90.44% of the distributed questionnaires).

2.2. Measures

To measure the constructs of the TPB model, statements were developed based on those used in previous studies with the TPB. The statements used to measure the construct of self-identity as a healthy consumer were used in their original form (Table 1). All statements were measured on a 5-point Likert scale ranging from "strongly disagree" (1) to "strongly agree" (5). The guideline of having at least two indicators per construct (Morrison et al., 2017) was followed.

Table 1 Statements used in the research

Tablica 1. Izjave korištene u istraživanju

Construct Konstrukt	Indicator (statement) Indikator (izjava)	Source Izvor
Attitudes towards consumption (ATT) Stavovi prema porošnji (ATT)	Eating at least 5 portions of fruit and vegetables a day is a ritual for me. (ATT_1) / Konzumacija najmanje 5 porcija voća i povrća dnevno je moj osobni ritual. (ATT_1)	Tomić (2016); Gratton et al. (2007)
	Eating at least 5 portions of fruit and vegetables a day is a pleasure for me. (ATT_2) / Konzumacija najmanje 5 porcija voća i povrća dvevno mi je užitak. (ATT_2)	
	Eating at least 5 portions of fruit and vegetables a day is fun for me. (ATT_3) / Konzumacija najmanje 5 porcija voća i povrća dnevno mi je zabavna. (ATT_4)	
	Eating at least 5 portions of fruit and vegetables a day is beneficial for me. (ATT_4) / Konzumacija najmanje 5 porcija voća i povrća dnevno je korisno za mene. (ATT_4)	

Subjective norm (SN) Subjektivna norma (SN)	Most people who are important to me think that I should eat at least 5 portions of fruit and vegetables a day. (SN_1) / Većina ljudi koji su mi važni smatraju da bih trebao/la jesti najmanje 5 porcija voća i povrća dnevno. (SN_1)	Kothe and Mullan (2015); Gratton et al. (2007)
	People close to me expect me to eat at least 5 portions of fruit and vegetables a day. (SN_2) / Ljudi koji su mi bliski očekuju da konzumiram najmanje 5 porcija voća i povrća dnevno. (SN_2)	
	People in my life whose opinion I value consume at least 5 portions of fruit and vegetables a day. (SN_3) / Ljudi u mome životu čije mišljenje cijenim konzumiraju najmanje 5 porcija voća i povrća dnevno. (SN_3)	
	People close to me consume at least 5 portions of fruit and vegetables a day. (SN_4) / Ljudi koji su mi bliski konzumiraju najmanje 5 porcija voća i povrća dnevno. (SN_4)	
Perceived behavioral control (PBC) Percipirana bihevioralna kontrola (PBC)	I have full control over how many portions of fruit and vegetables I eat per day. (PBC_1) / Imam potpunu kontrolu nad time koliko ću porcija voća i povrća konzumirati dnevno. (PBC_1).	Kothe and Mullan (2015); Kothe et al. (2012); Nystrand and Olsen (2020)
	I can largely decide for myself how often I consume fruit and vegetables per day. (PBC_2) / U velikoj mjeri mogu sam/a odlučiti koliko ću često konzumirati voće i povrće dnevno. (PBC_2)	
	If I wanted, I could consume at least 5 portions of fruit and vegetables a day. (PBC_3) / Kada bih to htio/htjela, mogao/la bih konzumirati najmanje 5 porcija voća i povrća dnevno. (PBC_3)	
	It would be possible for me to consume at least 5 portions of fruit and vegetables a day. (PBC_4) / Bilo bi mi moguće konzumirati najmanje 5 porcija voća i povrća dnevno. (PBC_4)	
Self-identity (SI) Samo-identitet (SI)	I think of myself as a healthy eater. (SI_1) / Smatram se osobom koja se zdravo hrani. (SI_1)	Dunn et al. (2011)
	I think of myself as someone who is concerned with healthy eating. (SI_2) / Smatram se osobom koja se brine o zdrvoj prehrani. (SI_2)	
	I think of myself as someone who is concerned with the health consequences of what I eat. (SI_3) / Smatram se osobom koja se brine oko zdravstvenih posljedica onoga što se konzumira. (SI_3)	
	I think of myself as someone who enjoys the pleasures of eating. (SI_4) / Smatram se osobom koja uživa u zadovoljstvima konzumacije hrane. (SI_4)	

Intention (IN) Najmera (IN)	I intend to consume at least 5 portions of fruit and vegetables a day. (IN_1) / Namjeravam konzumirati najmanje 5 porcija voća i povrća dnevno. (IN_1)	Kothe and Mullan (2015); De Bruijn (2010)
	I will probably consume at least 5 portions of fruit and vegetables per day in the near future. (IN_2) / Vjerojatno ću konzumirati najmanje 5 porcija voća i povrća dnevno u bliskoj budućnosti. (IN_2)	
	I plan to consume at least 5 portions of fruit and vegetables per day. (IN_3) / Namjeravam konzumirati najmanje 5 porcija voća i povrća dnevno. (IN_3)	
Behaviour (F&V consumption (BI) Ponašanje (potrošnja voća i povrća) (BI)	I usually eat at least 5 portions of fruit and vegetables a day. (BI_1) / Obično konzumiram najmanje 5 porcija voća i povrća dnevno. (BI_1)	Kothe and Mullan (2015)
	My daily diet usually includes at least 5 portions of fruit and vegetables. (BI_2) / Moja dnevna prehrana obično uključuje najmanje 5 porcija voća i povrća. (BI_2)	
	On my daily menu are at least 5 portions of fruit and vegetables. (BI_3) / Na mom dnevnom meniju nalazi se najmanje 5 porcija voća i povrća. (BI_3)	

2.3. Statistical approach

The data obtained from the survey was analyzed using the statistical software SPSS and Amos. Structural equation modeling (hereafter SEM) with the maximum likelihood (ML) method was used to test the extended TPB model. When using the maximum likelihood method, two assumptions must be met: no missing data, and dependent variables must exhibit multivariate normality (Morrison et al., 2017). As recommended by Burdenski (2000), multivariate normality was checked by identifying multivariate outliers using the Mahalanobis distance (D^2). As recommended by Tabachnick and Fidell (2013), cases with $p<0.001$ for the X^2 value were excluded from further analysis.

After data verification, a two-stage SEM analysis was performed. First, a confirmatory factor analysis (hereafter CFA) was conducted to test the measurement model. Standardized indicator loadings and fit indices: Comparative Fit Index (CFI), Goodness of Fit Index (GFI), Tucker-Lewis Index (TLI), Root Mean Square of Error Approximation (RMSEA), and chi-square/degrees of freedom (x^2/df) were considered. Indicators with standardized loadings of 0.7 and higher were selected for further analysis (see Hair et al., 2011). CFI, GFI and TLI values equal to or higher than 0.9 indicate acceptable values of these indices (see Kline, 2011). RMSEA less than 0.10 (see Fabrigar et al., 1999) and x^2/df less than 5.0 (see Schumacker and Lomax, 2004) were considered acceptable values.

In addition, the convergent and discriminant validity as well as the internal and composite reliability of the constructs of the measurement model were tested. An average variance extracted (hereafter AVE) of 0.5 or higher indicates a convergent validity of the construct (Ahmad et al., 2016). If the AVE of a construct is higher than its squared correlation with another construct, discriminant validity can be considered confirmed (Hair et al., 2011). Cronbach's alpha greater than 0.6 indicates that internal reliability is confirmed (Ahmad et al., 2016), and Joereskog Rho greater than 0.7 indicates that the composite reliability of the construct is present (Chin, 2009).

In the second step of the SEM analysis, the composite model was tested. As in the case of the measurement model, fit indices (CFI, GFI, TLI, RMSEA, x^2/df) and the percentage of explained variance (R^2) were considered.

3. RESULTS

3.1. Sample description

The sample was predominantly composed of female respondents (66.2%), compared to male respondents (33.8%). 62.7% of the study participants grew up in the city and 37.3% in the countryside. Most respondents were medical students (36.8%), followed by students of social sciences (20.1%), agricultural sciences (13.7%), engineering and technology (12.7%), humanities (10.9%), arts (4.1%) and natural sciences (1.8%). Based on the three statements used to measure the frequency of consumption, it can be seen that between 16% and 20% of students usually consume the recommended daily amount of fruit and vegetables, while between 52% and 57% of them do not follow the recommendations on fruit and vegetables consumption. Between 23% and 28% of students were undecided about the recommended daily intake of fruit and vegetables.

3.2. Results of the data preparation for SEM

After reviewing the data, it can be confirmed that there were no missing values in our data set. The Mahalanobis distance test revealed that there were 13 multivariate outliers in the sample. These cases were excluded, and further analysis was performed with 394 cases.

3.3. Confirmatory factor analysis

The results of the CFA showed that our measurement model needs to be improved. Some fit indices as well as standardized indicator loadings showed unacceptable values. In accordance with the recommendation (Hair et al., 2011), indicators with a standardized loading of less than 0.7 were excluded from further analysis. A new CFA was performed without the following indicators: ATT_4, SN_1, SN_2, PBC_1, SI_4 (see Table 1). This time, the CFA results showed a good measurement model. The values of all standardized indicator loadings as well as the fit indices (x^2/df, GFI; TLI; CFI; RMSEA) were in acceptable ranges (see Table 2).

Table 2 Results of (repeted) confirmatory factor analysis

Tablica 2. Rezultati (ponovljene) konfirmatorne faktorske analize

Construct Konstrukt	Indicator (statement) Indikator (izjava)	Standardized loading Standardizirano zasićenje
Attitudes towards consumption (ATT) Stvovi prema potrošnji (ATT)	ATT_1	0.787
	ATT_2	0.873
	ATT_3	0.836
Subjective norm (SN) Subjektivna norma (SN)	SN_3	0.908
	SN_4	0.905
Perceived behavioral control (PBC) Percipiran bihevioralna kontorla (PBC)	PBC_2	0.709
	PBC_3	0.879
	PBC_4	0.807
Self-identity (SI) Samo-identitet (SI)	SI_1	0.863
	SI_2	0.941
	SI_3	0.732
Intention (IN) Namjera (IN)	IN_1	0.908
	IN_2	0.943
	IN_3	0.934
Behaviour - consumption (BI) Ponašanje – potrošnja (BI)	BI_1	0.860
	BI_2	0.946
	BI_3	0.937
Model fit indices Indeksi pogodnosti modela	x^2/df= 2.809; GFI= 0.916; TLI= 0.955; CFI= 0.965; RMSEA= 0.068	

Note / Napomena: x^2/df – relative chi-square / x^2/df - relativni hi kvadrat, GFI – goodness of fit indeks / GFI – indek najboljeg slaganja, TLI – Tucker-Lewis index / TLI – Tucker-Lewisov indeks, CFI – comparative fit index / CFI – komparativni indeks slaganja, RMSEA – root mean square error of approximation / RMSEA – prosječna kvadratna pogreška

3.4. Validity and reliability of the measurement model

Both types of validity, convergent and discriminant, are confirmed. The AVE of each construct is above the critical value of 0.5, and the AVE of each construct is higher than its squared correlation with any ther construct in the model (Table 3).

In terms of reliability, Cronbach's alpha was greater than 0.6 for all constructs, and the Joreskog rho coefficient was greater than 0.7, indicating good internal reliability and good composite reliability (Table 3).

Table 3 Validity and reliability of the constructs

Tablica 3. Valjanost i pouzdanost konstrukata

Construct / Coefficient Konstrukt / Koeficijent	ATT	SN	PBC	SI	IN	BI
ATT	**0.693**					
SN	0.199	**0.822**				
PBC	0.121	0.066	**0.642**			
SI	0.292	0.119	0.037	**0.722**		
IN	0.555	0.240	0.143	0.234	**0.862**	
BI	0.649	0.178	0.077	0.268	0.391	**0.837**
Joreskog rho	0.871	0.902	0.842	0.885	0.949	0.939
Cronbach alpha	0.866	0.901	0.839	0.879	0.949	0.938

Note / Napomena: AVE values are in bold, other values in the upper part of the table refer to squared correlations between constructs / AVE vrijednosti su podebljane, ostale vrijednosti u gornjem dijelu tablice odnose se na kvadratne korelacije između konstrukata

3.5. Testing of composite model

Considering all model fit indices, it can be concluded that the extended TPB model has an acceptable model fit in predicting the frequency of fruit and vegetables consumption (Table 4). Attitudes, subjective norm and PBC had a significant and positive influence on the intention to consume the recommended amount of F&V, confirming hypotheses 1, 2 and 3. The influence of attitudes (β=0.582; $p<0.001$) was the strongest, followed by subjective norm (β=0.183; $p<0.001$), and perceived behavioral control (β=0.108; $p=0.013$) (Table 4). Hypothesis 6 is rejected because self-identification has no significant influence on intention (Table 4). Attitudes, subjective norm, and perceived behavioral control explained 61% of the variance in intention (Table 4). A significant and positive influence of intention and self-identification on the consumption of the recommended amount of fruit and vegetables was found, confirming hypotheses 4 and 7. The influence of intention (β=0.487; $p<0.001$) was stronger than that of self-identification (β=0.285; $p<0.001$) (Table 4). Perceived behavioral control did not have significant effect on behavior, so hypothesis 5 is rejected. Intention and self-identification explained 48% of the variance in behavior (Table 4).

Table 4 Results of the extended TPB model for the prediction of F&V consumption

Tablica 4. Rezultati proširenog modela teorije planiranog ponašanja za predikciju potrošnje voća i povrća

Relation / Odnos	B	S.E.	p	β	Hypothesis Hipoteza	R^2
(H1) ATT → IN	0.555	0.053	***	0.582	accepted	
(H2) SN → IN	0.205	0.049	***	0.183	accepted	
(H3) PBC → IN	0.122	0.049	0.013	0.108	accepted	
(H6) SI → IN	0.092	0.050	0.067	0.086	rejected	
						0.61
(H4) IN → BI	0.516	0.055	***	0.487	accepted	
(H5) PBC → BI	0.055	0.056	0.324	0.046	rejected	
(H7) SI → BI	0.322	0.055	***	0.285	accepted	
						0.48
Model fit indices / Indikatori pogodnosti modela: x^2/df= 3.715 ; GFI= 0.905; NFI= 0.929; TLI= 0.933; CFI= 0.947; RMSEA= 0.083						

Note / Napomena: B – unstandardized coefficient / B - nestandardizirani koeficijent, β – standardized coefficient / ß - standardizirani koeficijent, S.E. – standard error / S.E. - standardna pogleška, p – significance level / p - razina značajnosti , *** $p<0.001$, x^2/df – relative chi-square / x^2/df – relativni hi kvadrat, GFI – goodness of fit indeks / GFI – indek najboljeg slaganja, TLI – Tucker-Lewis index / TLI – Tucker-Lewisov indeks, CFI – comparative fit index / CFI – komparativni indeks slaganja, RMSEA – root mean square error of approximation / RMSEA – prosječna kvadratna pogreška

4. DISCUSSION

This study empirically tested whether the extended theory of planned behaviour is suitable as a possible basis for marketing campaigns when it comes to the fruit and vegetables consumption of the student population in Bosnia and Herzegovina. To investigate this, the structural equation modelling approach was applied to the collected data. Acceptable model fit indices, significant relationships between the TPB variables and a substantial amount of explained variance indicate that this model can be interpreted coherently and used to make recommendations for practical behaviour. Given the low frequency of fruit and vegetables consumption among students in the researched market, these results can be used to develop campaigns to increase fruit and vegetables consumption. One of the main tasks of social marketing is to contribute to positive behaviour

change (Bach and Alnajar, 2016). In order to make specific recommendations for promoting desired behavioral changes, it is important to consider the predictive power of the independent variables and to test the hypotheses defined in the TPB model.

The percentage of explained variance in the intention to consume the recommended amount of F&V is 61%, which is a similar percentage to previous studies on this topic using SEM (e.g. Jung and Bice, 2019). Compared to other studies (e.g., Kothe et al., 2012; Kothe and Mullan, 2015; Carfora et al., 2016), the proportion of explained variance in behaviour, i.e., F&V consumption, is even higher in this study, amounting to 48%. However, this should be viewed with caution, as only the study by Carfora et al. (2016) included the construct of self-identity, while the other studies mentioned were mostly limited to standard predictors of behaviour, i.e. intention and PBC. Students with a more positive attitude towards eating 5 portions of fruit and vegetables per day intend to eat this amount of fruit and vegetables more often (H1 accepted). This relationship has also been found significant in many previous studies on factors predicting F&V consumption using the TPB (e.g. Kothe and Mullan, 2015; Carfora et al., 2016; Jung and Bice, 2019). When preparing marketing campaigns to increase F&V consumption in the target population, it is recommended to try to influence students' attitudes towards the aspects that are important to students when it comes to the F&V consumption.

Communication with the target group should emphasise the pleasure and enjoyment of regular F&V consumption. Part of these activities should include raising awareness that eating fruit and vegetables regularly is a beneficial ritual. To achieve this, a combination of online media such as Facebook and Instagram and offline media such as school newspapers is recommended. In this way, a large audience can be reached. Campaigns that place messages in the media reach a large number of people (Wakefield et al., 2010). Educational programmes in the form of monthly lectures on a university-wide level could be particularly effective in achieving more positive student attitudes towards F&V consumption and ultimately a stronger behavioural intention. As noted in previous research on this topic (e.g. Kothe et al., 2012; Kothe and Mullan, 2015; Jung and Bice, 2019; Jung et al., 2021), students who report a stronger subjective norm are more likely to want to consume the recommended amount of F&V (H2 accepted). Those who had higher perceived control over their own F&V consumption were more likely to consume the recommended amount of

F&V (H3 accepted). Perceived behavioural control also played an important role in previous studies when the TPB was used in the same context (e.g., Kothe et al., 2012; Kothe and Mullan, 2015; Carfora et al., 2016; Jung and Bice, 2019; Jung et al., 2021). Considering that subjective norm and perceived behavioural control significantly and positively influence the intention to consume fruits and vegetables, but also the fact that fruits and vegetables are often not available or cheap for students, it is recommended to promote the introduction of subsidised fruit and vegetables offerings in student dining halls and to establish outlets near faculties that are geared towards selling healthy food. The construct self-identification as a healthy eater contributed to the percentage of explained variance in behaviour, as in previous studies (e.g., Carfora et al., 2016), justifying the inclusion and usefulness of this construct in the TPB model. Students who rate themselves as healthy eaters are more likely to consume the recommended amount of fruit and vegetables (H7 accepted). Therefore, the importance of healthy eating behaviour should be prioritised in promotional and educational activities. A significant and positive influence of intention on fruit and vegetables consumption behaviour (H4 accepted) means that all those who previously had the firm intention to consume the recommended amount of fruit and vegetables also do so when they actually consume them. This relationship has also been found in numerous previous studies using the TPB model (e.g. Kothe et al., 2012; Jung et al., 2021).

5. CONCLUSION

First and foremost, this study confirms the applicability of the TPB in the context of students' F&V consumption. The research results showed that the TPB variables, when augmented with the construct of self-identification, explained a considerable percentage of the variance in intention and behavior. Based on the research findings, we can conclude that fruit and vegetables consumption among students in Bosnia and Herzegovina is not satisfactory However constructs such as attitude towards consumption, subjective norm, perceived behavioral control, intention to consume, and self-identification as a healthy eater can play an important role in changing these consumption patterns. Therefore, future promotion and health programs in this country could take these findings into account and focus their activities on, for example, reinforcing positive attitudes or the role of important people in one's life when it comes to increasing F&V consumption among the student population.

5.1. Limitations and recommendations

This study has some limitations. Although it provides an important insight into the F&V consumption of students from the country studied and related psychological factors, further research is needed to generalize the results. Due to the study's design, it was not possible to categorize the students in terms of their F&V consumption. Future research on this topic should therefore consider a more representative sample, but also incorporate a segmentation approach, which would be a next step in gaining a broder insight when it comes to F&V consumption among student population in this country. The fact that this study was conducted several years ago and that the period between its conduct and today was characterised by some significant societal events, such as the COVID-19 pandemic, is another reason why one should be cautious when interpreting the results of this study and why new research on this topic is needed. The construct of self-identity as a healthy eater had a significant impact on F&V consumption, and we can talk about its contribution to the TPB model. Future research should be open to the inclusion of new variables in the TPB model. Before that, the relevance of their inclusion should be confirmed through qualitative studies, for example focus groups. Also before such inclusion, we recommend conducting a cognitive pretest to determine how well potential study participants understand the statements related to a particular construct. In this way, an even more credible later interpretation of the results can be achieved.

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