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Understanding Students' and Science Educators' Eco-Labeled Food Purchase Behaviors: Extension of Theory of Planned Behavior with Self-Identity, Personal Norm, Willingness to Pay, and Eco-Label Knowledge

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ABSTRACT

This study aims to understand antecedents of students' and science educators' purchasing behaviors for eco-labeled foods with the extended Theory of Planned Behavior (TPB) model including self-identity, personal norm, willingness to pay, and eco-label knowledge in the Turkish context. A web-based survey was used to collect data from 3,393 people including middle school students, high school students, pre-service science teachers, science teachers, and academic staff. The results revealed that both the original (32%) and extended (37%) TPB models successfully explained intentions to purchase eco-labeled foods. In addition, personal norm, eco-label knowledge, and intention explained 25% of the variance in purchase behaviors indicating an acceptable explanatory power. In the original TPB model, attitude and perceived behavioral control had positive influence on intention, and in addition to those factors, willingness to pay and self-identity had a positive effect on intention in the extended TPB model. However, subjective norm had no significant influence on intention for both models. As a result, the study has important practical implications for policy and curriculum makers, education stakeholders, and science educators.

KEYWORDS

Purchase of eco-labeled food; theory of planned behavior; self-identity; personal norm; willingness to pay; eco-label knowledge; science education

Introduction

Over the last a few decades, the world faces severe environmental degradation such as fluctuation in air temperature, rise in greenhouse gas emissions, and climate change (Beattie and McGuire 2016). Human behaviors are an important driving force of these environmental problems because of their demand for higher living standards (Stern et al. 2006) and in this direction, changes in their behavior, habits, and lifestyles are of prime importance for a better world (Marchand and Walker 2008). In particular, food preferences of individuals especially have a major environmental influence (Hartmann and Siegrist 2017) and accordingly, behavioral change in food consumption has a strong influence in decreasing environmental degradation (Gerbens-Leenes and Nonhebel

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2002). To ensure sustainable food consumption, consumers are in need of being appropriately enlightened given the current situation so that they can make the best food purchase preferences available, and to beware of problems that relate to food purchases (Ramos and Squeff 2020). However, earlier studies indicated that consumers are often poorly informed and have a lack of understanding related to food product information in terms of its impact on environment (Xie et al. 2015). Therefore, making informed purchasing decisions is difficult for consumers in line with their environmental consciousness and behaviors (Hempel and Hamm 2016).

As an indicator of consumers' food alternatives, an eco-label indicates the general environmental preference related to product or service based on eco-friendliness and informs the consumers to promote their food purchase behaviors (McCluskey and Loureiro 2003). Over the last a few decades, eco-labeling has become useful to inform about environmental-friendly concerns regarding foods (Bougherara and Combris 2009) and its positive effect has been realized by companies and organizations in developing the identity of sustainable foods (Joshi and Rahman 2015). Previous studies indicated that an eco-label can positively affect consumers who perceive eco-label foods as more eco-friendly than traditional foods (Magnusson et al. 2003), and it has an influence on the consumers' evaluations and consumptions of a food product (Bublitz, Peracchio, and Block 2010). Hence, it is important to obtain a better understanding of behavior preferences toward purchasing eco-labeled foods, since unless direct information is given about environmental impact of foods, consumers have difficulty to understand the difference between more eco-friendly foods and less eco-friendly ones (Siegrist, Visschers, and Hartmann 2015). One of the best ways to understand purchase behaviors is to test the theory of planned behavior (TPB). While some of earlier studies were focused on general eco-labeled products (e.g., Mufidah et al. 2018), only a few studies aimed to reveal antecedents of purchase behavior for eco-labeled foods by using TPB (e.g., Mohamed et al. 2014).

Accordingly, there is a lack of understanding of the factors influencing consumer intentions to purchase eco-labeled foods and behaviors. Therefore, to the best of our knowledge, the current study is first attempt to address the research gaps by exploring antecedents of purchase behaviors for eco-labeled foods in the Turkish context with TPB. Given the lack of knowledge about consumption behavior, especially in developing countries (Ramayah, Lee, and Mohamad 2010) such as Turkey, to prevent environmental degradation, this study is needed to understand the purchase behavior of people who have different environmental anxieties, beliefs, and attitudes than people in developed countries (Singh and Gupta 2013). In Turkey, last reports showed that between 2009 and 2014, the per capita and total food consumption in Turkey increased by 34%, and 21%, respectively (Presidency of the Republic of Turkey Investment Office 2015). For the last few years, however,

there have been significant changes in consumer demands toward preferring organic foods in Turkey. In line with the organic consumption demand, the Turkish Ministry of Environment and the Urban Planning (2018) developed eco-labeled regulations to decrease the negative effects of consumption of natural resources on human, health, environment, climate, and natural life. In Turkey, an organic agriculture label has been used for years. The label includes name of the certification institution, its logo, harvest year, code number, Turkish label information for imported products, and information that it has been produced in accordance with organic agriculture legislation (Republic of Turkey Ministry of Agriculture and Forestry 2010).

In addition, the study contributes to the relevant literature by adding new constructs including self-identity, personal norm willingness to pay (WTP), and eco-label knowledge (ELK), considered as important determinants of eco-labeled food purchase behaviors. Among them, the role of self-identity has been reported that consumers with a strong food purchase self-identity will more influentially perceive themselves as type of people who purchase these foods, and consequently would be more likely to food purchase intentions (e.g., Carfora, Caso, and Conner 2016). Personal norm is “*used to signify the self-expectations for specific action in particular situations that are constructed by the individual.*” (Schwartz 1977, 227). Accordingly, it can be stated that consumers’ feelings of moral obligation to purchase food products are related to their purchase behaviors (Koklic et al. 2019). In this vein, it can be stated that while the original TPB model only focuses on rational considerations, the extended TPB model also includes examining pro-social motives and moral issues. One of other important constructs is willingness to pay (WTP), which plays an important part in preventing environmental degradation. Knowledge of the consumers also plays a fundamental role in sustainable purchase behaviors (Nielsen 2010) as consumers should be conscious of labels and understand their meanings. Within this context, this study can address the gap explaining role of self-identity, personal norm, WTP, and ELK to explain eco-labeled food purchase intentions and behaviors in Turkey. Furthermore, the study examines and compares superiority of explanatory powers of the original TPB model and extended model, thus enabling contributions to theory-based environmental psychology literature. In addition, the present study confirms the suitability of the extended model, which contributes to pro-social and pro-environmental study context.

The study is focused on people in a variety of age groups, from children to adults, since environmental issues concern the whole society. Among them, understanding young peoples’ eco-labeled food purchase behaviors is very important since they are future generations and representative of the community (Kanchanapibul et al. 2014). However, educating students also occupies an important place in environmental education, which aims to develop and encourage a sense of relationship with the environment from young

(Littledyke 2008). The most important task for the realization of this aim belongs to the educators. In particular, science educators have great importance in encouraging scientific understanding about environmental issues, and they have important potential and status in environmental education (Littledyke, Lakin, and Ross 2013). Although the importance of science educators was empirically tested in a limited number of studies (e.g., Ateş 2020b; Rachmatullah, Lee, and Ha 2020), to the best of our knowledge, there is no study aimed at understanding science educators' eco-labeled food purchases. Accordingly, the current study has made an attempt to examine the determinants of students' and science educators' eco-labeled food purchase intentions and behaviors in Turkey.

Conceptual framework and hypothesis development

Theory of planned behavior

Theory of Planned Behavior (TPB) explains the psychological antecedents of behaviors consisting of attitude, subjective norm, and perceived behavioral control (PBC) which are main determinants of intention to act in a certain behavior (Ajzen 1991).

Attitude

Attitude is defined as “*the degree to which a person has a favorable or unfavorable evaluation of the behavior in question*” (Ajzen 1991, 188). Based upon consumer behavior studies, attitude toward behavior is of capital importance related to its impact on behavioral intentions (e.g., Taufique and Vaithianathan 2018). Concerning earlier studies related to green consumption settings, a relationship between attitude toward purchasing eco-labeled food and behavioral intention was revealed across several studies (e.g., Mohamed et al. 2014). Therefore, the current study hypothesizes that:

H₁: Attitude has positive influence on the intention to purchase eco-labeled foods.

Subjective norm

Subjective norm refers to “*an individual's perception that most people who are important to his/her should (or should not) perform a particular behavior*” (Fishbein and Ajzen 2011, 131). If an individual thinks that the people who are important to her/him approve or express disapproval of the behavior, she or he will intend to act in a way that helps them to be approved or to avoid disapproval (Connor and Armitage 2002). Various studies have established the predictive role of subjective norm in explaining organic purchase intentions (e.g., Paul and Rana 2012), while only a few studies focused on this role on

purchase intentions to purchase eco-labeled food (e.g., Aitken et al. 2020). In the light of past studies, the following is hypothesized:

H₂: Subjective norm has positive influence on the intention to purchase eco-labeled foods.

Perceived behavioral control

PBC is defined as “*the perceived ease or difficulty of performing the behavior*” (Ajzen 1991, 188) and is an indicator of a person’s consideration of how difficult it would be to realize the behavior; therefore it is determined by the degree to which they consider that they have control over the behavior (Greaves, Zibarras, and Stride 2013). For example, Aitken et al. (2020) noted that labeling on foods plays a fundamental role in PBC, which in turn can empower intentions to buy eco-labeled foods. Therefore, the hypothesis is proposed as follows:

H₃: Perceived behavioral control has positive influence on the intention to purchase eco-labeled foods.

Intention

Behavioral intention is “*an indication of how hard people are willing to try, of how much of an effort they are planning to exert, in order to perform the behavior*” (Ajzen 1991, 181), and is accepted to be a major antecedent of behavior (Ajzen 2002). In sustainable food purchases, the influence of intention to engage in the purchase of eco-labeled food on purchase behavior has not been established in the literature, as far as we know. Therefore, following hypothesis is tested:

H₄: Intention has positive influence on the purchase of eco-labeled foods.

Extension of TPB

Earlier studies reported that some additional variables such as self-identity, personal norm, WTP, and ELK were successfully used to explain sustainable intentions and behaviors (e.g., Carfora et al. 2019; Prakash and Pathak 2017). Among them, the construct of WTP has been widely involved to understand its influence on behavioral intentions in the scope of TPB (e.g., Mohamed et al. 2014). Assessing consumers’ WTP for environmental health and quality is considered important since sustainable consumption is generally priced higher due to costs incurred in the process; hence, price further constitutes an impediment to engage in sustainable consumption behavior (Gleim et al. 2013). More specifically, in several studies, the consumer has more WTP for eco-labeled food (e.g., Xu et al. 2012). For example Xu et al. (2012) stated that

76% of the consumers are willing to pay more for eco-labeled food. Further, Prakash and Pathak (2017) reported that WTP has a positive impact on the intention to purchase eco-friendly products.

One of the other most well-used additional constructs in TPB is self-identity which seemed to be a motive variable that contributes to understanding consumers' intentions in several studies (Connor and Armitage 2002). Given the previous results (e.g., Van der Werff, Steg, and Keizer 2013b), it may be assumed that self-identity indicates the degree to which people perceive themselves as a type of people who may purchase eco-labeled food, and thus has an important role on one's intention to act. In addition, past studies indicated that self-identity is related to personal norm, which is in turn influences environmental behavior (e.g., Ateş 2020a; Van der Werff, Steg, and Keizer 2013a). For example, Ateş (2019b) revealed that middle school students', pre-service science teachers' and science teachers' environmental self-identity had positive impact on their personal norm. Similarly, Ateş (2020a) reported that there is a positive relationship between science teachers' environmental self-identity and personal norm which has a positive influence on pro-environmental behavior. Furthermore, earlier studies pinpointed that the inclusion of personal norm to the TPB model can enhance its explanatory power in respect of understanding the purchase of sustainable foods (e.g., Koklic et al. 2019). Therefore, the current study assumed that the more strongly an individual sees himself/herself as an individual who purchases eco-labeled foods, the more strongly they feel morally obliged to do so, and the more strongly they are likely to engage in the purchase of eco-labeled foods.

Some of the previous studies suggested that food purchasing is dependent on understanding of information provided on eco-labels and the role of eco-labels to support food purchasing behaviors is affected by consumers' knowledge (e.g., Mohamed et al. 2014; Taufique, Vocino, and Polonsky 2017). Therefore, in order for eco-labels to be useful, consumers need to understand their meaning. The study of Yadav and Pathak (2016) indicated positive impact of the knowledge on the purchase of green products. Similarly, the study of Mohamed et al. (2014) showed the importance of ELK for consumers when purchasing eco-labeled foods. Past empirical studies also reported that there is an association between attitude and knowledge, which in turn has an influence on various sustainable purchase behaviors (e.g., Polonsky et al. 2012). Furthermore, it was revealed that knowledge about specific environmental issues influences attitudes and people's purchasing behaviors are also influenced by knowledge (Scott and Vigar-Ellis 2014). Polonsky et al. (2012) found that carbon-specific knowledge is positively associated with attitudes and environmental behaviors. Accordingly, the current study focuses on the importance of ELK on attitude toward the purchase of eco-labeled foods and purchase behaviors in Turkish context. Given the contribution of additional factors on TPB model presented in Figure 1, the study proposes the following hypotheses:

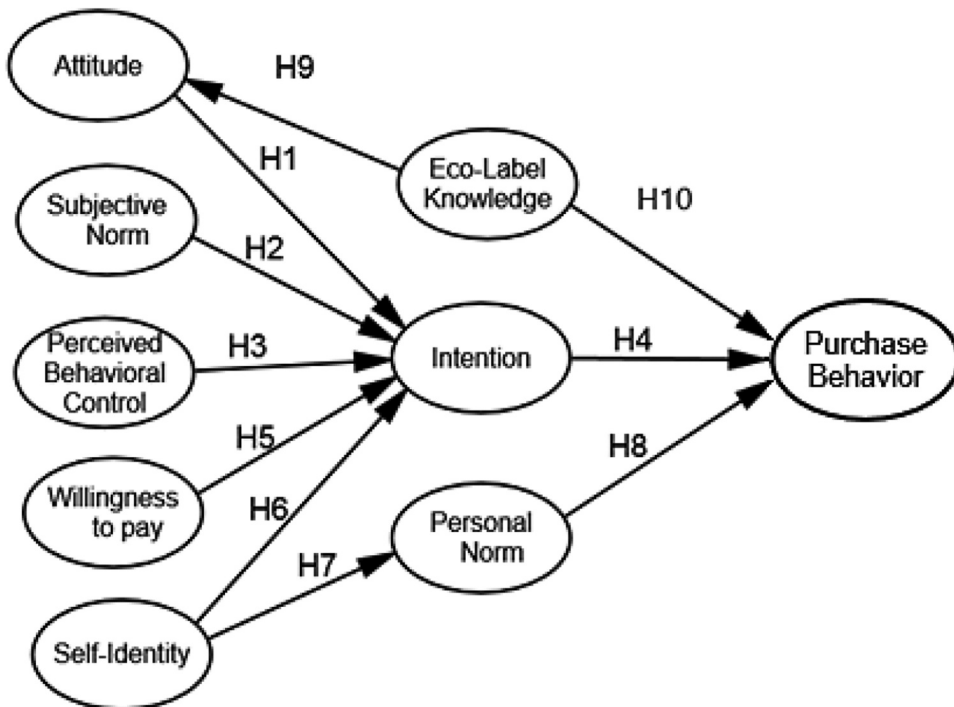


Figure 1. The proposed model.

H5: Willingness to pay for eco-labeled foods has positive influence on the intention.

H6: Self-identity has positive influence on the intention.

H7: Self-identity has positive influence on the personal norm.

H8: Personal norm has positive influence on the purchase of eco-labeled foods.

H9: Eco-label knowledge has positive influence on attitude.

H10: Eco-label knowledge has positive influence on the purchase of eco-labeled foods.

Methodology

Participants and data collection

The data were collected through a self-administered web-based survey with the help of Google Forms between July 2019 and May 2020 in accordance with

Table 1. The scale items, adoption sources, and convergent validity.

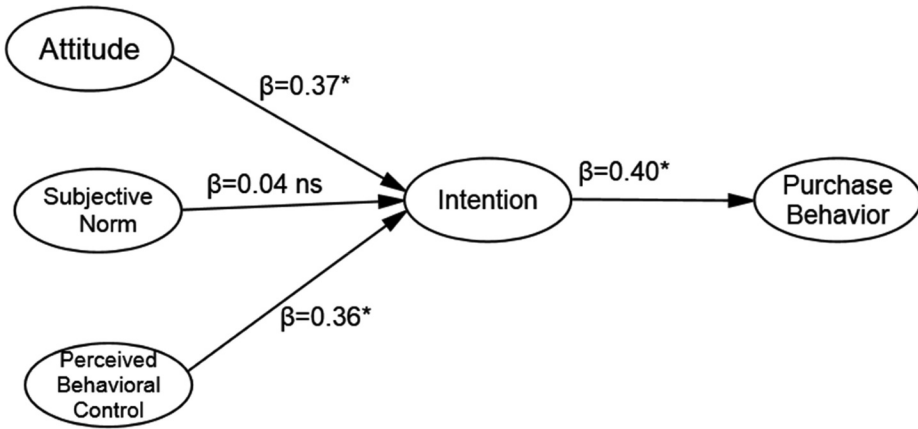
Construct	Statements	Source	FL	α	AVE	CR
Attitude	I think that purchasing eco-labeled food is interesting.	Ajzen (2002); Arvola et al. (2008); Yazdanpanah and Forouzani (2015)	0.71	0.73	0.53	0.87
	I think that purchasing eco-labeled food is a good idea for environment.		0.79			
	I think that purchasing eco-labeled food is important for environment.		0.78			
	I think that purchasing eco-labeled food is beneficial for environment.		0.78			
Subjective Norm	I think that purchasing eco-labeled food is wise.	Ajzen (2002); Arvola et al. (2008); Yazdanpanah and Forouzani (2015)	0.65			
	I think that purchasing eco-labeled food is favorable for environment.		0.64			
	My family thinks that I should purchase eco-labeled food rather than food without eco-label.		0.74	0.75	0.56	0.84
	Most people I value would purchase eco-labeled food rather than food without eco-label.		0.79			
Perceived Behavioral Control	People I value (such as my colleagues) think I should purchase eco-labeled food.	Ajzen (2002); Arvola et al. (2008); Yazdanpanah and Forouzani (2015)	0.71			
	My close friends, whose opinions regarding diet are important to me, think that I should purchase eco-labeled food.		0.76			
	If I wanted to, I could purchase eco-labeled food instead of food without eco-label.		0.66	0.76	0.54	0.77
	I think it is easy for me to purchase eco-labeled food.		0.74			
Intention	It is mostly up to me whether or not to purchase eco-labeled food.	Ajzen (2002); Arvola et al. (2008); Yazdanpanah and Forouzani (2015)	0.79			
	I am willing to purchase eco-labeled food if it is available.		0.79	0.78	0.58	0.85
	I intend to purchase eco-labeled food if it is available.		0.81			
	I plan to purchase eco-labeled food if it is available.		0.78			
Purchasing Behavior	I will try to purchase eco-labeled food if it is available.	Jaiswal and Kant (2018); Lee (2008)	0.67			
	When I want to purchase a food, I look at the ingredients label to see if it contains things that are environmentally damaging.		0.82	0.71	0.62	0.87
	I prefer eco-labeled food over food without eco label when their product qualities are similar.		0.79			
	I choose to purchase eco-labeled food that are environmentally-friendly.		0.76			
Self-identity	I purchase eco-labeled food even if they are more expensive than the food without eco-label.	Fielding, McDonald, and Louis (2008); Terry, Hogg, and White (1999); Van der Werff, Steg, and Keizer (2013b)	0.79			
	Purchasing eco-labeled food is an important part of who I am.		0.85	0.77	0.64	0.84
	I am the type of person who purchases eco-labeled food.		0.84			
	I see myself as a person who purchases eco-labeled food.		0.71			
Personal Norm	I feel morally obliged to purchase eco-labeled food.	Van der Werff, Steg, and Keizer (2013a)	0.82	0.80	0.61	0.76
	I would feel guilty if I would food without eco-label.		0.74			

(Continued)

Table 1. (Continued).

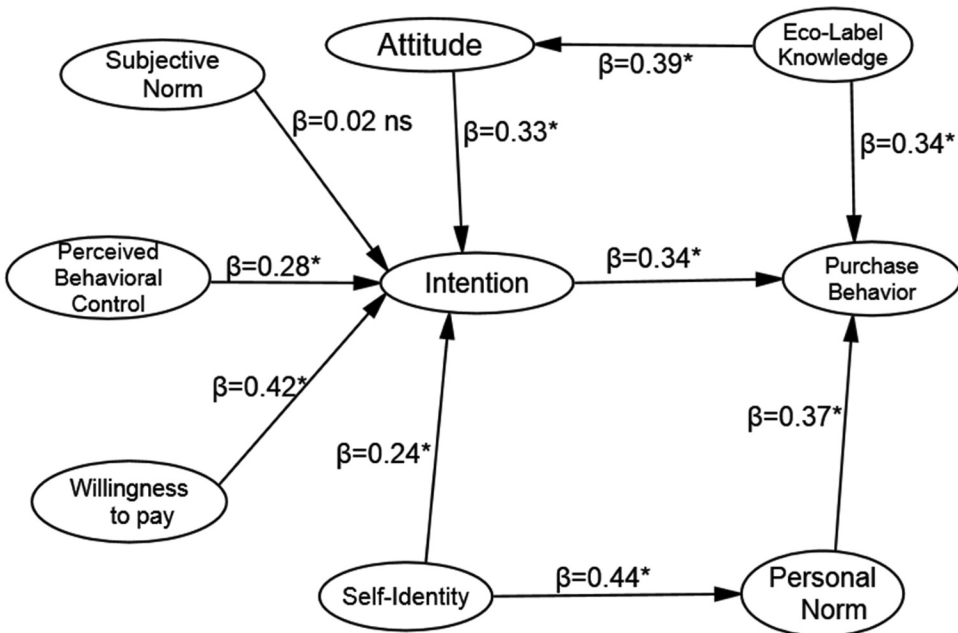
Construct	Statements	Source	FL	α	AVE	CR
Willingness to Pay	It is acceptable for me to pay more for eco-labeled foods that are produced in an environmentally friendly way.	Jang, Kim, and Bonn (2011); Prakash and Pathak (2017)	0.81	0.81	0.55	0.78
	I feel proud to purchase eco-labeled foods though they are more costly than food without eco-label.		0.68			
	I would be willing to spend more for eco-labeled foods to purchase less environmentally harmful food products.		0.72			
Eco-Label Knowledge	I know the meaning of the term eco-friendly food.	Chang (2004); Taufique, Vocino, and Polonsky (2017)	0.76	0.71	0.60	0.82
	I know the meaning of the term eco-labeled food.		0.79			
	I usually pay attention to information about eco-labeled food.		0.78			

α = Cronbach's Alpha AVE: Average Variance Extracted, CR: Composite Reliability, FL: Factor Loading



Note: ns= not significant,
*Significant at $p < 0.01$

Figure 2. SEM results for original TPB model.



Note: ns= not significant,
*Significant at $p < 0.01$

Figure 3. SEM analysis of Extended TPB model.

convenience sampling. The participants represent individuals in the education system within the scope of science education. In this context, students and

science educators are included. While the students represent young individuals who are educated at middle and high school level, science educators represent pre-service science teachers who still study at the university, science teachers, and academic staff working at departments of science education.

Accordingly, the study was conducted in 13 cities located in different regions of Turkey. The cities have eco-labeled products available to purchase and their population is more than 1 million. A total of 3,393 Turkish participants ($M_{female} = 1,560$ and $M_{male} = 1,833$) are involved in the study (age ranged from 11 to 65; $M = 24.63$, $SD = 10.45$). Among them, there are 896 middle school students, 657 high school students, 751 pre-service science teachers, 564 science teachers, and 525 academic staff.

Measures

The present study includes nine scales including five TPB constructs and four additional variables (self-identity, personal norm, WTP, and ELK). In particular, as seen in Table 1, items for the attitude (six items), subjective norms (three items), PBC (three items), intention (four items), purchasing behavior (four items), self-identity (three items), personal norm (two items), WTP (three items), and ELK (four items) were adapted from earlier studies and modified to fit the present study settings. The items were evaluated with 7-point Likert Type scale from “strongly disagree” to “strongly agree”.

Data analysis

The data were analyzed using SPSS and AMOS estimating two models including the measurement and structural models (Byrne 2016). The measurement model consists performing Confirmatory Factor Analysis (CFA) to assess reliability and validity of constructs (Bagozzi and Yi 2012). α and Composite Reliability (CR) indicate reliability of the model and the Average Variance Extracted (AVE) is tested to provide convergent validity of measurement model (Carmines and Zeller 1979). Since Factor Loading (FL), α and AVE are higher than 0.5 and CR exceeds 0.7 (Hair et al. 2016) and the square root of the AVE has higher value than all of correlation values for any other variable (Carmines and Zeller 1979), convergent (see Table 1) and discriminant validity (see Table 2) was established. The CFA analysis also revealed that the proposed model has acceptable goodness of fit indices ($\chi^2 = 680.68$, $df = 187$; $p < .05$; $\chi^2/df = 3.64$; $GFI = 0.92$ $TFI = 0.91$; $CFI = 0.93$; $RMSEA = 0.06$; $SRMR = 0.07$) since χ^2/df is lower than 5, GFI , TFI , and CFI are higher than 0.90 (Hair et al. 2016), $SRMR$ is lower than 0.10 (Hu and Bentler 1999) and $RMSEA$ is between 0.05 and 0.08 (Brown and Cudeck 1993).

Table 2. Discriminant validity.

	M	SD	ATT	SN	PBC	INT	PB	SI	PN	WTP	ELK
ATT	5.39	0.82	0.73								
SN	5.18	0.84	0.66	0.75							
PBC	5.28	0.98	0.55	0.73	0.73						
INT	4.91	0.92	0.39	0.69	0.69	0.76					
PB	5.06	0.97	0.47	0.72	0.71	0.71	0.79				
SI	5.46	1.11	0.36	0.54	0.55	0.70	0.67	0.80			
PN	5.12	0.88	0.55	0.69	0.70	0.73	0.74	0.67	0.78		
WTP	4.84	1.02	0.70	0.38	0.66	0.69	0.71	0.68	0.77	0.74	
ELK	4.71	1.13	0.48	0.55	0.49	0.68	0.79	0.68	0.71	0.65	0.77

The bold values are indicator of square root of AVE.

Results

The structural model assessed for goodness of fit statistics via Structural Equation Modeling (SEM) revealed that the proposed model has an acceptable level to test the original TPB ($\chi^2 = 720.38$, $df = 221$; $p < .05$; $\chi^2/df = 3.26$; $GFI = 0.93$ $TFI = 0.94$; $CFI = 0.92$; $RMSEA = 0.05$; $SRMR = 0.06$), the extended model ($\chi^2 = 652.96$, $df = 212$; $p < .05$; $\chi^2/df = 3.08$; $GFI = 0.94$ $TFI = 0.94$; $CFI = 0.93$; $RMSEA = 0.05$; $SRMR = 0.05$) and the explanation of purchase behaviors ($\chi^2 = 785.21$, $df = 233$; $p < .05$; $\chi^2/df = 3.37$; $GFI = 0.91$ $TFI = 0.90$; $CFI = 0.91$; $RMSEA = 0.07$; $SRMR = 0.06$). Therefore, it is possible to deduce that purchasing eco-labeled food intentions and behaviors can be predicted by applying the proposed model.

According to path analysis of original TPB model (see [Figure 2](#)), attitudes ($\beta = 0.37$; $t = 7.986$, $p < .01$) and PBC ($\beta = 0.36$; $t = 7.258$, $p < .01$) had a positive relationship with intention. In addition, purchasing eco-labeled food behavior was affected by intention ($\beta = 0.40$; $t = 8.435$, $p < .01$). However, paths from subjective norm ($\beta = 0.04$; $t = 1.463$, $p > .01$) to intention were not significant. The original model explained 32% of variance in intention to purchase eco-labeled food behaviors.

Standardized coefficient estimates of the extended TPB model (see [Figure 3](#)) indicated that the path between attitude and intention ($\beta = 0.33$; $t = 6.249$, $p < .01$) and PBC and intention was significant ($\beta = 0.28$; $t = 5.614$, $p < .01$). However, subjective norm was not significantly related to intention ($\beta = 0.02$; $t = 1.367$, $p > .01$). Furthermore, among additional variables, it was determined that there is a significant and positive influence of WTP ($\beta = 0.42$; $t = 8.511$, $p < .01$) and self-identity ($\beta = 0.24$; $t = 5.275$, $p < .01$) on intention. The extended TPB model with WTP and self-identity accounted for 37% of variance in intention to purchase behaviors for eco-labeled foods. It was also revealed that self-identity had a significant influence on personal norm ($\beta = 0.44$; $t = 9.544$, $p < .01$), which in turn is positively related to behaviors ($\beta = 0.37$; $t = 7.237$, $p < .01$). ELK had a significant influence on attitude ($\beta = 0.39$; $t = 7.687$, $p < .01$) and behavior ($\beta = 0.34$; $t = 6.674$, $p < .01$). Lastly, the relationship between intention and

behaviors ($\beta = 0.44$; $t = 9.246$, $p < .01$) was significant and positive. Accordingly, personal norm, ELK and intention explained 25% of variance in purchase behaviors for eco-labeled food.

Discussion and conclusion

The current study aimed to understand antecedents of students' and science educators' purchase behaviors for eco-labeled foods with extended TPB model including self-identity, personal norm, WTP, and ELK in the Turkish context. The findings demonstrated that both original (32%) and extended (37%) TPB models explained successfully intentions to purchase behaviors for eco-labeled foods. The variance difference implies that the constructs of self-identity and WTP contributed to general understanding of intentions and the proportion of explanation of the variance was increased by 5%. In addition, the personal norm, ELK, and intention made significant contribution to the model in understanding purchasing behaviors ($R^2 = 25$).

Considering the path analysis, attitude, and PBC predicted intention, which are positive predictors of purchase behavior for eco-labeled foods, while subjective norm had no influence on intention for both original and extended models. The findings are consistent with earlier studies reporting that attitude and PBC were found to be important factors of intentions to purchase eco-labeled foods (e.g., Mohamed et al. 2014), which was positively related to purchase behavior (e.g., Aitken et al. 2020). In particular, the influence of PBC on intentions can be noted in that to increase the purchasing of eco-labeled foods, it may be useful to eliminate the purchasing barriers such as price and lack of knowledge related to purchasing the eco-labeled food products (Xie et al. 2015). Given the social influences, in line with the current study, past studies reported that subjective norm was generally not significantly associated with intention in purchasing food products (e.g., Carfora, Caso, and Conner 2016). It can be due to the fact that subjective norm is more relevant to people who are involved in the collective self prominently (Kumar, Manrai, and Manrai 2017). The collective self is based upon impersonal ties to other people, who derive this from common identification with a group (Sedikides and Brewer).

Furthermore, WTP was positively related to intention, and self-identity was positively related to intention and personal norm, which had positive influence on behavior, and that ELK was positively related to attitude and behavior. These findings imply that the students and science educators who see them as people purchasing eco-labeled foods have a high moral obligation to purchase, and in turn have a higher likelihood to purchase eco-labeled foods. It was also implied that the more they want to pay for eco-labeled food, the higher the likelihood to want to try to purchase eco-labeled foods. Lastly, the stronger ELK, the more likely it is that they have high degree to which they have more favorable evaluation of the purchase of eco-labeled foods, and the more likely it is that

one purchases eco-labeled foods. The findings are in line with previous studies, which determined that self-identity (e.g., Carfora, Caso, and Conner 2016; Carfora et al. 2019), personal norm (e.g., Koklic et al. 2019), WTP (e.g., Mohamed et al. 2014) and ELK (e.g., Taufique, Vocino, and Polonsky 2017) play an essential role in explaining food purchase intentions and behaviors.

Implications, limitations and future studies

The study offers some important implications for policy and curriculum makers, education stakeholders, and science educators. First of all, this study was carried out with students and science educators. Accordingly, the results reflect the idea of an important part of a population and provide a guide to policy makers to determine a road map, since a variety of factors have an influence on purchase behaviors. In particular, the results of the study suggested that students' and science educators' purchase behaviors for eco-labeled food are affected not only by intrinsic motives but also by ELK. These findings might be useful in some ways. Firstly, the study indicated that attitude and PBC are the most significant factors related to eco-labeled food purchase intention, which is strongest factor for purchase behavior. The study also revealed that another way to strengthen students' and science educators' eco-labeled food purchase intention and behaviors is to influence their personal norms and self-identity, implying that eco-labeled food purchase behavior is based on moral considerations and self-perceptions. These findings stress the emphasis of creating positive situations with regards to usability which can provide opportunities and help in purchase decisions (De Leeuw et al. 2015). Accordingly, policy makers should focus on people' favorable or unfavorable evaluations regarding eco-labeled food purchasing behaviors, the perceived ease or difficulty of purchasing eco-labeled food, self-evaluations, and moral issues since they play an important role in impacting their eco-labeled food purchase intentions and behaviors. The findings of the current study also imply that the knowledge is very important, because they are reluctant to receive comprehensive information (Petty and Cacioppo 1986) and some of environmental information related to eco-labels are presented as misleading (Lyon and Montgomery 2015). Accordingly, the results can help policy makers regarding the development of eco-label food policies such as highlighting environmental benefits of eco-labeled foods, motivating, and supporting organizations in terms of redesigning of eco-labels on foods. The findings also have some implications for science educators who play an important role in building students' personality for a better sustainable world, since education has an important place in achieving sustainability (Rowe 2007). Several sustainable food consumption-based subjects, such as packaged foods, natural and healthy nutrition, and the importance of fresh and natural food consumption, are involved in science curriculum (Ateş 2019a; Turkish Ministry of National

Education 2018). However, past studies expressed the shortcomings in education of science teachers related to teaching sustainable topics (Frisk and Larson 2011), and asserted that pre-service science teachers have a low self-confidence, content knowledge, and skills regarding teaching of the nature of sustainability issues (Summers, Corney, and Childs 2004). Therefore, curriculum makers, and education stakeholders can reconsider science curriculums to develop students' and pre-service science teachers' sustainable behaviors. However, there are some limitations to be considered for further research. The study is limited to specific people who may not take as a generalization beyond this sampling method, since they don't represent all of the society and findings from this study may decrease external validity and thus cause sampling bias. Therefore, to strengthen the validity of future studies, data collection can be expanded beyond the limited participant. It is also a limitation to rely on self-reported measures, which may cause that the influence of socio-psychological attributes on behavior in real situations to be unclear.

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