Hacettepe University Graduate School of Social Sciences

Department of Economics

INVESTIGATING THE DETERMINANTS OF UNIVERSITY STUDENTS' RECYCLING BEHAVIOR

Açelya Gizem ÖKTEM

Master's Thesis

Ankara, 2021

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DEDICATION

I dedicate this thesis to my beloved father Hakan Ataktürk Öktem, who is no longer with me, but his guiding hand on my shoulder will remain forever.

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First of all, I would like to express my deepest appreciation to Dr. Shihomi Ara Aksoy for her dedicated support and guidance in this thesis process. Her examination of this thesis in great detail, giving me suggestions, and always spending time with me motivated me. I can definitely describe as luck in my life that being a student of her. Moreover, I would like to thank her for bringing me incredible knowledge in behavioral economics, which is my field of interest. I hope I could follow in her footsteps.

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ÖZET

Öktem, Açelya Gizem. Üniversite Öğrencilerinin Geri Dönüşüm Davranışlarının Belirleyicilerinin İncelenmesi, Yüksek Lisans Tezi, Ankara, 2021.

Günümüzde artan hızlı tüketim alışkanlıklarının bir sonucu olarak, katı atık üretimi de günden güne artış göstermektedir. Ancak bu durum çevre üzerinde çok sayıda olumsuz etkiye neden olmaktadır. Çevreye yayılan atıklar insan ve diğer tüm canlı türlerinin hayatını olumsuz bir biçimde etkilemektedir. Üretilen atığı doğru bir biçimde yönetmek ise her bireyin elindedir. Geri dönüşüm, çevreyi korumak ve enerji tasarrufu sağlamak için uygun bir çözüm sunmaktadır. Bu bağlamda öncelikle bireylerin geri dönüşüm davranışlarının belirleyicilerini saptamak uygun bir atık yönetimi stratejisi belirlemek için önem arz etmektedir. Bu çalışma, planlı davranış teorisini temel alarak Hacettepe Üniversitesi öğrencilerinin geri dönüşüm davranışını tanımlamaktadır. Planlı davranış teorisinde davranışa yönelik niyeti belirlemek için üç belirleyici kullanılmasına rağmen çalışmada yalnızca iki belirleyici üzerinde odaklanılmıştır: Öznel norm ve algılanan davranış kontrolü. Ayrıca çalışmada modelleme metodu olarak, psikoloji kökenli çalışmalarda sıklıkla tercih edilen, Yapısal Eşitlik Modeli (YEM) kullanılmıştır. Araştırmanın sonuçlarına göre, öznel norm ve algılanan davranış kontrolü geri dönüşüm davranışı üzerinde anlamlı bir etkiye sahiptir. Sonuç olarak, öğrenciler çevresindeki kişilerin geri dönüşüm davranışlarından etkilenmektedir. Ayrıca, öğrencilerin geri dönüşümün uygulanabilirliğine ilişkin olan görüşleri, geri dönüşüm davranışlarını etkilemektedir.

Anahtar Kelimeler

Kentsel katı atık, planlı davranış teorisi, yapısal eşitlik modeli

ABSTRACT

Oktem, Acelya Gizem. Investigating the Determinants of University Students Recycling Behavior, Master's Thesis, Ankara, 2021.

As a result of today's increasing fast consumption habits, municipal solid waste (MSW) generation is also growing day by day. However, it creates many adverse effects on the environment. The wastes spread to the environment negatively affect the health of humans and all other creatures. It is up to every human being to correctly evaluate the waste produced. Recycling offers a viable solution to protect the environment and save energy. Therefore, it is critical to primarily examine individuals' recycling behavior to determine a correct waste management strategy. This study defines Hacettepe University students' recycling behaviors based on the Theory of Planned Behavior (TPB). Although TPB uses the three determinants to explain intention towards behavior, the study focused on two of these three variables: subjective norm and perceived behavioral control. Moreover, Structural Equation Modeling (SEM), which is frequently preferred in psychology-based studies, was used as the modeling method in the study. According to the results of the research, it is stated that the main determinants of students' recycling behavior are subjective norms and perceived behavior control. Consequently, it can be stated that students are highly influenced by the behavior of the people around them on recycling behavior. Moreover, students' opinions about the feasibility of recycling also played a strong role in governing their behaviors with regard to waste disposal.

Key Words

Municipal Solid Waste, The Theory of Planned Behavior, Structural Equation Modeling

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LIST OF ABBREVIATIONS

AMOS Analysis of Moment Structures

AVE Average Variance Extracted

CFA Confirmatory Factor Analysis

CR Construct Reliability

CIF Comparative Fit Index

EFA Explanatory Factor Analysis

EQS Actually an Abbreviation for Equations

EPA Environmental Protect Agency

IN Intention

KMO Kaiser-Meyer-Olkin

LISREL Linear Structural Relations

MSW Municipal Solid Waste

NAM Norm Activation Model

OECD Organization for Economic Cooperation and Development

PBC Perceived Behavioral Control

RB Recycling Behavior

REI Recycling Economic Information

RMSA Root Mean Square Error of Approximation

SEM Structural Equation Modeling

SN Subjective Norm

SRMR Standardized Root Mean Square Residual

TPB The Theory of Planned Behavior

TRA The Theory of Reasoned Action

WB World Bank

WWF World Wildlife Fund

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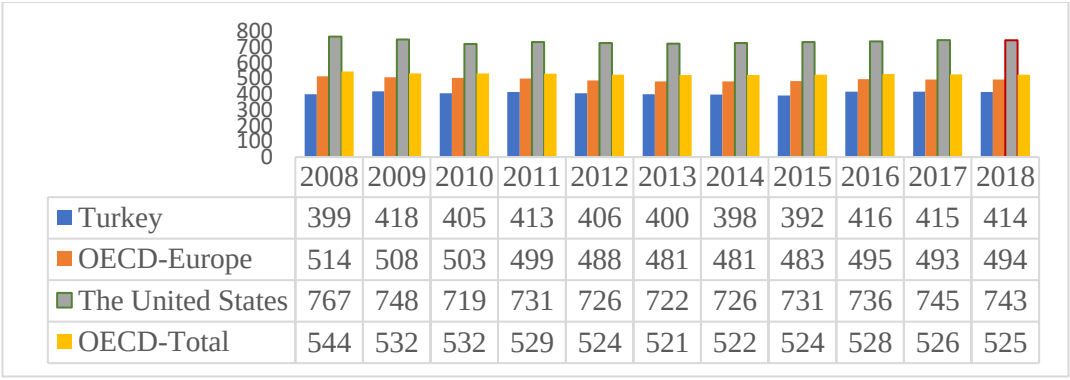
INTRODUCTION

While a burgeoning world population of billions mainly driven by developments in healthcare, agriculture, infrastructure, and a net rise in fertility rates may have spurred the global economy to faster growth, it has also caused an unprecedented rise in waste production worldwide. EPA (1993) describes waste, which is mostly the byproduct of uncontrolled urbanization and overpopulation, as "*any discarded, rejected, abandoned, unwanted or surplus matter, whether or not intended for sale or recycling, reprocessing, recovery or purification by a separate operation from that which produced the matter.*" Every year, enough waste is produced, making its timely and effective disposal vital. Though international treaties governing waste management vary from country to country, the Basel Convention (1989) outlines a more or less globally accepted method of how waste should be treated and/or disposed of by individual states. Country-specific laws define what constitutes waste and, as such, their disposal. However, the World Bank (WB, 2018) attributes waste production largely to urbanization, economic development, and population growth. WB data (2018) shows that 0.74 kg of waste per capita per day is generated, and waste generation is anticipated to increase to 3.40 billion tons by 2050 globally. For the last ten years, waste has been regulated as the primary, unavoidable, and harmful production and consumption surplus (Ewijk & Stegemann, 2020). Based on their physical and chemical properties, types of waste vary greatly from simple household refuse to hazardous effluents. Among them, solid waste-produced largely by human and animal activities-account for the largest share of the total waste produced globally and is cited most frequently in academic studies. Solid waste refers to all solid materials that are unwanted, useless, and have no economic value for the owner, formed by human and animal activities (Pathak et al., 2018).

As a result of today's increasing fast consumption habits, municipal solid waste (MSW) has a large place in solid wastes. According to Environmental Protect Agency (EPA, 2019), MSW is defined as "*the solid component of the waste stream arising from mainly*

domestic but also commercial, industrial, government and public premises including waste from council operations, services, and facilities that are collected by or on behalf of the council via curbside collection but does not contain Commercial and Industrial Waste (General), Listed Waste, Hazardous Waste or Radioactive Waste." Based on the EPA's definition of MSW, it is stated that "*MSW does not include industrial, hazardous, or construction and demolition (C&D) waste, and once generated, MSW must be collected and managed."* MSW mainly consists of daily items such as product packaging, bottles, and cans, newspapers. Household refuses and institutive locations' wastes, such as schools, workplaces, hospitals, and shopping centers, constitute the largest MSW share. Moreover, 2.01 billion tons of MSW were generated in 2016, and 33% of these were thrown into the environment and burnt because of poor waste management (WB, 2018).

OECD data shows that, while municipal waste[1] generation tends to decrease between 2011 and 2015, it started to increase from 2015 in European countries that are OECD members, Turkey, and the USA. In other words, it could be said that there is a worldwide increase in municipal waste generation. However, per capita, waste production in Turkey remains behind the other countries (Figure 1.1).



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Turkey	399	418	405	413	406	400	398	392	416	415	414
OECD-Europe	514	508	503	499	488	481	481	483	495	493	494
The United States	767	748	719	731	726	722	726	731	736	745	743
OECD-Total	544	532	532	529	524	521	522	524	528	526	525

Figure 1.1 Municipal Waste Generated kilograms/capita in Turkey, OECD-Europe, The United States and OECD Countries Total (2008 – 2018)

Source: OECD Database, 2020

[1] "*Municipal waste covers waste from households, including bulky waste, similar waste from commerce and trade, office buildings, institutions and small businesses, as well as yard and garden waste, street sweepings, the contents of litter containers, and market cleansing waste if managed as household waste*" (OECD, 2020)

Due to the increasing waste production day by day, sustainable waste management should be adopted worldwide. Owing to today's fast consumption habits, it is almost impossible not to produce waste, but it is up to every human being to correctly evaluate the waste produced. The wastes spread to the environment adversely affect the health of humans and all other creatures. If not treated or disposed of in time, accumulated waste can hurt the environment and humans alike. A robust waste management system coupled with a thorough examination of individual behavior relating to its disposal can help prevent the rapid depletion of natural resources caused by negligence. It also causes rapid depletion of natural resources. For this reason, correct waste management should be adopted, and one of the main approaches to be adopted in waste management is recycling.

When it is considered the recycling rate, it is observed that Turkey has low recycling rates compared to the average of OECD countries (Figure 1.2). Although it seems a good situation that waste generation per capita is lower in Turkey compared to OECD countries, it is also an adverse situation that the recycling rate is very low. In other words, this statistic highlights how far behind we are when it comes to addressing recycling. Therefore, sustainable waste management is indispensable to Turkey.

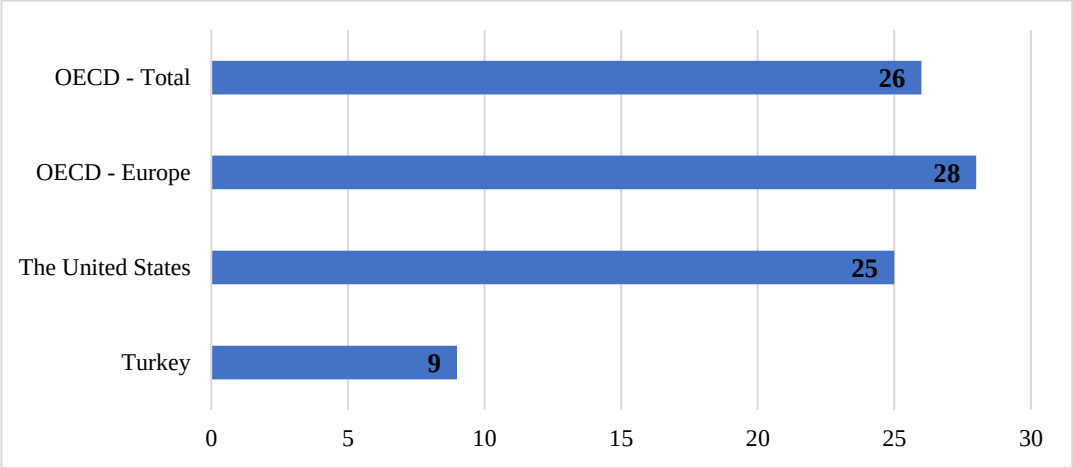


Figure 1.2 Recycling rate of Municipal Waste in Turkey, OECD-Europe, The United States and OECD Countries, 2017 (%)

Source: OECD Database, 2020

It is critical to primarily examine individuals' environmental behavior to determine a correct waste management strategy in this context. This study explores and attempts to define the recycling behaviors of students. Since students often develop new habits in

universities and explore the world around them, it is crucial to understand what factors shape their behavior towards waste management at this formative stage and try to instill positive habits that allow for better waste management.

Students of Hacettepe University were selected in the study. Hacettepe University is a university with a large campus and green area where many students study and live at the same time. Although environmental activities such as waste collection are organized at the university, littering is a common malpractice in and around the campus and must be checked through proper inspection and a reconditioning of their attitude towards waste disposal. Teaching an encouraging student to recycle regularly will improve their behavior and inculcate a conscientious approach towards waste management. For this purpose, a preliminary observation of Hacettepe University Beytepe Campus was made in the ten months up to October 2019. Canteen and garden areas where students are concentrated in the Faculty of Economics and Administrative Sciences were closely examined particularly. It has been found that a large quantity of wastes is dumped into the environment by students. Then, a questionnaire study was conducted with students studying in the Departments of Economics, Social Work, and International Relations to examine the determinants of recycling behavior. 37% of the questionnaires were delivered in classes, 67% of them were sent via e-mail. The data obtained were analyzed using SEM. Analysis results will be explained in the results section in detail.

CHAPTER 1: THEORETICAL BACKGROUND

1.1 EFFECTS OF SOLID WASTES ON ENVIRONMENT AND HUMAN HEALTH AND SOLID WASTE MANAGEMENT

Waste generation creates many adverse effects on the environment. It affects human and environmental health due to reasons such as littering, dumping, and disposal. The occurrence of many peripheral problems such as climate crisis, acid rain, and polluted environment cause the gradual deterioration of environmental quality (Salleh et al., 2016). Besides, wastes can cause environmental losses due to the destruction of valuable and scarce

While about 19% of the overall waste is either recycled or used as biodegradable waste, another 11% is incinerated. 33% of the global waste is openly discarded in unregulated dumps, which has an adverse impact on the environment (Figure 1.3).

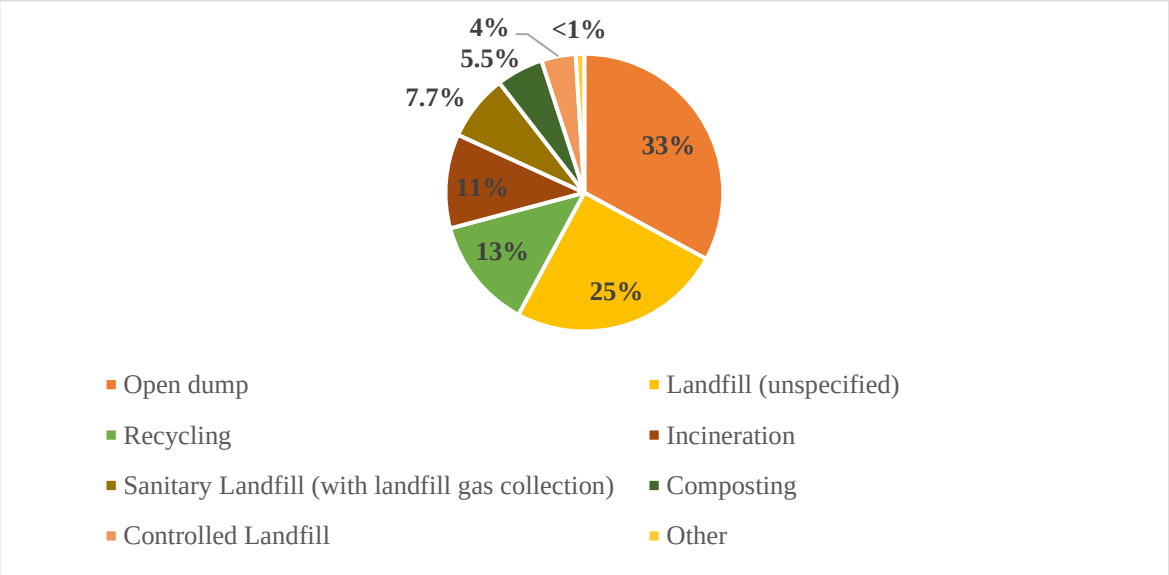


Figure 1.3 Global Treatment and Disposal of Waste

Source: World Bank, 2018

Wastes disposed of in such landfills quickly pile up by thousands of tons and start polluting the environment. Furthermore, A byproduct formed during disposal, leachate, pollutes the soil it enters, and disrupts the overall ecosystem.

Carbon and greenhouse gas emissions, which are often the side effects of unsustainably managed waste, hasten global warming and result in natural calamities. The decomposition of waste in poorly managed landfills emits methane (CH4), one among several non-CO2 greenhouse gases, into the atmosphere. CH4 constitutes about 21 percent of the total global greenhouse gas emissions (Ho et al., 2017).

Plastic waste coming from household refuse and discarded consumer staples account for about 40% of the packaging waste in Europe, according to data by World Wildlife Fund (WWF, 2018). Most plastics remain in nature for many years. For instance, a plastic cup can stay in nature for 50 years (WWF, 2018). In 2016, plastic waste equivalent to 2200 plastic bottles per person was produced in the world (WWF, 2019).

Products such as bags, cigarette butts, plastic bottle caps, and straws are visible plastic waste, called macro plastics. However, microplastics and nano-plastics formed from the breakdown of larger plastics, which may be invisible to the naked eye but nevertheless present in the atmosphere, also hurt humans and the environment alike.

Plastics smaller than 5mm in size are microplastic; plastics smaller than 1 μm are called nano-plastic. Micro and nano-plastics are used as a microbead in personal care products such as shower gel, cosmetics, and toothpaste. When these products are used, microbeads mix with household water wastes subsequently and mix assimilate into the environment. Hernandes et al. (2017) confirmed that the nano-plastics included in personal care products such as shampoos, cosmetics, and bath salts find their way into the wastewater system before mixing with sewerage sludge. Since it is used as fertilizer, thousands of plastics granules/particles eventually mix into the soil every year. Mason et al. (2016) revealed that in 17 domestic water waste facilities with a total of 2.029,54 million liters per day in the United States, more than 4 million microparticles per facility per day were found. Fiber parts constitute most of these microparticles. Micro and nano-plastics can enter the human body because of ingestion. Consuming shellfish such as oysters and

mussels increase the possibility of ingesting these particles of plastics. Thus, micro, and nano plastics consisting of tiny particles mix with water, food, and air, penetrate humans and all other living creatures.

Humans are not the only creatures affected by plastic. Especially the health of marine animals is adversely affected by the plastics thrown into the sea. Güven et al. (2016) examined the composition of microplastics in the marine environment with the data they obtained from 1337 fish samples living on the Mediterranean coast of Turkey. According to the findings, plastic was found in 34% of the fishes examined. Among the plastics in the sea, blue-colored plastics are the most affected, such as plastic water bottle caps. Besides, fiber plastics have been identified as a type of plastic. Also, plastic parts in the sea hold different microorganisms such as bacteria and insects, causing the formation of a different living group than living things that generally live in water. Microorganisms such as vibriosis that cause disease in humans and animals also live among this new living group (WWF, 2018).

Paper also accounts for a large chunk of packaging waste. The deforestation involved in the process of producing large quantities of paper not only worsens the climate crisis but also increases the concentration of CO2 in the atmosphere. Moreover, forests act as natural gatekeepers of atmospheric pollutants and cleanse the air off different kinds of contaminants.

Disposing of waste properly is vital for building livable and sustainable cities. Since having inadequate solid waste regulation is harmful to public health and reduces the quality of life of city residents, it is indispensable for each country to have a waste management system. Effective solid waste management is expensive, often accounting for a large share of the municipal budgets, but it is indispensable to our overall health and longevity. The seamless operation of this municipal service demands integrated systems that are sustainable and calls for a paradigm shift in the mindsets of people, who need to start viewing the environment as a precious heirloom for future generations, not just a bottomless pit of free resources to continuously plunder and profit from.

1.2 THE IMPORTANCE OF RECYCLING WITHIN THE SCOPE OF SOLID WASTE MANAGEMENT

Fundamental principles and descriptions to control waste produced are explained in the EU Waste Directive[2], setting out some basic waste management principles. Therefore, regarding waste management, the priorities of the waste management hierarchy included in the directive are implemented. According to the EU waste management hierarchy, it aims to prevent waste to minimize waste generation. It is then desired to reuse waste for the same or different purposes, such as using a water bottle as a vase. If it is not possible to reuse waste, it is aimed to recycle and then recover it as energy or raw material. It removes the waste that remains after these methods or the last waste to which we cannot apply these methods. However, recycling is the most crucial element of the waste management hierarchy. EPA (2016) expressed recycling as "*the process of collecting and processing materials that would otherwise be thrown away as trash and turning them into new products.*" In other words, recycling describes the physical or chemical duration of a separately collected waste stream that consists of a blend of wanted and unwanted materials such as impure, contaminated materials, or materials of low economic value (Roithner and Rechberger, 2020).

Recycling offers a viable solution to protect the environment and save energy. Recycling also helps promote energy efficiency by reducing the number of steps involved in traditional methods. For example, the recycling of metal beverage cans spares us to purify ore to produce new products. It cuts down energy consumption by half compared to normal operations. Similarly, the energy required to recycle the paper is 50% of the energy needed for normal operations.

Moreover, recycling helps mitigate the harmful effects of greenhouse gas emissions resulting from unsustainable and improper waste disposal. Recycling can also help reduce the level of toxic fumes that the incineration of plastic waste gives off. These toxic gases, such as dioxins, mercury, furans, and polychlorinated biphenyls, pose grave threats to vegetation, human and animal health.

[2] Directive 2008/98 / EC

Recycling has social and economic benefits as well as environmental benefits. The efficient use of natural resources is essential so that future generations do not suffer from resources. Economic problems may arise because of the raw materials' decline and natural resources' speedy consumption. Thus, turning the waste into new products can provide added value to the economy. Reducing the consumption of natural resources is a favorable situation for a country's economy. Reduced consumption of raw materials that we depend on abroad positively affects the economy. Besides, imports of products such as fiber resulting from recycling can provide foreign currency inflows to our country. The efficient use of natural resources is also vital so that future generations do not suffer from resources.

Recycling also makes economic sense as it helps create jobs in the clean energy sector, drive the economy, and reduce the cost associated with waste disposal. Various stakeholders, businesses, and institutions benefit from a switch to recycling from traditional waste disposal methods that have far outlived their time. The recycling sector enables the establishment of new facilities and the creation of new employment opportunities. Recycling Economic Information (REI) Study (2016) found that it was constituted 757.000 works and $36.6 billion in salaries in the US in just a year thanks to reuse and recycling.

1.3 WASTE GENERATION AND WASTE MANAGEMENT STRATEGIES IN THE WORLD

In Europe, 494 kg of municipal waste per capita was generated, and 29% of this was recycled in 2018 (Figure 1.4).

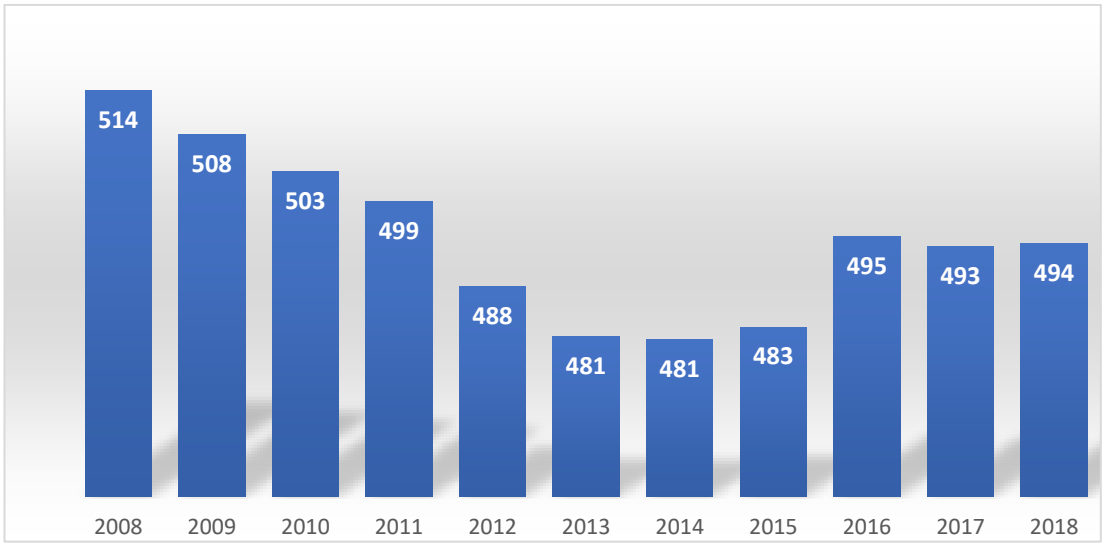


Figure 1.4 Municipal waste generated kg/capita in OECD-Europe (2008 – 2018)

Source: OECD Database, 2020

MSW management is an essential issue in most EU countries. Moreover, the residents pay landfill taxes to cover recycling services. There is a landfill tax system in all EU member countries except Cyprus, Malta, Croatia, and Germany (CEWEP, 2017). Although there is no tax in Germany, it has a very high recycling rate. The rate of recycled municipal waste in Germany in 2018 is 67.3%. Besides, this rate is above the average of the EU-27 countries, which is 47.4% (Eurostat, 2020). Besides, Germany demands a landfill ban for unsorted municipal waste, and there is vigorous enforcement of the ban, especially since 2005. In this way, wastes are prevented to thrown into the landfill. Moreover, residents pay the penalty if they throw wastes into the environment. The ban has a positive effect on recycling as it ensures that wastes are separated and disposed of by residents according to their waste types. It also strengthens the cooperation of local authorities in waste collection.

In the United States (the USA), 743 kg municipal waste per capita was generated, and 25% of this was recycled in 2017 (Figure 1.5).

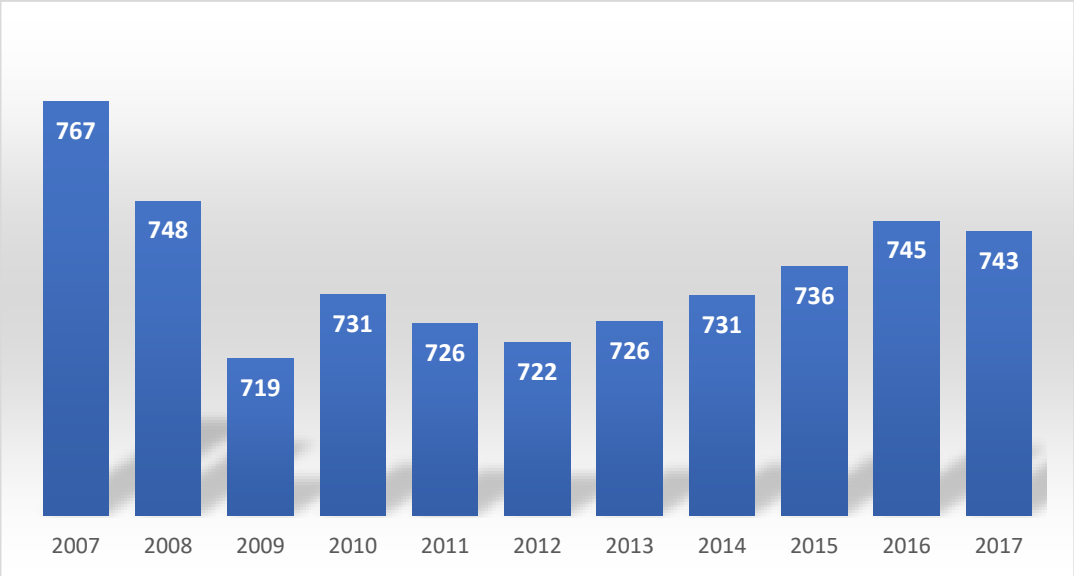


Figure 1.5 Municipal Waste Generated kg per Capita in The United States (2007 – 2017)

Source: OECD Database, 2020

For recycling, the Pay as You Throw System is widely used in the USA. In this system, residents collect their wastes by separating them and pay the amount of waste they collect. In traditional systems where households pay for the collection of waste, everyone pays an equal amount of tax or a flat fee regardless of the amount of waste accumulated. In this system, the payment of the amount accumulated encourages less waste to be produced. While in some countries, residents pay for each bag of waste they collect, they pay the equivalent of the weight of the waste collected in other countries. For instance, the Pay-as-You-Throw System has been implemented in 34 out of 180 towns in New Hampshire in the USA. Between $1 and $2 per garbage bag is charged. Even though the region residents bring a very different size garbage bag, the transport companies only have one size bag, and the waste is emptied into this bag. The University of New Hampshire conducted a study. According to the research, it has been observed that the rate of waste disposal fell between 42% and 54% in the 34 towns. Moreover, the other towns are implemented with different user fee-based pricing policies (The University of New Hampshire, 2018).

1.4 WASTE GENERATION AND WASTE MANAGEMENT STRATEGY IN TURKEY

Municipal waste generated kg per capita in Turkey has fluctuated since 2008. Even though it tended to decrease especially between 2011 and 2015, it had skipped in 2016. It has tended to slightly decrease again since 2016. While 414 kg of municipal waste per capita were generated in 2018, only 12% of this was recycled (Figure 1.6).

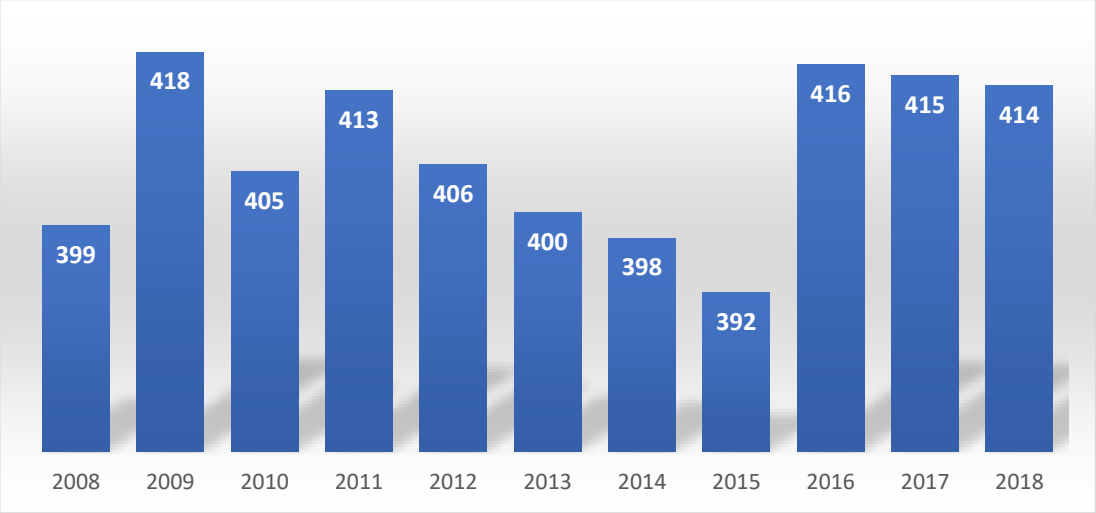


Figure 1.6 Municipal Waste Generated kg per capita in Turkey (2008 – 2018)

Source: OECD Database, 2020

Under the scope of waste management in Turkey, wastes are collected from waste bins placed in the environment and sorted according to their waste types. They are provided interim storage, transported, recovered, recycled, and disposal, as well as the aim of waste minimization. (Ministry of Science, Industry, and Technology, 2017). Waste management is a subject of legal regulations in Turkey since 1930, and recycling activities covered by the main application tasks are assigned to municipalities (Turkish Court of Accounts, 2003).

Existing legislation on the environment in Turkey is covered by the EU Harmonization Process. Environment and Urbanization Ministry has been harmonized with EU regulations, and the National Packaging Waste Control Regulation was prepared. The regulation covers all processes from the production of packaging wastes to their recovery.

Therefore, it is aimed to create a regular system by assigning duties and responsibilities to various stakeholders regarding recycling (REC Turkey, 2016). Municipalities are responsible for the collection of wastes in Turkey. In the Waste Management Regulation (2015), the waste generator defines as "a person, institution, organization and enterprise that causes waste generation as a result of their activities and/or any real and/or legal entity that performs pre-treatment, mixing or other operations that will cause a change in the composition or structure of the waste." According to the regulation, even though the main responsible is a waste producer, the task of conducting waste collection activities is assigned to the municipalities. Thus, each municipality is obliged to coordinate waste collection in its district. This coordination is carried out with waste producers and various private sector organizations authorized for waste collection.

When it is considered the statistics of packaging waste produced, released to the market, and recycled between 2012 and 2018 in Turkey, it is stated that the packaging waste production doubled in 2018. However, the recycling rate of these wastes has decreased (Table 1.1). Therefore, it is cruel to increase recycling activities in Turkey.

Table 1.1 Total Packaging Wastes Generated and Recycling Rates of the Total Packaging Waste in Turkey (2012 – 2018)

	Total Packaging Wastes Generated (ton)	**Recycled Packaging Wastes (ton)**	**Recycling Rate (%)**
2012	2,684,009	1,833,614	68
2013	3,528,845	2,300,345	65
2014	3,948,307	2,422,521	61
2015	4,183,309	2,530,664	60
2016	3,850,712	2,226,273	58
2017	4,127,867	2,198,845	53
2018	3,893,396	2,375,518	61

Source: Ministry of Environment and Urban Planning (Turkey), 2020

While the number of municipalities that packaging waste management plan prepared were 45 in 2008, it increased to 478 in 2018 (Ministry of Environment and Urban Planning, 2020). Besides, with advances in recycling investments, paper, glass, metal,

and almost all plastic materials can be recycled at the industrial level in Turkey (Metin et al., 2003). Whereas there were 46 units for different types of waste recycling and recovery facility in 2003, this number increased to 956 in 2010 (European Environment Agency, 2013). Although developments in recycling were significant, they were not sufficient in Turkey.

Metin et al. (2005) found that the type of waste foremost in Turkey was paper and cardboard. However, types of waste differ according to their source and collection point. Ministry of Environment and Urban Planning (2020) has also stated that of the packaging wastes put on the market in 2018, 34% is paper cardboard, 24% plastic, 22% glass, and 3% metal waste.

In Turkey, the most released packaging wastes are plastic and paper - cardboard wastes. The largest amount of recycled waste is paper-cardboard waste that corresponds with a recycling rate of 93% (Table 1.2).

Table 1.2 Type of Packaging Wastes Generated and Recycling Rate of the Wastes in Turkey (2018)

	Total Packaging Wastes (tons)	**Recycled Packaging Wastes (tons)**	**Recycling Rate (%)**
Plastic	943,567	590,923	63
Metal	130,981	89,488	68
Paper,Carton	1,314,154	1,227,249	93
Glass	860,239	234,699	27
Composite	96,773	62,110	64
Wooden	547,681	171,048	31

Source: Ministry of Environment and Urban Planning (Turkey), 2020

In Turkey, waste is collected in a large portion of the landfill and the streets of the primitive and unsanitary conditions. However, some of the wastes collected in this way cannot be evaluated since they are mixed with wet garbage. The basic condition of creating a healthier and more efficient recovery system is to collect the recyclable wastes separately from the garbage at the source, such as houses, workplaces, schools, hotels,

and holiday villages. Thus, cleaner and larger amounts of waste can be collected economically (Banar and Ozkan, 2005).

The amount of solid waste collected in one day in Ankara is an average of 5,500 tons (Ministry of Environment and Urbanization, 2020). Wastes are collected by contracted companies of the municipalities and transmitted to waste transfer stations. There are 12 solid waste transfer stations in Ankara. Wastes are collected at these stations for a short time and transferred to larger collection and separation facilities. There are three solid waste collection and separation facilities. In the stations, wastes are separated according to waste types and transferred to waste collection stations for recycling or disposal. There are 17 waste collection centers.

It was mentioned that the municipalities had the responsibility for waste collection in Turkey. There are 18 districts in Ankara, and each district has its own waste collection plan. In addition to the responsibility of municipalities for waste collection, they also have a responsibility to train their residents on waste collection. For instance, education and a variety of waste collection activities are organized in many schools.

1.5 EXAMPLES OF SUCCESSFUL WASTE COLLECTION METHODS IN THE WORLD

The Berlin Municipal Cleaning Affairs Unit is responsible for the waste collection of two million families living in Berlin and environmental cleanliness there. Wastes are collected in waste bins of different colors according to their types. Domestic waste consisting of non-recyclable or hardly recyclable wastes is used for gray, brown bins for organic wastes such as fruit and vegetables, and blue bins for paper waste. The recycling of plastic and metal packaging waste in Berlin preserves reduced raw materials such as oil or iron ore, and these wastes are used in the valuable waste group as they are thought to support climate protection. Examples of these wastes accumulated in yellow or orange boxes are yogurt containers, detergent boxes, and canned boxes. Also, three different color waste boxes, white, green, and brown, are used for glass waste in Berlin. The Berlin Municipality also has a service to collect and remove massive waste from the house. Households pay 50 euro for this service (BSR, 2019). Also, waste can be exchanged in

the shops established by the municipality called the Berlin Gift Market. While the municipality provides all these services, it also receives services from private companies.

Japan has a much more systematic waste separation and disposal recycling system compared to many countries. For instance, people living in Kamikatsu Town of Tokushima in Japan targeted Zero waste in 2003. For this purpose, residents of the town bring their garbage to a waste collection center. Wastes are classified there into 45 different categories by contracted firms. Some residents of the region also bring the center their wastes by separating them. Moreover, there are also volunteers among the residents of the town at the waste collection center. There are many subcategories within the normal waste category. For instance, metal wastes are divided into aluminum and steel; paper wastes are divided into newspaper, cardboard, or carton. In this way, 80% of the wastes was recycled in 2018. Although having too many waste categories caused an adverse reaction among the residents, it was adapted as good practice by them. Furthermore, Zero Waste Academy, a non-profit organization, was established in the town in 2005. The academy has provided informative seminars on zero waste in cooperation with the municipality. The academy also has provided waste transportation services for $ 0.093 per 45 liters of waste.

An awareness study was conducted between December 2017 and April 2018 in Sălacea, a commune in Romania, with the goal of zero waste. First, the recycling bins in the region were removed, and the door-to-door waste collection system was introduced. The system was carried out through two regional operators responsible for recycling. Moreover, volunteers trained to answer residents' questions acted as an intermediary for the system. These volunteers distributed bins and bags redundantly, collecting their waste at home, and informative documents explaining how this system works. In this way, participation in recycling activities increased from 8.4% to 97%. Besides, collaborations were made with experts and the University of Oradea to provide technical support. Before this system, a monthly 1 E tax was collected for waste collection services, and it continued in the same way in the new system. Along with the informative documents distributed to homes, training was given in schools, churches, cafes, and cultural centers with the mayor, school principal, and representatives from waste collection companies. As a result

of this new system, the recycling rate has increased by 40% in the region. Also, waste generation has decreased by 55%.

1.6 CONDUCTED AND PLANNED IMPLEMENTATIONS IN TURKEY WITHIN THE SCOPE OF WASTE MANAGEMENT

Zero Waste Project has been adopted in Turkey since January 1, 2019. The project goals cover the years between 2018-2023. These goals include using resources more efficiently, preventing or minimizing waste generation, and recycling. All targets adopted within the scope of zero waste are aimed to be realized by 2023.

Within the project's scope, colored waste bins application has been started. For instance, blue bins are used for paper-cardboard waste. However, it has not been implemented in every district yet.

The most important work done within the project's scope is the paid plastic bag application since January 1, 2019. People who want to use plastic bags in shopping must pay 0.25 TL for each bag. In many countries, the same application is adopted, such as Germany and England. Germany aimed to ban using it entirely. In some countries, the use of it is completely prohibited, such as France and Italy. Thanks to the application, using plastic bags decreased by 77% in Turkey in 2019. Moreover, 200,000 tons of plastic was prevented, thus preventing 8 million kg of greenhouse gas production.

Compulsory Deposit Application will be implemented as of 2021 in Turkey. The application covers companies that offer returnable beverage bottles and barrels to the market. With the regulation, packaging labels will have a visible and legible "returnable" text, and a unique barcode will be used on these products. The deposit price of the packaged product will be shown separately from the sales price of the product. Returnable packages sold at sales points such as markets, grocery stores, and kiosks can be returned to the same places. The returned packaging deposit will be refunded to the person returning the package or exchanged for a new packaged product of the same nature. Empty packages will be collected from sales points or dealers with the system to be established by marketers.

Steps have been taken seriously, especially regarding reducing waste production and recycling in Turkey since 2019. However, Turkey is still behind the successful examples of countries in the world. Therefore, every individual must raise awareness about this issue and recycle behavior.

CHAPTER 2: LITERATURE REVIEW

2.1 BEHAVIORAL ECONOMICS APPLICATIONS ON RECYCLING BEHAVIOR

Although most people express that they know the importance of recycling, contributing to environmental cleanliness and protection of natural resources, they do not act in this direction. Wang et al. (2020) conducted a study to measure public awareness of recycling behavior. The results revealed that almost all the people surveyed expressed that they were aware of the municipal solid wastes' harmful effects on the environment, but only 55% of the participants expressed their willingness to participate in recycling behavior. Therefore, it is necessary to direct individuals to recycling behavior. Behavioral economics tools are vital to guide individuals in the right direction. Nudge, a behavioral economics tool is one of the most frequently used tools for adopting a behavior. Thaler & Sunstein (2008, p. 6) explained nudge as "*any aspect of the choice architecture that alters people's behavior in a predictable way without forbidding any options or significantly changing their economic incentives. To count as a mere nudge, the intervention must be easy and cheap to avoid. Nudges are not mandates".* For example, people are affected by the behavior of the people around them. Therefore, it is a simple but effective nudge method for them to be aware that people are doing similar behaviors around them. An advertisement was given at the University of Montana that "Most of the Montana youth (70 percent) do not smoke", and this strategy saw a large decrease in the proportion of students who smoke (Thaler and Sunstein, Nudge, 2008).

Various studies were carried out using nudge to adopt recycling behavior. Cosic et al. (2018) conducted a study between October 2013 and December 2013 to measure the effect of nudging on students' recycling behaviors in Pisa, Italy. There were both garbage cans and recycling bins beside the coffee machine in a university. Observations were made without any intervention in the first two weeks, and the number of coffee cartons in the recycling bins was counted each evening. Later, two different experiments were conducted for two weeks each. In Experiment 1, a poster was hung where the recycling bins and trash can were. In the poster, it was stated that 70% of university students recycle, recycling is easy, and they choose the suitable recycling bin for cardboard glasses among

the recycling bins. In experiment 2, the garbage can was reduced in size, and instead of multiple recycling bins, a large green recycling bin was placed where they could only throw coffee cups. The same poster was hung. However, the statement that they should only choose the appropriate recycle bin on the poster was removed. According to the results, it was observed that there was an increase in the number of coffee cups thrown away for recycling. It was also observed that more recycling was made during the weeks of the 2nd experiment compared to the weeks of the 1st experiment.

It was investigated whether the impact of an information leaflet designed by the researchers with the light of theories in environmental psychology and behavioral economics on food waste recycling behavior by Linder et al. (2018) The study was conducted in a city district in Stockholm. Before the experiment, food waste recycling stations were installed in the area. Then, the selected urban area separated two groups as control and treatment groups. After more than a year since the stations have been installed, the information leaflet sends out to the people living treatment group area. It was found that there was an increase in the amount of waste collected from food waste recycling stations after the distribution of the leaflet.

2.2 SEM

SEM is modeling that has a wide scope of use in behavioral sciences (Hox et al., 1999). It ensures that abstract concepts that cannot be directly observed are measured through concrete concepts that can be directly observed. Since it is not possible to directly measure the concepts of interest in fields such as psychology, sociology, economics, and education, SEM is frequently used in these fields. For instance, being hardworking is an unobserved concept, but a student's exam grades, how often the student follows the lessons are observed concepts, and they can be measured. Therefore, students who have high exam scores and frequently attend lessons can be interpreted as hardworking.

SEM examines the structure of interrelation of many equations. These equations describe all the relationships between a dependent that is explained by other variables and independent variables that are not impressed by other variables but can influence other

variables in the model. In other words, SEM enables the estimation of more than one regression equation at the same time.

All the regression equations in SEM defines a model (Nachtigal et al.,2003). Two types of model drawing and analysis are performed in SEM studies: Measurement model and structural model. SEM is a multivariate model that depends on variables in the two models. In the measurement model, each indicator set defines the constructor as a variable. In the structural model, the correlation relationship of constructs with each other and dependent relationships are examined.

The structural part of the model:

$\eta = \beta\eta + \Gamma\xi + \zeta$

η, endogenous variable, attribute to a variable which is impressed by other variables.

ξ, exogenous variable, attribute to a variable which is not impressed by other variables but can influence other variables in the model

β is a matrix of regression coefficients relevant to the unobserved endogenous variables

ζ is a random term

The unobserved variables are matched to observable variables by estimate equations for the endogenous and exogenous variables.

These equations:

$Y = \lambda y\eta + \varepsilon$

$X = \lambda x\xi + \delta$

λy & λx are the matrices of factor loadings.

η & ξ can be explained by the observation variables, Y and X, respectively

ε & δ are the measurement errors of the endogenous and exogenous variables, respectively.

2.2.1 History of SEM

SEM was developed at the beginning of the 20th century for researchers in the field of genetics and economics to investigate variables' causal relationships. The basis of the model was laid by a geneticist, Sewell Wright, in 1918 with path analysis. In this way, the path diagram has been brought to the literature. At first, the model was used only for observed variables, and then latent variables were also comprised in the model. Although the mathematical complexity of the model in the first period of its emergence restricts using of the model, its use has become widespread with the availability of computer and software applications such as AMOS and LISREL. In 1980, psychologist and statistician Peter Bentler predicted that the structural equation model would provide significant practical and theoretical advances in psychology. Especially after 1994, many articles about SEM started to be written. Today, it has become one of the most used multivariate techniques.

2.2.2 Basic Concepts in the Structural Equation Modeling

Observed or Measurement Variable, Indicator: The data that can be obtained directly is called the observed variable. The researcher can directly observe or measure these data. Survey questions, or indicators such as age, gender, education level, can be given as examples of observed variables.

Latent or Unobserved Variable, Construct, Factor: Data that cannot be obtained directly are called latent variables. For instance, motivation, environmental attitude, customer satisfaction cannot be directly observed.

Factor Loadings: Factor loadings measure the relationships between observed and latent variables. Factor loadings can have positive or negative values between -1 and +1. It means that the closer it is to +1 and +1, the stronger the relationship between factor and items. It shows the ability of each observed variable to represent the latent variable.

Fixed-Parameter: As a requirement of the estimation in SEM studies, the factor load of one of the observed variables of the latent variable is fixed to 1. This variable is named a fixed parameter.

Free Parameter: The estimated values are called free parameters.

Error Term: Each observed variable has an error term. Error terms are related to the reliability estimates of each variable. While the observed variables reflect the latent variables, they do not have a perfect measuring power. Thus, each observed variable has a side that does not reflect the desired property to be measured.

Residual Term: It represents the error in the prediction of the latent variable.

Exogenous Variable: They are variables that are not affected by other variables.

Endogenous Variable: They are variables that are affected by exogenous variables.

2.2.3 Symbols in the Structural Equation Modeling

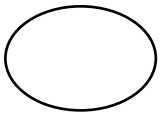
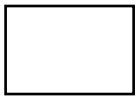
	Circles correspond to constructs.
	Squares correspond to measured variables.
	The effect of one variable on another variable is shown with a one-way arrow. Each exogenous variable is connected to each endogenous variable with a one-way arrow.
	The correlation or covariance between two variables is shown by a two-way arrow. Exogenous variables are linked by a two-way arrow.

Figure 2.1 Symbols in the Structural Equation Modeling

2.2.4 Relationships in the Structural Equation Modeling

An example figure about the observed variables, latent variables, and the error term is given below. The one-way arrow going from the error term to the observed variable expresses the effect of the measurement error on the observed variable.

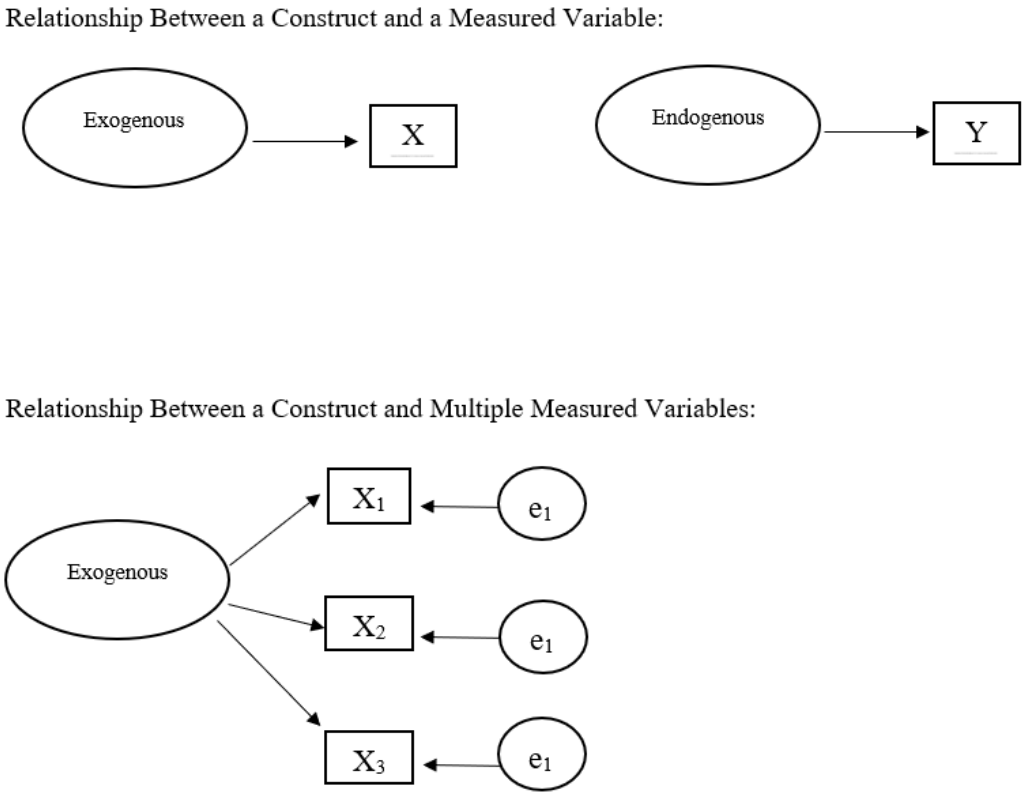


Figure 2.2 Primary Relationships in SEM between a Construct and Variables adapted from Hair et al. (2010)

Source: Hair et al. (2010, p. 551)

Moreover, there are two types of relationship between constructs:

1) Dependence Relationship

2) Correlation (Covariance) Relationship

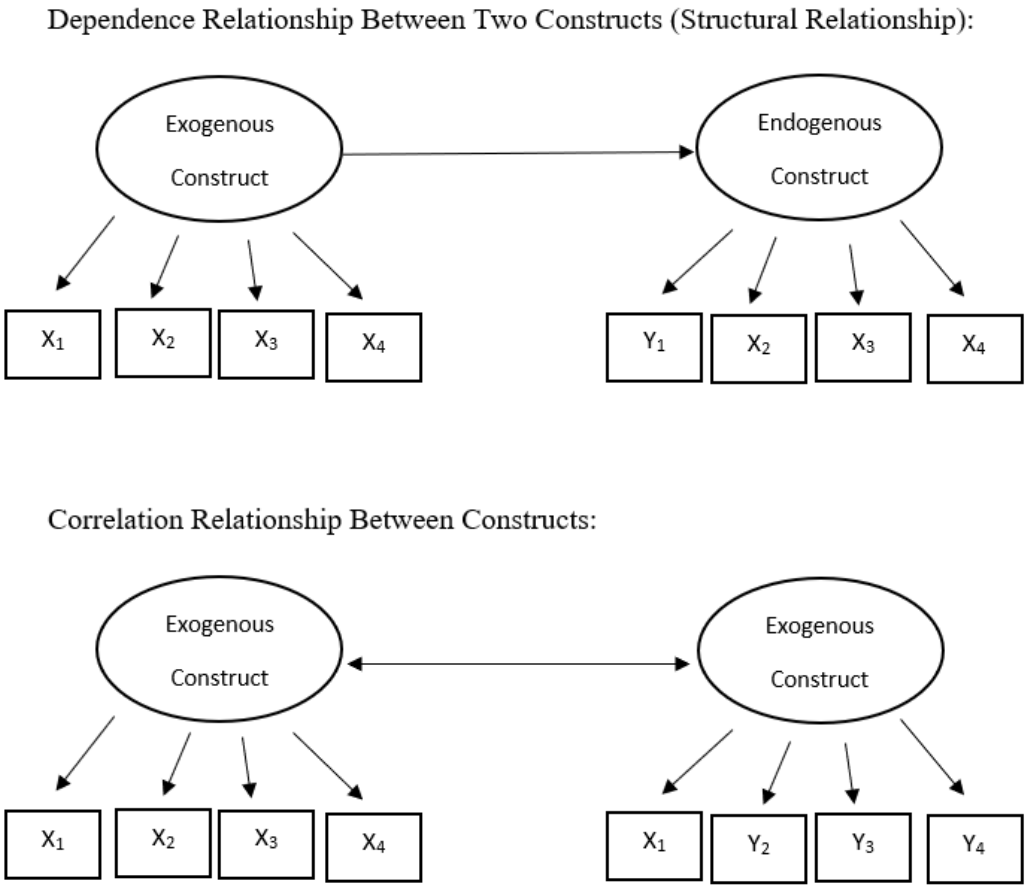


Figure 2.3 Primary Relationships in SEM Model adapted from Hair et al. (2010)

Source: Hair et al. (2010, p. 552)

2.2.5 Mediator Variable in Structural Equation Modeling

In SEM, many independent variables can affect the dependent variable. Since more than one relationship is considered in the model, while a variable is independent in a relationship, it can be dependent on a different relationship. Therefore, there can be many independent variables as well as more than one dependent variable. An independent variable can affect a dependent variable through another variable. In such cases, a mediator variable is added to the model.

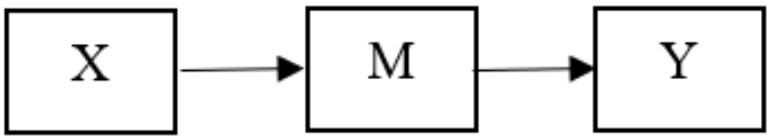


Figure 2.4 Mediating Relationship in SEM

M plays some role in the relationship between X and Y. Mediator variable is used to seek a more accurate explanation of the effect the X has on the Y (Gaskin, 2020).

In SEM, the relations of each endogenous construct are written like the regression equation. The endogenous construct is the dependent variable. Exogenous construct is linked to the dependent variable with an arrow as independent variables. After the constructs are determined, it is determined which variables are exogenous and which variables are endogenous. Some variables can be both endogenous and exogenous variables. These variables are called mediator variables in SEM. In other words, the mediator variable M is the endogenous variable in its relation with X, while it is the exogenous variable in its relation with Y.

Mediator variable focus represents a productive mechanism where the exogenous variable can influence the endogenous (outcome) variable (Baron and Kenny, 1986)

There are two types of mediation relationship: Full mediation and partial mediation

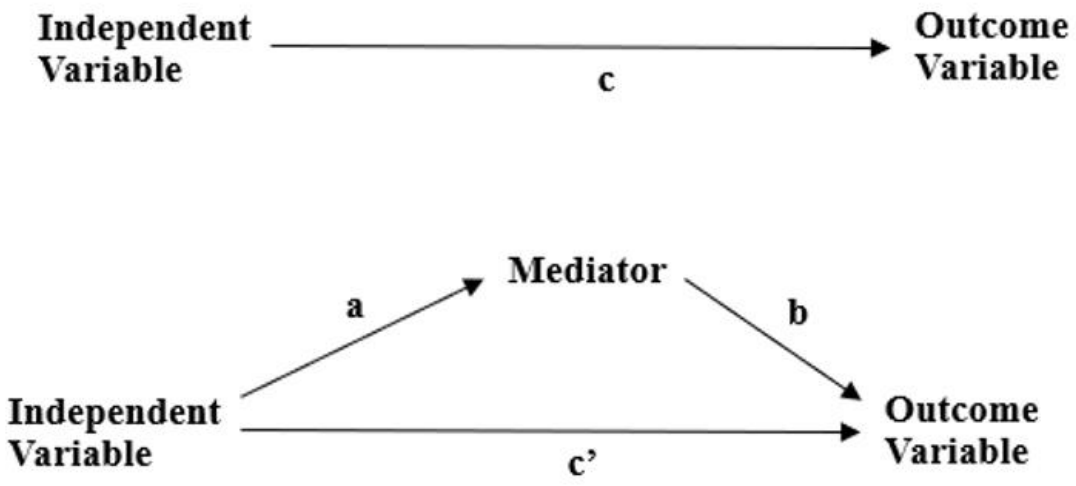


Figure 2.5 Mediation Relationships in SEM adapted from Barron and Kenny (1986)

As for the mediation relationship, the following conditions must be provided:

1) The mediator variable does not add the model, and it is expected that the direct relationship (c) must be statistically significant.

2) The mediator variable is added to the model. It is expected that the exogenous variable's impress on the mediator variable, a, must be statistically significant. Moreover, the effect of the mediator variable on the outcome variable, b, must be statistically significant.

3) Direct relationship is expected to weaken after the mediator variable is added to the model. In other words, it is expected that the effect of an exogenous variable on the outcome variable, c', is not statistically significant. If c' is not significant, it is mentioned "*full mediation* relationship." If c' is still significant, it is mentioned "*partial mediation* relationship."

In the case of partial mediation, the mediator variable cannot measure all connections among independent and dependent variables. The relationship between independent and dependent variables remains meaningful, but there is a decrease in the significance level.

In multiple regression analyzes, indirect effects are ignored when examining the independent variable's direct impact on the dependent variable. However, while

determining the linear relationship's degree and direction, its direct and indirect effects are also examined in structural analyses. An example from Hair et al. (2010, p.563) was used to explain the model better:

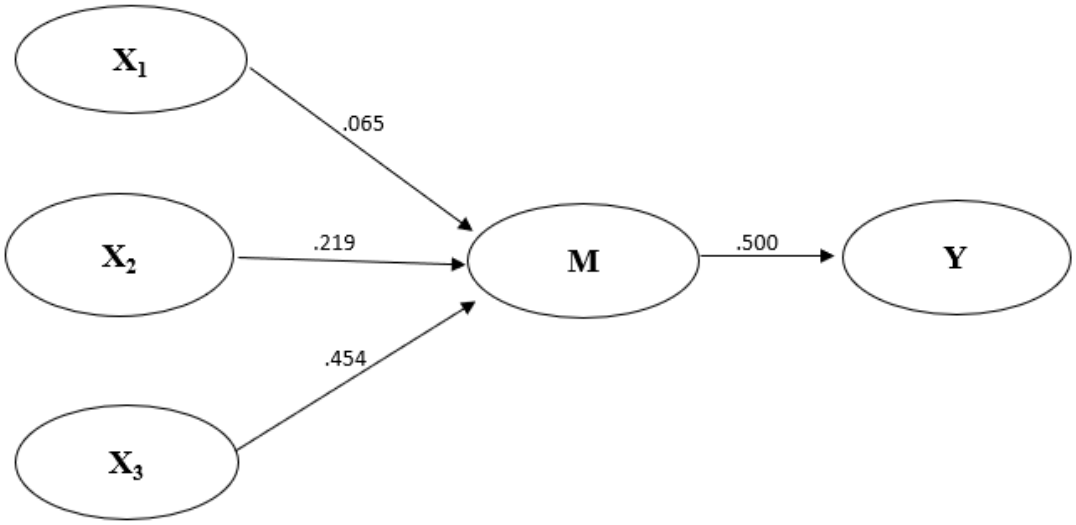


Figure 2.6 Sample Figure used to Explain SEM adapted from Hair et al. (2010)

Source: Hair et al. (2010, p.563)

In the model, M is calculated using the values of X_1, X_2, and X_3:

$M = .065(X_1) + .219(X_2) + .454(X_2)$

Thus, values of Y can be reached:

$Y = .500(M)$

or

$Y = .500[.065(X1) + .219(X2) + .454(X3)]$

This exemplification shows how path coefficients estimate M and Y values. In this model, X_1, X_2, and X_3 are independent variables; M is the mediator variable, and Y is the dependent variable. As can be seen, more than one regression analysis can be performed simultaneously in the SEM.

2.3 STAGES OF THE STRUCTURAL EQUATION MODELING

2.3.1 Defining Individual Construct

A theory is drawn based on experiences or research. While drawing the theory, it also distinguishes which independent variables will predict the dependent variable. Variables are measured using questionnaires, observations, or other measurement tools. In the study, variables are survey items. Likert type scales are mostly used for indicators representing latent variables in a survey study. Researchers can design scales themselves, as well as using scales used in previous studies.

2.3.2 Defining the Measurement Model

Each construct in the model is defined, and the indicators for these constructs are assigned. In other words, a model drawing is made. The researcher names all variables by drawing observed and unobserved variables and the correlation relations between them. In addition, all variables in the model are defined as exogenous, and correlations are drawn between all of them.

Enough known parts are needed to predict unknown parameters in SEM analysis. To estimate a statistical model drawn by the researcher for analysis, this model must be a model defined by SEM programs. To interpret this situation, the degree of freedom is checked

Df < 0 unidentified

Df = 0 just identified

Df > 0 over identified

SEM Models always need over-identified models. "*Degrees of freedom (df) represents the amount of mathematical information existing to estimate model parameters. Df in SEM are based on the size of the covariance matrix which comes from the number of indicators in the model*" (Hair et al., 2010)

$$Df = \frac{1}{2}\left((p) * (p+1)\right) - k$$

$\frac{1}{2}\left((p) * (p+1)\right)$ → covariance terms' count

p → observed variables count

k → estimated (free) parameters count

For the program to define a statistical model proposed in SEM research, the following four conditions must be provided as follows (Gürbüz, 2019):

The factor loads of one of the observed variables for each implicit variable in the model should be fixed to 1.

The error term must be added to exogenous variables in the model.

There should be at least three indicators describing each latent variable.

There should be sufficient correlation relationships between observed variables.

2.3.3 Arrangement of the Data Set, Research Method, and Program Selection

The researcher adjusts the research data set, the research method, and the program in which the analysis will be conducted. "The researcher must be careful to specify the type of data being used for each measured variable so that appropriate measure of association can be calculated" (Hair et al., 2010). "SEM can be estimated with either covariances or correlations. Thus, the researcher must choose the appropriate type of data matrix for the research question being addressing" (Hair et al., 2010). When using SEM was not common, the covariance or correlation matrix was calculated by the researcher and used for analysis.

SEM Programs may not produce reliable results when the sample is small. SEM is a complex model since it contains more than one regression equation. Complex models contain more parameters than simple models. Thus, the more the number of parameters, the more the sample size should be to produce stable results (Kline, 2011). There is no

consensus on exactly how much data should be available in SEM studies. However, SEM analysis is not recommended with the sample below 150 (Gürbüz et al., 2015).

The research method found by default in the program in SEM research is the Maximum Likelihood method. To use this calculation method, the sample is expected to be of sufficient size and the measurements to be numerical variable (at least 5-point Likert type) data to be normal or nearly normal. There are opinions that calculation methods other than ML. Before analyzing, it is essential to check the kurtosis and skewness values of the data to understand whether each data shows the normal distribution. The fact that these two values are between -2 and +2 means that the data show a normal distribution (Tabachnick et al., 2013).

The main programs that calculate SEM are AMOS, LISREL, and EQS. The main difference between programs is the notation they use when defining the measurement and structural model. EQS, AMOS, and LISREL allow analysis based on the schema. SEM calculations have gained popularity since AMOS is a module of SPSS.

2.3.4 Evaluating the Validity of Measurement Model

At this phase, the measurement model is tested. The measurement model shows how the observed variables represent the latent variables logically and systematically. For this purpose, EFA and CFA are performed within the scope of the measurement model. With factor analysis, it is investigated relationships between observed and latent variables. Factor analysis is the basic component of SEM exploring the interrelationships between these variables if variables can form sets in smaller groups.

To separate many variables into smaller groups is done with EFA. It basically specifies how many constructs there are and how many indicator groups are clustered under these constructs. Each construct is called a factor. With EFA, each indicator is associated with a factor with its loadings. After EFA analysis, the researcher switches to the CFA. It indicates whether the drawn model is supported by data collected. In other words, the CFA states that the model will either be confirmed or rejected. Accordingly, the results of the goodness of fit tests produced because of CFA are examined. Among these values,

the most used value is the chi-squared (x^2) value. The equivalent of this value in AMOS program is CMIN (Minimum Discrepancy) value.

Table 2.1 Mostly Used Goodness of Fit (GoF) Indices

Index	Threshold	Source
CMIN/DF	$x^2/df \leq 3$	Gaskin. J. (2020)
CFI	$0.95 \leq CFI$	Tabachnick et al. (2013)
RMSA	$RMSA \leq .08$	Hair et al. (2010)
SRMR	$SRMR \leq .08$	Hu and Bentler (1999)

Since there is much goodness of fit indices are used, researchers do not decide whether the tested model is verified by checking at just one goodness of fit (GoF) index. The oldest value used to check how compatible the SEM Model with the data is the x^2 value. This value tests whether the data obtained from the sample are compatible with the theoretical model proposed by the researcher institutionally. In other multivariate analyzes, only a p-value is considered. If the p-value is below .05, it is evaluated statistically significant. The smaller the value of x^2, the better established the theory. However, this value can be high in Structural Equation Models where the sample is larger than 200. Therefore, it is accepted that the part of the x^2 value to the degree of freedom will have better results to evaluate the GoF of the overall model. A normal x^2 / df below three is accepted for a good fit. However, in cases where the sample is over 700, it is possible for this value to exceed 5. It is most recommended to check at CFI, SRMR, and RMSA values as well as x^2 /df value in SEM studies conducted with ML calculation method (Hair et al., 2010).

2.3.5 Defining the Structural Model

The structural model is drawn at this stage. In the 4th step, all factors were defined as endogenous variables, and correlations were drawn between each other. However, hypothesis tests are performed at this stage. In other words, while reliability and validity measurements of the model are made in the 4th step, structural relationships are tested in the 5th stage. Also, the residual term is added to endogenous constructs. It has been stated that most structural equation models have more than one endogenous variable in the model, and an endogenous construct can also predict another endogenous construct. In other words, there can be one or more endogenous construct as an outcome variable or a mediator variable. Thus, the residual term also added a mediator variable. The researcher defines the dependent relationships that exist between constructs in the hypothesis. In the structural model, the model is tested by examining the relationship between exogenous and endogenous constructs.

2.3.6 Evaluating the Validity of Structural Model

In the last phase, the structural model's validity and the theoretical relations established by the hypothesis are tested. At this stage, there is more emphasis on estimated parameters for structural relationships.

If the model established at this stage does not come out well, it is expected that an alternative model will be developed. If a new model is developed, it is interpreted by comparing the previous model, especially the chia-square value.

2.4 MODELS THAT EXPLAIN THE DETERMINANTS OF RECYCLING BEHAVIOR

It was mentioned that SEM is a widely used modeling method to understand human behavior. To understand the determinants of recycling behavior, it is necessary to define what behavioral preferences are involved in the disposal of household waste (Davies et al., 2002). Therefore, various models have been developed to examine recycling behavior. Among the models, the most used models by researchers to explain recycling behavior will be examined in this section. Basic definitions are given below to better understand the models:

Altruistic Behavior: A person displays such behavior if his actions satisfy someone else, despite an expense he may incur in the process. For example, it is when a hungry person gives his lunch to someone else (APA, 2015).

Personal norms: "*The self-expectations for specific action in particular situations that are constructed by the individual"* (Schwartz, 1977). In other words, an individual's belief that it is right or wrong to act a behavior.

Social norms: *"Social norms consist of expectations, obligations, and sanctions currently anchored in social groups"* (Schwartz, 1977).

Awareness of consequences: It is the perception of individuals about what consequences they have for other people when they do a behavior (Schwartz, 1977).

Ascription of responsibility: It is a belief to take a certain responsibility. It refers to the feeling of liability for the unfavorable outputs of doing a behavior people don't prefer. In other words, it expresses the moral obligation to continue a behavior.

Subjective norm (SN): "*The perceived social pressure that is felt to perform or perform a behavior*" Ajzen (1991).

In contrast to academic studies, where the concepts of social norm and subjective norm are defined as the same, discrete definitions proposed by the researcher are used in this study for the sake of clarity.

Perceived behavioral control (PBC): "*People's perception of the ease or difficulty of performing the behavior of interest"* Ajzen (1991).

Attitude: The value attributed to whether it is appropriate or not to act a behavior.

Behavioral beliefs: It is the association of the behavior of interest with expected results and experiences.

Normative beliefs: It is the belief of an individual about the thoughts of the people around him/her about performing a behavior.

Control beliefs: It is the perception of difficulty or ease in carrying out a behavior.

2.4.1 Altruistic Behavior Model

In the model, which was proposed by Schwartz (1970), there are four concepts that explain the behavior: "Personal norms, social norms, awareness of consequences, and ascription of responsibility." Social norms do not have an impression on behavior directly. Personal norms have an intermediary effect between behavior and social norms. If the personal norm is interpreted through the recycling behavior, it can be defined as whether recycling behavior is found right by individuals (Valle et al., 2016). According to the model, the behavior is explained by social norms and personal norms when it is triggered by awareness of consequences and ascription of responsibility (Khan et al., 2019) In other words, they are efficient only when the two concepts are added to the model. The behavioral effect of the social norm includes the pressure of social sanctions on the individual (Bamberg et al., 2007). Social norms can strengthen the influence of the personal norm on behavior Schwartz (1977). However, if these two effects are opposite to each other, they can also have a balancing effect. Social norms can only have an impact on altruism if they are internalized like personal norms.

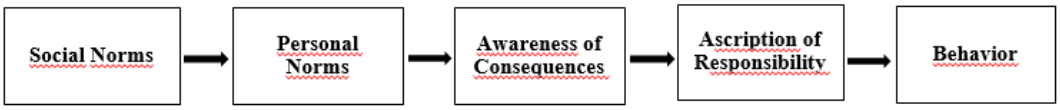


Figure 2.7 Altruistic Behavior Model

Source: Davies et al., 2002

2.4.2 Norm Activation Model (NAM)

NAM was developed by Schwartz (1973) based on the Altruistic behavior model. It is a social-psychological model that has been widely used. The basic assumption of the model is that the concept that directly affects pro-social behavior is the personal norm (Bamberg et al., 2007). Personal norm is triggered by two basic concepts: "Awareness of consequences and ascription of responsibility." According to NAM, when individuals notice the negative consequences of their non-pro-social behavior, they feel negative responsibility for this behavior. So, if they see the negative consequences of a behavior, they hold themselves more responsible for that behavior. As a result, they feel more morally responsible for exhibiting pro-social behavior. Personal norm depends on the negative emotions she/he thinks she/he will feel after breaking her/his own personal norm, such as guilty and regret (Bamberg et al., 2007). In other words, when an individual notices an individual who needs help, the individual's personal norms come into play.

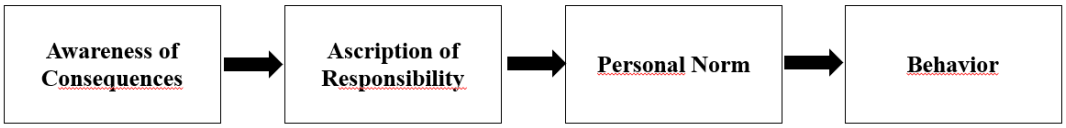


Figure 2.8 NAM

Source: Onwezen, et al., 2013

2.4.3 The Theory of Reasoned Action (TRA)

The model was proposed in 1975 by Fishbein & Ajzen. It is the most common model among researchers investigating the effect of attitude on recycling behavior (Davies et al., 2002). According to the model, the basis of performing a behavior is the intention to perform that behavior. In other words, the model assumes that most behaviors are under volitional control, and intention to implement a person's behavior is the best concept explaining behavior (Sutton, 2001). One of the two concepts in the model defining intention, attitudes describe expresses the degree of favorable or unfavorable assessment of behavior. The other concept, "*subjective norm is the perceived social pressure that is felt to perform or perform a behavior*" Ajzen (1991).

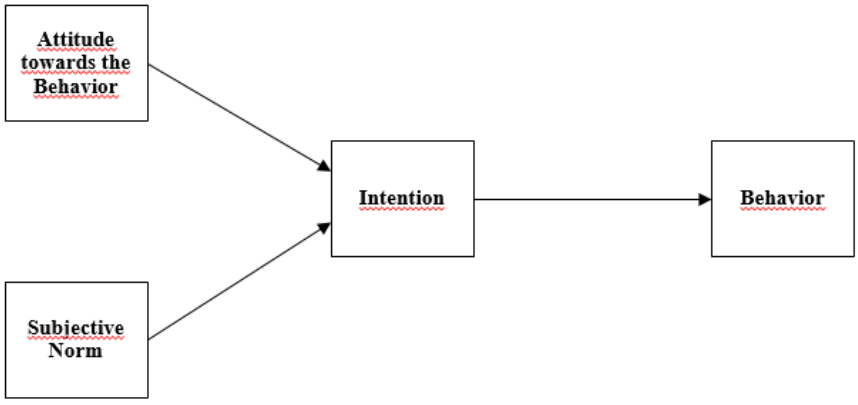


Figure 2.9 TRA

Source: Madden et al. (1992)

2.4.4 The Theory of Planned Behavior (TPB)

It is originated from the previous theory, TRA. According to TRA, the behaviors of individuals are completely under their own control. Furthermore, individuals understand that they can perform a behavior if they wish. With TPB, the limits of pure voluntary control defined in TRA have been expanded. According to the model, the more

opportunities and resources individuals think they have, the more their beliefs about performing a behavior are. The reason why TPB is different from TPA is that TPB is added to the concept of Perceived Behavioral Control. According to Ajzen (1991), although these three concepts have an independent contribution to intention, perceived behavioral control has the strongest impact.

TPB states that a behavior's emergence depends on behavioral intention. "*As a general rule, the stronger the intention to engage in behavior, the more likely should be its performance*" (Ajzen, 1991).

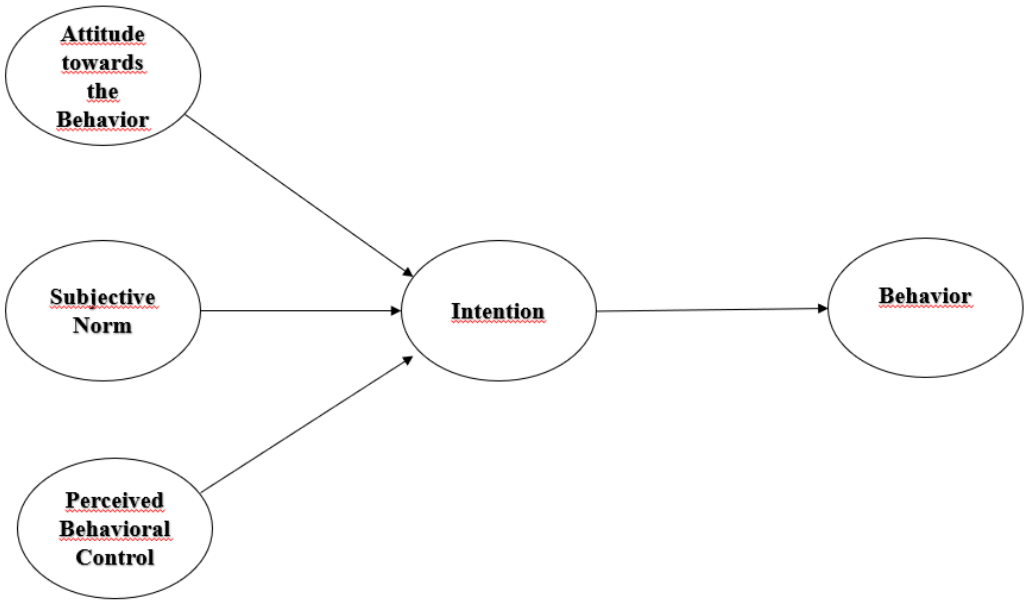


Figure 2.10 TPB adapted from Ajzen (1991)

The intention is defined by three conceptual ideas: "Attitude towards the behavior, subjective norm, perceived behavioral control." Ajzen (1991) describes the attitude towards the behavior as "the value appraised whether it is appropriate to perform and not to perform a behavior." Subjective norm describes as "the perceived social pressure that is felt to perform or perform a behavior," according to Ajzen (1991). Subjective Norm represents the rating of noticed social pressure to participate in or not participate in a behavior (Bai et al., 2019). Ajzen (1991) also describes perceived behavioral control as "people's perception of the ease or difficulty of performing the behavior of interest.". Perceived behavioral control also includes past experiences and barriers. Furthermore,

some behaviors do not depend on freedom because there is some constraint to act the behavior such as ability, money (Ajzen, 1991).

According to Ajzen (1991), people have many thoughts on any subject, but they do make up a small part of them. Certain beliefs are considered as determinants of people's intentions and behaviors, and there are three obvious beliefs: Behavioral beliefs, normative beliefs, and control beliefs. Behavioral beliefs affect attitude; normative beliefs affect subjective norms, and control beliefs affect perceived behavioral control. Behavioral beliefs are the value of the output that contributes to the behavior that strengthens belief. Normative belief is the situation that a person or group approves or disapproves of behavior. Individuals have affected the thoughts of the people around them about the behavior they want to perform. Control belief is that If individuals think that they have more opportunities and opportunities, they hope that there will be fewer obstacles and difficulties in their behavior.

2.5 STUDIES THEORY OF PLANNED BEHAVIOR-BASED AND USING STRUCTURAL EQUATION MODELING

Psychology-based models procure a better realization of the effect of intention on behavior. NAM is mostly used to describe behaviors that focus on the negative consequences of behaviors and create a helping drive in individuals. However, TPB tries to explain a wide variety of social behaviors (Bamberg et al., 2007). Although there are studies combining NAM and TPB in the literature (Khan et al., 2019; Wang et al., 2019), the most appropriate and basic model among these models is TPB (Mamun et al., 2019). Many studies have been conducted using TPB to examine the determinants of recycling behavior. Tonglet et al. (2003) investigated the factors that encourage recycling behavior intention among Brixworth residents using SEM based on TPB by sending a questionnaire to residents via an e-mail. The finding shows that social pressure to recycle, knowledge about recycling, and having opportunities to recycle affect resident's recycling attitude positively. In the study investigated by Mamun et al. (2019), face to face interview was made with 200 micro-entrepreneurs selected with a stratified random sample method. The findings suggest whereas SN has an insignificant effect, PBC

positively affects the intention to recycle. The findings also suggest that recycling intention has a significant effect on recycling behavior. It is examined that factors affecting residents' waste separation behavior by Zhang et al. (2015) using SEM. In accordance with this purpose, questionnaires were distributed to residents chosen randomly through questionnaires in Guangzhou, China. The results suggest that attitude, SN, and PBC have a positive and significant effect on waste separation intention. Whereas subjective norms have a weak influence on waste separation intention, attitude has the most significant influence. Zhang et al. (2019) investigated that while it is observed that residents are willing to recycle, it has also been observed that the amount of waste in China has also increased. So, the researchers suggest that there is a gap among these two factors. Therefore, they conducted a study using SEM with 422 available questionnaires in Thaisan, China. They revealed that the main factor affecting people's intention is a personal attitude that is an awareness of the consequences of performing a behavior. However, government incentives and accessible recycling facilities have an insignificant effect on recycling intention. PBC also includes past experiences and barriers. However, in some studies, barriers to recycling behavior are characterized as situational factors. For instance, Latif et al. (2012) conducted a study in Malaysia using SEM. The study focuses on the impact of restrictions on access to recycling facilities on the recycling behavior of households. These constraints are described as situational factors in the study. They revealed that situational factors are the key indicators of residents' recycling intention. In other words, the fewer recycling opportunities, the fewer residents willing to participate in recycling.

CHAPTER 3: METHODOLOGY

In the study, SEM was used as the modeling method. SEM differs from other multivariate techniques since the covariance structure analysis technique is used instead of a variance analysis technique. SEM programs calculate their results using covariance or a correlation matrix. Moreover, SEM is a flexible model. In other words, it deals with a simple single or multi-directional linear regression and a regression equation system (Nachtigal et al., 2003). Unlike an ordinary regression analysis, many equations are made simultaneously in SEM. It enables the definition of the latent variable that cannot be measured directly and the use of these variables in the analysis. It is of great importance to be able to add the concept of the latent variable to the model since not every concept is visible when examining human behavior. Moreover, error terms are also considered in SEM analysis. Since error terms are ignored in regression analysis, it may cause erroneous results. Consequently, these are the main reasons why SEM is frequently preferred in psychology-based studies.

However, there are also some challenges with analysis using SEM. Since a confirmatory analysis is made in SEM, the established models should be based on strong empirical relationships. As the default option is a maximum likelihood as the parameter estimation method in the software programs such as AMOS, LISREL; two assumptions have to be provided: 1) Sample size must be sufficient 2) the data must be normally distributed. However, researchers are not always able to obtain enough data. Besides, in psychology-based studies examining individual behavior, the entire data set may not show a normal distribution. Having a small data set, data not showing normal distribution, and a weak experimental relationship between variables can lead to prediction problems and erroneous results (Werner et al., 2009).

The construct was defined as the data that cannot be obtained directly in the literature review section. In the study, there are five constructs: Subjective norm (SN), perceived behavioral control (PBC), intention (IN), and recycling behavior (RB). The indicator has also been defined as the data that can be obtained directly in the same section. Different

constructs were measured using different numbers of indicators. SN Construct has five indicators (SN1, SN2, SN3, SN4, SN5); PBC Construct also has five indicators (PBC1, PBC3, PBC4, PBC5, PBC6); IN Construct has seven indicators (IN1, IN3, IN4, PEB1, PEB2, PEB3, PEB4) and RB Construct has four indicators (RB1, RB2, RB3, RB4).

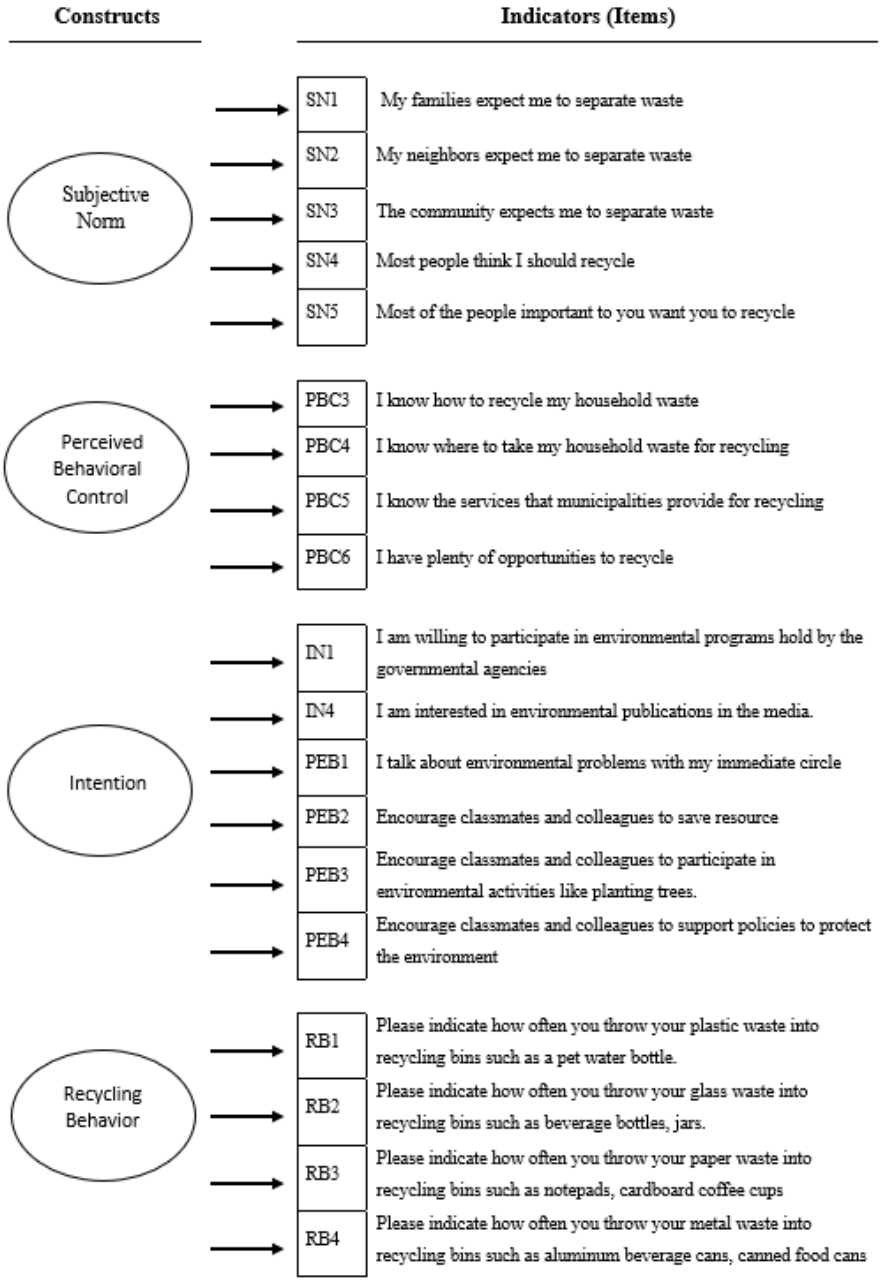


Figure 3.1 Constructs and Indicators (Items) in the Study

The indicators refer to each survey question. These items are used to measure constructs. Perceived Behavioral Control, for example, is an abstract concept and cannot be observed directly. However, this construct can be measured thanks to the survey questions; PC1, PC3, PC4, PC5, and PC6 (Figure 3.1).

SEM is a confirmatory analysis. In other words, which survey questions express which factor was determined before the study. First, EFA and CFA analyzes were conducted to measure whether the questions reflect these factors. Then, the structural model analysis was applied to examine the relationship of these factors with each other. Consequently, a two-stage analysis is performed in SEM. While the analysis in which EFA and CFA analyzes are performed refers to the measurement model analysis, the analysis that examines the relationship of factors is called structural model analysis.

3.1 HYPOTHESES

Before the research, the constructs and the survey questions measuring them were investigated based on previous studies. TPB is the most suitable and appropriate model to explain recycling behavior and offers novel solutions. Therefore, the model was taken as a basis while creating the hypotheses. It was stated that TPB uses attitude, SN, and PBC, three determinants to explain intention towards the behavior. However, the study utilized two of these three variables: SN and PBC.

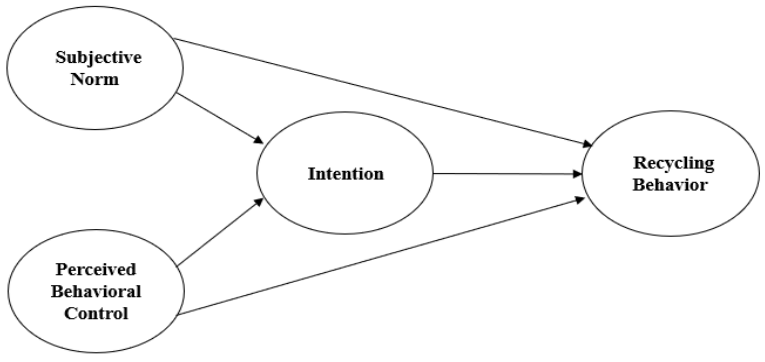


Figure 3.2 Proposed Model in the Study

People's families, friends, neighbors, and an essential person or group of people to them can influence people's intentions and specific behaviors. Moreover, easy or difficult perception is adopted for behavior in humans, and easy access to opportunities is quite useful in intention and behavior. Within the scope of TPB, it is stated that the more appropriate it is for individuals to perform a behavior and the more social pressure they feel to adapt to that behavior, the more possible it is to serve the behavior (Chan and Bishop, 2013).

Studies have revealed that social pressure influences intention towards the behavior. Nguyen et al. (2018) found that social obligation has a positive and significant impression on e-waste recycling intention. Fan et al. (2019) found that people living in both countries tend to focus on the thoughts of people around them. Thus, the hypothesis below was created:

H1: SN has a positive impact on IN

Tan (2013) revealed that the perception that behavior is easy or difficult has a significant impression on IN. Zhang et al. (2015) suggest that PBC has a positive and significant impression on waste separation intention. Thus, the hypothesis below was developed:

H2: PBC has a positive impact on IN

Zhang et al. (2015) also demonstrated that the waste separation behavior could improve as the intention increases. Wang et al. (2020) reveal that subjective norms and perceived behavioral control have a positive and significant impact on using recyclable express packaging intention. Therefore, the following hypothesis was developed for the assumption that intention trigged by the two variables influences recycling behavior:

H3: IN has a positive impact on RB

In the study, the mediating impact of IN on RB through SN and PBC was examined. Sabri, Razak, and Wijekon (2019) found that pro-environmental workplace (PEW) intention mediated PEW perceived behavioral control and PEW subjective norms on PEW behavior. Mamun et al. (2019) stated that PBC has a significant mediating effect on recycling intention. Thus, the hypotheses below were developed:

H4: IN mediates the positive relationship between SN and RB

H5: IN mediates the positive relationship between PBC and RB

Moreover, the direct effect of variables on recycling behavior was wanted to be examined. Razali et al. (2020) suggested that SN has a significant impact on waste separation behavior. Meng et al. (2018) express that having convenient access to environmental facilities and services has a significant impact on household solid waste recycling. Thus, the following hypotheses were developed:

H6: SN has a positive impact on RB

H7: PBC has a positive impact on RB

3.2 SURVEY DESIGN

The best practices in literature were taken into consideration while establishing models. Constructs on PBC, SN, IN, and RB were modified from past studies (Tonglet et al., 2004; Zhang D. et al., 2015; Zhang et al., 2019; Paul et al., 2016; Fu et al., 2018). While some items are taken directly from earlier studies, some items were modified from them, considering the students of Hacettepe University (Table 3.1)

Table 3.1 Sources of the Items

Constructs	Items	Source
Subjective Norms	"My families expect me to separate waste"	Zhang D. et al., 2015
	"My neighbors expect me to separate waste"	Zhang D. et al., 2015
	"The community expects me to separate waste"	Zhang D. et al., 2015
	"Most people think I should recycle"	Tonglet et al., 2004
	Most of the people important to you want you to recycle	modified from Paul et al., 2016
Perceived Behavioral Control		
	"I know how to recycle my household waste"	Tonglet et al., 2004
	"I know where to take my household waste for recycling"	Tonglet et al., 2004
	I know the services that municipalities provide for recycling.	modified from Tonglet et al., 2004
	"I have plenty of opportunities to recycle"	Tonglet et al., 2004
Intention	I am willing to participate in environmental programs held by the governmental agencies	modified from Zhang D. et al., 2015
	I am interested in environmental publications in the media.	modified from Fu et al., 2018

	I talk about environmental problems with my immediate circle	modified from Fu et al., 2018
	I encourage classmates and colleagues to save resource	modified from Fu et al., 2018
	I encourage classmates and colleagues to participate in environmental activities like planting trees.	modified from Fu et al., 2018
	I encourage classmates and colleagues to support policies to protect the environment.	modified from Fu et al., 2018
Recycling Behavior	Please indicate how often you throw your plastic waste into recycling bins such as a pet water bottle.	modified from Zhang et al., 2019
	Please indicate how often you throw your glass waste into recycling bins such as beverage bottles, jars.	modified from Zhang et al., 2019
	Please indicate how often you throw your paper waste into recycling bins such as notepads, cardboard coffee cups.	modified from Zhang et al., 2019
	Please indicate how often you throw your metal waste into recycling bins such as aluminum beverage cans, canned food cans.	modified from Zhang et al., 2019

The survey comprises of two parts. In the initial part, personal details are included: Gender, the year the students are studying, income. Moreover, it was asked whether the students had relatives who recycled and whether they received an environmental education before starting university, as it was thought to affect recycling behavior. The second section is designed to measure the determinants of students' recycling behavior. For this, the Five-Point Likert Scale was adopted with labels stating (1) Strongly disagree, (2) Disagree, (3) Neither agree nor disagree, (4) Agree, (5) Strongly agree.

3.3 DATA COLLECTION

For the purposes of the study, a preliminary observation of the Beytepe Campus was made in the ten months up to October 2019; its student bus stop, dormitory areas, canteen, and garden areas where students are concentrated in the Faculty of Economics and Administrative Sciences were closely examined for the study. The investigation revealed that large quantities of packaging waste in the form of plastic, paper, glass, and metal were dumped by students around the premises. Most of the canteen’s food is packed in

plastic, but some of them are also covered or served in paper or glass packaging. Three of the most popular products —tea, coffee, and water —are sold either in cardboard cups or plastic bottles. This is how the study aims to examine the determinants of students' recycling behavior. The pilot study was applied to 78 students who were selected randomly at Hacettepe University Beytepe Campus. Survey questions were conveyed to students through Whatsapp groups of student clubs. This method was preferred since there are member students of almost every university department in student clubs. Also, Whatsapp groups provide a wide reach. Before the current study, the results of the pilot study were evaluated. The questionnaire forms were distributed to 249 students. While 93 of the questionnaire forms were distributed in the classroom,156 questionnaire forms were collected through an e-mail.

CHAPTER 4: RESULTS

4.1 DESCRIPTIVE STATISTICS

The questionnaire study was applied to the students studying the Department of Economics, International Relations and Social Work located in Hacettepe University Beytepe Campus.

Eight questionnaire forms were excluded from the analysis. Since five students did not fill most of the questionnaire form and three students gave inconsistent answers to the questions. These five students are among those who received an online questionnaire form, and it has been determined that mostly the last questions are left blank. The other three students answered all questions as 1-2-3-4-5 and 1-2-3-4-5, respectively. Therefore, it was not included in the survey analysis as it does not reflect the real opinion. These meaningless questionnaires are among the paper surveys. As a result, 3% of answers were excluded from the analysis. Furthermore, among the remaining 241 questionnaires, there were nine missing values. For this, missing value analysis was performed using IBM SPSS 25. and it was verified that the missing values were randomly distributed. Then, data was assigned with the mean substitution method. This method is not preferred much since it leads to inconsistent bias (Kang, 2013). However, since the number of missing values is low, it was used in the study.

Distribution of the students participating in the study regarding demographic variables (N=241):

Table 4.1 Profile Information of the Students

Variables	Category	Frequency	Percentage
Gender	Female	162	67.2
	Male	79	32.8
Department	Economics (Eng)	30	12.4
	Economics (Tr)	154	63.9
	International Relations	26	10.8
	Social Work	31	12.9
Year	1st	49	20.3
	2nd	65	27
	3rd	37	15.4
	4th	68	28.2
	Master student	22	9.1
Monthly Household Income	< 3.000 TL	38	15.8
	3.000 TL – 5.000 TL	70	29
	5.000 TL – 7.000 TL	57	23.7
	> 7.000 TL	76	31.5
Student's Income	0	61	25.3
	< 500 TL	51	21.2
	500 TL – 1.000 TL	79	32.8
	1.000 TL – 3.000 TL	38	15.8
	> 3.000 TL	12	5.0

Demographic characteristics of the students surveyed showed that 67.2% of students are female and 32.8% are male. It was mentioned that some of the questionnaires were distributed in classrooms, and some of them were delivered to students through an e-mail. Except for the social service department, the number of male students is higher than the number of female students in selected departments in the study. However, the rate of female students among the respondents in each department was higher than male. Therefore, it can be stated that female students attended the lesson the most, and among the students who were sent an e-mail, female students answered the survey mostly.

However, as can be seen in the next section, the unequal ratio of female and male does not create any problem since gender does not have a significant effect on RB in this study.

184 of the questionnaires were applied to students studying in the Department of Economics, 31 in the Department of Social Work, and 26 in the Department of International Relations. 20.3% of the students are 1st year, 27% of the students are 2nd year, 15.4% of the students are 3rd year, 28.2% of the students are 4th year, and 9.1% of the students are master's students.

Almost one-third household of the students (31.5%) has a monthly income of more than 7.000 TL. Households of 29% of students have a monthly income between 3.000 TL – 5.000 TL, households of 23.7% of students have a monthly income between 5.000 TL – 7.000 TL, and households of 15.8% of students have a monthly income less than 3.000 TL. In addition, almost one-third of the students (32.8%) earn between 500 TL – 1.000 TL, 21.2% of the students earn less than 500 TL, 15.8% of students earn between 1.000 TL – 3.000 TL, and only 5% of students earn more than 3.000 TL.

4.2 DATA ANALYSIS RESULTS

4.2.1 Demographic Analysis

At the beginning of the study, the effect of students' selected demographic characteristics on recycling behavior was examined using IBM SPSS 25.

T-Test was used to examine whether the students' recycling behavior varies according to their gender, their relatives who recycled, and whether they had received an environmental education before.

Table 4.2 T-Test Results of the Study

Variables	Category	N	Mean	P
Gender	Female	162	3.1142	0.292
	Male	79	2.9778	
Relatives who recycled	Yes	161	3.3214	0.000

	No	80	2.5625	
Environmental Education*	Yes	103	3.1966	0.054
	No	133	2.9586	

* It refers to the environmental education that students attend before starting university.

According to the results of the analysis, the recycling behavior of the students does not differ according to their gender ($p > .05$). However, recycling behavior differs among students who have relatives who recycle around ($p < .05$) In other words, it is stated that the students who have relatives who recycle are recycling more. Moreover, the variable, Environmental Education is borderline ($p = .054$). It can be stated that environmental education that students attend before starting the university has a positive impact on their recycling behavior.

A one-way ANOVA test was conducted to detect students' and their family's income' impact on recycling behavior. In addition, the impact of the year of students studying on their recycling behavior is examined.

Table 4.3 ANOVA Results of the Study

Variables	**Category**	**N**	**Mean**	**p**
Student's Income*	0	61	2.934	0.603
	< 500 TL	51	3.069	
	500 TL – 1.000 TL	79	3.098	
	1.000 TL – 3.000 TL	38	3.132	
	> 3.000 TL	12	3.375	
Monthly Household Income**	< 3.000 TL	38	2.947	0.522
	3.000 TL – 5.000 TL	70	2.982	
	5.000 TL – 7.000 TL	57	3.132	
	> 7.000 TL	76	3.164	
Year***	1st	49	3.092	0.518
	2nd	65	2.919	
	3rd	37	3.196	

	4th	68	3.066	
	Master student	22	3.261	

* What is your monthly income? (For example, if you have a part-time job or student scholarship)

** What is your monthly household income?

*** Please indicate what year you are studying.

ANOVA results show that the recycling behavior of the students participating in the study does not differ according to student's income, monthly household income, and year ($p > .05$).

In this part of the research, SEM analysis was introduced. SEM consists of the Measurement Model and the Structural Model.

4.2.2 Measurement Model

While designing the survey questions and establishing the relationship between each construct, measuring “reuse” and “situational factors” constructs were also used. Because of EFA and CFA analyzes, questions involving these factors were not included in the structural model analysis. However, all stages and results of the analysis are discussed in detail.

4.2.2.1 EFA

EFA was carried out using IBM SPSS program. Pattern matrix expresses how many factors and items associated with these factors according to the results of the survey. Thus, a six-factor model was formed. Variables have a unique relationship with each factor. The matrix of this unique relationship, Pattern Matrix, is as follow:

Table 4.4 Pattern Matrix

	Component					
	1	2	3	4	5	6
SN1		.685				
SN2		.751				
SN3		.752				
SN4		.935				
SN5		.720				
PBC1			.745			
PBC3			.777			
PBC4			.725			
PBC5			.753			
PBC6			.487			
IN1	.826					
IN3	.564					
IN4	.734					
SF2						-.729
SF4						.725
SF7						.633
RB1				.578		
RB2				.802		
RB3				.750		
RB4				.908		
RU1					.680	
RU2					.901	
RU3					.808	
RU4					.581	
PEB1	.715					
PEB2	.848					
PEB3	.848					
PEB4	.720					

SN1, SN2, SN3, SN4, and SN5 are the indicators of Subjective Norms; PBC1, PBC3, PBC4, PBC5, and PBC6 are the indicators of Perceived Behavioral Control, IN1, IN3, IN4, PEB1, PEB2, PEB3, and PEB4 are the indicators of Intention; SF2, SF4, and SF7 are the indicators of Situational Factors; RB1, RB2, RB3, and RB4 are the indicators of Recycling Behavior; RU1, RU2, RU3, and RU4 are the indicators of Reuse

In cases where it is not possible to predict exactly how many factors will occur, the Promax method is recommended (Gaskin, 2020). Therefore, this method was chosen as the factor rotation method in the analysis. Principal Component Method is suggested

since it is simpler and more suitable for EFA analysis (Gaskin, 2020). Thus, this method was chosen as the Extraction Method.

The value corresponding to each item in the table indicates the factor loadings. Factor loadings should be .50 or greater to be considered significant, but if the number of observations is between 200 and 250, but .40 and above should also be preferred (Hair et al.,2010). Therefore, the values below .40 were excluded from the analysis. Therefore, the items, PBC2, IN2, SF1, SF3, SF5, SF6 were removed by the program since they had a factor load below .40.

Moreover, while constructing the analysis, Intention and Pro-environmental Behavior were considered as separate factors. However, after EFA, the two factors combined under a single factor, Intention.

The factors and items after the 6-factor structure are as follows:

Table 4.5 Factors and Items in the Study according to EFA

Factor 1	**Subjective Norms**
SN1	"My families expect me to separate waste"
SN2	"My neighbors expect me to separate waste"
SN3	"The community expects me to separate waste"
SN4	"Most people think I should recycle"
SN5	Most of the people important to you want you to recycle
Factor 2	**Perceived Behavioral Control**
PBC1	"I know what items can be recycled"
PBC3	"I know how to recycle my household waste"
PBC4	I know where to take my household waste for recycling
PBC5	I know the services that municipalities provide for recycling.
PBC6	"I have plenty of opportunities to recycle"
Factor 3	**Intention**
IN1	I am willing to participate in environmental programs held by the governmental agencies
IN3	My intention to recycle next year is more than this year.
IN4	I am interested in environmental publications in the media.
PEB1	I talk about environmental problems with my immediate circle
PEB2	Encourage classmates and colleagues to save resource

PEB3	Encourage classmates and colleagues to participate in environmental activities like planting trees.
PEB4	Encourage classmates and colleagues to support policies to protect the environment.
Factor 4	**Situational Factors**
SF2	The regular or scattered locations of recycling bins affect my recycling behavior.
SF4	I do not think that enough recycling bins are placed in the environment.
SF7	I think the capacity of the recycling bins around me is sufficient.
Factor 5	**Recycling Behavior**
RB1	Please indicate how often you throw your plastic waste into recycling bins such as a pet water bottle.
RB2	Please indicate how often you throw your glass waste into recycling bins such as beverage bottles, jars.
RB3	Please indicate how often you throw your paper waste into recycling bins such as notepads, cardboard coffee cups.
RB4	Please indicate how often you throw your metal waste into recycling bins such as aluminum beverage cans, canned food cans.
Factor 6	**Reuse**
RU1	I reuse used but blank backed papers as drafts.
RU2	If possible, I fill and reuse the products I purchased. (For example, putting a drink in a glass water bottle and reusing it)
RU3	I reuse the plastic bags that I used as shopping bags before.
RU4	I reuse some products such as cardboard coffee cups and aluminum products as pencil holder etc.

Another method that gives information about how many factors there are is the scree plot. It gives the information about how many breakdowns above 1. Six factors were extracted based on eigenvalues above 1 (Figure 4.1)

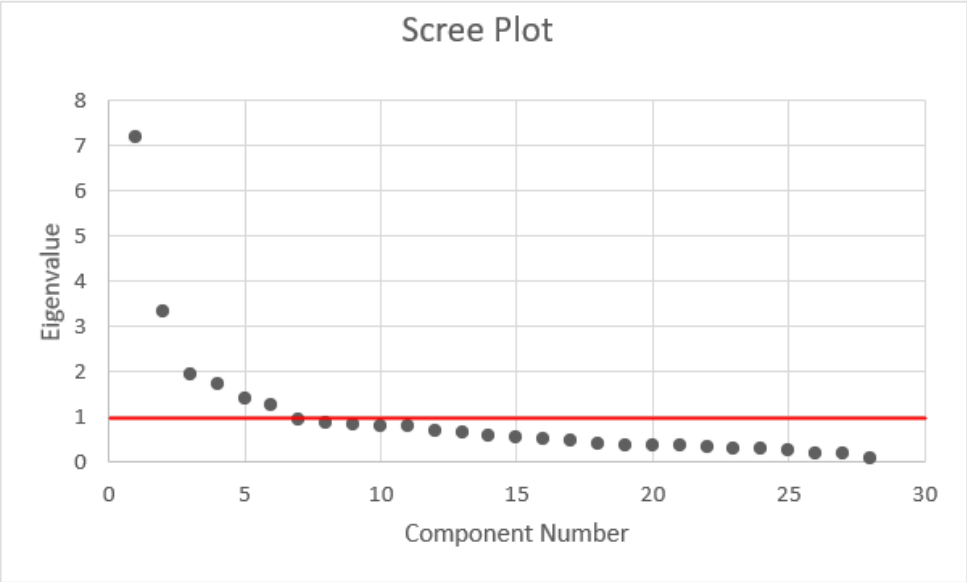


Figure 4.1 Scree Plot

Kaiser – Meyer Olkin (KMO) and Bartlett's Test gives whether the variables can be summed up under the factors in small groups. KMO is a coefficient that measures whether the sample size is sufficient for factor analysis. It is preferred that the KMO value is at least over .60 In addition, .70 – .79 is considered middling, .80 – .89 is considered meritorious and .90 – 1.00 is considered marvelous (Kaiser, 1974)

Bartlett's Test tests the convenience of the data to factor analysis under the assumption of normal distribution. This value compares the Correlation Matrix and Identity Matrix. A zero means there is no difference between the two.

Table 4.6 KMO and Bartlett's Test Results

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy		.848
Bartlett's Test of Sphericity	Approx. Chi-Square	2973.309
	df	378
	Sig.	.000

According to KMO and Bartlett's Test results, KMO coefficient is .848. This value is considered excellent and indicates that the sample size is sufficient for factor analysis. According to Bartlett's Test results, it can be said that there are high correlation relations between the items, and the data come from multiple normal distributions (X^2=2973.3; p <.001). According to these findings, the data set is suitable for factor analysis (Table 4.5).

Communalities indicates the degree of the relationship of each item with the factor to which it belongs. The high extraction value indicates that there is a high correlation between the factor and the item.

Table 4.7 Communalities

Items	**Extraction**
SN1	.588
SN2	.610
SN3	.604
SN4	.711
SN5	.680
PBC1	.494
PBC3	.552
PBC4	.720
PBC5	.651
PBC6	.517
IN1	.570
IN3	.402
IN4	.510
SF2	.472
SF4	.529
SF7	.512
RB1	.639
RB2	.655
RB3	.580
RB4	.734
RU1	.525
RU2	.742

RU3	.627
RU4	.432
PEB1	.633
PEB2	.801
PEB3	.784
PEB4	.599

If extraction value is less than .40 then that variable may struggle to load significantly on any factor (Gaskin, 2020). As it is considered the communalities value of all items in the analysis is above 0.40 (Table 4.6).

Table 4.8 Total Variance Explained for the Model

Total Variance Explained							
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings[a]
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	7.193	25.688	25.688	7.193	25.688	25.688	5.258
2	3.323	11.868	37.556	3.323	11.868	37.556	4.771
3	1.951	6.968	44.524	1.951	6.968	44.524	4.289
4	1.720	6.144	50.668	1.720	6.144	50.668	4.627
5	1.425	5.090	55.758	1.425	5.090	55.758	3.463
6	1.260	4.498	60.256	1.260	4.498	**60.256**	2.198
7	0.962	3.436	63.692				
8	0.890	3.177	66.869				
9	0.852	3.042	69.911				
10	0.799	2.854	72.765				
11	0.795	2.840	75.605				
12	0.707	2.524	78.129				
13	0.652	2.328	80.457				
14	0.603	2.154	82.611				
15	0.554	1.980	84.591				
16	0.516	1.843	86.434				
17	0.477	1.704	88.138				
18	0.416	1.487	89.625				
19	0.390	1.394	91.020				
20	0.385	1.375	92.394				
21	0.375	1.339	93.734				
22	0.344	1.228	94.962				
23	0.311	1.111	96.073				
24	0.304	1.085	97.158				
25	0.278	0.992	98.150				
26	0.211	0.752	98.902				
27	0.202	0.720	99.622				
28	0.106	0.378	100.000				

Total variance explained for the model must be .60 or higher (Hair et al.,2010). Six factors have been extracted and explained about 60.256 of the variances in the model (Table 4.7).

4.2.2.2 CFA

It was conducted using the IBM AMOS 23. AMOS applies Maximum likelihood as the estimation method unless another method is chosen. Since the data show normal distribution, the maximum likelihood method was used. For the significance of the paths in the model, p values of each variable in Regression Weight outputs are checked. According to the analysis, all p values are significant. This means that the items are loaded correctly on the factors.

Table 4.9 Standardized Regression Weights and Estimates

			P	Estimate
SN1	<---	SubjectiveNorm	#	0.721
SN2	<---	SubjectiveNorm	***	0.567
SN3	<---	SubjectiveNorm	***	0.692
SN4	<---	SubjectiveNorm	***	0.718
SN5	<---	SubjectiveNorm	***	0.827
PBC1	<---	PerceivedBC	#	0.422
PBC3	<---	PerceivedBC	***	0.535
PBC4	<---	PerceivedBC	***	0.871
PBC5	<---	PerceivedBC	***	0.78
PBC6	<---	PerceivedBC	***	0.587
IN1	<---	Intention	#	0.572
IN3	<---	Intention	***	0.49
IN4	<---	Intention	***	0.559
PEB1	<---	Intention	***	0.771
PEB2	<---	Intention	***	0.939
PEB3	<---	Intention	***	0.9
PEB4	<---	Intention	***	0.702
SF2	<---	SituationalF	#	0.363
SF4	<---	SituationalF	***	-0.532

SF7	<---	SituationalF	***	-0.67
RB1	<---	RecyclingBehavior	#	0.799
RB2	<---	RecyclingBehavior	***	0.701
RB3	<---	RecyclingBehavior	***	0.666
RB4	<---	RecyclingBehavior	***	0.692
RU1	<---	Reuse	#	0.594
RU2	<---	Reuse	***	0.803
RU3	<---	Reuse	***	0.69
RU4	<---	Reuse	***	0.519

***: $p < 0.01$
#: While the model is drawn in AMOS, since the program equates the factor load of one item in each factor to 1, these values are not expressed as *** in the program outputs. However, these items are also evaluated as $p < 0.01$.

Standardized loading estimates should be at least .50 and ideally .70 or higher. It is also preferred to have at least 3 or 4 variables per factor (Karagöz, 2019). The values of PBC1, IN3, and SF2 items were below the threshold value. The drawing of this model on AMOS is expressed as Model 1, the program output is as follows:

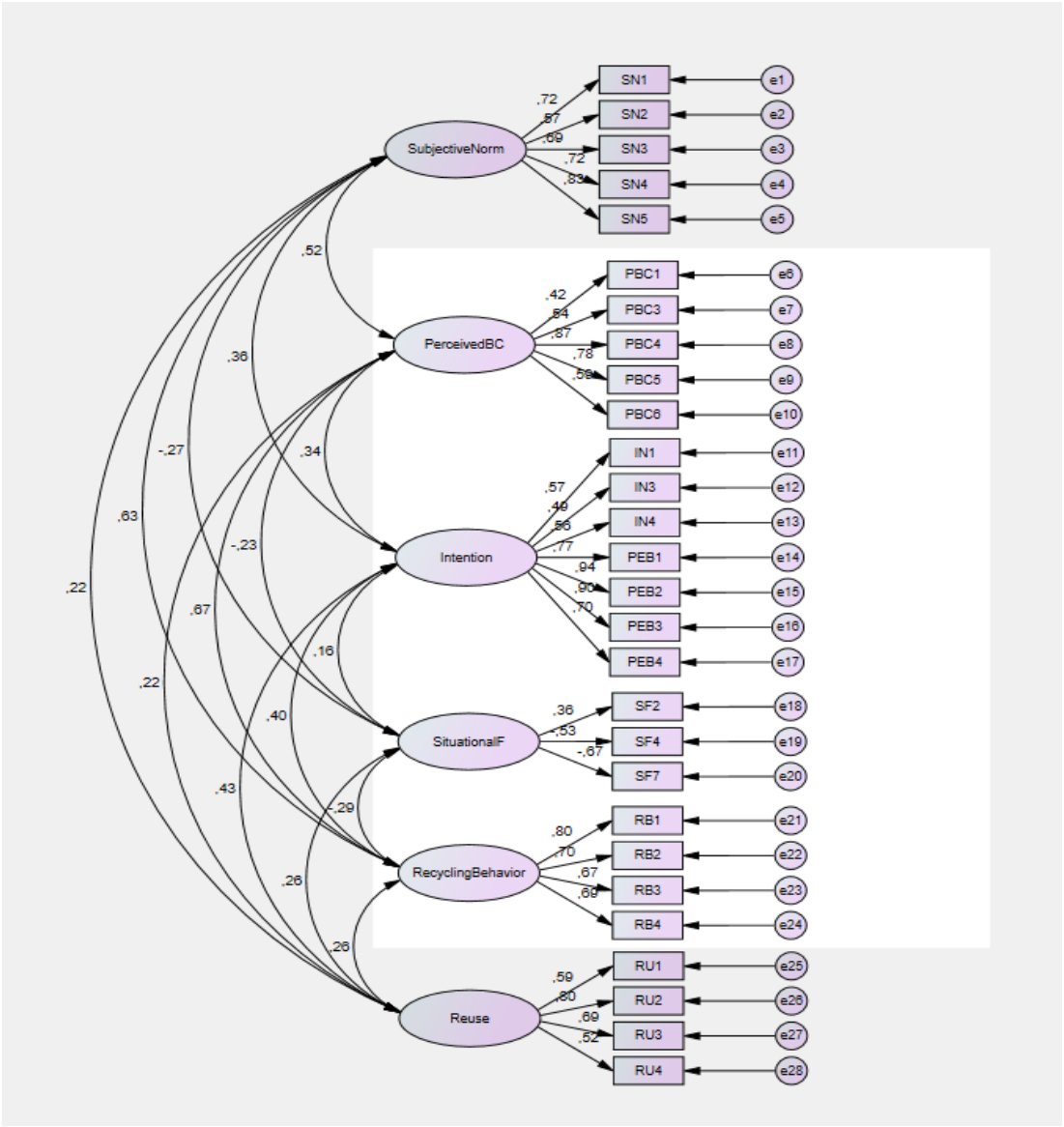


Figure 4.2 Drawing of Model 1

As evaluated from Model 1, the factor loads of PBC1, IN3, and SF2 items were excluded from the analysis since they were below .50. Moreover, after the SF2 item was removed, only two items of the Situational Factors remained: SF4 and SF7. Situational factors were not included in the analysis since they should have at least 3 or 4 variables. As it was mentioned in the literature review section, items under situational factors can also be considered perceived behavioral control. Therefore, removing this factor from the analysis did not lead to any change in reaching the answers to the hypotheses in the study.

After the items were excluded from the model, CFA was repeated and is shown below as Model 2.

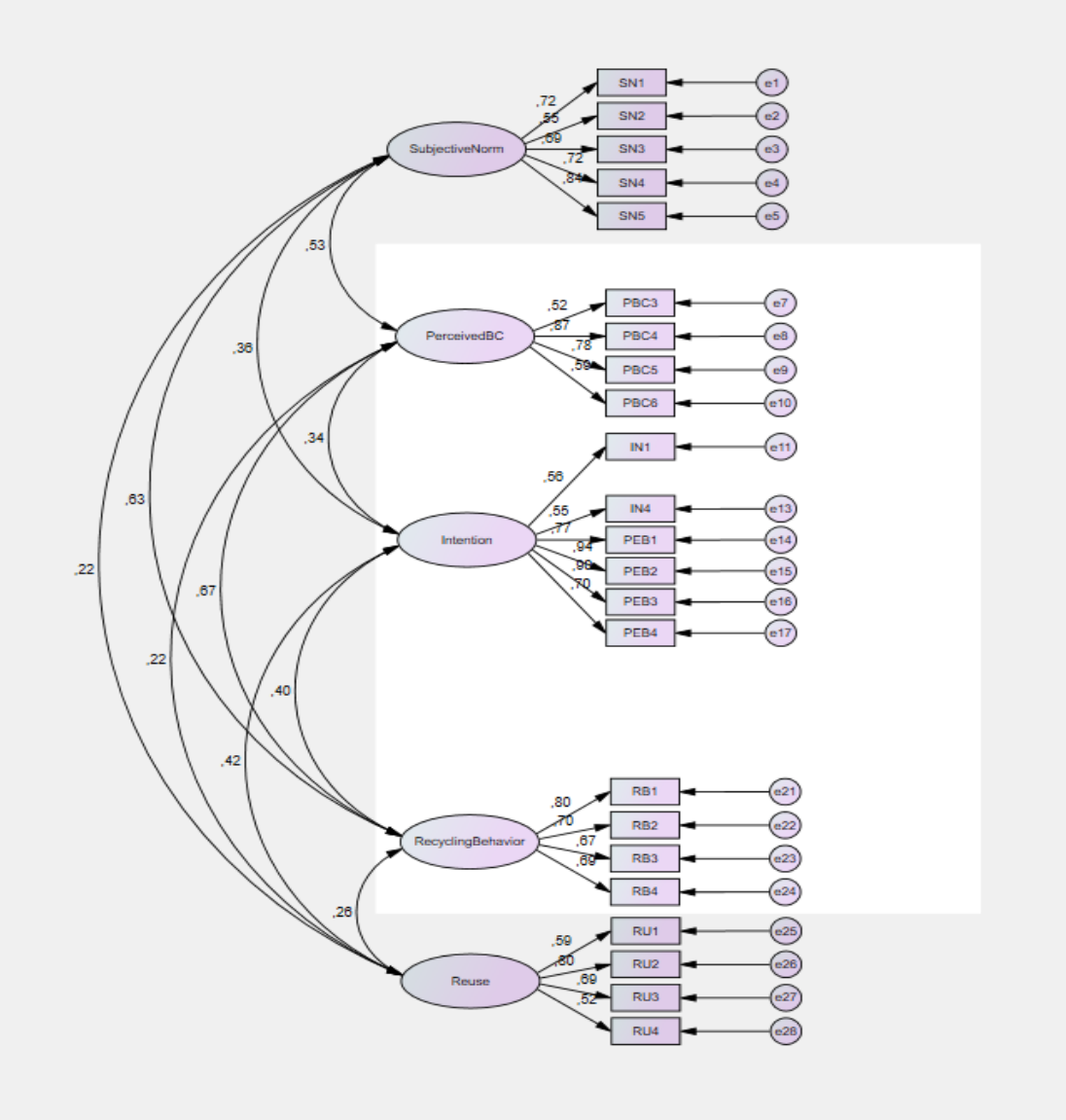


Figure 4.3 Drawing of Model 2

As a result of Model 1 and Model 2 analysis, the model fit results were considered for two, comparatively. Model fit gives how well the proposed model explains the correlations between variables in the data set. The program offers many model fit indices. There is no clear judgment about which goodness of fit tests should be evaluated in the analysis. As it was explained in section 2.3.4, using three or four model fit indices is

sufficient to interpret the fit of the model. CMIN/DF, RMSA, CIF, and SRMR indices are preferred in general.

Table 4.10 Model Fit Indices

Index	Threshold	Model 1	Model 2
CMIN/DF	$x^2/df \leq 3$	1.884	2.026
CFI	$0.95 \leq CFI$	0.891	0.909
RMSA	$RMSA \leq 0.08$	0.061	0.065
SRMR	$SRMR \leq 0.08$	0.065	0.065

x^2/df is sensitive to the sample size. This index can be higher as the sample size increases. For this reason, fit indices have been developed that minimize the effect of sample size (Tabachnick et al., 2013). When the model fit results are examined, it is stated that the x^2/df index has increased, and there is an improvement in CFI index. As a result, CMIN/DF, RMSA, and SRMR indices are within the accepted threshold values. However, it is observed that CFI index is below the threshold value. CFI index can be accepted above .85, but values above .95 indicate a better fit (Hair et al.,2010)

To reveal the validity of a measurement model revealed by EFA and confirmed by CFA, the model must also provide Construct Validity. It consists of four components: Convergent Validity, Discriminant Validity, Nomological, and Face Validity (Hair et al.,2010).

Convergent Validity

It states that items representing the same structure are related to each other and measure a single conceptual structure. Three indicators are widely used to determine the Convergent Validity: “Standardized Loading Estimates, Average Variance Extracted (AVE) and Construct Reliability (CR**).”**

Table 4.11 Convergent Validity

			Factor Loadings	**AVE**	**CR**
SN		Subjective Norm		.50	.77
SN1	<---	SubjectiveNorm	.720		
SN2	<---	SubjectiveNorm	.555		
SN3	<---	SubjectiveNorm	.685		
SN4	<---	SubjectiveNorm	.719		
SN5	<---	SubjectiveNorm	.836		
PBC		Perceived Behavioral Control		.50	.74
PBC3	<---	PerceivedBC	.522		
PBC4	<---	PerceivedBC	.871		
PBC5	<---	PerceivedBC	.778		
PBC6	<---	PerceivedBC	.593		
IN		Intention		.57	.85
IN1	<---	Intention	.564		
IN4	<---	Intention	.552		
PEB1	<---	Intention	.769		
PEB2	<---	Intention	.941		
PEB3	<---	Intention	.903		
PEB4	<---	Intention	.701		
RB		Recycling Behavior		.51	.81
RB1	<---	RecyclingBehavior	.800		
RB2	<---	RecyclingBehavior	.699		
RB3	<---	RecyclingBehavior	.670		
RB4	<---	RecyclingBehavior	.688		
RU		Reuse		.44	.69
RU1	<---	Reuse	.590		
RU2	<---	Reuse	.805		
RU3	<---	Reuse	.691		
RU4	<---	Reuse	.519		

The main indicator that items belonging to the same factor agree is that they have high factor loadings. After the items with a factor load of below .50 were excluded from the model and the analysis was repeated, it is expressed that the values of all variables are above .50.

The value of AVE must be .50 or above .50 to have sufficient convergent validity. If the AVE value is greater than .50, it can be said that the factor has convenience validity. Moreover, the value of CR must be .70 or above .70 to have sufficient internal consistency. It can be said that the factor with a CR coefficient greater than .70 has high structure reliability and, therefore, compliance validity. When CR value takes a value between .6 and .7, it indicates an acceptable level of reliability, but it does not indicate a very good reliability (Hair et al., 2010). According to the results, CR value of Reuse is an acceptable threshold, but AVE value is low (Table 4.11). Therefore, it should not be included in structural model analysis. It can be said that factors in the model apart from Factor Reuse have Convergent Validity

Discriminant Validity

One of the main purposes of factor analysis is to collect items that are highly correlated with each other and represent the same latent variable under a common factor. Another purpose of factor analysis is to examine that these factors are independent of each other and that these factors measure different characteristics. Whether the factors in a multi-factor measurement structure measure independent and different structures are examined with the Discriminant Validity. Hence, AVE values of the factors must be higher than the square of the correlation coefficient among factors (Kartal and Bardakçı, 2018).

Table 4.12 Discriminant Validity

Factors	SubjectiveNorm (AVE=0.50)	PerceivedBC (AVE=0.50)	Intention (AVE=0.57)	RecyclingBehavior (AVE=0.51)	Reuse (AVE=0.44)
SubjectiveNorm (AVE=0.50)	1.00				
PerceivedBC (AVE=0.50)	0.28	1.00			
Intention (AVE=0.57)	0.13	0.11	1.00		
RecyclingBehavior (AVE=0.51)	0.40	0.45	0.16	1.00	
Reuse (AVE=0.44)	0.05	0.05	0.18	0.07	1.00

This condition is provided for all factors (Table 4.12).

Nomological and Face Validity

Face Validity is the determination that the variables in the model are validly compatible with the model. When using CFA, face validity must be determined before any theoretical test. It is unfeasible to state and accurately express a measurement theory without comprehension of each item's content or point. Nomological Validity is that the factors and items in the model are supported by the theoretical framework in the literature. Assessments in Nomological are based on EFA approach.

4.2.3 Structural Model Analysis

In the structural model analysis, direct or indirect relationships between variables are tested. Firstly, the model is drawn without the mediator variable.

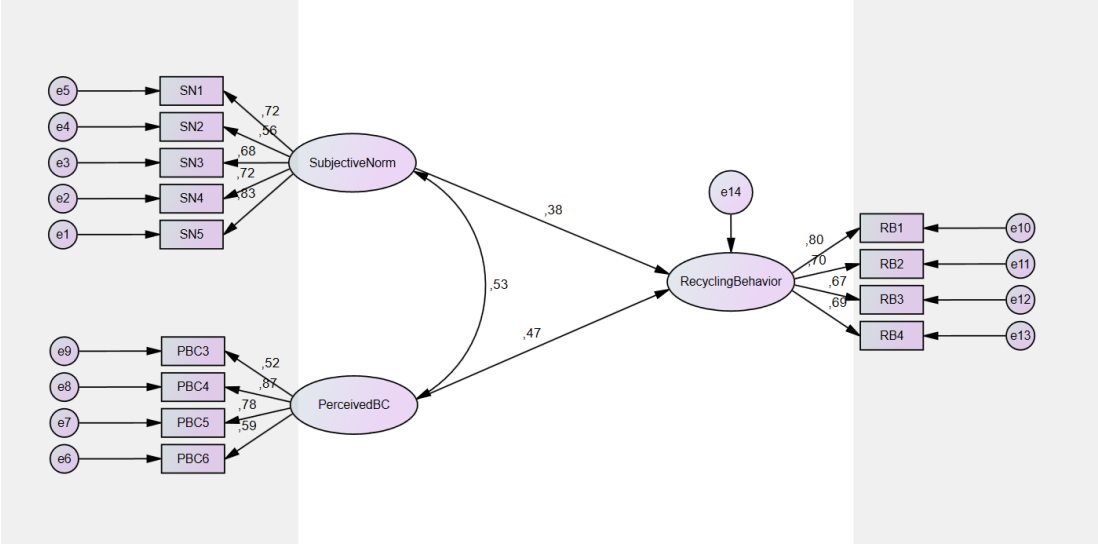


Figure 4.4 Structural Model without Mediator Variable

To establish a model in which the intention as the mediator variable, PBC and SN variables should have a significant effect on recycling behavior. According to the analysis results, it is stated that PBC (β =. 466, $p < .01$) and SN (β = .381, $p < .01$) have positive and significant effect on RB.

After confirming that the relationships were significant, the mediator variable was added to the model to examine the hypothesis testing and mediation relationship. Before these relationships were tested, model fit values were examined in both measurement model and structural model analysis. The closer the model fit values in CFA and Structural Model Analysis are to each other, the more reliable the researcher's model is (Hair et al., 2010). Therefore, it is stated that Index values of model fit obtained as a result of the analysis showed that the model was validated (Chi-square=328.237; Degrees of

freedom=146; CMIN/DF=2.248; CFI=0.917; RMSA= 0.072; SRMR= 0.065). The structural model with intention, mediator variable, is defined as follows:

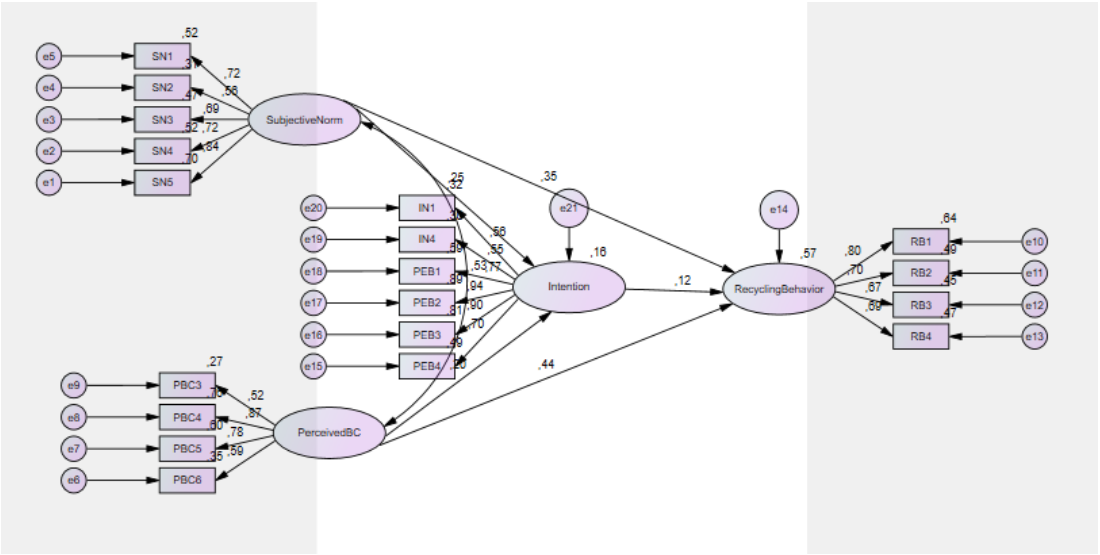


Figure 4.5 Structural Model with Mediator Variable

4.3 FINDINGS ON RESEARCH HYPOTHESES

In the study, it was mentioned seven hypotheses.

H1: SN has a positive impact on IN

H2: PBC has a positive impact on IN

H3: IN has a positive impact on RB

H4: IN mediates the positive relationship between SN and RB

H5: IN mediates the positive relationship between PBC and RB

H6: SN has a positive impact on RB

H7: PBC has a positive impact on RB

Table 4.13 Results of Hypothesis in the Study

No	Hypothesis	Estimates	P Values	Results
H1	SubjectiveNorm --> Intention	.250***	.006	Supported
H2	PerceivedBC --> Intention	.204**	.026	Supported
H3	Intention --> RecyclingBehavior	.123*	.089	Supported
H4	SubjectiveNorm --> Intention -->RecyclingBehavior	.031**	.041	Supported
H5	PerceivedBC --> Intention -->RecyclingBehavior	.025*	.060	Supported
H6	SubjectiveNorm --> RecyclingBehavior	.350***	.001	Supported
H7	PerceivedBC --> RecyclingBehavior	.441***	.001	Supported

Significance levels: *p < .10. **p < .05. ***p < .01

The results suggest that SN (β = .250, p < .01) and PBC (β = .204, p < .05) have the significant impact on IN. Therefore, H1 and H2 are confirmed. However, SN has slightly more effect on IN than PBC.

Furthermore, IN mediates the positive relationship both between SN and RB (β = .031. p < .05) and between PBC and RB (β = .025, p < .10). Thus, H4 and H5 are confirmed. However, it was mention that there were two types of mediation relationships: Full mediation and partial mediation. Firstly, the exogenous variables in the model without mediator should have a significant effect on the endogenous variable. Secondly, after the mediator variable is included in the model, the exogenous variables have a significant effect on the mediator variable. Thirdly, if the exogenous variables still have a significant effect on the endogenous variable, there is partial mediation, otherwise, there is full mediation. Consequently, since direct and indirect effects are significant in the model, it is stated that there is a partial mediating.

When the impact of the mediator on RB is examined, it is expressed that H3 is confirmed, but the intention has a weak impact on Recycling Behavior (β = .123, p < .10). In other words, the direct effects on recycling behavior are stronger than the indirect effects.

When the direct impacts of SN and PBC on RB are examined, it is stated that SN (β = .350, p < .01) and PBC (β = .441, p < .01) have the significant impact on RB. Thus, H6 and H7 are confirmed. Moreover, it is stated that the direct impact of PBC on RB is greater

than the direct impact of SN on RB. Therefore, the impact of SN and PBC on IN is less than the direct effect of these two factors on RB.

While the magnitude of SN is greater on IN compared to PBC, the magnitude of PBC on RB is greater than SN. Since the mediating effect on Intention between PBC and RB is weaker than the mediating effect on IN between SN and RB.

According to the result, it is stated that students' knowledge of recycling opportunities and how to recycle has an impact on recycling behavior. In addition, the fact that SN has a positive effect on RB indicates that students are influenced by the individuals around them in terms of recycling behavior.

CHAPTER 5: DISCUSSION AND POLICY IMPLICATIONS

According to the study's findings, the direct effect of SN and PBC on RB is greater than in relationships where the IN is a mediator variable between these two variables and RB. Therefore, there is no strong mediation effect between intention and the two variables. According to TPB, just behind a behavior was the intention of that behavior. In this study, the intention has a partial mediation effect on behavior. A different aspect of the study from TPB, while there are three factors, attitude, SN, PBC that trigger IN in TPB, in this study, two factors, SN, PBC, were evaluated. It was concluded that these two variables' direct effect on behavior is greater than the indirect effect. Therefore, while presenting policy implications, the study focused on the direct effect of these two variables on recycling behavior. In this direction, approaches that will help shift recycling behavior into a habit have been preferred.

The research findings reveal that students' behavior towards waste management is mainly shaped both by the behavior of those in their milieu and their own personal opinions about waste management. As such, it is essential that recycling be adopted as a way of life among students and be viewed as an environmental imperative. Campuses that practice this lifestyle can set the trend for larger academic circles to emulate for the good of the environment and simultaneously raise awareness about the advantages of recycling from a sustainability perspective. Therefore, it is requisite to raise awareness about recycling behavior. Small, incremental steps to create awareness can produce results that benefit the environment significantly. For instance, a poster can be put on the canteen's walls and the student boards inside the faculty to attract the students' attention. Posters highlighting the benefits of recycling can draw students' attention and spark a change in attitudes towards sustainable recycling. Such awareness can help lay the groundwork for systemic changes in attitudes and responses towards recycling and bring about lasting behavioral change. University cafeterias and mess halls are ideal places to raise awareness about environmental causes from the ground up as they are frequented by students and staff alike and have the potential to influence the lifestyles of everyone living on campus. Since people are affected by the behavior of the people around them, the message such as "Hacettepe University students throw their waste into recycling bins! Join it" can

positively impact students' behavior. This may encourage students to emulate the behavior of their peers who actively recycle waste. When students see their fellow pupils recycling waste regularly, they too will develop a collective sense of responsibility and follow in the footsteps of their peers.

Students drinking tea, coffee, and other beverages should make a concerted effort to responsibly dispose of any waste after consuming their snacks. Paper waste bin can be placed in the canteen. Specific messages can be given to indicate that these products are waste and should be thrown into recycling bins. For instance, “recycle your coffee cup here.” However, it is also important not to reduce the attention to other types of waste and not create a perception that only sample wastes should be disposed of. Attempts should be made to discard all kinds of waste responsibly, not just sample wastes. A clear and concise message about the same can help instill such habits among students over time.

While there is no definite consensus in academic researches on the link between how environmental issues are portrayed and the behavioral changes it triggers, some studies have shown that showing a positive outcome of recycling has a stronger effect on people’s recycling habits than showing a negative one. For instance, Chatelain et al. (2018) found that positive expressions are more effective on environmentally friendly behavior. Therefore, emphasizing the preservation of the campus’ beauty can also help instill stronger recycling behaviors. Hacettepe University has a lush green campus and Yeşil Vadi (It is a place at Hacettepe University with a lake and plenty of trees) that hosts many species. It can be emphasized that the existing beauties of Hacettepe University can continue with a clean environment.

Waste collection activities were organized at Hacettepe University in some periods. Since these activities are carried out as a team, it has a positive effect on students. Occasional waste collection activities should be replaced by regular ones to help cultivate recycling behavior. Varotto and Spagnolli (2017) examined the studies investigating the effects of psychological intervention strategies on households' recycling behavior in the academic studies. Here, it has been determined that the most effective methods are environmental alteration and social modeling. Environmental alteration covers the adjustment of the physical environment to make recycling behavior more appropriate. For example, putting recycling bins closer or making them more. Social modeling involves learning behavior

by observing the people acting. For example, universities' waste collection activities can enable a student who has never collected waste before learning by seeing. Besides, Moore and Boldero (2017) argue that most behaviors need to be sustained to be efficient in the long term. Consequently, they examined the factors affecting the adoption and sustainability of a behavior. Accordingly, these factors are expressed as "low cost of an activity, easy to carry out the activity, carrying out activities similar to that activity and repeating the activity regularly" to increase adoption and sustainability. Besides, according to researchers, educational campaigns and social norms are efficient in adapting to behavior and maintaining that behavior in the long term.

Alongside raising awareness about the importance of recycling, students should also be made aware of the very practice and basics of recycling, which they are often uninformed about. Students who are unaware of recycling may be under the impression that such a practice does not even exist. Directly informing them can help change this. Moreover, individual messages can have a far greater impact on affecting behaviors rather than seminars, which many find cold and impersonal. For example, the university administration can apprise students about the basics of recycling by preparing small information notes, and they can notify them about this via e-mails. This behavior provides that it is informed to many students to be aware of the activities. Instead of sending generic emails to all students, each email should be personalized and addressed to individual students to create a greater impact. This is a more effective call to action and can help instill a better sense of responsibility. Many leaflets are distributed at the university. However, it led to increases in paper waste generation as most of it is thrown into the environment. In this way, paper waste can be prevented.

When the demographic findings were examined, the effect of the environmental education students received until the beginning of university is considered significant. Having knowledge of environmental issues is important for their recycling behavior. It should be underlined that environmental education is an important issue. In addition to the education, it is necessary to support these educations. For instance, after sending an informative e-mail to students about how to recycle at the university, regular waste collection activities should also be organized. Ramayah et al. (2012) conducted a study among 200 university students. The results emphasized the need to educate students about the environment and to be encouraged for positive environmental behavior.

CONCLUSION

The development of industry, agricultural methods, transportation systems, and health systems have led to an increase in the global population as improving living standards. The increasing population triggered consumption and economic activities. An increase in consumption fueled by overpopulation and aggressive urbanization has also led to a commensurate spike in daily waste. Based on their physical and chemical properties, there is various type of wastes such as solid waste, agricultural and animal waste, medical waste. Among them, solid waste account for the largest share of the total waste generated globally. As a result of today's increasing fast consumption habits, MSW has a large place in solid wastes. OECD data shows that all over the world, there has been an increase in municipal waste generation since 2015. Even though municipal waste generation in Turkey tended to decrease between 2011 and 2015, it has tended to decrease again since 2016 slightly.

Waste generation creates many adverse effects on the environment. It affects human and environmental health due to reasons such as littering, dumping, and disposal. If not treated or disposed of in time, accumulated waste can hurt the environment and humans. Carbon and greenhouse gas emissions are often the side effects of unsustainably managed waste, hasten global warming and natural disasters. It is up to every individual to manage their wastes generated. Waste mismanagement affects all countries, but its worst effects are felt by those with a flawed waste disposal system. While the primary goal is to prevent waste generation by reusing purchased products, recycling is an essential waste management issue. Recycling is an inevitable solution method to protect the environment and save energy.

Hacettepe University is one of the largest universities in Turkey, with 5,877,628 m2. Studying waste management behaviors in university campuses can provide useful insights into the effects of efficient waste disposal on a statistically meaningful scale since they are large enough to yield vast quantities of solid waste. Since students often develop new habits in universities, it is crucial to understand what factors shape their behavior towards waste management. Therefore, this study was created to investigate the determinants of recycling behaviors of Hacettepe University students.

One of the most preferred behavioral sciences methods, SEM, was conducted to evaluate the validity of the model and examine the hypotheses. SEM allows multiple regression equations to be examined simultaneously in a model. Since unobserved concepts can be included in the model, it is a highly preferred modeling method in psychology-based studies. Moreover, TPB was taken as a basis while creating research hypotheses since it is the most suitable and favored model to explain recycling behavior. Many academic studies have strived to describe the determinants of people's recycling behavior based on TPB and using SEM.

Before the study, the canteens, and garden areas where students are concentrated in the Faculty of Economics and Administrative Sciences, students' bus stop, and dormitory areas were examined at Hacettepe University, Beytepe Campus. The investigation revealed that students dumped large quantities of packaging waste in the form of plastic, paper, glass, and metal around the premises. The questionnaire study was applied to the students studying the Department of Economics, International Relations, and Social Work. Before the current study, the results of the pilot study were evaluated. While the questionnaire forms were distributed to 249 students, 241 valid questionnaires were used for the analysis.

Demographic analysis' results are stated that the recycling behavior of the students does not differ according to their gender, student's income, monthly household income, and the year they are studying. However, recycling behavior differs among students who have relatives who recycle around. In other words, students who have relatives who recycle are recycling more. Moreover, it can be stated that students' environmental education before starting university has a positive impact on their recycling behavior.

SEM analysis results are stated that the main determinants of students' RB are SN and PBC. Consequently, it can be stated that students are highly influenced by the behavior of the people around them on recycling behavior. Moreover, students' opinions about recycling's feasibility also played a substantial role in governing their waste disposal behaviors. Therefore, it is necessary to raise awareness about recycling behavior. Since people are affected by the behavior of the people around them, the message such as "Hacettepe University students throw their waste into recycling bins! Join it" can positively impact students' behavior. This may encourage students to emulate the

behavior of their friends who recycle. Hacettepe University has a large campus and green area where many students study and live at the same time. Showing the positive outcomes of recycling can also increase students' willingness to participate in recycling activities. Emphasizing the conservation of the campus' beauty can help to adopt recycling behaviors. Environmental activities, such as waste collection, are occasionally organized at Hacettepe University. However, regularly organized waste collection activities can also encourage the students to adopt recycling behavior. Alongside raising awareness about the importance of recycling, students should also be aware of recycling basics. It is important to know the location of the recycling bins in the university and how to recycle to embark on recycling behavior. For instance, the university administration can apprise students about recycling basics, prepare small information notes, and notify them about this via e-mails. Individual messages can have a far greater impact in affecting behaviors rather than seminars, which many find cold and impersonal. Moreover, the physical environment's adjustment to recycling can positively affect recycling behavior, such as putting recycling bins closer or making them more.

Foreign dependency is a serious problem for a country's economy. With the increase in population, the consumption of natural resources is increasing day by day. Waste of resources is reduced thanks to recycling. Generating a product requires more energy consumption than recycling. Moreover, providing raw materials from waste to yield a product is an extremely important contribution. For instance, the production of fibers from plastic wastes provides raw materials to the textile industry. Therefore, the more students recycle, the more contribution the economy will be made.

Moreover, wastes dispose of without separation mixed with garbage through rain and wind. Wastes that cannot be separated are transmitted to facilities for disposal. Disposal of waste is a costly process. Separating the waste on the campus and recycling it will ensure that less waste is delivered to the disposal facilities. This will contribute to the reduction of waste disposal costs.

The current study was planned to be conducted through questionnaires distributed to three different student groups studying Economics, Computer Engineering, and Law. However, during the data collection period, because of the university interruption of education due to the Covid-19, it was restricted to students studying at the Faculty of Economics and

Administrative Sciences. In other words, merely social science department students' recycling behaviors were examined in the study. In addition, after the university interruption of face-to-face education, some of the questionnaires were sent to the students via e-mail. Receiving some of the data via e-mail did not cause any problems. Put differently, a sufficient sample size has been reached for analysis. However, in the next study, it is aimed to include in the questionnaire study students from the other departments. In this way, it will be tried to examine the determinants of recycling behaviors of students with different profiles.

Moreover, the policy suggestions presented in the study are aimed to be implemented at Hacettepe University, Beytepe Campus, once the universities begin face-to-face education.

REFERENCES

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179–211

Arı, E., Veysel Y. "A proposed structural model for housewives' recycling behavior: A case study from Turkey". Ecological Economics, 2016.

al Mamun, A., Mohiuddin, M., Ahmad, G. bin, Thurasamy, R., & Fazal, S. A. (2018). Recycling intention and behavior among low-income households. *Sustainability (Switzerland), 10*(7)

Bamberg, S., Hunecke, M., & Blöbaum, A. (2007). Social context, personal norms and the use of public transportation: Two field studies. *Journal of Environmental Psychology, 27*(3), 190–203

Baron, R. M., & Kenny, D. A. (1986). The Moderator-Mediator Variable Distinction in Social Psychological Research. Conceptual, Strategic, and Statistical Considerations. *Journal of Personality and Social Psychology, 51*(6), 1173–1182

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

Chatelain, G., Hille, S. L., Sander, D., Patel, M., Hahnel, U. J. J., & Brosch, T. (2018). Feel good, stay green: Positive affect promotes pro-environmental behaviors and mitigates compensatory “mental bookkeeping” effects. *Journal of Environmental Psychology, 56*, 3–11

Cosic, A., Cosic, H., & Ille, S. (2018). Can nudges affect students’ green behaviour? A field experiment. In *Journal of Behavioral Economics for Policy* (Vol. 2, Issue 1)

Davies, J., Foxall, G. R., & Pallister, J. (2002). Beyond the intention-behaviour mythology: An integrated model of recycling. *Marketing Theory, 2*(1), 29–113

Fan, B., Yang, W., & Shen, X. (2019). A comparison study of ‘motivation–intention–behavior’ model on household solid waste sorting in China and Singapore. *Journal of Cleaner Production, 211*, 442–454

Gaskin, J. (2020). Gaskination's StatWiki. http://statwiki.kolobkreations.com

Gürbüz, S. (2019). AMOS ile Yapısal Eşitlik Modellemesi.

Güven, O., Gökdağ, K., Jovanović, B., & Kıdeyş, A. E. (2017). Microplastic litter composition of the Turkish territorial waters of the Mediterranean Sea, and its occurrence in the gastrointestinal tract of fish. *Environmental Pollution*, *223*, 286–294

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis*

Hernandez, L. M., Yousefi, N., & Tufenkji, N. (2017). Are there nanoplastics in your personal care products? *Environmental Science and Technology Letters*, *4*(7), 280–285

Ho, W. S., Hashim, H., Lim, J. S., Lee, C. T., Sam, K. C., & Tan, S. T. (2017). Waste Management Pinch Analysis (WAMPA): Application of Pinch Analysis for greenhouse gas (GHG) emission reduction in municipal solid waste management. Applied Energy, 185, 1481–1489

Hox, J. (1999). An Introduction to Structural Equation Modeling Bayesian estimation techniques View project Dexter View project Introduction Structural Equation Modeling

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

Kaiser, H. F. (1974). An Index of Factorial Simplicity

Karagöz, Y. (2019). SPSS 23 ve AMOS 23 Uygulamalı İstatistiksel Analizler

Kartal, M., Bardakçı, S. (2018). SPSS ve AMOS Uygulamalı Örneklerle Güvenilirlik ve Geçerlilik Analizleri

Khan, F., Ahmed, W., & Najmi, A. (2019). Understanding consumers' behavior intentions towards dealing with the plastic waste: Perspective of a developing country. *Resources, Conservation and Recycling*, *142*, 49–58

Kleinman, A., & Petryna, A. (1994). The Implications of Genetics for Health Professional Education. Josiah Macy, Jr Foundation, New York Farmer P 1999 Infections and Inequalities: The Modern Plagues. In *Medical Geography; Medical Sociology* (Vol. 39). Princeton University Press

Kline, B. (2011). Principles and Practice of Structural Equation Modeling. Third Edition

Latif, S. A., Omar, M. S., Bidin, Y. H., & Awang, Z. (2012). Environmental Problems and Quality of Life: Situational Factor as a Predictor of Recycling Behaviour. *Procedia - Social and Behavioral Sciences*, *35*, 682–688

Linder, N., Lindahl, T., & Borgström, S. (2018). Using behavioural insights to promote food waste recycling in urban households-evidence from a longitudinal field experiment. *Frontiers in Psychology*, *9*(MAR)

Madden, T. J., Ellen, P. S., & Ajzen, I. (1992). A Comparison of the Theory of Planned Behavior and the Theory of Reasoned Action. Personality and Social Psychology Bulletin, 18(1), 3–9

Mamun, A. al, Saufi, R. A., Mohiuddin, M., & Fazal, S. A. (2019). Recycling intentions and behaviors among informal micro-entrepreneurs in Kelantan, Malaysia. *World Journal of Entrepreneurship, Management and Sustainable Development*, *15*(2), 123–138

Mason, S. A., Garneau, D., Sutton, R., Chu, Y., Ehmann, K., Barnes, J., Fink, P., Papazissimos, D., & Rogers, D. L. (2016). Microplastic pollution is widely detected in US municipal wastewater treatment plant effluent. *Environmental Pollution*, *218*, 1045–1054

Meng, X., Tan, X., Wang, Y., Wen, Z., Tao, Y., & Qian, Y. (2019). Investigation on decision-making mechanism of residents' household solid waste classification and recycling behaviors. *Resources, Conservation and Recycling*, *140*, 224–234

Moore, H. E., & Boldero, J. (2017). Designing interventions that last: A classification of environmental behaviors in relation to the activities, costs, and effort involved for adoption and maintenance. In Frontiers in Psychology (Vol. 8, Issue NOV). Frontiers Media S.A

Nachtigall, C., Kroehne, U., Funke, F., & Steyer, R. (2003a). (Why) Should We Use SEM? Pros and Cons of Structural Equation Modeling. In Methods of Psychological Research Online (Vol. 8, Issue 2)

Nguyen, H. T. T., Hung, R. J., Lee, C. H., & Nguyen, H. T. T. (2018). Determinants of residents' E-waste recycling behavioral intention: A case study from Vietnam. Sustainability (Switzerland), 11(1)

OECD Database (2020). Municipal Waste. https://data.oecd.org/waste/municipal-waste.htm

Onwezen, M. C., Antonides, G., & Bartels, J. (2013). The Norm Activation Model: An exploration of the functions of anticipated pride and guilt in pro-environmental behaviour. Journal of Economic Psychology, 39, 141–153

Pathak, P., Roshani, W., & Aniket, D. (2018). Solid Waste Management

Ramayah, T., Lee, J. W. C., & Lim, S. (2012). Sustaining the environment through recycling: An empirical study. Journal of Environmental Management, 102, 141–147

Razali, F., Daud, D., Weng-Wai, C., & Anthony Jiram, W. R. (2020). Waste separation at source behaviour among Malaysian households: The Theory of Planned Behaviour with moral norm. Journal of Cleaner Production, 271

REC Türkiye (2016). Ambalaj Atıklarının Kontrolü Yönetmeliği, Belediye Uygulama Rehberi

Roithner, C., & Rechberger, H. (2020). Implementing the dimension of quality into the conventional quantitative definition of recycling rates. Waste Management, 105, 586–593.

Sabri, M. F., Razak, N. F., & Wijekoon, R. (2019). The mediation effect of intention in the pro-environmental workplace (Pew) behavior of malaysian public employees. Management Science Letters, 9(10), 1567–1576

Salleh, M. F. M., Zuki, N. H. M., Ismail, M. H., & Abdullah, N. (2016). Secondary School Students' Knowledge and Awareness on Environmental Issues. In 7th International Conference on University Learning and Teaching (InCULT 2014) Proceedings (pp. 563–577). Springer Singapore

Schwartz, S. H. (1977). NORMATIVE INFLUENCES ON ALTRUISM

Staats, H. (2004). Pro-environmental Attitudes and Behavioral Change.

Tan, T. H. (2013). Use of structural equation modeling to predict the intention to purchase green and sustainable homes in Malaysia. Asian Social Science, 9(10), 181–191

Tonglet, M., Phillips, P. S., & 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

UNEP& GRIDArenda (2020). The Little Book of Green Nudges

Varotto, A., & Spagnolli, A. (2017). Psychological strategies to promote household recycling. A systematic review with meta-analysis of validated field interventions. In Journal of Environmental Psychology (Vol. 51, pp. 168–188). Academic Press

Wang, H., Liu, X., Wang, N., Zhang, K., Wang, F., Zhang, S., Wang, R., Zheng, P., & Matsushita, M. (2020). Key factors influencing public awareness of household solid waste recycling in urban areas of China: A case study. Resources, Conservation and Recycling, 158

Wang, Q., Zhang, W., Tseng, C. P. M. L., Sun, Y., & Zhang, Y. (2021). Intention in use recyclable express packaging in consumers' behavior: An empirical study. Resources, Conservation and Recycling, 164

Wang, S., Wang, J., Zhao, S., & 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

Werner, Dipl.-P. C., & Schermelleh-Engel, K. (2009). Introduction to Structural Equation Modeling with LISREL-Version

World Bank (2018). What a Waste: An Updated Look into the Future of Solid Waste Management.

Zhang, B., Lai, K. hung, Wang, B., & Wang, Z. (2019). From intention to action: How do personal attitudes, facilities accessibility, and government stimulus matter for household waste sorting? Journal of Environmental Management, 233, 447–458

Zhang, D., Huang, G., Yin, X., & 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

APPENDIX 1 THE QUESTIONNAIRE

Sayın katılımcı,

Bu ankette, geri dönüşüm davranışlarınızı ölçmeye yönelik sorular bulunmaktadır. Özel sorular (politik görüş, din vb.) kesinlikle sorulmayacaktır. Cevaplamak istemeyeceğiniz, özel olduğunu düşündüğünüz sorular olursa cevap vermeyebilirsiniz. Bu araştırma için Hacettepe Üniversitesi Etik Komisyonu'ndan gerekli izinler alınmıştır.

Ankette yer alan soruların tamamını yanıtlarsanız çok memnun olurum. Çünkü vereceğiniz her cevap veri analizinin bir parçasını oluşturacağı için çok değerlidir! Araştırmaya katılım gönüllülük esasına dayanmaktadır. Araştırmadan istediğiniz zaman çekilebilirsiniz. Bu durum size hiçbir sorumluluk getirmeyecektir. Çalışmadan ayrılmanız durumunda sizden toplanan veriler çalışmadan çıkarılacak ve imha edilecektir. Araştırma sonuçları eğitim ve bilimsel amaçlar için kullanılacaktır. Araştırmanın tüm süreçlerinde kişisel bilgileriniz ihtimamla korunacaktır.

Lütfen aşağıdaki soruları verilen seçeneklerden sizin için uygun olanı işaretleyerek cevaplayınız.

1.Cinsiyetiniz nedir?
( )Kadın
( )Erkek

2.Üniversiteye başlamadan önce ikamet ettiğiniz il neresidir?
( )Ankara
( )Diğer Lütfen Belirtiniz: ……..

3.Çevrenizde geri dönüşüm amaçlı bir davranışta bulunan yakınınız var mı? (Örneğin bir arkadaşınızın plastik su şişelerini biriktirerek atık kutusuna atması). Eğer cevabınız Evet ise 4. soruya, Hayır ise 5. soruya geçiniz.
( )Evet
( )Hayır

4.Geri dönüşüm amaçlı bir davranışta bulunan yakınınız kimdir?
( )Annem / Babam
( )Kardeşim
( )Akrabalarım
( )Komşularım
( ) Arkadaşlarım

5.Daha önce çevresel konular ile alakalı bir eğitim faaliyetine katıldınız mı? Eğer cevabınız evet ise 6. soruya, hayır ise 7. soruya geçiniz.

( )Evet
( )Hayır

6.Çevresel konular ile alakalı neredeki bir eğitim faaliyetine nerede katıldınız?
( ) Anasınıfında öğretici eğitim faaliyetleri düzenlenirdi
( ) Öğrenim gördüğüm ilköğretim okulundaki etkinliklere katıldım
( ) Öğrenim gördüğüm lisedeki etkinliklere katıldım
( ) Bir çevre kuruluşu tarafından düzenlenen bilgilendirici faaliyetlere katıldım
( ) Belediye tarafından düzenlenen etkinliklere katıldım
( ) Kişisel olarak denk geldiğim sergi vb. etkinlikler sayesinde bilgi sahibi oldum

7.Ailenizin aylık gelir düzeyi nedir?
( )3.000 TL'den az
( )3.000 TL – 5.000 TL arası
( )5.000 TL – 7.000 TL arası
( )7.000 TL ve üzeri

8.Eğer kendinize ait bir geliriniz varsa, aylık gelir düzeyiniz nedir?
( )500 TL'den az
( )500 TL – 1.000 TL arası
( )1.000 TL – 3.000 TL arası
( )3.000 TL ve üzeri

Lütfen aşağıdaki her bir ifadeye kendiniz ile ilgili ne ölçüde katıldığınızı belirtiniz.

		Kesinlikle Katılmıyorum	**Katılmıyorum**	**Biraz Katılıyorum**	**Katılıyorum**	**Kesinlikle Katılıyorum**
9.	Ailem benden atıklarımı ayırmamı bekler.					
10.	Komşularım benden atıklarımı ayırmamı bekler.					
11.	Çevrem benden atıklarımı ayırmamı bekler.					
12.	Çoğu insan geri dönüşüm yapmam gerektiğini düşünür.					
13.	Benim için önemli olan insanların çoğu geri dönüşüm yapmamı ister.					
14.	Hangi maddelerin geri dönüştürülebilir olduğunu biliyorum.					

15.	Atıkları ayrıştırmanın zahmetli bir eylem olduğu düşünüyorum.					
16.	Atıklarımı nasıl geri dönüştürebileceğimi biliyorum.					
17.	Geri dönüşüm amacıyla atıklarımı atabileceğim yerleri biliyorum.					
18.	Belediyelerin geri dönüşüm konusunda sağladıkları hizmetleri biliyorum.					
19.	Geri dönüşüm yapabilmek için çok sayıda imkana sahip olduğumu düşünüyorum					
20.	Atıklarımı ayrıştırmak benim için kolaydır.					
21.	Resmî kurumların veya gönüllü kuruluşların uygulamaya koyduğu çevre programlarına katılmaya istekliyim.					
22.	Aileme ve arkadaşlarıma geri dönüşümün neden önemli olduğu ile ilgili bilgiler verme konusunda istekliyim.					
23.	Gelecek yıl geri dönüşüm yapma niyetim bu yıla kıyasla daha fazladır.					
24.	Medyada yer alan çevre konulu yayınlar ile ilgilenirim.					
25.	Geri dönüşüm doğal kaynakların korunmasına katkı sağlar.					
26.	Geri dönüşüm enerji tasarrufu sağlar.					
27.	Geri dönüşüm çevredeki atık miktarının azalmasına katkı sağlar.					
28.	Atıkları geri dönüşüm kutularına atmak faydalı bir davranış biçimidir.					
29.	Geri dönüşüm gelecek nesillere daha iyi bir çevre bırakılmasına katkı sağlar.					
30.	Evimde atıkları ayrı ayrı biriktirebilmek için yeterli alana sahip değilim.					
31.	Geri dönüşüm kutularının yerlerinin düzenli veya dağınık bir biçimde olması geri dönüşüm davranışımı etkiler.					
32.	Katılabileceğim çevre dostu bir aktivite bulmanın zor olduğunu düşünüyorum.					
33.	Çevreye yeteri kadar geri dönüşüm kutusu konulduğunu düşünmüyorum.					
34.	Atıklarımı geri dönüşüm kutularına atabilmek için yeterli vakte sahip değilim.					

35.	Çevremdeki geri dönüşüm kutularının üzerinde her bir atık türünün ayrımını açıkça gösteren bir ifade mevcuttur.					
36.	Çevremdeki geri dönüşüm kutularının kapasitesinin yeterli olduğunu düşünüyorum.					

Lütfen aşağıdaki eylemleri ne sıklıkla gerçekleştirdiğinizi belirtiniz.

			Hiçbir zaman	**Çok Seyrek**	**Bazen**	**Çoğunlukla**	**Her zaman**
37.		Plastik atıklarınızı hangi sıklıkla geri dönüşüm kutularına attığınızı belirtiniz. *Örneğin pet su şişesi.*					
38.		Cam atıklarınızı hangi sıklıkla geri dönüşüm kutularına attığınızı belirtiniz. *Örneğin içecek şişeleri, kavanoz.*					
39.		Kâğıt atıklarınızı hangi sıklıkla geri dönüşüm kutularına attığınızı belirtiniz. *Örneğin not kağıtları, karton kahve bardağı.*					
40.		Metal atıklarınızı hangi sıklıkla geri dönüşüm kutularına attığınızı belirtiniz. *Örneğin alüminyum içecek kutuları, konserve kutuları.*					
41.	Kullanılmış ama arkası boş kağıtları müsvedde olarak yeniden kullanırım.						
42.	Eğer mümkünse satın aldığım ürünleri içini doldurarak tekrar kullanırım. (Örneğin cam bir su şişesine içecek koyarak tekrar kullanmak)						
43.	Daha önce alışveriş çantası olarak kullandığım plastik çantaları yeniden kullanırım.						

44.	Karton kahve bardakları veya metal konserve kutusu gibi ürünleri kalemlik vb. amaçlarla yeniden kullanırım.					
45.	Yakın çevrem ile yaptığım görüşmeler sırasında çevre sorunları hakkında konuşurum.					
46.	Sınıf arkadaşlarımı ve iş arkadaşlarımı doğal kaynakları korumaları konusunda teşvik ederim.					
47.	Sınıf arkadaşlarımı ve iş arkadaşlarımı çevreyi korumaya yönelik politikaları desteklemeleri konusunda teşvik ederim.					
48.	Sınıf arkadaşlarımı ve iş arkadaşlarımı ağaç dikmek gibi çevresel etkinliklere katılmaları konusunda teşvik ederim.					

GÖNÜLLÜ KATILIM FORMU

Sayın katılımcı,

Hacettepe Üniversitesi, İktisadi ve İdari Bilimler Fakültesi, İktisat Bölümü'nde yüksek lisans öğrencisiyim. Öğrencilerin geri dönüşüm davranışlarının belirleyicilerini incelemek amacıyla bir araştırma gerçekleştiriyorum. Araştırmadan elde edilen bulgular, geri dönüşüm faaliyetlerindeki farklılıkları saptamak amacıyla kullanılacaktır. Bu araştırma için Hacettepe Üniversitesi Etik Komisyonu'ndan gerekli izinler alınmıştır.

Araştırma kapsamında sizlere anket soruları yöneltilecektir. Bu ankette, geri dönüşüm davranışlarınızı ölçmeye yönelik sorular bulunmaktadır. Özel sorular (politik görüş, din vb.) kesinlikle sorulmayacaktır. Cevaplamak istemeyeceğiniz, özel olduğunu düşündüğünüz sorular olursa cevap vermeyebilirsiniz.

Araştırmaya katılım gönüllülük esasına dayanmaktadır. Araştırmadan istediğiniz zaman çekilebilirsiniz. Bu durum size hiçbir sorumluluk getirmeyecektir. Çalışmadan ayrılmanız durumunda sizden toplanan veriler çalışmadan çıkarılacak ve imha edilecektir. Ankette sorulan sorulara vereceğiniz cevaplar, çalışmada yer alan iki araştırmacı dışında kimseyle paylaşılmayacaktır. Araştırma sonuçları eğitim ve bilimsel amaçlar için kullanılacaktır. Araştırmanın tüm süreçlerinde kişisel bilgileriniz ihtimamla korunacaktır. Bu Gönüllü Katılım Formu'na adınızı ve soyadınızı yazmanıza gerek yoktur.

Bu gönüllü katılım formunu imzalamadan önce veya daha sonra aklınıza gelebilecek olan soruları istediğiniz zaman bize sorabilirsiniz. Telefon ve adresim bu kâğıtta yazmaktadır. Bu anket ya da araştırma bittikten sonra bana ulaşabilir ve araştırma ile ilgili soru sorabilirsiniz. Araştırmaya katılmayı tercih ediyorsanız, lütfen aşağıya imzanızı atınız. İmzaladıktan sonra size bu formun bir kopyasını vereceğim.

Katılımcının adı, soyadı:

İmzası:

Tarih:

Araştırmanın yürütücüsü

Adı Soyadı: Doç. Dr. Selcen Öztürk

Adres: İktisat Bölümü İktisadi ve İdari Bilimler Fakültesi Binası 2. Kat, Hacettepe Üniversitesi Beytepe Yerleşkesi, 06800 Çankaya/Ankara, Türkiye

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