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RESEARCH ARTICLE

Preservice Teachers' Intention to Recycle and Recycling Behavior: The Role of Recycling Opportunities

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Abstract

The purpose of the study is to grasp preservice teachers' recycling intention via Ajzen's TPB model and to examine the TPB components regarding recycling opportunities of the residence where they lived in childhood, the city where they live at the moment and the university campus. Data were gathered via the scale named TPB survey that covers main TPB components in terms of attitude, subjective norm, personal behavioral control (PBC), intention to recycle, and recycling behavior. From a faculty of education in a university, 834 preservice teachers from different departments participated to study. The results indicated that preservice teachers' attitude, subjective norm, and PBC were found as significant predictors of recycling intentions. Furthermore, preservice teachers' recycling intentions and behavior were differentiated based on the recycling opportunities in their childhood residence, campus, and city.

Keywords: Theory of Planned Behavior, recycling intention, recycling behavior, preservice teachers.

Introduction

Sustainable Development (SD) concept in teacher education encompasses a vision that pursues to lead people of all ages to undertake responsibility for creating a sustainable future. There is a worldwide attempt for inclusion of SD in preservice teacher education. In fact, integrating SD into teacher education process is believed to strongly influence teachers' professional practices. Preservice teachers are considered as active agents to promote SD; in other words, preservice teachers have a powerful window of opportunity to play an active and significant role in guiding people to adopt appropriate behaviors for a sustainable future (Ferreira, Ryan & Tilbury, 2006; Kaviola, 2007; Steele, 2010; Siraj-Blatchford & Pramling-Samuelsson, 2016). Considering teachers' influence on students from all ages, it is important to answer that how they behave for a sustainable future and which factors affect their behaviors.

As human beings, we are more than 7 billion living in the world and producing waste every day which brings out a variety of environmental problems. At least half of this waste is not safely collected, separated, or safely disposed and causes a global waste crisis (The Sustainable Development Goals Report, 2018). In Turkey, 77 million tons waste was generated in 2016. Among them, 44 million tons was disposed in waste disposal centers. Moreover, 33 million tons of them was recycled in waste recycling centers. It was 20 million tons in 2014 (TUIK, 2017). Managing waste is crucial to improve quality of environment considering the growth in population with the intense increase in

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household solid waste (Boldero, 1995; Hopper & Nielsen, 1991). Recycling is the process of collecting waste and sorting out them to be raw materials and turning raw ones into valuable resources (Environmental Protection Agency, 2013). For the reason that recycling processes have numerous benefits including reduction of waste, prevention of pollution, conservation of natural resources and energy, and protecting the natural habitat and it is also critical to maintain a sustainable world for future generations (Environmental Protection Agency, 2016).

In this regard, recycling behavior contribute to conversation of natural resources by minimizing household waste (Oztekin, Teksöz, Pamuk, Sahin, & Kilic, 2017; Vining & Ebreo, 1991). In other words, recycling behavior is emerged as a promising approach to promote sustainable development (Cheung, Chan, & Wong, 1999). Existing research revealed that many factors have been taken into account for recycling behavior (Ebreo, Hershey, & Vining, 1999; Hopper & Nielsen, 1991; McCarty & Shrum, 1994). Within this context, the Theory of Planned Behavior (TPB; Ajzen, 1985, 1991) seem to provide a good theoretical starting point for understanding determinants of the recycling behaviors (Bagozzi, & Dabholkar, 1994; Boldero, 1995; Cheung, Chan & Wong, 1999; Oztekin, et al., 2017; Tekkaya, Kiliç, & Sahin, 2011).

According to the Theory of Planned Behavior, person's intention to do a particular behavior is the fundamental predictor of the given behavior. Persons' behavior depends on his/her intention and the intention relies on three conceptually independent predictors: attitudes toward the behavior, subjective norm, and perceived behavioral control.

The Theory of Planned Behavior (TPB) puts "intention" as a central role in the model. According to Ajzen (1985) intention is "…the motivational factors that influence a behavior; they are indications 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". In other words, the behavior which people intend to perform is under the control of intention (Conner & Armitage, 1998).

As mentioned above, according to TPB (1985), there are three underlying factors which forms behavioral intention, namely attitude, subjective norm, and perceived behavioral control. Ajzen (1991, p.188) describes attitude as "the degree to which a person has a favorable or unfavorable evaluation or appraisal of the behavior in question". The perceived behavioral control (PBC) is about the opportunities and/or obstacles; eases and difficulties to perform a specific behavior. If people have perception about that they have required resources to perform the behavior, they tend to possess higher levels of PBC (Ajzen, 1991). Subjective norms mean perceived social pressures and/or acceptance on individuals to perform or not to perform a particular behavior (Ajzen, 1991, p.188). Indeed, attitudes towards the behavior refers evaluation of the behavior by the person as good or bad; subjective norm indicates the social pressure which is perceived in relation to behaving in a certain way; and perceived behavioral control means that how easy or difficult persons find to perform a certain behavior (Ajzen, 1991; Ajzen & Driver, 1992).

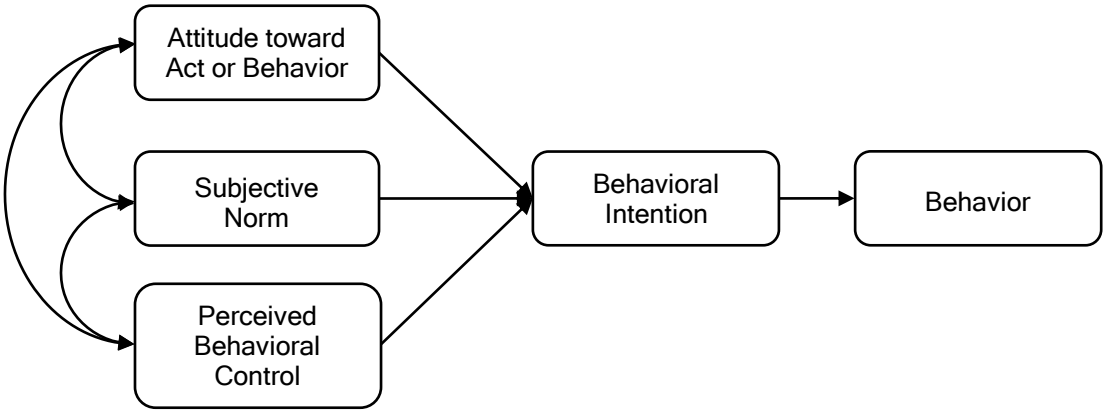

Figure 1. The Theory of Planned Behavior Model.

To specify with the concern of this article, the recycling behavior of a person relies on his/her intention of the recycling which is under the influence of three independent variables: attitude towards recycling, subjective norms about recycling, and perceived behavioral control on recycling. In addition to these, a variety of demographic variables in terms of gender, parents' educational level, recycling opportunities, and etc. are also considered to be predictor of recycling intention & behavior (Oztekin et al, 2017; Tekkaya et al, 2011; Kahriman-Ozturk, 2016).

Environmental Protection Agency (2010) claimed that the university system is a main waste-producing area which may be an opportunity for students to participate in waste management process by recycling. On the other hand, students in faculty of education who are the preservice teachers may have another important role in this process. As well as relevant research reported that younger people are more concerned about environmental problems (Arcury & Christianson, 1990; Nord, Luloff, & Bridger, 1998; Pearce & Prestin, 2010). Hence, one may conclude that recycling behavior of preservice teachers is emerged as a promising approach to be investigated.

Considering preservice teachers' influence, it is important to answer that how they contribute for a sustainable future by recycling and which factors affect their recycling behaviors. In this study, components of TPB were examined on answer of preservice teachers and the effects of their perception about the recycling opportunities on intentions to recycling and behavior were investigated.

Research questions are:

a) What are the levels of preservice teachers' attitude towards recycling, subjective norms, PBC, intention to recycling, recycling behaviors, and their perception to recycling opportunities in their childhood residence, campus, and city?

b) How well do the three components of TPB (attitude, subjective norm, perceived behavioral control) predict intentions to recycling?

c) Do the components of the TPB (attitude, subjective norm, perceived behavioral control, intention, and recycling behavior) differentiate regarding recycling opportunities in childhood residence, campus, and city?

Methodology

Design

The purpose of this study is to investigate the factors that explain preservice teachers' recycling intentions and behavior via the TPB on a public university in Mersin, Turkey. Several variables have been examined in the literature to explain the recycling intention

and behavior. In addition to main components of the TPB which are attitude, subjective norms, and PBC, recycling opportunities in preservice teachers' childhood residence, campus, and city were investigated. Because recycling intention can directly predict recycling behavior, it is defined as the dependent variable. First of all, attitude, subjective norms, perceived behavioral control were determined as independent variables. Then, perceived recycling opportunities of preservice teachers' childhood residence, campus, and city were tested to see differentiation on all components of the TPB.

Sample

Random sampling technique is chosen to determine sample of this study. Participants are a total of 834 preservice teachers enrolling in six different teacher education programs in terms of Early Childhood Education, Science Education, Elementary Education, Mathematics Education, Turkish Education, and English Education at an education faculty of a big campus universities in Mersin, Turkey. Of the participants, 610 (73.1%) were female and 224 (26.7%) were male (Figure 1). The age of participants were between 18 to 38 year-old, but the mean age of the whole sample was 21.49 (SD = 2.29). Considering their grade levels, 12.8% of them was in the first grade level, 31.3% of them was in the second grade level, 30.7% of them was in the third grade level, and 25.2% of them was in the fourth grade level (Figure 2).

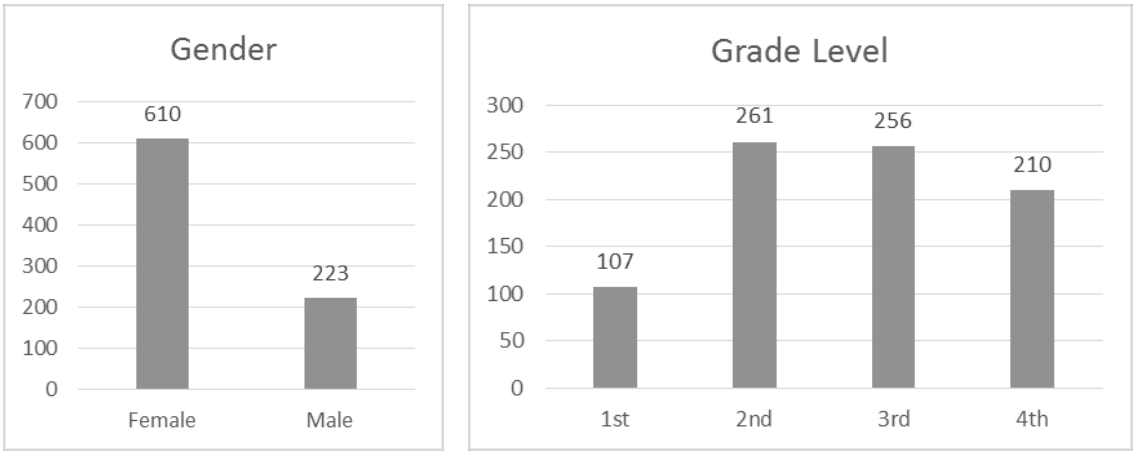

Figure 2. Information about preservice teachers' gender and grade level.

Instrument

Seven-point rating scales developed by Tekkaya, Kilic, Sahin (2011) are used to measure the components of the TPB. This survey included items related to recycling behaviors, recycling intentions, recycling attitudes, the subjective norms, perceived behavioral control, and the related belief constructs, but five parts of original TPB survey were used in this study.

Attitude. Attitude towards recycling is measured using 17 items. An example item is: "recycling the recyclable materials (paper, glass, plastic, etc.) is easy/difficult for me."

Subjective Norm. The subjective norm is related to social pressure to make recycling. This component was measured using 2 items. An example of them is: "the people that views are important for me, expect me to recycle."

Perceived Behavioral Control. PBC is related to easiness to recycle and measured using 4 items. One of the items of this component is: "if I want, it is possible for me to recycle the recyclable materials (paper, glass, plastic, etc.) regularly for next months."

Intention. Recycling intention was measured by using 3 items. One of the example of them is: “I am planning to recycle the recyclable materials (paper, glass, plastic, etc.) regularly for next months.”

Behavior. And last component of the TPB was measured with 10 items and one of these items is: “I recycled battery very recently.”

Reliability analyses results of the study are calculated as: Attitude Scale, α=.90; Subjective Norms Scale, α=.66; Perceived Behavioral Control Scale, α=.68; Intention Scale, α=.91; and Recycling Behavior Scale, α=.90.

The survey also included some socio-demographic variables and three questions to see simply perceptions of preservice teachers about recycling opportunities in childhood residence, campus, and city.

Procedure

The data of the study were collected between April-June 2017 in spring semester of 2016-2017 Education Year. The research was conducted following the ethical protocols approved by University’s Human Research Ethic Committee. Prepared online survey was filled out by participants voluntarily. They were informed about the study and the survey and guaranteed about confidentiality of their names or other information about them. The questionnaires were conducted in a single time by the researchers and took about 15 minutes to complete by the participants.

Data Analysis

To examine the data of the study, both descriptive and inferential statistics were used by utilizing SPSS 20.0 and $p < .05$ significance level was applied for the statistical tests performed. Reliabilities of the scales of TPB survey were tested by using Cronbach’s alpha. Examining the all scales’ Chronbach’s alpha scores in this study, it can be said that all scales demonstrated strong internal consistency. Pearson Correlation were conducted as a test to see the associations among variables. Then, to investigate the predictor power of the variables on the outcome, regression analysis was run. And finally, to t-tests were run to examine differentiation on all components of the TPB via perceived recycling opportunities in preservice teachers’ childhood residence, campus, and city.

Findings

The aim of this study is to investigate the determinants of preservice teachers’ intention to recycle and behavior and to see if the components of the TPB differ based on the opportunities to recycle in preservice teachers’ childhood residence, campus, and city.

Descriptive Statistics

First of all, to learn opportunities for recycling at preservice teachers’ childhood residence, campus, and city, three questions were asked. The results indicated that 38.5% of preservice teachers reported that they had opportunities for recycling in their childhood residence, whereas 61.5% of them did not have (Figure 3). However, examining the opportunities for recycling in their campus life, 72.0% of them reported that their campus had opportunities for recycling, whereas 28.0% of them considered their campus as supporting opportunities for recycling (Figure 3).

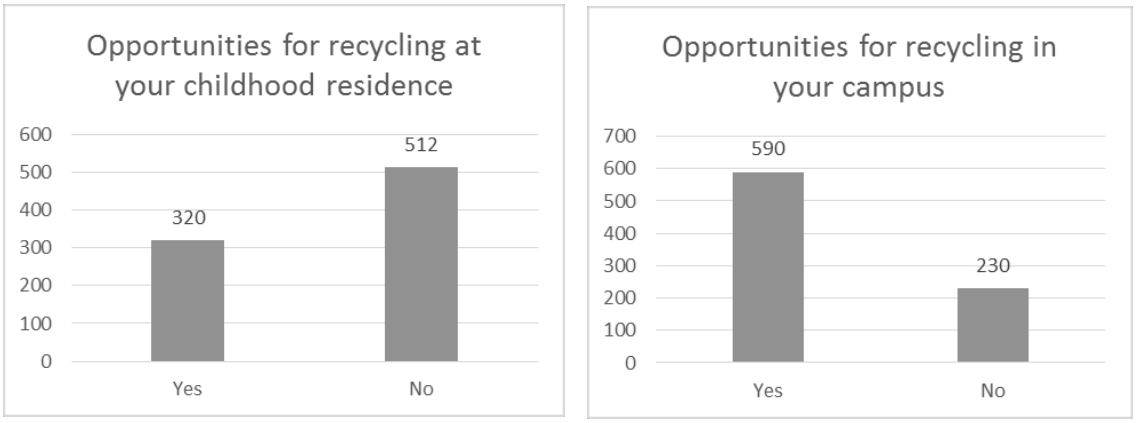

Figure 3. Perceived recycling opportunities in preservice teachers' childhood residence and their campus.

Similar results were reached for opportunities for recycle in city that preservice teachers live (81.2% answered as yes, 18.8% answered as no) (Figure 3). Other important information is about "Where preservice teachers live in?" The results indicated that 77.1% of them live out of the campus (Figure 4). Among preservice teachers, 46.0% of them lives in apartments, 38.1% lives in dormitories, and 15.9% lives in house (Figure 5).

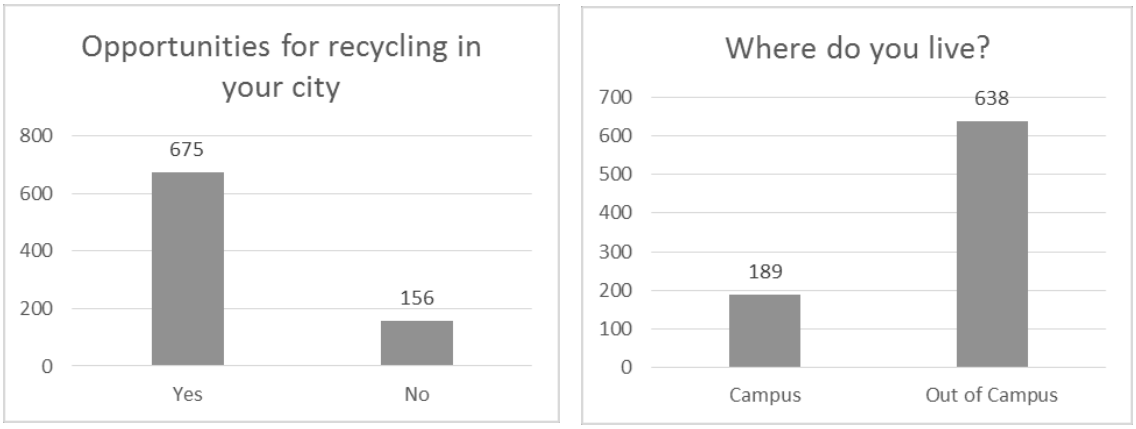

Figure 4. Perceived recycling opportunities in preservice teachers' city and information about where they live.

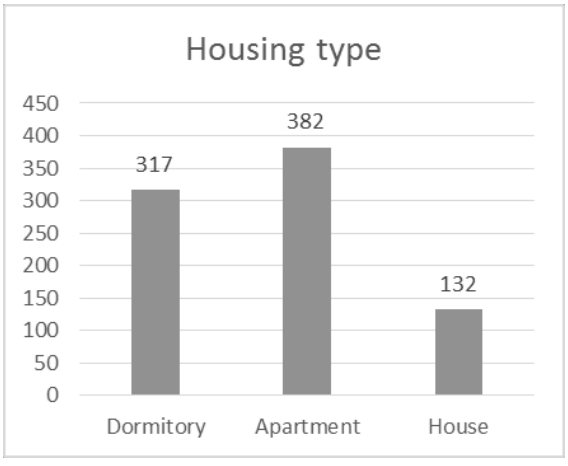

Figure 5. The information about preservice teachers' housing type.

Inferential Statistics

Descriptive Statistics. The set of statistics presented in Table 1 are the means, standard deviations, minimum and maximum values of all TPB components. Based on descriptive results (Table 1), attitude scores (M = 6.15, SD = .74) and subjective norm (M = 5.75, SD = 1.15) had the highest means. The lowest mean was the recycling behavior (M = 3.99, SD = .1.33).

Correlations. Correlation among recycling behavior, recycling intention, and its' main three predictors (attitude, subjective norm, and PBC) were tested. Pearson correlation test results revealed that all predictors of recycling intention are significantly correlated with intention ($r = .398$, $p < .05$ for attitude; $r = .350$, $p < .05$ for subjective norm; and $r = .451$, $p < .05$ for PBC), but show a low correlation with behavior. Moreover, recycling intention and behavior were significantly correlated ($r = .422$, $p < .05$). As can be seen in Table 1, there were significant correlations among TPB variables. Whereas recycling behavior were in a weak relation with attitude, subjective norm, and perceived behavioral control (PBC), its' correlation with intentions to recycling was higher.

Table 1.

Means, Standard Deviations, and Correlations among variables.

	M	*SD*	*Min*	*Max*	*ATT*	*SN*	*PBC*	*INT*
Attitude towards Recycling (ATT)	6.15	.74	1.00	7.00	-			
Subjective Norm (SN)	5.75	1.15	1.00	7.00	.342*	-		
Perceived Behavioral Control (PBC)	4.85	1.15	1.00	7.00	.331*	.179*	-	
Intentions to Recycling (INT)	5.38	1.27	1.00	7.00	.398*	.350*	.451*	-
Recycling Behavior	3.99	1.33	1.00	7.00	.157*	.214*	.142*	.422*

Regressions. In the regression analysis, R2 was calculated for the proportion of explained variance in the outcome. Attitude, subjective norm, and PBC collectively explained 31.4% of the variance in preservice teachers' intention to recycle ($F(3, 800) = 121{,}959$, $p < .05$, $R2 = .314$). According to the results, all these components were found as statistically significant predictors of recycling intention. The results of regression analysis were presented in Table 2.

Table 2.

Regression analysis to investigate the predictors of recycling intention.

	B	*Std. Error*	*Beta*	*t*	*Sig.*
Attitude	.362	.056	.211	6.464	.000
Subjective Norm	.238	.034	.216	6.910	.000
PBC	.379	.034	.342	11.000	.000

Dependent Variable: Intention to recycle

Table 3.

The t-test results.

Parameter	*Recycling Opportunities in…*		*N*	*Mean*	*SD*	*p*
Attitude	*childhood residence*	Yes	311	6.148	.751	.95
		No	500	6.151	.721	
	campus	Yes	577	6.167	.705	.22
		No	223	6.096	.808	
	city	Yes	658	6.172	.721	.03*
		No	153	6.028	.802	
Subjective Norm	*childhood residence*	Yes	317	5.870	1.044	.02*
		No	504	5.685	1.213	
	campus	Yes	583	5.818	1.129	.01*
		No	229	5.583	1.210	
	city	Yes	666	5.790	1.125	.05
		No	155	5.587	1.261	
PBC	*childhood residence*	Yes	317	5.057	1.139	.00*
		No	504	4.727	1.133	
	campus	Yes	583	4.974	1.140	.00*
		No	229	5.583	1.101	
	city	Yes	666	4.939	1.157	.00*
		No	155	4.500	1.0223	
Intention	*childhood residence*	Yes	317	5.510	1.198	.02*
		No	504	5.302	1.306	
	campus	Yes	583	5.468	1.219	.01*
		No	228	5.152	1.355	
	city	Yes	666	5.455	1.254	.00*
		No	154	5.054	1.293	
Recycling Behavior	*childhood residence*	Yes	317	4.203	1.265	.00*
		No	502	3.862	1.360	
	campus	Yes	581	4.077	1.281	.01*
		No	229	3.780	1.435	
	city	Yes	664	4.0780	1.302	.00*
		No	155	3.632	1.403	

t-tests. In the second part of the results, all components of the TPB model were examined regarding recycling opportunities in preservice teachers' childhood residence, campus, and city. Therefore, three independent-samples t-test were conducted to compare components of the TPB in recycling opportunities in preservice teachers' childhood place, campus, and city (Table 3).

As seen as the Table 3, all components of the TPB except for attitude were differentiated regarding recycling opportunities in childhood residence, campus, and city. There was not a significant difference in attitude towards recycling scores with respect to preservice teachers' perceptions on recycling opportunities in their childhood residence and their campus, but there was a significant differences on attitude scores regarding related perception for the city.

Results and Discusiion

Recently, researchers in environmental education pay a considerable amount of attention to studies about recycling behavior grounding on the Theory of Planned Behavior (TPB). In the relevant literature, there is a variety of research tested theTPB examining the predictors of recycling behavior. Focus of these studies were mostly about residents and their recycling behaviors for waste management (Boldero, 1995; Elgaaied, 2012). However, given the significance of recycling behavior for sustainable futures, and role of teacher education, this research aimed to report recycling behavior of preservice teachers. In other words, the objective of this study was to examine the applicability of the Theory of Planned Behavior in predicting the recycling behavior of preservice teachers in an education faculty campus of a southern city in Turkey.

By the first research question, the levels of preservice teachers' attitude towards recycling, subjective norms, PBC, intention to recycling, and recycling behaviors were examined. The results revealed that, among all components of TPB, attitude towards recycling has highest scores. Subjective norms scores are also high, but perceived behavioral control scores seem low compared to attitude and subjective norms. Indeed, there was a positive correlation between attitude, subjective norm, perceived behavioral, and recycling intention. Moreover, all three constructs were found to be statistically significant predictors of recycling intention and explained 31.4% of intention's variance. Based on the findings one may conclude that the results of this study support the applicability of the Theory of Planned Behavior (TPB) in describing the factors form recycling intention of preservice teachers. Hence, it can be said that if a preservice teacher have positive attitude towards recycling, feel social pressure from their relatives, and think recycling as easy, the level of their intention to recycle is higher. In other words, the result of the current study, confirming the theory, showed that preservice teachers who have more promising attitudes and subjective norms along with a better perceived behavioral control inclined to have stronger intentions to recycling behavior which in turns recycling behavior. Similar results were reported by Tekkaya, Kilic and Sahin (2011) and proved the application of TPB in educational science.

In the last research question, it was investigated whether recycling opportunities of preservice teachers' childhood residence, campus, and city make difference in TPB components for recycling. The t-test results showed that preservice teachers' subjective norms, perceived behavioral controls, intention to recycle, and behaviors were differentiated by recycling opportunities in their childhood residence, campus, and city except for attitude towards recycling. Their attitudes was only significantly varied for opportunities in city. In the relevant literature, as Boldero (1995), Davies, Foxall, and Pallister (2002), and Oztekin et. al. (2017) reported that if individuals think that they have necessary recycling opportunities, they engage in recycling behavior. Similarly, Vining,

Linn, and Burdge (2012) also highlighted that having more recycling opportunities seemed to related with the performing more recycling behaviors.

To conclude, the current research study attempted to put forward a comprehensive understanding of the determinants of preservice teachers' recycling behavior. One may infer from the results of the current study that preservice teachers are willing to recycle regardless of recycling opportunities and they engage in recycling behavior. On the other hand, if preservice teachers perceive that they have necessary recycling opportunities, they seem to engage in recycling behavior easier. To be more specific, if preservice teachers perceive their surroundings as proposing recycling opportunities, they tended to recycle more.

The results reported in this study provide valuable information for curriculum developers and environmental educators about recycling behaviors of preservice teachers as the role models of future generations. In addition, stakeholders may consider the results of the current study to make broad recycling opportunities in cities; especially, in university campuses.

Future research may take into consideration the additional variables in terms of moral norm, past experience, environmental knowledge, etc. along with TPB variables and trial it on a various population from different grade levels, programs, campuses and cities. Moreover, the sample of this study cannot be generalized to the entire student population. Therefore, further research can be conducted on different contexts for example teaching and administrative staff at universities and in-service teachers. As well as, observational data may be collected to test actual recycling behavior of participants.

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Öğretmen Adaylarının Geri Dönüşüm ve Geri Dönüşüm Davranışı Niyeti: Geri Dönüşümün Rolü

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Özet (Turkish Abstract of Paper)

Bu çalışmanın amaçlarından biri, Ajzen'in TPB modeli üzerinden öğretmen adaylarının geri dönüşüm davranışını incelemektir. Bir diğer amacı ise öğretmen adaylarının çocuklukta yaşadıkları yerde, şu an yaşadıkları şehirde ve eğitim-öğretim gördükleri kampüslerindeki geri dönüşüm imkânları açısıdan Ajzen'in TPB modelindeki bileşenleride değişim olup olmadığını incelemektir. Veri toplama aracı olarak TPB anketi kullanılmış olup, bu anket TPB'nin tutum, öznel norm, kişisel davranış kontrolü, geri dönüşüm niyeti ve geri dönüşüm davranışı boyutlarını içermektedir. Türkiye'de eğitim-öğretim faaliyeti yürüten bir üniversitenin eğitim fakültesinden, farklı bölümlerde öğrenim gören 834 öğretmen adayı ile çalışılmıştır. Çalışmanın bulgularına göre öğretmen adaylarının tutumları, öznel normları ve kişisel davranış kontrol düzeyleri, onların geri dönüşüm davranışları anlamlı olarak tahmin etmiştir. Öte yandan öğretmen adaylarının geri dönüşüm niyetleri ve geri dönüşüm davranışları, onların çocukken yaşadıkları yerdeki, şu an yaşadıkları şehirdeki ve eğitim-öğretim gördükleri kampüsteki geri dönüşüm imkânlarına göre farklılık göstermektedir.

Anahtar Kelimeler: Planlı Davranış Teorisi (TPB), geri dönüşüm niyeti, geri dönüşüm davranışı, öğretmen adayları.

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