Factors affecting women's waste separation behaviour in Turkey

Güngör KARAKAŞ*

Abstract

Turkey has recently made some regulations on environmental issues. Perceptions and participation of households are important for the implementation of legal regulations. Since women were more interested in household waste than men, in this study, environmental behaviours of women was investigated in Çorum province. Analysis of women's approach to separation of recyclable wastes in their source were investigated using the Theory of Planned Behaviour (TPB), Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). The research was conducted in 2018 with 414 participants. According to the results of the research, it was determined that the most important factor of separation behaviour at source was consequences awareness. It was determined that almost all of the participants were willing to separate the wastes at source if necessary facilities were provided. For this reason, the work should be done to create consequences awareness in the province. Finally, for the sustainable environmental applications, separation facilities must be provided at all locations in the province.

Keywords: Sustainable Environment, Behaviour, Waste, Separation, Women

Introduction

Rapid urbanization, population growth, economic development and industrialization have caused municipalities to face solid waste problems in many countries in the world (Liu and Wu, 2011; Chiemchaisri et al., 2007; Saeed et al., 2009). Recycling and environmental issues together with the increase of Turkey's population has become more important. Therefore, the National Waste Management and Action Plan (NWMAP) was prepared on a national and regional basis in Turkey scheduled for 2023 (NWMAP, 2017). In the NWMAP, it is aimed to minimize the waste at the source and to collect the waste separated at the source according to their types. Collecting more waste via source separation, waste collection systems is an essential part of increasing resource efficiency, achieving Turkey recycling targets.

* Güngör KARAKAŞ is Assistant professor at the Hitit University, Çorum, Turkey, e-mail: gungorkarakas@hitit.edu.tr, https://orcid.org/0000-0001-5236-2407.

If the wastes are not separated at the source, many environmental, economic and social problems arise. The fact that Turkey has set a zero waste target in order to use resources effectively is a very important environmental goal. Currently, although the infrastructure required for source separation is not available in all provinces in Turkey, partial source separation is being implemented in some cities and some districts of these cities. In the province of Çorum, where this research was conducted, there are containers for separation at the source in some neighbourhoods. The aim of this research is to reveal the factors that affect the waste separation behaviour of women.

1. Environmental Regulations in Europe and Turkey

In Europe, the European Economic Community had common market and economic growth targets as a priority between 1957-1972. For this reason, there is no important environmental measure in the 1958 Rome Treaty (Burchell and Lightfoot, 2001: 34). At the meeting held in Paris in 1972, environmental policies were discussed for the first time at the level of governments within the European Community. After the Single European Act (1986), Treaty of Maastricht (1992), Treaty of Amsterdam (1997) were signed in the following years, the European Commission introduced the Europe 2020 Strategy in 2010, which would replace the Lisbon Strategy (2000). Since the mid-1970s, EU environmental policy has been guided by seven environmental action programmes were defined priority objectives to be achieved over a period of years

The European Commission introduced a Circular Economy Action Plan in 2015 (COM, 2015) The Europa Union (EU) highlights household waste separation as an integral part of the Commissions' new circular economy package to stimulate Europe's transition toward sustainable development and global competitiveness (Milios, 2018). For this reason, it is aimed to increase the amount of packaging and packaging waste recovered through separation and recycling in European countries (Eurostat, 2016).

As in the whole world and in the EU, very important environmental regulations were not made in Turkey until the 1960s (Erdem and Yenilmez, 2017). Environmental issues were partially addressed in the First Five-Year Development Plan in 1963. In the following years, eleven Five-Year Development Plans were published. With the National Environmental Strategy and Action Plan initiated in the 2000s, progress has been made in the legislation and institutional structure in order to solve environmental problems. Among these development plans, especially in the eighth (2001-2005) and ninth Five-Year Development Plan (2007-2013), important steps were taken within the scope of harmonization with the EU (Erdem and Yenilmez, 2017).

Regarding the separation of wastes at the source, significant progress has been made with the Zero Waste Regulation published in 2019 based on the Environmental Law dated 1983 (No 2872). Within the scope of harmonization with the EU environmental regulation; Many plans have been prepared, such as Planning of High Cost Environmental Investments, National Environmental Integrated Adaptation Strategy, Solid Waste Master Plan, Waste Management Action Plan, National Recycling Strategy Document and Action Plan (NWMAP, 2017;14).

2. Theoretical Framework/Literature Review

Recycling is one of the most important environmental activities that can help protect natural resources and reduce the amount of solid waste (Arı and Yılmaz, 2016). Participation of households in recycling is crucial for effective recycling. In Iran, it was claimed that women should be taken into account in the separation of resources and education programs based on the implementation of their needs (Babaei et al., 2015). In a study which investigated the active participation of university students in the separation of wastes at the source, it was stated that the students who are more likely to participate are female students (Zhang et al., 2017). In another study conducted in the UK, it was determined that women were more interested in recycling than men (Pettifor, 2012).

In Spain, 154 housewives' environmental behaviours were analysed by the TPB. As a result of the research, it was stated that the TPB remains a very useful model for explaining recycling behaviour (Aguilar-Luzón et al., 2012). The TPB (Ajzen, 2011) was used to explain social behaviours (Armitage and Conner, 2001) and recycling behaviour in many previous studies (Chen and Tung 2010; Valle et al., 2005; Tonglet et al., 2004; Chan and Bishop, 2013). In the literature, the effects of consequences awareness (Chen and Tung, 2010), attitude (Huffman et al. 2014), perceived policy effectiveness (Wan et al. 2014), subjective norms, moral norms (Botetzagias et al., 2015), intention (Wang et al., 2016; S. Wang et al., 2019; Bortoleto et al., 2012), behaviour control, direct behaviour and indirect behaviour factors on recycling behaviour were investigated (Wan et al., 2014).

In previous studies, it was stated that the subjective norms were determinative in the recycling behaviours (Mahmud and Osman, 2010; Shaw 2008; Valle et al., 2005; Arı and Yılmaz, 2016). In another study, the role of intentions and attitudes in explaining environmental behaviours was emphasized (Meyerhoff, 2006). In a study to investigate the environmental behaviour of Hitit University students in Turkey, the intent and field activities were found to have an effect on environmental behaviour (Karakas, 2018). Another factor that is important in people's recycling behaviour is political regulation. Environmental behaviour occurs as a result of the correct perception

of political regulation. In a study conducted in Hong Kong, it was determined that the intent of recycling was affected by behavioural control, subjective norms, consequences awareness and perceived policy effectiveness (Wan et al., 2014). In a survey that used the recycling intent scale, the willingness to recycle was investigated. It was seen that the intention of recycling had a significant effect on recycling behaviours (Chan and Bishop, 2013). The behavioural intention of households was shaped by the perceived behavioural control, past behaviour and subjective norm in Turkey. Also, behavioural intention of females was reported by attitude (Oztekin et al., 2017).

In a study conducted in Kampala, Uganda, factors influencing participation in separatist activities were identified, such as household income, educational attainment, gender and impact awareness (Banga, 2011). In a study conducted in Hong Kong, it was emphasized that local authorities should provide more recycling bins and incentives (Wan et al., 2014). In some studies, moral norms were used to explain the behaviour of recycling (Chen and Tung, 2010; Pakpour et al., 2014). In a study, how the moral norms and demographic variables of individuals affect the intention of recycling were investigated with the TPB. According to the research, it was determined that the moral norms were more effective on the behaviour of recycling and the demographic variables were meaningless (Botetzagias et al., 2015). In another study, it was stated that moral norms were effective on the behaviour of recycling (Chan and Bishop, 2013). According to the results of the research conducted in China, it was emphasized that campaigns targeting moral obligations could increase the rate of participation in the separation behaviours at the source of waste (D. Zhang et al., 2015). It was also stated that social norms were effective in recycling behaviour in Turkey (Sorkun, 2018).

According to the results of the TURKSTAT Survey 2016, the amount of municipal waste collected was calculated as 1.2 kg per person per day in Turkey (TUIK 2018). In the survey, the daily average amount of waste per person in TR83 Region; It was determined that 0.98 kg in Amasya, 1.11 kg in Çorum, 1.29 kg in Samsun and 1 kg in Tokat. For the development of recycling behaviour, it is necessary for the participants to understand the recycling policies correctly and to explain the political sanctions to the participants (Sidique et al., 2010). Therefore, the success of recycling programs depends on the participation of households in recycling. Women play an important role in the recycling of household waste separation at home in Turkey (Arı and Yılmaz, 2016). In this study, it was aimed to investigate the approach of separation of wastes at the source by the TPB and structural equation models in the Çorum Province.

Data and Methods

The present study was conducted in Çorum Province, Turkey in March-October 2018. Data were collected through questionnaire method. The questionnaire was conducted through face-to-face interviews with 414 women. The following formula was used in the sampling:

$n=Nt^2pq\alpha^2(N-1)/+t^2pq$, where:

n: The minimum number of individuals required for the sample,

N: Number of individuals in the universe (294 807),

t: The value in the t table according to the significance level selected in the study (1.96),

p and q: the homogeneity level of the universe (p;0.5 and q; 0.5 for the non-homogeneous universe), and α: is the margin of error (5%) (Saruhan and Özdemirci, 2011).

As a result of the calculations, the number of samples was calculated as 383.57, but just in case, a survey was conducted with 414 women. In the study, 33 items were used. Waste separation behaviours of participants were assessed with expressions in the form of a five-point Likert-type scale. These are 'Strongly Disagree, Disagree, Indifferent, Agree and Strongly Agree'.

A previously verified scale was used in the study (Wan et al., 2014). Sample adequacy was tested using Kaiser-Meyer-Olkin (KMO) test (Henry, 1974). The KMO value less than 0.50 shows inadequacy of data for the Exploratory Factor Analysis (EFA). The KMO values between 0.5 and 0.7 are moderate, while those between 0.7 and 0.8 are good, between 0.8 and 0.9 are excellent, and above 0.9 are the best (Andy 2009). After checking the suitability of sample size, the EFA analysis was performed to determine factors affecting women's approach to separation of recyclable wastes. Data were analysed by the EFA using SPSS statistics v. 22 software. Principal Component Analysis and Varimax rotation technique were employed for data analysis. The reliability of the scales used was tested by Cronbach's alpha and composite reliability test. Cronbach's Alpha and Composite Reliability (CR) coefficients of over 0.7 are considered reliable (Hair Jr. et al., 2014). Also, the criterion of convergent validity test average variance extracted (AVE) score must be above the threshold of 0.5 (Fornell and Larcker, 1981).

The CFA was used to measure the fitness of the factors obtained by the EFA. Robust statistic fit indices have been used in the psychometric literature. Fit indices were calculated through the structural equation model. Among them are Normed Fit Index ($0.90 \leq NFI < 1$), Relative Fit Index (RFI), Comparative Fit Index ($0.93 \leq CFI < 1$), Incremental Fit Index ($0.90 \leq IFI < 1$), Tucker Lewis Index ($TLI \geq 0.90$) or Non-Normed Fit Index ($NNFI \geq 0.90$), Root Mean Square Error of Approximation ($RMSEA \leq 0.08$), minimum discrepancy function (CMIN) and Degrees of Freedom

(DF) (Bentler, 1990; Fan et al., 1999; Hu and Bentler, 1999; Kline, 2011; Schreiber et al., 2006). Finally, path analysis was used to determine the effects of the factors to each other.

Results and Discussion

In this study, the average age of the participants is 39.01. Their age ranges between 19 to 80 years. 11.4% of the participants were between 19- 25 years old, 33.3% were between 26-35 years old, 28.5% were 36-45 years old, and 26.80% were 46-80 years old (Table 1).

Table 1. Demographic Profile of Participant

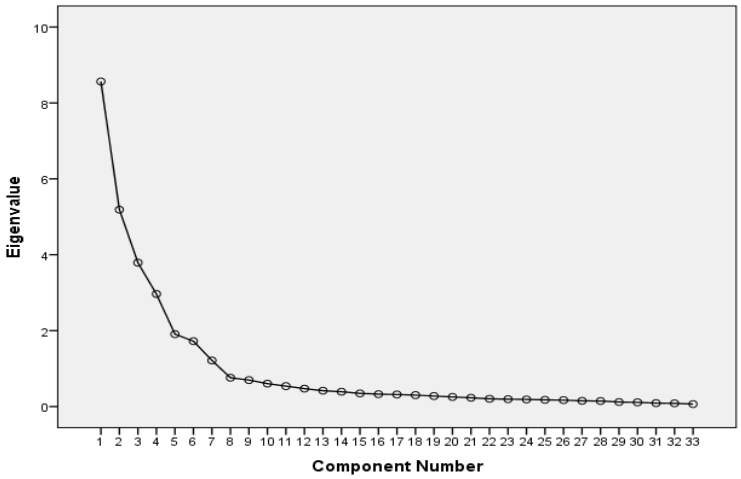
Age	n	%	Household Size	n	%
19-25	47	11.40	2 and below	72	17.40
26-35	138	33.30	3	90	21.70
36-45	118	28.50	4	133	32.10
46-80	111	26.80	More than 5	119	28.80
Education	n	%	İncome	n	%
Elementary school	176	42.50	Up to ₺1651	156	37.60
Intermediate	104	25.10	₺ 1652-2901	110	26.60
University	134	32.40	₺ 2902-8500	148	35.80

₺: Turkish Lira (1 $= ₺5.28).

The average household size was 3.75 people per household. Of the participants' household size, 28.8% were five people and over, 32.1% of them were four people, 21.7% of them three people, and 17.4% of them two and below. Of the participants, 42.50% had primary education, 25.1% had secondary education, and 32.40% had a university degree. Participants' average monthly income was determined as ₺2286. 61. 36.60% of the women's income were below ₺1651. In addition, 26.60% of the women's income was calculated as ₺1652-2901, and the income of 35.80% was calculated as ₺2902-8500.

The KMO and Bartlett's Test were applied to test sample adequacy of the study. Field (2000) also stated that for KMO test, the value of 0.50 should be the lower limit. It is generally desirable that the KMO value is as close to one as possible. Büyüköztürk (2018) stated that the factor load value would be sufficient if it was 0.70 and above. In addition, at least ten times of each statement were suggested for path analysis (Kline, 2011). Therefore, 414 samples were used in the study. The KMO value was found as 0.868 which is excellent for the factor analysis (Cokluk et al., 2012). The results of the Bartlett's Test of Sphericity (11822.53) were also significant (P<.01). Factor loadings less than 0.50 were not reported. Eigenvalues obtained by the EFA and component number scree plot were given in Figure 1.

Figure 1. Scree Plot of Factors and Items



The factors affecting the separation of women's wastes at the source were investigated with the EFA. According to the EFA results, 7 factors and 33 items were found. These factors were named as 'consequences awareness', 'perceived policy effectiveness', 'subjective norm', 'attitude', 'direct behaviour', 'perceived behaviour control', and 'intention'. These factors explained 76.838% of the total variance (Table 2).

Table 2. Result of the EFA

Factors & Items	Standard Loadings	Variance Explained (%)
Consequences Awareness (CAW)		
"Recycling saves energy"	.900	15.079
"Recycling improves environmental quality"	.880	
"Recycling saves money"	.864	
"Recycling conserves natural resources"	.856	
"Recycling reduces pollution"	.834	
"Recycling creates a better environment for future generations"	.773	
Perceived Policy Effectiveness (PPE)		
"The Government's policy encourages me to recycle"	.884	13.295
"The Government's promotion clearly explains the benefits of recycling"	.877	
"The Government's promotion helps citizens understand the importance of recycling"	.857	
"The Government's policy facilitates me to recycle"	.813	
"The Government provides clear guidelines on recycling"	.806	
"Overall, the government policy on recycling is effective"	.784	
Subjective Norm (SN)		
"My neighbours expect me to recycle household materials"	.888	13.257
"My friends expect me to recycle household materials"	.864	
"Most people who are important to me would approve of my recycling"	.826	
"My co-workers or schoolmates expect me to recycle household materials"	.796	
"My family expects me to recycle household materials"	.766	
"Most people who are important to me think I should recycle"	.758	
Attitude (AT)		
"Recycling is useful"	.899	12.443
"Recycling is the future"	.869	

"Recycling is good"	.852	
"Recycling is responsible"	.828	
"Recycling is sensible"	.799	
Direct Behaviour (DB)		
"I have been recycling my recyclables regularly"	.943	10.550
"I have recycling behaviour at home"	.910	
"I have recycling behaviour at work"	.908	
"I have recycled my recyclables in the last days"	.889	
Perceived Behavioural Control (PBC)		
"I have plenty of opportunities to recycle"	.789	6.228
"Recycling is easy"	.786	
"Recycling is convenient"	.749	
Intention (INT)		
"I plan to recycle regularly if the municipality provides the facility"	.777	5.985
"In the next months, I will try to sort out recyclable materials"	.751	
"I am willing to participate in the recycling scheme in the future"	.724	

The percentage of variance explained by the factors obtained respectively, consequences awareness 15.079, perceived policy effectiveness 13.295, subjective norm 13.257, attitude 12.443, direct behaviour 10.550, perceived behaviour control 6.228, and intention 5.985 (Table 2).

The mean scores of all factors were collected in three categories. They can be ranked as strongly agree, agree and undecided. Factors in the first category (strongly agree), having the highest positive expressions, were determined as the attitude (4.45) and the consequences awareness (4.43). It was observed that women generally have positive attitudes towards the separation of waste at the source. Because the direct behaviour score is in the indecision range, positive attitudes did not turn into direct behaviour. Consequences awareness was the most important factor explaining women's recycling behaviour. One of the components of this factor, 'recycling saves energy', was the highest standard loading. This can be interpreted women know the relationship between energy and waste (Table 3).

Table 3. Mean Score and Interpretation of Factors

Factors	Mean	Std. Deviation	Interpretation*
Attitude	4.445	.766	Strongly Agree
Consequences Awareness	4.429	.729	Strongly Agree
Intention	4.029	.688	Agree
Perceived Behaviour Control	3.826	.908	Agree
Subjective Norm	3.747	.775	Agree
Perceived Behaviour Control	3.385	.948	Undecided
Direct Behavior	3.040	1.181	Undecided

In the second category, three factors were found (agree). These factors were intent (4.03), perceived behavioural control (3.83), and subjective norms (3.75). From the items of intent, it was observed that women had willingness, plans and efforts to recycle behaviour. It was determined that, from subjective norm items, women were mostly influenced by the behaviour of their neighbours. In the third category, perceived policy effectiveness (3.38) and direct behaviour (3.04) factors were

found (undecided). The average score of these two factors in the undecided category was not desirable, but it was very important in terms of status determination (Table 3). According to results of reliability and convergent validity tests, all factors' the CR and the AVE coefficients were found appropriate (Table 4). All of the model coefficients were significant (P<0.01).

Table 4. Results of Reliability and Convergent Validity Tests

	RA	PPE	SN	AT	DB	PBC	INT
Cronbach's Alpha	.947	.922	.914	.951	.947	.746	.757
CR	.941	.934	.923	.929	.952	.819	.795
AVE	.726	.702	.669	.722	.833	.601	.564

The CR of the constructs ranged from 0.795 to 0.952, and the AVE ranged from 0.564 to 0.833. The Cronbach's Alpha coefficients of the factors obtained ranged from 0.746 to 0.951 (Table 4). Hence, all the aforementioned criteria for convergent validity were met (Fornell, 1981). In the last part of the study, it was determined that the findings complied with the Fit Indices Criteria. All factors are statistically significant, and the results of the fit indices showed that the model had a perfect fit (Table 5).

Table 5. Fit Indices Criteria and Result

Fit Indices	Finding	Result	Fit Indices	Finding	Result
NFI	.918	√	RFI	.906	√
CFI	.956	√	IFI	.956	√
RMSEA	.050	√	TLI	.950	√
X^2/df	2.040	√			

After explaining the factors that were effective in recycling behaviour, it was important to explain their relationship with each other. Therefore, the correlation between the factors were investigated (Table 6). There was a correlation between perceived policy effectiveness and direct behaviour. In this study, it was determined that there was a weak correlation between subjective norms and direct behaviour. In addition, there was a weak correlation between subjective norms and behavioural control. A high correlation between behavioural control and direct behaviour, and a moderate correlation between behavioural control and indirect behaviour was calculated. There was a moderate correlation between consequences awareness and direct behaviour. Social pressure plays an important role on individual behaviours (Borgstede and Andersson, 2010).

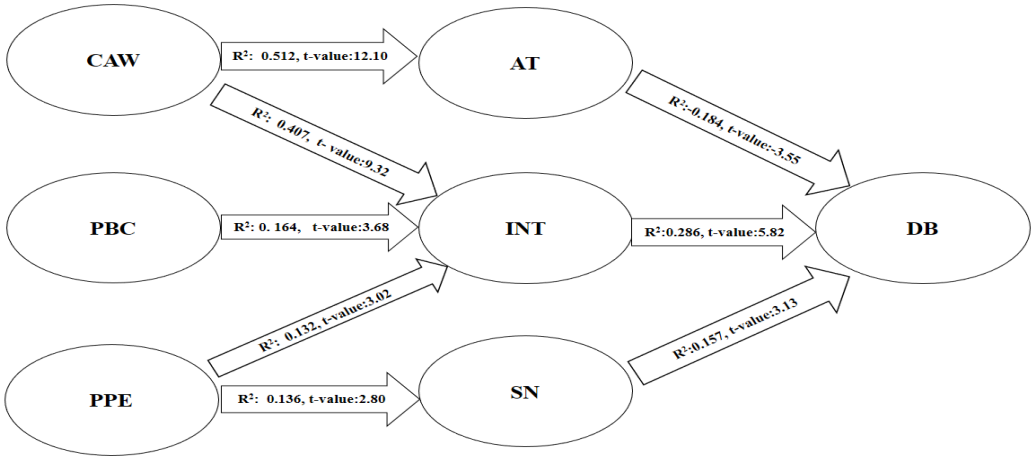
Table 6. Correlations between Factors

	AT	PBC	CAW	DB	İNT	PPE	SN
AT	1.000						
PBC	0.249**	1,000					
CAW	0.567**	0.190**	1.000				
DB	-0.059	0.109*	-0.068	1.000			
İNT	0.299**	0.262**	0.362**	0.241**	1.000		
PPE	0.029	0.237**	0.057	0.266**	0.179**	1.000	
SN	0.352**	0.333**	0.180**	0.170**	0.169**	0.206**	1.000

**: P<0.01, *P<0.05.

Firstly, the effect of perceived policy effectiveness on the subjective norms of women in waste separation was determined as 0.14. On the other hand, the effect of perceived policy effectiveness on the intention was calculated as 0.13. In addition, the effect of perceived behaviour control on the intent was found 0.16. Since consumers' perceived policy effectiveness does effect consumers' intentions and the subjective norm in recycling the Çorum Municipality must pay attention to the improvement and provision of facilities for recycling. The path coefficient between consequences awareness and intention variables was 0.41. The path coefficient between consequences awareness and attitude variables was 0.51 (Figure 2).

Figure 2. The Path Analysis



Intention, attitude and subjective norms were important in explaining women's waste separation behaviours. Although the path coefficient between attitude and direct behaviour was negative, the other two were positive. A unit increase in the woman's attitude decreased their direct behaviour of waste separation by 0.18 units. This is an indication that the necessary facilities have not been installed. In other words, although the average score of the attitude factor was 4.45, the municipality was inadequate in terms of waste separation facilities. Bernstad (2014) underlined the importance of

convenience and infrastructure for the separation of waste at the source. Stoeva and Alriksson (2017) stated that the lack of proper conditions for waste separation can lead to negative attitudes (Sorkun, 2018). In another study, it was stated that decreased distance to the drop-off point resulted in improved sorting of recyclables in Sweden (Rousta et al., 2015).

A unit increase in the woman's intention increased their direct behaviour of waste separation by 0.29 units. In a study conducted in Hong Kong, attitudes were found to have a negative effect on intent (Wan, 2014). In this study, it was determined that the path coefficient between subjective norms and direct behaviour variables was 0.16 (Fig 2). In another word, a unit increased in the woman's subjective norm increased its direct behaviour of waste separation by 0.16 units. In many studies in the literature, it was stated that subjective norms were an important predictors of the recycling behaviour (Oom Do Valle et al., 2005; Shaw, 2008; Mahmud and Osman, 2010). In another study, it was stated that social norms and consequence awareness had a strong effect on waste prevention behaviours (Corsini et al., 2018).

Conclusion

According to the results of this study, it was determined that women were both intentional and willing to recycle in the Çorum province. While the intent and willingness to recycling activities are necessary, they are not sufficient. There is no integrated infrastructure for recycling in the province. Therefore, the Çorum Municipality should provide the opportunity to achieve separation of wastes at the source.

In this research, consequences awareness for effective recycling was determined as the most important factor. The consequences awareness needs to be increased because the consequences of awareness affect the behaviours of recycling through attitudes and intents. In order to increase environmental awareness, it is of great importance that recycling is associated with energy saving, environmental quality, economic dimension, natural resources, pollution and the idea of leaving a clean environment for the children of the participants. In recent years in Turkey, rising sudden rainfall, flooding, hail and drought has caused food security. In this respect, the relationship between global climate change and waste should be highlighted.

In this study, social pressure groups that are effective in women's behaviours were investigated. The groups that women care about were; neighbours, friends, people around him, work or school friends, family and other people around him. Women were most affected by the social pressures of

their neighbours. Therefore, it can be said that neighbours were effective on women's recycling behaviour.

Acknowledgement: This study was supported by the Çorum Municipality in 2018, Project number is 2018/9, within the scope of 'I have a project for Çorum'.

References

Aguilar-Luzón, M. d. C., García-Martínez, J. M. Á., Calvo-Salguero, A., and Salinas, J. M. (2012), Comparative Study Between the Theory of Planned Behavior and the Value–Belief–Norm Model Regarding the Environment, on Spanish Housewives' Recycling Behavior, *Journal of Applied Social Psychology*, 42(11), 2797-2833.

Ajzen, I. (2011), *The theory of planned behaviour: reactions and reflections*, Taylor & Francis.

Andy, F. (2009), *Discovering Statistics Using SPSS for Windows*, Sage Publications.

Arı, E., and Yılmaz, V. (2016), A proposed structural model for housewives' recycling behavior: A case study from Turkey, *Ecological Economics*, 129, 132-142.

Armitage, C. J., and Conner, M. (2001), Efficacy of the Theory of Planned Behaviour: A meta-analytic review, *British Journal of Social Psychology*, 40(4), 471-499.

Babaei, A. A., Alavi, N., Goudarzi, G., Teymouri, P., Ahmadi, K., and Rafiee, M. (2015), Household recycling knowledge, attitudes and practices towards solid waste management, *Resources, Conservation and Recycling*, 102, 94-100.

Banga, M. (2011), Household Knowledge, Attitudes and Practices in Solid Waste Segregation and Recycling: The Case of Urban Kampala, *Zambia Social Science Journal*, 2(1), 27-39.

Bentler, P. M. (1990), Comparative fit indexes in structural models, *Psychol Bull*, 107(2), 238-246.

Bernstad, A. (2014), Household food waste separation behavior and the importance of convenience, *Waste Management*, 34(7), 1317-1323.

Borgstede, C. V., and Andersson, K. (2010), Environmental information Explanatory factors for information behavior, *Sustainability*, 2(9), 2785-2798.

Bortoleto, A. P., Kurisu, K. H., and Hanaki, K. (2012), Model development for household waste prevention behaviour, *Waste Management*, 32(12), 2195-2207.

Botetzagias, I., Dima, A.-F., and Malesios, C. (2015), Extending the Theory of Planned Behavior in the context of recycling: The role of moral norms and of demographic predictors, *Resources, Conservation and Recycling*, 95, 58-67.

Burchell, J. & Lightfoot, S. (2001), The Greening of the European Union?, London, Sheffield Academic Press, p.34.

Büyüköztürk, Ş. (2018), Sosyal bilimler için veri analizi el kitabı, *Pegem Atıf İndeksi*, 001-214.

Chan, L., and Bishop, B. (2013), A moral basis for recycling: Extending the theory of planned behaviour, *Journal of Environmental Psychology*, 36, 96-102.

Chen, M. F., and Tung, P. J. (2010), The Moderating Effect of Perceived Lack of Facilities on Consumers' Recycling Intentions, *Environment and Behavior*, 42(6), 24-844.

Chiemchaisri, C., Juanga, J. P., and Visvanathan, C. (2007), Municipal solid waste management in Thailand and disposal emission inventory, *Environ Monit Assess*, 135(1-3),13-20.

Cokluk, O., Sekercioglu, G., and Buyukozturk, Ş. (2012), Sosyal Bilimler icin Çok Degiskenli SPSS ve LISREL UygulamalarI, Ankara: *Pegem Yayincilik*.

COM, 2015, 614 final. Communication From the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. Closing the Loop - An EU Action Plan for the Circular Economy, Brussels, 2.12.2015.

Corsini, F., Gusmerotti, N. M., Testa, F., and Iraldo, F. (2018), Exploring waste prevention behaviour through empirical research, *Waste Management*, 79, 132-141.

Erdem, M. S., & Yenilmez, F. (2017), Türkiye'nin Avrupa Birliği Çevre Politikalarına Uyum Sürecinin Değerlendirilmesi, *Optimum Ekonomi ve Yönetim Bilimleri Dergisi*, 4(2), 91-119.

Eurostat (2016), Packaging waste statistics [web Document] (retrieved from https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Packaging_waste_statistics).

Fan, X., Thompson, B., and Wang, L. (1999), Effects of sample size, estimation methods, and model specification on structural equation modeling fit indexes, *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 56-83.

Field, A. (2000), *Discovering Statistics using SPSS for Windows*, London – Thousand Oaks, New Delhi: Sage publications.

Fornell, C., and Larcker, D. F. (1981), Evaluating Structural Equation Models with Unobservable Variables and Measurement Error, *Journal of Marketing Research*, 18(1), 39-50.

Henry, K. (1974), An index of factorial simplicity, *Psychometrika*, 39(1), 31-36.

Hu, L. t., and Bentler, P. M. (1999), Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives, *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1-55.

Huffman, A. H., Van Der Werff, B. R., Henning, J. B., and Watrous-Rodriguez, K. (2014), When do recycling attitudes predict recycling? An investigation of self-reported versus observed behavior, *Journal of Environmental Psychology*, 38, 262-270.

Hair Jr. J. F., da Silva Gabriel, M. L. and Patel, V. K. (2014), Amos Covariance-Based Structural Equation Modeling (Cb-Sem): Guidelines on its Application as a Marketing Research Tool, *Revista Brasileira de Marketing*, 13(2), 44-55

Karakas, G. (2018), Factors Affecting the Environmental Attitudes and Behaviours of University Students in Turkey, *Fresenius Environmental Bulletin*, 27(8), 5372-5379.

Kline, R. B. (2011), *Principles and practice of structural equation modeling* (3rd Ed.), New York, NY: The Guilford Press.

Liu, C., and Wu, X. W. (2011), Factors influencing municipal solid waste generation in China: a multiple statistical analysis study, *Waste Manag Res*, 29(4), 371-378.

Mahmud, S. N. D., and Osman, K. (2010), The determinants of recycling intention behavior among the Malaysian school students: an application of theory of planned behaviour, *Procedia - Social and Behavioral Sciences*, 9, 119-124.

Meyerhoff, J. (2006). Stated willingness to pay as hypothetical behaviour: Can attitudes tell us more? *Journal of Environmental Planning and Management*, 49(2), 209-226.

Oztekin, C., Teksöz, G., Pamuk, S., Sahin, E., and Kilic, D. S. (2017), Gender perspective on the factors predicting recycling behavior: Implications from the theory of planned behavior, *Waste Management*, 62, 290-302.

Pakpour, A. H., Zeidi, I. M., Emamjomeh, M. M., Asefzadeh, S., and Pearson, H. (2014), Household waste behaviours among a community sample in Iran: An application of the theory of planned behaviour, *Waste Management*, 34(6), 980-986.

Pettifor, H. (2012), *Patterns of household practice: An examination into the relationship between housework and waste separation for households in the United Kingdom*, ISER Working Paper Series.

NWMAP, (2017), *National Waste Management and Action Plan 2023*, Ankara (retrieved from ulusal_at-k_yonet-m--eylem_plan--20180328154824.pdf (csb.gov.tr)).

Rousta, K., Bolton, K., Lundin, M., and Dahlén, L. (2015), Quantitative assessment of distance to collection point and improved sorting information on source separation of household waste, *Waste Management*, 40, 22-30.

Saeed, M. O., Hassan, M. N., and Mujeebu, M. A. (2009), Assessment of municipal solid waste generation and recyclable materials potential in Kuala Lumpur, Malaysia, *Waste Management*, 29(7), 2209-2213.

Saruhan, Ş.C. and Özdemirci, A. (2011), *Bilim, Felsefe ve Metodoloji*, Beta Yayınları, 2, Baskı, İstanbul.

Schreiber, J. B., Nora, A., Stage, F. K., Barlow, E. A., and King, J. (2006), Reporting structural equation modeling and confirmatory factor analysis results: A review, *The Journal of Educational Research*, 99(6), 323-338.

Shaw, P. J. (2008), Nearest neighbour effects in kerbside household waste recycling, *Resources, Conservation and Recycling*, 52(5), 775-784.

Sidique, S. F., Lupi, F., and Joshi, S. V. (2010), The effects of behavior and attitudes on drop-off recycling activities, *Resources, Conservation and Recycling*, 54(3), 163-170.

Sorkun, M. F. (2018), How do social norms influence recycling behavior in a collectivistic society? A case study from Turkey, *Waste Management*, 80, 359-370.

Stoeva, K., and Alriksson, S. (2017), Influence of recycling programmes on waste separation behaviour, *Waste Management*, 68, 732-741.

Tonglet, M., Phillips, P. S., and Read, A. D. (2004), Using the Theory of Planned Behaviour to investigate the determinants of recycling behaviour: a case study from Brixworth, UK, *Resources, Conservation and Recycling*, 41(3), 191-214.

TUIK (2018), Turkish Statistical Institute, Average Municipal Waste Amount per Person (Kg / Person-Day), In T. S. Institute (Ed.).

Valle, P. O. D., Rebelo, E., Reis, E., and Menezes, J. (2005), Combining behavioral theories to predict recycling involvement, *Environment and Behavior*, 37(3), 364-396.

Wan, C., Shen, G. Q., and Yu, A. (2014), The role of perceived effectiveness of policy measures in predicting recycling behaviour in Hong Kong, *Resources, Conservation and Recycling*, 83, 141-151.

Wang, S., Wang, J., Zhao, S., and Yang, S. (2019), Information publicity and resident's waste separation behavior: An empirical study based on the norm activation model, *Waste Management*, 87, 33-42.

Wang, Z., Guo, D., and Wang, X. (2016), Determinants of residents' e-waste recycling behaviour intentions: Evidence from China, *Journal of Cleaner Production*, 137, 850-860.

Zhang, D., Huang, G., Yin, X., and Gong, Q. (2015), Residents' Waste Separation Behaviors at the Source: Using SEM with the Theory of Planned Behavior in Guangzhou, China, *International Journal of Environmental Research and Public Health*, 12(8), 9475-9491.

Zhang, H., Liu, J., Wen, Z. G., and Chen, Y. X. (2017), College students' municipal solid waste source separation behavior and its influential factors: A case study in Beijing, China, *Journal of Cleaner Production*, 164, 444-454.