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Understanding Recycling Intentions: The Impact of Deposit-Return Schemes

Marta Marinho Peres Alcouce

Dissertation written under the supervision of
Prof. Paulo Romeiro

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ABSTRACT

Title: Understanding Recycling Intentions: The Impact of Deposit-Return Schemes.

Author: Marta Marinho Peres Alcouce

As the pressure that individuals exert on the environment is growing, there is an urgent need for action to revert the damage. Waste management is paramount for the ecosystem's preservation and recycling represents a step towards the solution.

With Portugal falling behind on the packaging waste targets defined by the European Union, there is a critical need to take additional measures to incentivize individuals to recycle.

This dissertation aims at identifying the main factors that propel individuals' recycling intentions and understand if Deposit-Return Schemes represent the needed incentive to increase them. Thereafter, to assess recycling intentions, this study applies the Theory of Planned Behavior enriched with contributions from the Model of Altruistic Behavior.

The data collection method employed consisted of an online questionnaire where respondents were exposed to one of two recycling systems: The Deposit-Return Scheme and the Current Recycling System. The results obtained showed that individuals' intention to recycle is lower through the Deposit-Return Scheme than through the Current Recycling System. This outcome is strongly impacted by the perceived inconvenience and difficulty of going throw with this new procedure.

Findings also confirmed the literature that the decision of individuals to recycle is founded on the belief that is the right thing to do for the collective, and not on a conscious evaluation of the personal costs and benefits involved.

Keywords: Deposit-Return Schemes, Current Recycling System, Theory of Planned Behavior, Model of Altruistic Behavior, Recycling, Packaging, Packaging Waste

SUMÁRIO

Título: Compreender as Intenções de Reciclagem: O impacto de Sistemas de Devolução de Embalagens.

Autor: Marta Marinho Peres Alcouce

Devido à crescente pressão ambiental exercida pelos indivíduos, há uma necessidade urgente de ação para reverter os danos. A gestão de resíduos é fundamental para a preservação do ecossistema e a reciclagem representa um forte contributo para a sua solução.

Com Portugal aquém dos objetivos impostos pela União Europeia para a gestão de resíduos de embalagens, é crítico a implementação de medidas adicionais para incentivar os indivíduos a reciclar.

Esta dissertação procura identificar os principais fatores que impulsionam as intenções de reciclagem dos indivíduos e perceber se os Sistemas de Devolução de Embalagens constituem o incentivo necessário para o seu aumento. Consequentemente, para avaliar as intenções de reciclagem, este estudo aplica a Teoria de *Planned Behavior* enriquecida com contribuições do Modelo de *Altruistic Behavior*.

O método de recolha de dados utilizado foi um questionário online onde os participantes foram expostos a um de dois sistemas de reciclagem: o Sistema de Devolução de Embalagens e o Sistema de Recolha Atual. Os resultados obtidos demonstraram que a intenção de reciclagem dos indivíduos é inferior através do Sistema de Devolução de Embalagens do que através do Sistema de Recolha Atual. Este resultado foi fortemente impactado pela inconveniência percecionada pelos indivíduos e a dificuldade associada a este novo procedimento.

As descobertas também confirmaram a literatura de que a decisão dos indivíduos em reciclar é fundamentada na crença de que é a atitude correta para o coletivo, e não numa avaliação consciente dos custos ou benefícios pessoais envolvidos.

Palavras-Chave: Sistema de Devolução de Embalagens, Sistema de Recolha Atual, Teoria de *Planned Behavior*, Modelo de *Altruistic Behavior*, Reciclagem, Embalagens

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GLOSSARY

ATR – Attitudes Towards Recycling

BI – Behavior Intention

CRS – Current Recycling Collection System / Current Recycling System

DRS – Deposit Return Scheme

EU – European Union

MAB – Model of Altruistic Behavior

PBC – Perceived Behavior Control

SDGs - Sustainable Development Goals

TPB – Theory of Planned Behavior

UN – United Nations

CHAPTER 1: INTRODUCTION

1.1 Background and Problem Statement

Worldwide, our culture of consumption resulted in an excessive resource extraction, well above what planet Earth is naturally capable to offer. This led to a growing pressure on natural capital and climate that, at this rate, will lead to irreversible damage. As highlighted by the General Assembly President of the United Nations, María Fernanda Espinosa Garcés, "We are the last generation that can prevent irreparable damage to our planet" (United Nations, 2019).

The UN 2030 Agenda for Sustainable Development, signed by multiple countries in September 2015, established 17 Sustainable Development Goals (SDGs) that represent the ultimate achievements to a sustainable and prosperous living and planet preservation. Among them, we have "sustainable cities and communities", "responsible consumption and production" and "Life below water" (Appendix 1).

The EU is one of the main forces behind the Agenda due to their deeply embedded concern regarding sustainable development which refers to the "development that meets the needs of present generations without compromising the ability of future generations to meet their needs" (European Commission, 2019b).

A Circular Economy is one of the main goals of the EU and therefore, recycling plays a pivotal role. According to the EU Directive 2018/852 (European Council, 2018b) on packaging and packaging waste, Member States need to reach a minimum of 65% of recycled packaging waste by 2025 with minimum targets for specific materials: 50 % of plastic; 25 % of wood; 70 % of ferrous metals; 50 % of aluminum; 70 % of glass; and 75 % of paper and cardboard.

Portugal failed to achieve these milestones in the majority of the materials mentioned registering, in 2017, 49% of recycled glass packaging waste, 67% of paper/cardboard, 35% of plastic, 44% of metal and 90% of recycled wood packaging waste (Appendix 2) (Portuguese Environment Agency, 2019).

Developing policies that will incentive consumers in Portugal to recycle is of the utmost importance in order to meet EU's targets. In light of this, Deposit-Return Schemes are one of the measures that will be implemented. This policy incentivizes consumers to return their non-reusable beverage packages made of glass, plastic, ferrous metals and aluminum to large commercial surfaces in exchange for a coupon with face-value dependent on the capacity of the returned package (República, 2018).

In conclusion, by applying the Theory Of Planned Behavior (Ajzen, 1991) and the Model Of Altruistic Behavior (Schwartz, 1977) proven to predict social behavior and shown relevant in

pro-environmental behaviors, this research focuses on understanding how impactful this type of policy is on consumers, through the assessment of the influence it has on their intention to recycle and, consequently, analyzing their willingness to change habits.

1.2 Problem Statement

The purpose of this research is to understand the main pillars that lead individuals to recycle. Additionally, it aims at understanding how Deposit-Return Schemes work as an incentive by analyzing how consumers' intention to recycle through this system differs from the Current Collection System.

Thereafter, this problem statement can be explained by the following research questions:

RQ1: What is the impact of the upcoming Deposit-Return Scheme on the consumers' recycling intentions?

RQ2: What will have the greatest impact on consumers' adoption of the Deposit-Return Scheme as a means to recycle?

RQ3: Which construct has the greatest influence on consumers' recycling intentions?

1.3 Relevance

Worldwide, environmental protection has become a very important issue as a result of the increasing consciousness of consumers' negative impact on the planet. Concepts such as sustainable production and consumption are receiving significant attention in present-day societies (Golob & Kronegger, 2019). Household consumption plays a pivotal role in the production-consumption chain as consumers are usually the deciding factors of what and how to consume (Caeiro, Ramos, & Huisingh, 2012). Moreover, they are also responsible for how their generated household waste is handled.

Household waste generation and the respective disposal process causes a significant impact on the degradation of the environment and human health. To overcome this issue, recycling represents the most reliable solution (Jekria & Daud, 2016).

Focusing on the sustainable development concern, recycling plays a fundamental role as the European Union is working towards a circular economy which ensures that, when a product reaches the end of its life, most of its material value is preserved in order to be re-used in the making of new products. A circular economy brings tremendous benefits which include the potential economic growth, job creation, positive innovation, enhancing the security of supply chains and building economic and environmental resilience. Consequently, making the

European economy more sustainable and competitive benefiting industries, businesses and citizens (European Commission, 2016).

This dissertation focuses on packaging waste due to the special attention it has been gaining in the latest years because of the environmental impacts that this type of material has on landfills (e.g. a significant part of this packaging waste is non-biodegradable) and their wrong disposal (Da Cruz, Ferreira, Cabral, Simões, & Marques, 2014). Moreover, the EU's Directive 2018/852 amending Directive 94/62/EC (European Council, 2018b) establishes targets for the Member States to reach a minimum of 65% of recycled packaging waste by 2025. Portugal is far behind registering only 55,3% in 2017 (Appendix 4).

To address this issue, the Portuguese government will be investing in equipment for the recycling and recovery of packaging waste, also known as, Deposit-Return Schemes. This measure incentivizes consumers to return their non-reusable beverage packages made of glass, plastic, ferrous metals and aluminum. Thereafter, the main goal of this dissertation is to understand the impact of these schemes on consumers recycling intention.

1.4 Research Methods

Aiming at providing answers to the research questions detailed above, both primary and secondary data were collected and analyzed.

The theoretical foundation of this dissertation was composed through an extensive analysis of secondary data that made it possible to develop the main hypothesis of this research, as well as define and understand the main concepts of the Theory Of Planned Behavior (Ajzen, 1991) and the Model Of Altruistic Behavior (Schwartz, 1977). Furthermore, this process allowed to understand the predictors of recycling intention, build a conceptual model and comprehend how to measure each corresponding construct.

In order to study the conceptual model built, primary data was collected through an online questionnaire that was distributed through the internet via multiple social media channels. To properly assess if recycling intention increases, two different groups of respondents were exposed to different versions of the recycling system. Either the Current Recycling System or the Deposit-Return Scheme. Thereafter, it was possible to test if Deposit-Return Schemes are more attractive to consumers and, consequently, increase their intention to recycle.

1.5 Dissertation outline

The present dissertation comprises a total of five chapters. The following chapter presents, in detail, the literature review conducted regarding the recycling collection systems, the Theory of Planned Behavior and the Model of Altruistic Behavior. Furthermore, it includes a thorough explanation concerning the relevancy of each variable that led to the development of the model used and, consequently, served as the foundation for each of the hypotheses developed.

The third chapter aims at detailing the methodology used to perform this investigation, including step-by-step methods about the data collection process, measurements, and the analysis performed.

Chapter four covers the results obtained with this research and, consequently, tests the validity of the developed hypotheses in addition to the overall model.

The final chapter – chapter five – concludes this dissertation as it addresses the main findings and conclusions of this study, as well as, its limitations. Moreover, presents suggestions for further research that could be developed.

CHAPTER 2: LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

This chapter starts by providing a detailed context analysis regarding Portugal's position concerning European targets, followed by the current Portuguese recycling collection system and the upcoming Deposit-Return Scheme. Subsequently, it will address the two models that will be applied to the current research - The Theory of Planned Behavior (Ajzen, 1991) and the Model of Altruistic Behavior (Schwartz, 1977) - by delivering a thorough theoretical framework, including the reasons behind their choice, as well as its constructs. Consequently, it will showcase the developed model that combines insights from these two theories that have been proven to be significant predictors of behavior.

Finally, based on this model, as well as previous research, the hypotheses are formulated. The main purpose is to provide insights and knowledge on the reasons leading to consumer's intention to recycle.

2.1 Research Background

Recycling plays a pivotal role to achieve one of the European Union's ultimate goals: A Circular Economy. As a result, one of EU's Member States key targets is to reach a minimum of 50% (European Council, 2008) preparation for re-use and recycling of municipal waste (mixed waste and separately collected waste from households, including packaging) (European Council, 2018a) by 2020, 55% by 2025, 60% by 2030 and 65% by 2035.

In 2017, the 28 countries in the EU achieve a collective total of 46,4% of recycled municipal waste (Appendix 3). However, as highlighted in the Early Warning Report (European Commission, 2018), 14 Member States have been identified to be at risk of not reaching this target by 2020. Portugal is one of the member states at risk due to their poor recycling performance – in 2017, only 28,4% of municipal waste was recycled, which is far behind the goal mentioned (Appendix 3) (European Commission, 2019a).

Focusing on packaging waste (directive (EU) 2018/852 amending Directive 94/62/EC) (European Council, 2018b), Member States need to reach a minimum of 65% of recycled packaging waste by 2025 with the following minimum targets for specific materials (Article 6(g) of the directive (EU) 2018/852) (European Council, 2018b):

- 50 % of plastic;
- 25 % of wood;
- 70 % of ferrous metals;
- 70 % of glass;

- 75 % of paper and cardboard;

According to the Portuguese Environment Agency, in 2017, Portugal registered 55,3% of packaging waste recycled, decreasing from 2016 results (60,9%) (Appendix 4). Regarding the recycling rate of specific materials, Portugal achieved, in 2017, the following (Appendix 2):

- 35% of plastic,
- 90% of wood;
- 44% of ferrous metals;
- 49% of glass;
- 67% of paper/cardboard;

We can conclude that, besides wood, none of the targets were successfully achieved.

2.1.1 Portuguese Current Recycling Collection System

Until the present-day, in Portugal, there are two types of waste collection systems (either for recycled or undifferentiated waste) available to citizens dependent on their area of residency. The available systems are door-to-door collection (curbside collection systems) or centralized collection points (in Portuguese called “Ecoilhas”).

a) Door-to-door collection or curbside collection systems are a service provided to households typically in urban areas where residents do not have to leave their buildings in order to properly dispose of their recycled waste. This service makes it easier for individuals to recycle because each building, covered by this system, is responsible for their own recycling bins and, in the respective day of the week destined for the collection of each material, the corresponding bin is left in front of the building in order for the collection truck to pick it up and proceed with the correct disposal of the recycled and undifferentiated waste.

b) In other areas, the collection is done through "Ecoilhas". These centralized collection points have concentrations of large recycling bins that are assigned to a specific area or neighborhood where every building, or individual, in the mentioned area, disposes their waste. This way the collection is centralized, and the collection truck goes to these points directly to retrieve the waste and proceed with its disposal.

2.1.2 New-System: Deposit – Return Scheme

It is clear that additional policies need to be implemented to incentivize citizens to recycle more, therefore, closing the existing gap and getting closer to the European targets. In order to do so, the Portuguese government will be implementing a new service known as Deposit-Return Schemes. This measure, available in various European countries, such as Norway and Poland, incentivizes consumers to return their non-reusable beverage packages made of glass, plastic, ferrous metals and aluminum to large commercial surfaces (A. República, 2018).

According to this new policy, from January 1st, 2022 onwards, it will be mandatory for large commercial surfaces, that sell beverages, to have the necessary equipment, which is financed by the Government, to allow the deposit of these packages. This Deposit-Return Scheme will guarantee the correct routing to recycle and, as an incentive, for each returned packaged, the final consumer will be rewarded with a coupon with a face value depending on the capacity of the package returned (Appendix 5).

The main goal is to change consumer's behavior and, consequently, increase their contribution towards recycling. Furthermore, this will ensure the retrieval and correct sorting of packages which have been identified by the Portuguese Environmental Agency (APA) to be a few of the reasons for the low numbers achieved in Portugal. Moreover, until this day, even though there has been an investment that allowed an increase in the number of infrastructures to recover recycled waste ("ecopontos" and "ecoilhas") there is yet to be proper and relevant reflections in the population's behavior (Ambiente, 2019; APA, 2019).

2.2 Theory of Planned Behavior (TPB)

The Theory of Planned Behavior (TPB) (Ajzen, 1991) is a well-known psychological theory, for nonvolitional behavior, commonly used to predict and understand pro-environmental behaviors such as green consumerism (Sparks and Shepherd, 1992; Sparks et al., 1995), recycling (Boldero, 1995; Tonglet, Phillips, & Read, 2004) and others.

According to this attitude-behavior theory, the main driver to any behavior is "intention" which can be explained as a person's self-commitment to perform such behavior. Additionally, this driver - "intention" - is influenced by three aspects:

(1) a person's attitude towards the behavior - This refers to the positive or negative evaluations that an individual has towards the behavior;

(2) Subjective norms which relates to the perceived social pressure to execute or not such behavior, as well as, the extent to which the societal surroundings influence this behavior.

(3) Perceived behavior control (PBC) is defined as a person's perception of how easy or difficult the performance of the behavior is likely to be. PBC also reflects an individual's external conditions that may impact (augment or moderate) the ability to adopt and carry out the behavior. It includes volitional behavior (when a person can decide at will to carry out the behavior or not) and non-volitional behavior. When applied to the recycling program, this can be understood as the perceived performance or convenience of the logistics provided by each service, the Deposit-Return Scheme, the centralized collection points ("ecoilhas") or the curbside collection system, and the specific knowledge about the tasks required to participate. According to the TPB, perceived behavior control alongside behavior intention can be used directly to predict behavior accomplishment. Ajzen (Ajzen, 1991) explains that, holding intention constant, the effort invested to successfully go through with a behavior is likely to increase when individuals have strong confidence in their ability to perform it (PBC). Furthermore, PBC can be a substitute measure for actual control depending on the accuracy of the perceptions, PBC may not be realistic if, for example, an individual has little information about the behavior or new and unfamiliar elements are involved. Under these premises, a measure of perceived behavioral control may add little to accuracy of behavioral prediction.

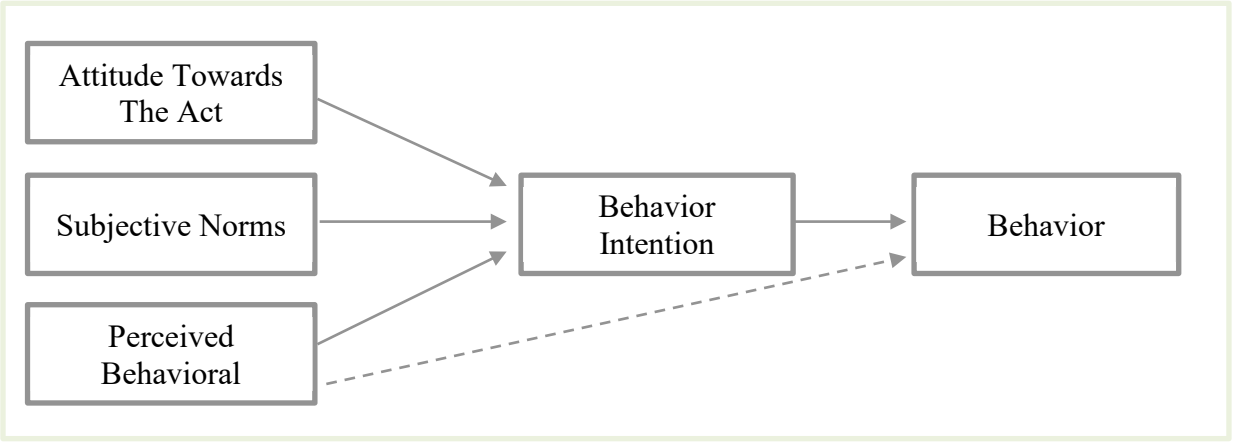

Figure 1: Processes of the Theory of Planned Behavior

In order to accurately predict behavior, besides what was mention prior regarding PBC, the Theory of Planned Behavior needs to meet a few conditions. Foremost, the constructs must have the same measures (Ajzen & Fishbein, 1977) or be compatible with the behavior (Ajzen, 1988) in study and the specific context must be the same. The second condition is that "intentions" and PBC have to remain constant in the period between their assessment and the actual observation of the behavior because intervening events may induce changes in PBC or intentions.

Since the Deposit-Return Scheme in study will be gradually implemented from 2020 to 2022, there will be a time gap between this study and the observation of the behavior. Due to this limitation, it is only possible to study the intention, in the current period, of consumers in Portugal to recycle through the Deposit-Return Scheme. This way, a basic representation of the model would be the following:

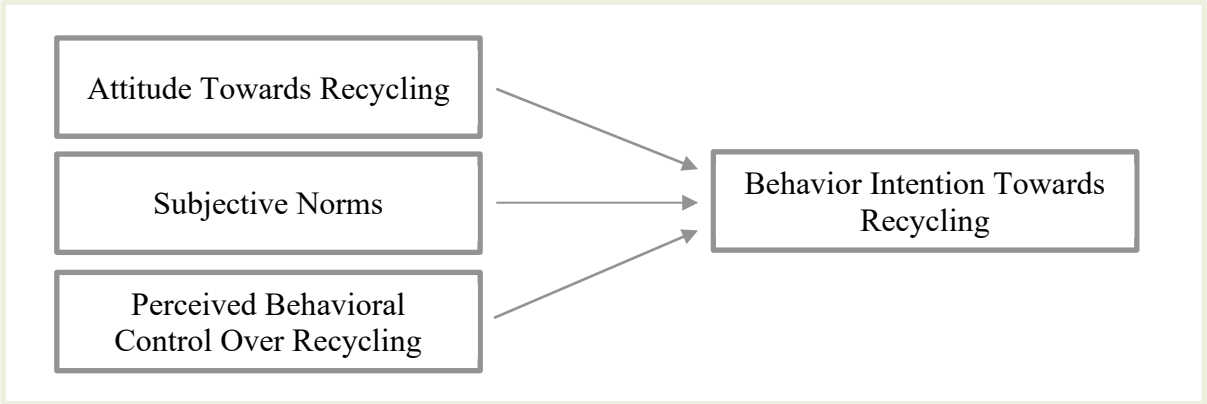

Figure 2: Processes of the TPB without "behavioral" construct

Ajzen (Ajzen, 1991) stated that the Theory of Planned Behavior is, "in principle, open to the inclusion of additional predictors if it can be shown that they capture a significant proportion of the variance in intention or behavior after the theory's current variables have been taken into account". For this reason, the TPB represents the starting point for the model proposed in this dissertation. Nevertheless, in order to develop a more comprehensive and integrated model, constructs from the Model of Altruistic Behavior will be taken into consideration and explained in the following section.

2.3 The Model of Altruistic Behavior (MAB)

In the Model of Altruistic Behavior (MAB) (Schwartz, 1977), Schwartz states that altruistic motivations are intentions or reasons, founded in one's internal values, to benefit another, without concern for the "network of social and material reinforcements".

We can conclude that recycling is rooted in altruistic behaviors through Thøgersen (Thøgersen, 1996) statement that, in affluent societies:

> (…) environmental behaviors like recycling are typically classified within the domain of morality in people's minds. Attitudes regarding this type of behavior are not based on a thorough calculation, conscious or unconscious, of the balance of costs and benefits. Rather, they are a function of the person's moral beliefs, that is, beliefs in what is the right or wrong thing to do. (Thøgersen, 1996)

The MAB model describes the process of an interrelationship among four constructs:

(1) Social norms – According to Schwartz, social norms are the starting point of the process regarding moral behaviors. These norms are the representation of the values and attitudes of significant others, that people generally agree upon in a sort of abstract way. They represent behaviors that we expect people to act in a morally proper manner and they expect the same from us (socially shared norms).

These norms, alone, are far too general and detached to direct behavior. However, they can be personally adopted by each of us, becoming internalized moral attitudes, also known as, personal norms (Heberlein, 1975b; Schwartz & Howard, 1980).

(2) Personal norms – The main difference of these norms is that even though they derive from social norms when they are violated or uphold the consequences are linked to one's self-concept which means that when violated they engender guilt and, on the other hand, when these norms are upheld they engender pride (Hopper & Nielsen, 1991).

Nevertheless, individuals may internalize the norms and still not act according to them. Personal Norms will not be activated unless they are defined as relevant and applicable to the situation. For this reason, Schwartz identified two concepts that influence whether or not personal norms turns into behavior (Schwartz, 1977):

(3) Awareness of consequences – represents an individual's understanding of the consequences that his behavior has on others.

(4) Ascription of responsibility – represents the individual's personal feeling of responsibility for the consequences of his behavior. When one has the tendency to deny his responsibility for the consequences of his actions, the moral obligation will be neutralized.

The following figure illustrates the relations among the model's constructs:

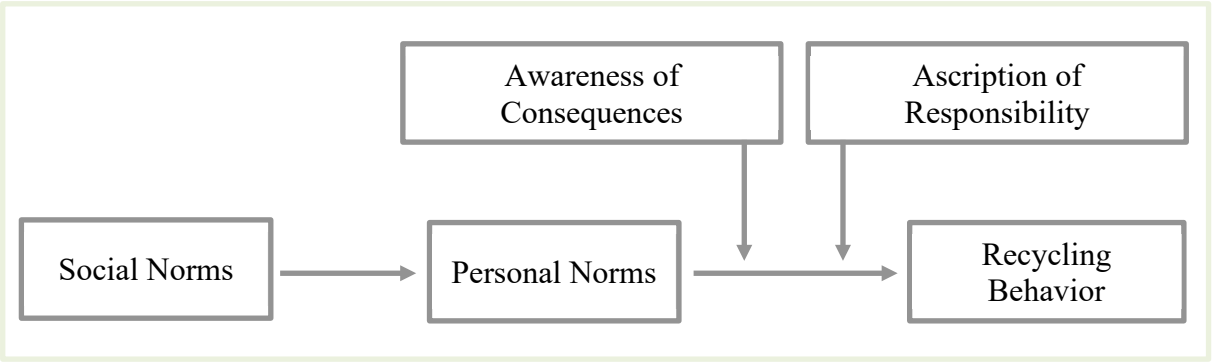

Figure 3: Model of Altruistic Behavior

When applied to the subject in study, we can understand that those who feel morally obligated to recycle will only do it if they are aware of the positive consequences of this action and feel personally responsible for the respective consequences.

2.4 Proposed Model based on the Two Behavioral Models

As formerly stated, the Theory of Planned Behavior is open to the inclusion of additional constructs if it can be shown that a significant proportion of the variance in intention, or behavior, is captured by them after the theory's existing variables have been taken into account. With this in mind, and with the support of the research conducted, only variables with relevant empirical support were included.

Social norms, as detailed prior, are far too general and detached to direct behavior. Furthermore, when they are adopted by an individual, becoming internalized moral attitudes, they convert to personal norms. In this scenario, a person will not, for instance, be more likely to recycle due to societal pressures but rather due to their willingness to do what is right. In addition, according to White et al. (White, Smith, Terry, Greenslade, & McKimmie, 2009), 'social injective norm' is not a forecaster of recycling intent since social surroundings influences behavior through example and not so much through pressure. Thereafter, these findings allow for the exclusion of the construct social norms from the model in the present study.

Boldero (Boldero, 1995) concluded that the concept of social norms, in the Model of Altruistic Behavior, is comparable to the concept of subjective norms, in the Theory of Planned Behavior, because it conveys to the perceived social pressure concerning the approval or not of a specific behavior. The same author established that the construct awareness of consequences, in the MAB, and attitude towards the act, in the TPB, are comparable since attitude towards the act is a "product of the perceived likelihood that the behavior will lead to certain outcomes (…) and the evaluation of these outcomes". It is possible to understand that the presence of concepts that are comparable between each model suggests that they can be incorporated to better predict recycling behavior. Due to these findings, and for simplification purposes, subjective norms will also be excluded from the model as well as awareness of consequences because, for the latter, attitude towards the act will be included.

Personal norms were included in the proposed model in light of Ajzen's assessment (Ajzen, 1991), as well as other authors (Davies, Foxall, & Pallister, 2002; Harland, Staats, & Wilke, 1999), that these norms, once added to the TPB, make a significant contribution in intention prediction.

In conclusion, after careful consideration of the research presented throughout this review of literature, the constructs selected led to the proposition of the following model:

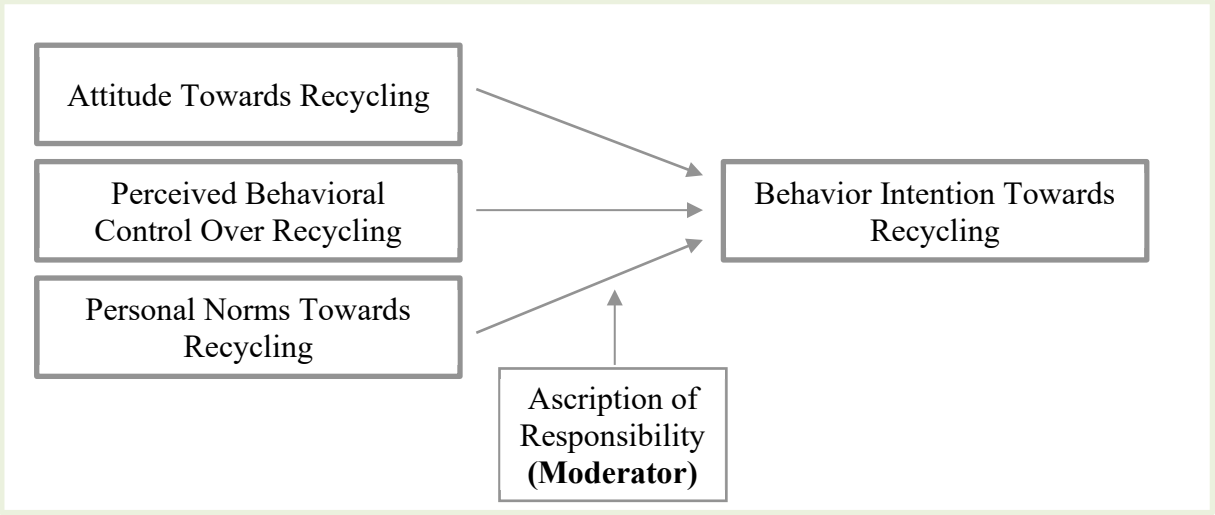

Figure 4: Comprehensive structural model of behavior intention

The present model (figure 4) will be applied to both collection systems, the Current and the Deposit-Return Scheme, in order to compare and study the impact of this new system on consumers' intention to recycle.

2.5 Research Hypothesis

The proposed comprehensive structural model of behavior intention is presented in figure 4 and it will be employed to both recycling collection systems.

In the model, it is clear to see the resemblance to the TPB as it includes attitudes towards recycling and perceived behavior control as predecessors of recycling intention supporting the assumption proposed by Ajzen (1991). As explained prior, two constructs were excluded from Ajzen's original model: (a) 'recycling behavior' due to the difference in time between this study and the establishment of the Deposit-Return Schemes. During this period, many intervening factors can happen which could change an individual's intention or perceived behavior control over his ability to go throw with the usage of this system; and (b) 'subjective norms', comparable to the construct 'social norms' from MAB (Boldero, 1995), was also excluded due to the conclusion of White et al. (2009) that these do not have a significant impact on participant's intention to recycle.

Perceived behavior control is the construct expected to differentiate the most between the two groups because of the new processes involved with the disposal of waste through the Deposit-

Return Scheme. Nevertheless, attitudes towards recycling and perceived behavior control will be analyzed to assess if there are significant differences between the groups (DRS and CRS). This led to the first four hypotheses this study considers and that will be analyzed thoroughly in upcoming chapters:

Hypothesis 1 (H1): The individual's attitude towards recycling holds a positive influence on his intention to recycle.
Hypothesis 1.a (H1.a): There are statistically significant differences in the construct attitudes towards recycling between the two groups.

Hypothesis 2 (H2): The individual's perceived behavior control towards recycling holds a positive influence on his intention to recycle.
Hypothesis 2.a (H2.a): The Deposit-Return Scheme has a lower perceived behavior control than the Current Collection System.

The Model of Altruistic Behavior (Schwartz, 1977) was the foundation for the remaining two constructs that are a part of the model presented in figure 4.
Personal norms were one of the constructs included due to Ajzen's (1991) findings that these norms make significant contributions to the model because the TPB does not take into account an individual's personal beliefs of what he considers right or wrong behavior. As stated by Davies et al. (Davies et al., 2002), the crucial difference between "recyclers and non-recyclers was that the decision to recycle is a function of the belief that it is the right thing to do. It is not based on a conscious evaluation of the personal costs and benefits involved." In sum, recycling is, for individuals, an integral part of who they are and how they live their life.
Findings lead to the exclusion of the predecessor construct of personal norms - social norms – as these do not direct behavior and are not forecasters of recycling intent (White et al., 2009).
In MAB, there are two moderators that influence whether personal norms translate into behavior. As detailed prior, only ascription of responsibility will be included in the model because, according to Boldero (1995), awareness of consequences is comparable to attitudes towards the behavior.
Equally to the previous hypotheses, personal norms will also be analyzed to assess if there are significant differences between the groups (DRS and CRS). As a result, the additional three hypotheses that this study considers, are as follows:

Hypothesis 3 (H3): The individual's personal norms hold a positive influence on his intention to recycle.
Hypothesis 3.a (H3.a): There are statistically significant differences in the construct personal norms between the two groups.

Hypothesis 4 (H4): The effect of personal norms on recycling intention is moderated by ascription of responsibility.

As prior stated, the overall model will be applied to both collection systems. This will allow the comparison of data and the analyzes of the impact that the Deposit-Return Scheme has on consumer's recycling intention. This led us to the remaining hypothesis:

Hypothesis 5 (H5): The Deposit-Return Scheme group has a higher recycling intention then the Current Collection System.

CHAPTER 3: METHODOLOGY

The following chapter will present a detailed explanation of the methodology employed to study the hypotheses formulated in chapter two and, subsequently, the research questions of this dissertation.

Primarily, it will start by defining the research approach, followed by the nature of the primary and secondary data used for this study. To conclude, primary data will go further in detail by carefully examining the data collection process, measurement, and data analysis techniques.

3.1 Research Approach

The main goal of this research is to understand if consumers' recycling intent increases with the use of the soon-to-be-implemented Deposit-Return Scheme and assess what are the relevant factors that define and influence their decision.

The conceptual framework, presented in the previous chapter, was developed based on extensive literature review and will be empirically tested to prove its relevancy by identifying and analyzing the relationships between each construct and understand their impact on consumer's recycling intention.

As a starting point, an exploratory research design was applied, based on qualitative methods, to gain deeper knowledge on the subject in study and to gather insights on the relevant theories that were already proven to be significant in pro-environmental behaviors and in the assessment of consumer's intention. Moreover, the qualitative approach was fundamental to correctly design the survey which will be the foundation of the quantitative research method.

The core theories that will be tested in the empirical research are the Theory of Planned Behavior (Ajzen, 1991) and the social-psychological Model of Altruistic Behavior (Schwartz, 1977). The review of the literature undertaken determined the constructs that need to be chosen to effectively test these theories and their sufficiency, namely: attitudes, perceived behavior control, intention, personal norms and ascription of responsibility.

The second phase was an online survey designed to measure the explanatory variables defined above and understand the relationships between them, according to the insights provided by Ajzen, Schwartz, Harland et al., and Davies et al (Ajzen, 2002b; Davies et al., 2002; Harland et al., 1999; Schwartz, 1977). Thereafter, the numerical data was collected online through Qualtrics platform and analyzed using statistical methods conducted in IBM's statistical software, SPSS.

3.2 Secondary Data

Secondary data collection was conducted while searching and gathering information and knowledge from previous authors known to have done extensive and valuable research on the subject of pro-environmental behavior and recycling. Furthermore, the information compiled was mainly in the form of academic articles where, the most relevant ones, were chosen from, what are considered to be, top journals assuring that the knowledge and data are founded on credible sources and results.

Secondary data was fundamental to develop the literature review present in chapter two due to the reliable information collected concerning the theories being study and applied to this research, as well as the respective variables chosen. The conclusions drowned enable the establishment of cause-effect relationships among the variables selected and, ultimately, the conception of the model and the hypotheses that will be studied.

Finally, the information extracted from the literature was also the basis for the primary data collection as it provided supporting evidence on how to properly measure each construct of the developed conceptual model.

3.3 Primary Data

Primary data research was conducted with the purpose of reaching conclusions that will confirm or deny the hypotheses projected in the literature review and, ultimately, allow the achievement of relevant knowledge to answer the specific research questions.

Quantitative data was collected through an online survey questionnaire. Prior to the survey's disclosure, a pilot survey was performed in a sample of 10 individuals to verify and correct any issues and ensure that the survey was ready to be launched. After the pilot survey, the answers were eliminated, and the final survey was shared via social media platforms, personal contacts, and email.

3.4 Data Collection

The online survey questionnaire was launch on the 5th of December 2019 on Qualtrics platform and was operational until January 10th, 2020. In order to collect answers, the survey's link was distributed throughout multiple social media platforms, personal contacts and via e-mail.

The survey was available for a longer period of time than initially foreseen due to the high number of uncomplete answers recorded. This was understandable considering the length of the survey and for that reason, respondents had one week to complete the questionnaire after

they started. One week after the respondent's last activity, their uncomplete responses would be eliminated.

The questionnaire was based on a cross-sectional design (Saunders, Lewis, & Thornhill, 2009) comprehending 2 scenarios that were randomly assigned to the participant but evenly distributed – 50% of the participants answered to questions related to the Current Recycling System and the other half answered questions related to the Deposit-Return Scheme. Moreover, this questionnaire comprised of 9 sections equal in both scenarios in order to enable the researcher to make inferences between them.

Regarding the sampling process, a non-probability sampling technique was chosen, more thoroughly a convenience sampling. This is appropriate because it allows the researcher to collect more data in a lesser amount of time by reaching accessible respondents.

Nevertheless, this technique is inclined to certain biases since, because of the rapidness of data collection, there is little control over the cases within the sample. Moreover, in a non-probability sampling technique, it is hard to generalize in a statistical sense to a population since it is very unlikely to obtain a representative sample (Saunders et al., 2009).

Even though the Deposit-Return Scheme in study will be implemented in Portugal, no target was restricted based on country of residence or nationality. While most of the participants were Portuguese, anyone that is currently in Portugal or intents to come will have access to these Deposit-Return Schemes. Moreover, this allowed the researcher to draw conclusions concerning the differences between responses.

A total of 378 responses were initiated however, 116 were unfinished which led to their exclusion. Moreover, 4 other entries were eliminated due to an outlier's analyses. This left the researcher with 258 responses that were considered valid.

3.5 Measurement / Indicators

The questionnaire used in this research was designed following the recycling literature and previous applications of the models of TPB and MAB (Ajzen, 2002b; Davies et al., 2002; Harland et al., 1999; Schwartz, 1977). This provides a more founded academic research and justifies the assortment of constructs selected.

For the purpose of investigating the intention to recycle through a Deposit-Return Scheme, each construct of the TPB (recycling attitudes, perceived behavior control, and recycling intentions) was measured, as recommended by Ajzen (1991), with a seven-point rating scale. The same scale was applied to the constructs personal norms and ascription of responsibility, from the

Model of Altruistic Behavior, as adopted in previous studies (Davies et al., 2002) and in order to simplify statistical testing.

The seven-point Likert scale ranges from "1" indicating a negative view of recycling (disagreement) and "7" to indicate a positive view of recycling (agreement). Furthermore, when necessary to keep the same coherency, questions were reversed scored and then re-coded.

To measure the variable attitudes towards recycling, the respondents were presented with the statement "Household recycling is an important way to:" followed by six behavioral beliefs that complete it ("the protection of the environment"; "the reduction of landfill waste"; "the preservation of natural resources"; "the conservation of energy"; "the saving of money" and "the creation of a better environment for future generations") which they were asked to evaluate from "strongly disagree" (1) to "strongly agree" (7). Afterward, they had to weigh the level of importance of the same six behavioral beliefs from "Not important at all" (1) to "Extremely Important" (7). Subsequently, to measure this construct, each behavioral belief was multiplied by the corresponding outcome evaluation item. In other words, a person's attitudes towards recycling (A) is directly proportional $(\propto)$ to the summative of products between behavioral beliefs (b) and outcome evaluations (e) (Ajzen, 1991):

$$A \propto \sum_{i=1}^{n} b_i e_i$$

Founded on the recommendations provided by Ajzen (2002b) and Tonglet, et al. (2004), the construct perceived behavior control can be assessed by directly asking participants how much control they have over a specific behavior of interest and how easy or difficult they believe the performance of that behavior is likely to be. In this section participants had to assess the following four statements related to the recycling system presented (("If I want to, I will easily be able to recycle through the new Deposit-Return Scheme/ Current Recycling System" ("Strongly Disagree" (1) – "Strongly Agree" (7))), ("For me, recycling through the new Deposit-Return Scheme/ Current Recycling System is:" ("Extremely difficult" (1) – "Extremely easy" (7))), ("How much control do you think you have over your ability to recycle though the new Deposit-Return Scheme/ Current Recycling System?" ("No Control" (1) – "Complete Control" (7))), and ("The number of external influences that may prevent me from recycling through the new Deposit-Return Scheme are:" ("Numerous" (1) – "None at all" (7))).

The construct intention to recycle, which is the last variable chosen from the Theory of Planned Behavior, was measured through one question indicating each material – glass, plastic, ferrous metals and aluminum. Following Ajzen and Harland et al. (Ajzen, 2002a, 2002b; Harland et al., 1999) recommendations, a time frame was set in order to make sure all participants focused and considered the same time frame while answering the survey ("How likely is that you will recycle your packages made of _____ through the Deposit-Return Scheme/Current Recycling System, in the next 3 months?" (ranging from (1) "extremely unlikely" to (7) "extremely likely")). This question was presented to both recycling systems to allow the researcher to make comparisons between the respondents that saw the Current Recycling System versus the ones that saw the Deposit-Return Scheme and, consequently, reach relevant conclusions.

The construct personal norms, from the Model of Altruistic Behavior (Schwartz, 1977), was measured by asking respondents to classify from "Strongly Disagree" (1) to "Strongly Agree" (7) indicators of personal obligation to recycle and indicators that assessed the experienced feeling of guilt when recycling is disregarded. The seven indicators selected were ("I feel I should not waste anything if it could be used again"); ("It would be wrong of me not to recycle my household waste"); ("Waste management problems are another people's concern, not mine"); ("I would feel guilty if I did not recycle my household waste"); ("Not recycling goes against my principles"); ("I do not need to recycle as enough is being done by others to clean up the environment"); and ("Everybody should share the responsibility to recycle their household waste") which followed Davies et al. (Davies et al., 2002) recommendations.

Finally, to assess ascription of responsibility six items were selected and measured using a 7-point scale ranging from "Strongly Disagree" (1) to "Strongly Agree" (7). These statements (Davies et al., 2002) allowed the assessment of respondent's perceptions concerning whether recycling was, or was not their responsibility. Concerning this construct, the following statements were asked ("Recycling efforts of all households will reduce landfill" ("Strongly Disagree" (1) - "Strongly Agree" (7))); ("Recycling my household waste is always worth the effort" ("Strongly Disagree" (1) - "Strongly Agree" (7))); ("There is no need to conserve natural resources because in the long run things will balance out" ("Strongly Disagree" (1) - "Strongly Agree" (7))); ("There is not much that anyone can do for the environment" ("Strongly Disagree" (1) - "Strongly Agree" (7))); ("There are only limited natural resources" ("Strongly Disagree" (1) - "Strongly Agree" (7))); and ("It is up to all individuals to preserve natural resources where

they can, and recycling will improve the quality of the environment" (1) - "Strongly Agree" (7))).

The constructs that are measured with more than one item will be compressed into a global variable if the Cronbach alpha value, which evaluates the internal consistency, reaches the acceptable scale.

Framework	Measure	Item	References
Dependent Variable	Intention to Recycle	4	(Ajzen, 2002a, 2002b; Harland et al., 1999)
Independent Variable	Attitudes Towards Recycling	6	(Ajzen, 1991).
Independent Variable	Perceived Behavioral Control	4	Ajzen (2002b) and Tonglet, et al.(2004)
Independent Variable	Personal Norms	7	(Schwartz, 1977) and (Davies et al., 2002)
Independent Variable	Ascription of Responsibility	6	(Schwartz, 1977) and (Davies et al., 2002)

Table 1: Measurement model

3.6 Data Analysis

The data used for this research was processed and analyzed using IBM's statistical software, SPSS version 25. The main purpose of this analysis was to assess the validity of the hypotheses drawn and test the statistical significance of the interactions between each variable.

Prior to hypotheses testing, the data collected was checked and cleaned as unfinished answers were eliminated. Moreover, when necessary, variables were re-coded to guarantee accuracy and consistency, and constructs were computed. Subsequently, descriptive statistics and frequencies were generated to get an overview of the sample. The reliability of the constructs was also measured through the calculation of Cronbach's Alpha.

The following chapter will detail these results as well as the testing of each hypothesis. Depending on the hypothesis in study, the performed tests include: Linear regressions, independent samples t-test, and multiple regressions. Moreover, Process Macro by Hayes (Hayes, 2013) was also used to test the hypothesis regarding the moderation effects.

CHAPTER 4: RESULTS AND DISCUSSION

This chapter focuses on the analysis of the main study results. Quantitative data collected through the online questionnaire is analyzed in order to provide a detailed sample characterization and to test the hypotheses detailed prior. Moreover, it will allow a broader understanding of the complete model in order to reach relevant conclusions.

4.1 Outliers Analysis

Prior to starting the analysis of the data collected, an outlier analysis was conducted in order to detect and eliminate responses that could lead the researcher to bias results (Seltman, 2015). To perform this study, a multivariate outlier analysis was conducted which allowed the identification of participants with unusual combinations of two or more variables. Posteriorly, the Mahalanobis distance was computed, creating a new variable for each respondent. Participants with corresponding values lower than .001 ($p < .001$) were labeled as outliers. This exercise discovered 4 potential outliers that were removed from the initial sample. In conclusion, the total sample of valid answered consists in 258 responses.

4.2 Sample Characterization

As detailed prior, a sample of 258 valid answers was registered. This sample comprises a broad range of nationalities from various continents - Europe (94,8%), America (2,8%) and Africa (2,4%) – nevertheless, 84,5% were Portuguese which represents the majority of the participants, with a total of 218 responses.

When it comes to gender, women represent 65,9% of the sample and male participants account for the remaining 34,1%. The age range was predominately between 18 and 24 years old (51,6%) and the vast majority of the sample (86,1%) was below the age of 45. As for marital status, 76,0% of participants were single, 4,3% were divorced or separated and the remaining 19,8% were married or cohabiting.

Most respondents held a high level of education (78,7%) and were employed (59,0%) earning a monthly income below 2.000€ (70,2%).

Regarding their recycling habits, most participants claim to recycle in their household (76,4%). Within this group, plastic is the most frequently recycled material in the household (77,6%), followed by glass (71,1%), aluminum (62,9%) and ferrous metals (59,9%).

Furthermore, regarding the disposal of recycled waste, a relevant percentage of respondents (60,5%) live in areas where they have to dispose of their waste in centralized pickup points called “Ecoilhas”. Only 36,8% live in areas where door-to-door collection exists.

When assessing participant's attendance to large commercial surfaces the researcher concluded that, on average, most respondents visit at least 2 to 3 times a month (72,0%) and use their personal car as means of transportation (73,3%).

Finally, when analyzing all the variables across the two scenarios shown in the online questionnaire, it is possible to conclude that their sub-samples are identical which ensures the existence of homogeneity between each group (Appendix 7). Notwithstanding, it is important to highlight that, by applying a non-probability sampling technique, it is unlikely to obtain a representative sample (Saunders et al., 2009), as stated prior.

4.3 Measures of Reliability

As previously mentioned, the scales used in the online questionnaire to measure the constructs included in the model under study were adapted from the literature review conducted. Nevertheless, it was fundamental to test their reliability considering the gathered sample. To this end, Cronbach's Alpha coefficient was measured to assess internal consistency. For quality ranking, recommendations from George, D., & Mallery, (2003) were followed.

The scales applied delivered different reliability indexes. Attitudes towards recycling and perceived behavior control delivered a good reliability index, with Cronbach's Alpha of 0.859 and 0,844, respectively. These results showcased that the constructs have good internal consistency (Table 2).

Recycling intention was the construct with the highest Cronbach's Alpha reaching 0,906 which indicates an excellent reliability index.

Regarding the measurement scales used in the construct personal norms, they delivered an acceptable reliability index with a Cronbach's Alpha value of 0,764.

Last, but not least, ascription of responsibility was the exception has it showed a questionable reliability index, with Cronbach's Alpha of 0,667. This score led to the elimination of one item from the scale. After this deletion, the Cronbach's Alpha value increased to 0,752 meaning that this construct reached an acceptable reliability index. (Appendix 8).

Reliability Statistics					
Construct	**Cronbach's Alpha**	**Nº of Initial Items**	**Nº of Items Deleted**	**Cronbach's Alpha after items deleted**	**Quality**
Attitudes Towards Recycling	0,859	12	-	-	Good
Ascription of Responsibility	0,667	6	1	0,752	Acceptable
Personal Norms	0,764	7	-	-	Acceptable
Perceived Behavior Control	0,844	4	-	-	Good
Recycling Intention	0,906	4	-	-	Excellent

Table 2: Reliability test for multi-item scales

4.4 Results from the Hypothesis Testing

To proceed with the research, it was mandatory to understand the relationship between the constructs, more precisely, between the predictor variables and the outcome variable. To do so, numerous statistical tests were employed to assess the validity of the hypotheses.

Three of the hypotheses mentioned, due to their nature, were studied through linear regressions. In order to conduct these tests, a preliminary analysis was performed to guarantee that none of the regression assumptions were violated and so, maintaining the validity of the generated data. Starting with the independence assumption, error terms are independent of each other as verified through the Durbin-Watson value which should be, approximately, 2. Furthermore, multicollinearity was also verified not to be an issue through the Pearson Correlation Value, shown to be lower than 0,8, and through the Variance Inflation Factor (VIF), with values below 2. Moreover, the residuals are linear, normally distributed, homoscedasticity is verified, and the mean of the error term is zero ($E\{\varepsilon i\} = 0$). Additionally, the nature of the variables entered in the regression analysis are metric.

Independent samples t-tests were also employed, and the respective assumptions (Statistics, 2018) were validated prior: the independent variable is continuous (measure at the interval level), the dependent variable consists of two categorical, independent groups (groups: Deposit-Return Scheme and Current Recycling System) and independence of observations was guaranteed since there was no relationship between the observations in each group or between the groups themselves. Additionally, there are no significant outliers, as explained prior, the dependent variable is approximately normally distributed for each group of the independent

variable, assured by the Central Limit Theorem (CLT), and homogeneity of variances is not an issue as the two samples are of equal size (Hays, 1994; Saunders et al., 2009).
In conclusion, the following analysis includes simple regressions and multiple regressions to assess hypotheses 1, 2, 3 and the overall model. Process Macro was used to test the moderation hypothesis (H4) and, independent samples t-test were performed to assess the validity of hypotheses 1.a, 2.a, 3.a, and 5.

4.4.1. Attitude Towards Recycling

Hypothesis 1 (H1): The individual's attitude towards recycling holds a positive influence on his intention to recycle.

For hypothesis 1, due to the nature of the variables, the linear regression below was conducted and employed to test how attitudes towards recycling predict behavior intention.
The test was performed using behavior intention towards recycling as a dependent variable and attitudes towards recycling as the independent variable.

$$RI = \beta_0 + \beta_1 \, ATR + \varepsilon$$

The null hypothesis (H0) for this test is written below and, if proven to be truthful, means that attitudes towards recycling does not have an effect on behavior intention.

$$\text{H0: } \beta_1 = 0$$

Through the output generated it was possible to conclude that there is a medium, positive correlation between the variables (Attitudes Towards Recycling & Behavior Intention), R = 0,482. The R^2 value indicated that attitudes towards recycling only predicts around 23% of the total variance of behavior intention (R^2 = 0,232). The ANOVA table showcased a *p*-value lower than 0,05 and so, it was possible to conclude that, overall, the regression model predicts the dependent variable significantly well (Sig = 0,000) (F (1;256) = 77,328; $p < 0{,}001$). The beta value (β_1) for attitudes towards recycling is positive and equal to 0,549 with $p < 0{,}001$, therefore, attitudes towards recycling has a positive and statistically significant impact on behavior intention. More precisely, this means that a positive increase in attitude (for every unit that increases) there is an increase in 0,549 units in the behavior intention to recycle, *ceteris paribus*.

As a result of these conclusions, the null hypothesis was rejected and *H1* was verified.

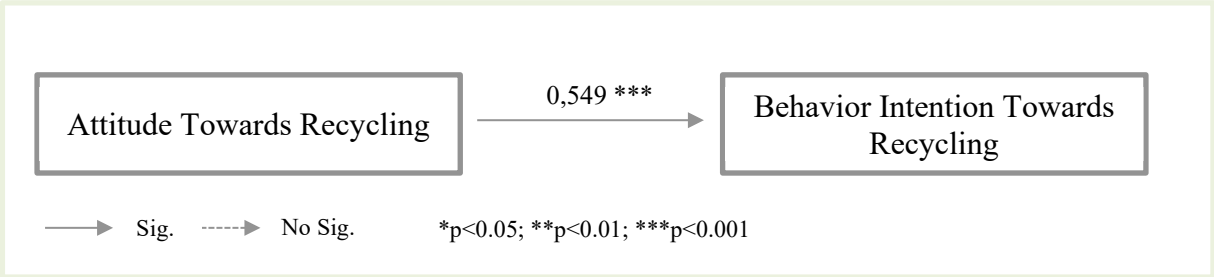

Figure 5: Linear Regression results of the impact of ATR on BI

Regarding this hypothesis testing, SPSS outputs can be found in appendix 9.

H1.a - There are statistically significant differences in the construct attitudes towards recycling between the two groups.

To understand if there was a statistically significant difference between the means of the two groups, an independent sample t-test was employed for the construct ATR. Thereafter, the null hypothesis (H0) for this test is written below and, if proven to be truthful, indicates that the means of the two groups are equal.

$$H0: \mu_{ATR_{DRS}} = \mu_{ATR_{CRS}}$$

With the output generated, it was possible to verify that both groups have the same sample size (n=129) and that the means between them are not statistically significantly different as the p-value equals 0,148, which is higher than 0,05. Consequently, the null hypothesis was not rejected. This leads to the conclusion that participants from both groups have similar ATR and that these attitudes which are towards recycling in general, are not significantly influenced by the recycling system shown.

In conclusion, it was achievable that *hypothesis 1.a* is not valid.

Regarding this hypothesis testing, SPSS outputs can be found in appendix 10.

4.4.2. Perceived Behavior Control

Hypothesis 2 (H2): The individual's perceived behavior control towards recycling holds a positive influence on his intention to recycle.

Once more, due to the nature of the variables, the linear regression below was conducted and employed to test how perceived behavior control predicts behavior intention.

The groups were tested separately using behavior intent towards recycling as the dependent variable and perceived behavior control as the independent variable.

$$RI = \beta_0 + \beta_1 \, PBC + \varepsilon$$

The null hypothesis (H0) for this test is written below and, if proven to be truthful, means that perceived behavior control does not have an effect on behavior intention.

$$\text{H0: } \beta_1 = 0$$

The conducted linear regression above, for perceived behavior control, presented a positive correlation with behavior intention (R = 0,539). The R^2 value indicated that perceived behavior control predicts around 29% of the total variance of behavior intention (R^2 = 0,290).

The overall model is statistically significant (F (1;256) = 104,613; p < 0,001) and so, the regression model predicts the dependent variable significantly well. The beta value (β_1) for PBC is positive, and equal to 0,510 with p < 0,001. Therefore, perceived behavior control has a positive and statistically significant impact on behavior intention. More precisely, this means that for every unit increase in PBC, which indicates a positive rise in control over the behavior, there is an increase in 0,510 units in behavior intention to recycle, *ceteris paribus*.

As a result of these conclusions, the null hypothesis was rejected and *H2* was verified.

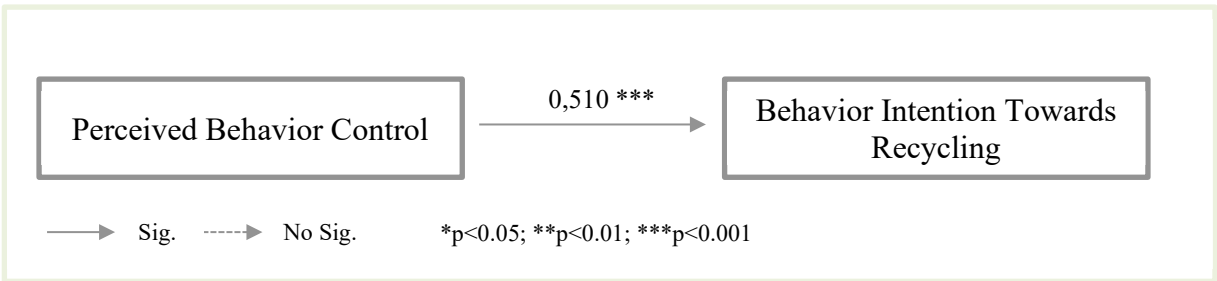

Figure 6: Linear Regression results of the impact of PBC on BI

SPSS outputs for this hypothesis can be found in appendix 11.

Hypothesis 2.a (H2.a): The Deposit-Return Scheme has a lower perceived behavior control than the Current Collection System.

To test this hypothesis an independent sample t-test was employed to understand if there was a statistically significant difference between the means of the two groups for the construct PBC. Thereafter, the null hypothesis (H0) for this test is written below and, if proven to be truthful, indicates that the means of the two groups are equal.

$$H0: \mu_{PBC_{DRS}} = \mu_{PBC_{CRS}}$$

With the output generated, it was possible to verify that both groups have the same sample size (n=129) and that the means between them are statistically significantly different as the p-value equals 0,006, which is lower than 0,05. Consequently, the null hypothesis was rejected. Furthermore, this study found that respondents perceive to have lower behavior control over the Deposit-Return Scheme ($\mu_{PBC_{DRS}}$ = 5,33) than in the Current Recycling System ($\mu_{PBC_{CRS}}$ = 5,61). Therefore, with a mean difference of -0,28 ($\mu_{PBC_{DRS}}$ - $\mu_{PBC_{CRS}}$) it was achievable that *hypothesis 2.a* is valid.

SPSS outputs for this hypothesis can be found in appendix 12.

4.4.3. Personal Norms

Hypothesis 3 (H3): The individual's personal norms hold a positive influence on his intention to recycle.

As applied before, due to the nature of the variables, the linear regression below was conducted and employed to assess how personal norms predict behavior intention.

The linear regression used behavior intention towards recycling as a dependent variable and personal norms as the independent variable.

$$RI = \beta_0 + \beta_1 PN + \varepsilon$$

The null hypothesis (H0) for this test is written below and, if proven to be truthful, means that personal norms do not have an effect on behavior intention.

$$H0: \beta_1 = 0$$

The performed linear regression above, demonstrated a statistically significant model (F (1;256) = 144,929; p < 0,001) for personal norms as a predictor of recycling intention. It was verified a relatively high level of a positive correlation between the variables (R = 0,601) and the R^2 value proved that PN predicts 36,1% of the overall variance of BI (R^2 = 0,361).

By analyzing the coefficients table output, it was possible to attest a positive beta value (β_1=0,843 with p < 0,001) for the linear regression formulated. Hereafter, it was viable to conclude that personal norms has a positive and statistically significant impact on behavior intention. For that reason, for every unit increase in PN, which implies a more positive personal belief, there is an increase in 0,843 units in behavior intention to recycle, *ceteris paribus*.

This outcome leads, not only to the rejection of the null hypothesis but, consequently, to the validity of *H3*.

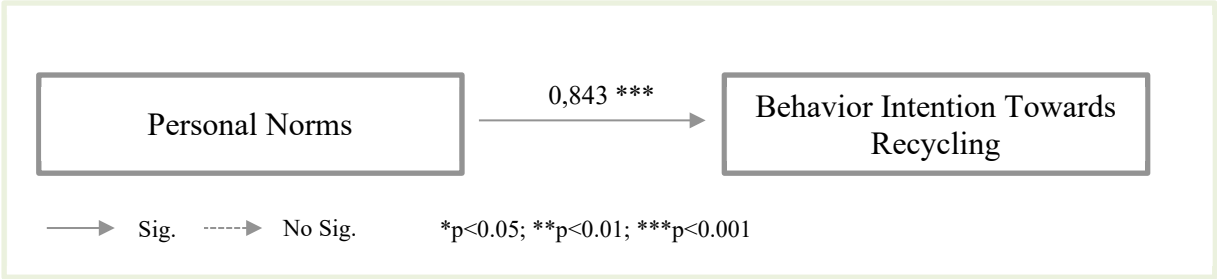

Figure 7: Linear Regression results of the impact of PN on BI

SPSS outputs for this hypothesis can be found in appendix 13.

H3.a **-** There are statistically significant differences in the construct personal norms between the two groups.

To understand if there was a statistically significant difference between the means of the two groups, DRS and CRS, the construct personal norms was subjected to an independent sample t-test. Thereafter, the null hypothesis (H0) for this test is written below and, if proven to be truthful, indicates that the means of the two groups are equal.

$$H0: \mu_{PN_{DRS}} = \mu_{PN_{CRS}}$$

With the output generated, it was possible to verify that both groups have the same sample size (n=129) and that the means between them are not statistically significantly different as the p-

value equals 0,271, which is higher than 0,05. Consequently, the null hypothesis was not rejected. Furthermore, this study found that respondents from both groups have similar PN and that these norms, which refer to fundamental values that one has about recycling, are not significantly influenced by the recycling system shown.
In conclusion, *hypothesis 3.a* is not valid.

SPSS outputs for this hypothesis can be found in appendix 14.

4.4.4. Personal Norms and Ascription of Responsibility

Hypothesis 4 (H4): The effect of personal norms on recycling intention is moderated by ascription of responsibility.

In order to understand if ascription of responsibility is a moderator of the impact of personal norms on recycling intention, the PROCESS SPSS add-on developed by Prof. Andrew F. Haynes was performed for model number 1.
The overall model showed to be significant ($p < 0.001$) and explains around 36,57% of the total variance. Regarding the effects on recycling intention, it is possible to conclude that only personal norms as a significant ($p < 0.05$) and positive impact of 1,4690 on the dependent variable. Contrarily, ascription of responsibility does not have a significant effect on recycling intention (p-value = 0.2280) neither does the interaction between personal norms and ascription of responsibility (p-value = 0.2527). Therefore, the moderation effect is not existent.
This outcome leads to the rejection of *hypothesis 4 (H4).*

SPSS outputs for this hypothesis can be found in appendix 15.

4.4.5. Recycling Intention

Hypothesis 5 (H5): The Deposit-Return Scheme group has a higher recycling intention then the Current Collection System.

To test this hypothesis an independent sample t-test was employed to understand if the construct recycling intention had a statistically significant difference between the means of the two groups. Thereafter, the null hypothesis (H0) for this test is written below and, if proven to be truthful, indicates that the means of the two groups are equal.

$$H0: \mu_{RI_{DRS}} = \mu_{RI_{CRS}}$$

Once more, the output showed that both groups have the same sample size (n=129) and that the means between them are statistically significantly different as the p-value equals 0,000 with $p < 0{,}001$. Consequently, the null hypothesis was rejected. Furthermore, this study found that respondents appear to have lower recycling intentions through the Deposit-Return Scheme ($\mu_{RI_{DRS}} = 5{,}98$) than through the Current Recycling System ($\mu_{RI_{CRS}} = 6{,}34$). Therefore, with a mean difference of -0,36 ($\mu_{RI_{DRS}} - \mu_{RI_{CRS}}$), hypothesis 5 was rejected.

SPSS outputs for this hypothesis can be found in appendix 16.

4.4.6. Hypotheses Testing Overview

Hypotheses	Description	Result
H1	The individual's attitude towards recycling holds a positive influence on his intention to recycle.	Valid
H1.a	There are statistically significant differences in the construct attitudes towards recycling between the two groups.	Not Valid
H2	The individual's perceived behavior control towards recycling holds a positive influence on his intention to recycle.	Valid
H2.a	The Deposit-Return Scheme has a lower perceived behavior control than the Current Collection System.	Valid
H3	The individual's personal norms hold a positive influence on his intention to recycle.	Valid
H3.a	There are statistically significant differences in the construct personal norms between the two groups.	Not Valid
H4	The effect of personal norms on recycling intention is moderated by ascription of responsibility.	Not Valid
H5	The Deposit-Return Scheme group has a higher recycling intention then the Current Collection System.	Not Valid

Table 3: Hypotheses testing overview

4.5. General Model

To conclude, a multiple regression was performed to assess the overall model presented in the literature review chapter.

First, the following multiple regressions were conducted, for each recycling system, only including the variables from the Theory of Planned Behavior by Ajzen's (Ajzen, 1991):

$$RI_{DRS} = \beta_0 + \beta_1 ATR_{DRS} + \beta_2 PBC_{DRS} + \varepsilon$$

$$RI_{CRS} = \beta_3 + \beta_4 ATR_{CRS} + \beta_5 PBC_{CRS} + \varepsilon$$

The general model, including only the variables mention prior, was proven to be statistically significant for both recycling systems: DPS (F (2;126) = 39,725; p < 0,001) and the CRS (F (2;126) = 40,246; p < 0,001).

For the Deposit-Return Scheme, a positive correlation between the variables was confirmed, R = 0,622. The R^2 value indicated that the model predicts 38,7% of the total variance of behavior intention $_{DRS}$ (R^2 = 0,387).

The β_1 value for ATR $_{DRS}$ and the β_2 for PBC $_{DRS}$ are positive, and equal to 0,413 and 0,396, respectively, with p < 0,001. Hereafter, both variables have a positive and statistically significant impact on behavior intention $_{DRS}$. However, it is important to highlight that attitudes towards recycling has a higher impact on recycling intention ($\beta_1 > \beta_2$).

In conclusion, on average, for every unit increase in ATR, there is an increase in 0,413 units in the behavior intention to recycle, *ceteris paribus*. And for every unit increase in PBC, there is an increase in 0,396 units in the behavior intention to recycle, *ceteris paribus*.

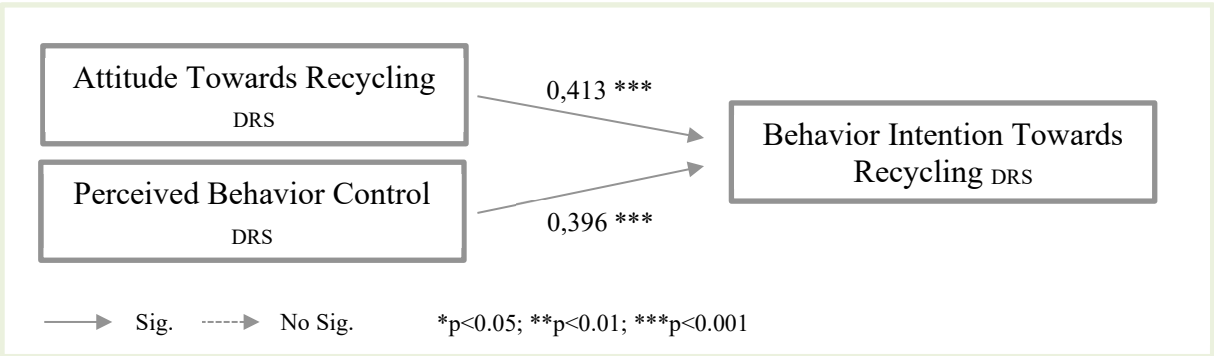

Figure 8: Multiple regression results of the impact of ATR $_{DRS}$ and PBC $_{DRS}$ on BI $_{DRS}$

SPSS outputs for the multiple regression detailed above (DRS) can be found in appendix 17.

Regarding the Current Recycling System, a positive correlation between the variables was confirmed, R = 0,624. The R^2 value indicated that the model predicts 39,0% of the total variance of behavior intention $_{CRS}$ (R^2 = 0,390).

Both variables have a positive and statistically significant impact on behavior intention $_{CRS}$. The β_4 value for ATR $_{CRS}$ and the β_2 for PBC $_{CRS}$ are positive, and equal to 0,379 and 0,383 (p <

0,001), respectively. These values show that perceived behavior control has a higher impact on recycling intention ($\beta_5 > \beta_4$).

In conclusion, on average, for every unit increase in PBC, there is an increase in 0,383 units in the behavior intention to recycle, *ceteris paribus*. And for every unit increase in ATR, there is an increase in 0,379 units in the behavior intention to recycle, *ceteris paribus*.

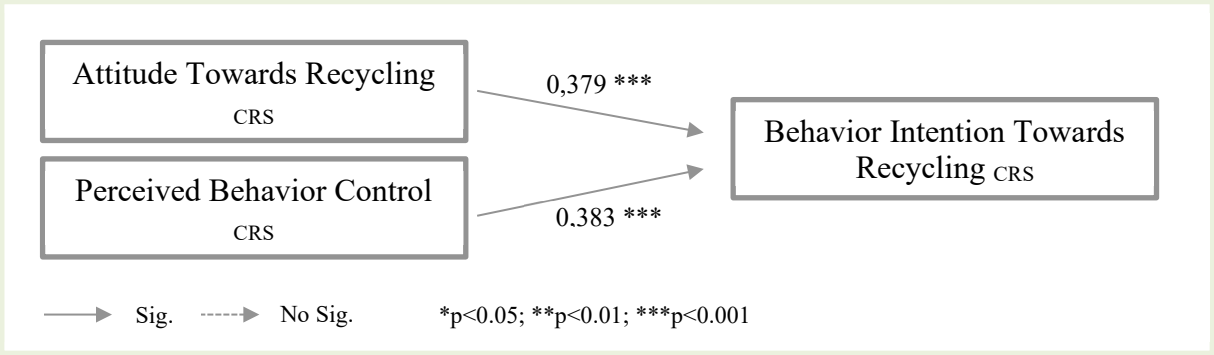

Figure 9: Multiple regression results of the impact of ATR $_{CRS}$ and PBC $_{CRS}$ on BI $_{CRS}$

SPSS outputs for the multiple regression detailed above (CRS) can be found in appendix 18.

Finally, the personal norms construct, from the Model of Altruistic Behavior (Schwartz, 1977) was added to the multiple regression to understand its impact on the overall model. Ascription of responsibility was excluded due to the results presented in hypothesis 5.

$$RI_{DRS} = \beta_0 + \beta_1 ATR_{DRS} + \beta_2 PBC_{DRS} + \beta_6 PN_{DRS} + \varepsilon$$

$$RI_{CRS} = \beta_3 + \beta_4 ATR_{CRS} + \beta_5 PBC_{CRS} + \beta_7 PN_{CRS} + \varepsilon$$

The general overall model proved to be statistically significant for both recycling systems: the DPS ($F(3;125) = 47{,}896$; $p < 0{,}001$) and the CRS ($F(3;125) = 37{,}808$; $p < 0{,}001$).

Starting with the Deposit-Return Scheme, it was possible to conclude that there is a positive correlation between the variables, $R = 0{,}731$. The R^2 value indicated that the model predicts 53,5% of the total variance of behavior intention $_{DRS}$ ($R^2 = 0{,}535$). These results confirm that, by adding the construct PN, there is an increase in the total variance that can be explained by the model.

ATR $_{DRS}$ is the only variable that is not statistically significant since β_1 equals to 0,139 with $p > 0{,}05$. PN $_{DRS}$ is the predictor with a higher impact on RI $_{DRS}$ ($\beta_6 = 0{,}728$ with $p < 0{,}001$)

followed by PBC $_{DRS}$ ($\beta_2 = 0{,}310$ with $p < 0{,}001$). Therefore, both variables have a positive and statistically significant impact on Behavior Intention $_{DRS}$.

In conclusion, on average, for every unit increase in PN, there is an increase in 0,728 units in the behavior intention to recycle, *ceteris paribus*. And for every unit increase in PBC, there is an increase in 0,310 units in the behavior intention to recycle, *ceteris paribus*.

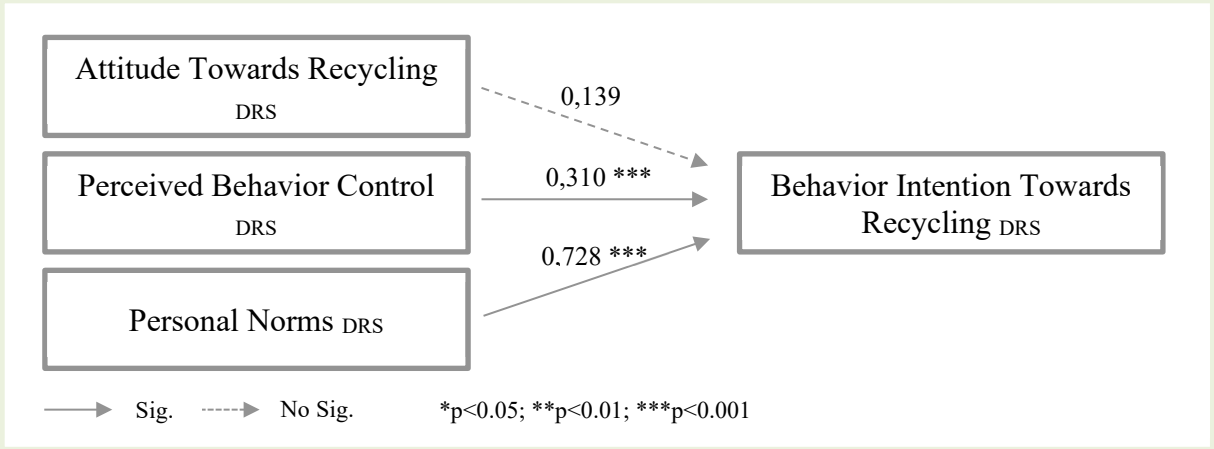

Figure 10: Multiple regression results for the overall model $_{DRS}$

SPSS outputs for the multiple regression detailed above (DRS) can be found in appendix 19.

Finally, regarding the Current Recycling System, it was possible to conclude that there is a positive correlation between the variables, R = 0,690. The R^2 value indicated that the model predicts 47,6% of the total variance of behavior intention $_{CRS}$ (R^2 = 0,476). Once more, these results confirm that, by adding the construct PN, there is an increase in the total variance that can be explained by the model.

The three intervening constructs showed to have a positive and statistically significant impact on BI. PN $_{CRS}$ is the predictor with a higher impact on RI $_{CRS}$ ($\beta_7 = 0{,}400$ with $p < 0{,}001$) followed by PBC $_{CRS}$ ($\beta_5 = 0{,}292$ with $p < 0{,}001$) and ATR $_{CRS}$ (β_4= 0,259 with $p < 0{,}05$).

In conclusion, on average, for every unit increase in PN, there is an increase in 0,400 units in the behavior intention to recycle, *ceteris paribus*. Moreover, for every unit increase in PBC, there is an increase in 0,292 units in the behavior intention to recycle, *ceteris paribus*. And for every unit increase in ATR, there is an increase in 0,259 units in the behavior intention to recycle, *ceteris paribus*.

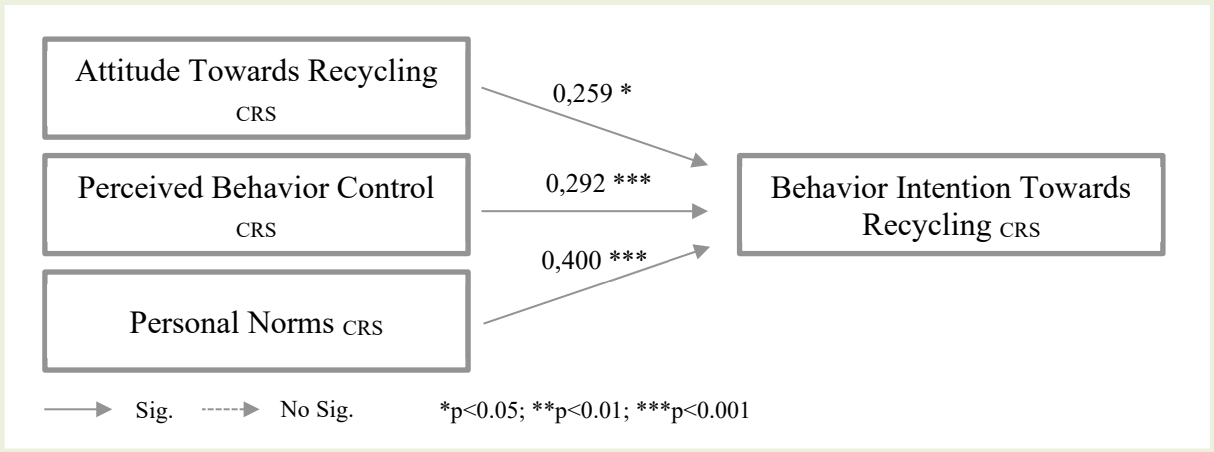

Figure 11: Multiple regression results for the overall model CRS

SPSS outputs for the multiple regression detailed above (CRS) can be found in appendix 20.

4.6. Further Analysis

As explained prior, Deposit-Return Schemes will be implemented in large commercial surfaces which will have an impact on consumer's habits as they have to transport their recycled packages to specific locations. This "new process" will re-shape their routines and can impact surrounding businesses. To shed some light on this topic, even though the location of Deposit-Return Schemes was not the focus of this research and, consequently, was not included in the model, a few questions were asked to participants who were presented with the Deposit-Return Scheme scenario regarding the frequency and choice of the commercial surfaces they would visit. These led to the conclusion that the location of this service has a positive impact not only on the number of times consumers frequent these surfaces but also their choice of which one to visit (Appendix 21 and 22). Thereafter, Deposit-Return Schemes not only contribute to the reduction of packaging waste and their correct routing to recycling, working towards a circular economy, but can also have a positive impact on surrounding businesses.

CHAPTER 5: CONCLUSIONS AND LIMITATIONS

The present section will summarize and highlight the main findings of this study, interconnecting them with previous literature, in order to draw relevant conclusions. Thereafter, this final chapter will identify the managerial and academic implications of this research, as well as its limitations. Lastly, suggestions for further research are also presented.

5.1 Main Findings & Conclusions

This research aims at understanding consumers' recycling intentions and how impactful systems that incentivize this practice can be. Deposit-Return Schemes were the selected system for this study due to the Portuguese Government's intention to implement them, in Portugal, during the next two years (2020 - 2022) (República, 2018).

To conduct this study, two models were integrated to better explain which factors influence consumers' recycling intentions – The Theory of Planned Behavior (Ajzen, 1991) and the Model of Altruistic Behavior (Schwartz, 1977). From the TPB, attitudes towards recycling and perceived behavior control were the antecedents of behavior intention selected for the model presented in this dissertation. Consequently, and according to Ajzen's theory, these will lead to behavior which was not directly assessed due to the time gap between this study and the implementation of the DRS where many intervening factors can change individuals' intention, or perceived behavior control, over their ability to go throw with the usage of this system. Personal norms, from the MAB, were also included due to its significant contribution to the prediction of behavior intention proven my multiple authors (Ajzen, 1991; Davies et al., 2002; Harland et al., 1999). Moreover, ascription of responsibility was also integrated as a moderator of the relationship between personal norms and intention, as presented in the MAB.
To the extent of the researcher's knowledge, this was the first study to apply a model with this specific combination of constructs to predict recycling intention.

Through this research, it was possible to verify that the constructs selected from the TPB (attitudes towards recycling and perceived behavior control) were proven to hold a positive influence over participants' recycling intentions, which led to the confirmation of Ajzen's findings (Ajzen, 1991) as well as other authors after him (Davies et al., 2002; Valle, Rebelo, Reis, & Menezes, 2005). Furthermore, personal norms not only showed to positively impact recycling intention but also to significantly increase the overall model's prediction of this construct. Once again sustaining the literature presented (Ajzen, 1991; Davies et al., 2002;

Schwartz, 1977). Ascription of responsibility, from the MAB, was proven to not moderate the relationship between personal norms and intention, contrary to what was advocated by Schwartz (Schwartz, 1977). This suggests that, for the sample gathered, even when an individual has the tendency to deny his responsibility for the consequences of his actions, moral obligation will not be neutralized.

Addressing the research questions presented for this dissertation, the following answers were elaborated based on the analysis conducted in the previous chapter:

RQ1: What is the impact of the upcoming Deposit-Return Scheme on the consumers' recycling intentions?

As a result of the thorough analysis conducted, it was possible to conclude that the Deposit-Return Scheme does not increase individuals' recycling intentions. Unexpectedly, the Current Recycling System showed to have higher recycling intention. This can be, in part, explained by the lower perceived behavior control that this new system has versus the current collection scheme. This finding is relevant because perceived behavior control has a higher influence on recycling intention in the Deposit-Return Scheme. Thereafter, a lower perceived behavior control means that participants sense this new system to be more difficult to use, or less practical, which will impact their decision to recycle through it. This is understandable since individuals need to transport their separated waste to specific locations, which can be further away from their homes and, consequently, not within a walking distance as the solutions offered by the Current Recycling System.

Furthermore, personal norms and attitudes towards recycling did not present statistical differences between the two groups (DRS and CRS). However, when the model was applied to the Deposit-Return Scheme, attitudes towards recycling was the only construct that showed to have no significant impact on the prediction of recycling intention. This leads to the conclusion that even though individuals can have high evaluations towards recycling, and its benefits, it does not mean that they will use this new DRS collection system.

RQ2: What will have the greatest impact on consumers' adoption of the Deposit-Return Scheme as a means to recycle?

This research uncovered important findings related to the relevancy of each construct when the model is applied to each recycling system separately. For the Current Recycling System, it was verified that attitudes, perceived behavior control, and personal norms are statistically

significant predictors, which means that they all contribute significantly to consumers' intention to recycle. For the Deposit-Return Scheme, the results were slightly different. Only perceived behavior control and personal norms were shown to be relevant predictors of consumers' intention to recycle. Attitudes towards recycling was not a statistically significant predictor. This leads to the conclusion that individuals will use the DRS if they have strong personal beliefs towards recycling and, also, when they perceive the performance of this behavior to be easy and convenient.

RQ3: Which construct has the greatest influence on consumers' recycling intentions?

In conclusion, for both recycling systems, personal norms were shown to be the construct to have a higher impact on intention, confirming Hopper and Nielsen's finding that recycling is primarily linked to one's self-concept (Hopper & Nielsen, 1991). Furthermore, according to these authors, it is possible to state that recycling has a moral component that is emotionally linked to the individuals and, because of it, when those rooted values and norms are violated, a person experiences a feeling of guilt and, on the other hand, when they are upheld, they engender pride.

Irreversibly, as stated by Davies et al. (Davies et al., 2002), the crucial difference between recyclers and non-recyclers lays in the fact that "the decision to recycle is a function of the belief that it is the right thing to do. It is not based on a conscious evaluation of the personal costs and benefits involved."

5.2 Managerial / Academic Implications

Concerning managerial implications, this dissertation provides relevant findings to governments as it gives insights on the impact of new policies, such as Deposit-Return Schemes, on consumers' recycling intentions. This knowledge can lead to the restructuring of the recycling system provided to citizens which, consequently, will have an impact on the countries' recycling rate and other relevant target numbers. Furthermore, this dissertation can influence businesses and marketeers who work in fields impacted by pro-environmental decisions and other services as the increasing environmental awareness of consumers made them more demanding and, consequently, is affecting their choices on what to buy and where to buy it from. This research tried to shed some light on the impact of the location of Deposit-Return Schemes and was able to demonstrate that there could be a positive relationship between individuals' attendance to retailers that provide this new service. Nevertheless, further investigation on this topic is needed after the implementation of Deposit-Return Schemes.

5.3 Limitations and Further Research

Even though this study provided multiple insights regarding recycling intentions and how Deposit-Return Schemes can impact it, it was also faced with multiple limitations that are important to consider.

Due to the nature of this study, there were time, financial, and resource constraints. Moreover, as the data collection method selected was an online survey, even though it is less invasive and allows for a faster response collection, respondents might not answer according to their actual behavior but more to their ideal intention of behavior. Considering this study approaches participants' pro-environmental attitudes and personal norms, this limitation can have a relevant impact since individuals can experience a feeling of obligation to answer according to the standards imposed by society (Fisher, 1993). The online questionnaire was designed to cover important topics regarding recycling, and each collection system, respecting the authors' guidelines on how each construct should be measured. Notwithstanding, it is also important to acknowledge that the presented survey was detailed and elaborate which could have impacted how respondents answered due to their time constraints or, in more extreme cases, experiencing feelings such as boredom which can lead them to, for example, speed through the survey without careful consideration. Additionally, even though detailed explanations regarding each recycling system were presented, there is a possibility that they were misunderstood by the respondents since no control questions were included to understand if this constituted a limitation.

Regarding the sample collected, because a non-probability sample technique was applied (convenience sampling), statistically, results cannot be generalized as samples should be handled as not being representative of the population. Furthermore, due to the existence of two randomized scenarios, each group had an extremely small sample. Consequently, to obtain more reliable results, the researcher strongly advises for this study to be replicated with a representative and random sample of the respective targeted population.

The Theory of Planned Behavior (Ajzen, 1991) states that individuals' intention to perform a specific action will lead to behavior (figure 1). However, as mentioned throughout this research, because the Deposit-Return Scheme will be gradually implemented through the next one to two years, there is a time gap between this study and the observation of the behavior which makes this variable impossible to measure as, during this period, many intervening factors can change

this outcome. Thereafter, it is advised to re-conduct this research once the Deposit-Return Scheme is available because, when respondents have real knowledge and usage experience, they will be able to answer more accurately to the survey and better understand the control they have over performing this action. Consequently, variables such as perceived behavior control and recycling intention are expected to be impacted.

This study, allied with the widespread awareness of ecological issues, could ignite interesting topics for further research. Starting with understanding which factors can influence more positive pro-environmental believes and how geographic culture can impact these values. It would provide relevant findings to test the impact of education and surrounding culture on an individual's pro-environmental behavior and deepen this study by understanding if those, who only experience pro-environmental knowledge later in life, can still change their habits and live a more conscious path of consumption. It would be enriching to research to perform these cultural and educational impact studies in more environmentally conscious countries such as Norway.

Further research should also comprehend if monetary incentives are the proper way to influence individuals to recycle and how much does it affect their decision since past studies showed evidence that these incentives have a negative impact on intrinsic motivation to perform an activity (Deci, 1971, 1972).

Another interesting route of complementary research could be understanding the weaker pillars of the Current Recycling System in order to understand if it needs to be adjusted to increase citizens' usage.

Finally, even though various amounts of research regarding sustainability and recycling were conducted, there is still little information available concerning the impact of Deposit-Return Schemes on functioning businesses in the retail industry. Thereafter, further investigation regarding the location of these services could assess how impactful the presence of Deposit-Return Schemes can be on surrounding businesses and, as briefly approached by this dissertation, to what extent it influences consumers' attendance.

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APPENDICES

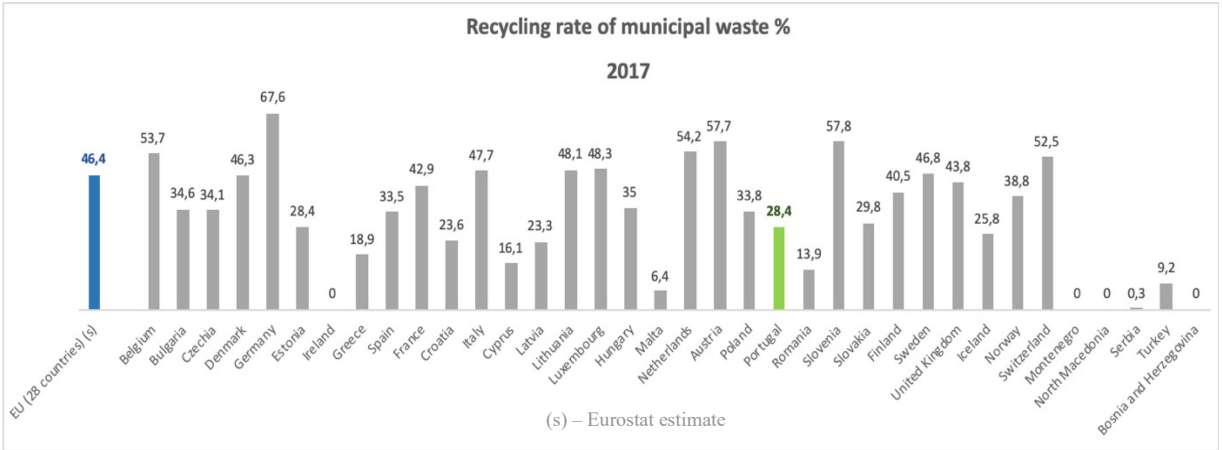
Appendix 1: United Nations - Sustainable Development Goals

Appendix 2: Recycled Packaging Waste in Portugal (2017) – APA

(Portuguese Environment Agency, 2019)

Source: APA, 2019	2017	Min. for 2025
Recycled packaging waste	55,3%	**65%**
Plastic	35%	**50%**
Wood	90%	**25%**
Ferrous Metal (steel)	44%	**70%**
Aluminum	n.a	**50%**
Glass	49%	**70%**
Paper & Cardboard	67%	**75%**

Appendix 3: Recycling Rate of Municipal Waste (2017) - Eurostat



Appendix 4: Packaging Waste Recycled (2017) - APA

(Portuguese Environment Agency, 2019)

Appendix 5: Deposit-Return Scheme: Value return to the consumer per package size

Capacity of the package	Value of the prize €
Capacidade da embalagem	Valor do prémio
≥ 0,1 L e ≤ 0,5 L	0,02€
> 0,5 L e ≤ 2 L	0,05€

Appendix 6: Questionnaire (English Version)

Intro and Screening

Welcome!

Thank you so much for being a part of this survey which is essential for me to develop my dissertation.

I kindly ask you to carefully read each question and answer as honestly as possible. It is important to highlight that there are **no right or wrong answers**.

The subject of my research is recycling.

The estimated time for the completion of this survey is **8 to 10 minutes**. If you have any doubts, please don't hesitate to contact me via e-mail to marta.alcouce@gmail.com.

This survey is available in both English and Portuguese. You can change the language in the button located at the top right corner of this page.

Confidentiality

All answers gathered will be keep confidential and anonymous. Furthermore, all data collected will be analyzed and reported in an aggregated format and will only be used for the purpose of this research.

This is the final step for me to successfully complete my master's degree! Once again, thank you very much for your time.

Marta Peres Alcouce

1st Block: General Recycling Habits (GRH) – Past Behaviors

Q1: Do you recycle in your Household?

- Yes (1)
- No (0)

Skip to: Q2 If Do you recycle in your Household? = Yes (1)
Skip to: Q3 If Do you recycle in your Household? = No (0)

Q2: How often did you recycled your beverage packages made of _____ during the last 3 months?

Q2.1: Glass

- Never (1)
- Very Rarely (2)
- Rarely (3)
- Sometimes (4)
- Frequently (5)
- Very Frequently (6)
- Always (7)

Q2.2: Plastic

- Never (1)
- Very Rarely (2)
- Rarely (3)
- Sometimes (4)
- Frequently (5)
- Very Frequently (6)
- Always (7)

Q2.3: Ferrous metals (Ex: Tomato cans, Tuna cans ...)

- Never (1)
- Very Rarely (2)
- Rarely (3)
- Sometimes (4)
- Frequently (5)
- Very Frequently (6)
- Always (7)

Q2.4: Aluminum (Ex: Soda cans)

- Never (1)
- Very Rarely (2)
- Rarely (3)
- Sometimes (4)
- Frequently (5)
- Very Frequently (6)
- Always (7)

Q3: In the area where you live, how does the disposal of recycled waste (excluding glass) occur?

- Door-to-door pick-up
- Centralized pickup ("ecopontos" placed in the neighborhood where you live)
- Other: _____

(Participants would randomly be presented with one of the following two scenarios – *Deposit -Return Scheme* or *Current Recycling System*).

Scenario a): Deposit - Return Scheme

A new recycling system will be implemented in Portugal. It is a pilot-project of a Deposit-Return Scheme that will be available in large commercial surfaces where beverage packages made of glass, plastic, ferrous metals, and aluminum can be delivered in exchange of, for example, discount coupons, sweepstakes or donations to help institutions in need (entities

involved can decide among the options. Nevertheless, it can't be in cash and the chosen method(s) the value of the prize should be the same).

The value of the prize depends on the capacity of the package (Note: these values can change during the period of the pilot-project):

Capacity of the package Capacidade da embalagem	Value of the prize € Valor do prémio
≥ 0,1 L e ≤ 0,5 L	0,02€
> 0,5 L e ≤ 2 L	0,05€

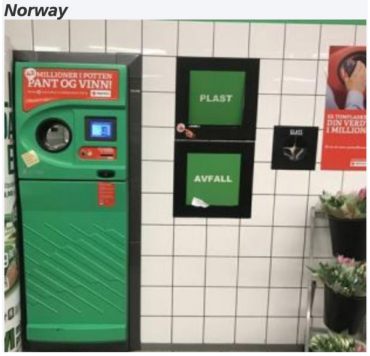
The main goal of this measure is to incentivize Portuguese consumers to recycle more of their beverage packages and guarantee their referral to recycle.

This system should be adopted until December 31, 2019, and until the end of the third trimester of 2021, the Government presents to the Republic Assembly a report assessing the impact of this pilot-project.

This type of equipment to return packages are already available in other countries. Here are some examples:

Sweden

Norway



Poland

Scenario B): <u>Current Recycling Collection System</u>

In Portugal, the recycling collection system varies depending on where you live.

In some areas, the collection of recycled (and undifferentiated) waste is done door-to-door. This means that individuals don't have to leave the building where they live in order to recycle. Each building is responsible for their own recycling bins and, in the specific days for collection, they

put the respective bin in front of the building and the collection truck will pick it up and proceed with the correct disposal of the recycled trash.

In other areas, the collection of recycled (and undifferentiated) waste is done via "ecopontos" known as "Ecoilhas" - large recycling bins assigned to a specific area or neighborhood - where every individual or building in that assigned area disposes of their waste. This way the collection is centralized since the truck goes directly to the "Ecoilhas".

Ecoilhas

Door-to-door pickup

2nd Block: Attitudes Towards Recycling

Q4: Household recycling is an important way to:

	Strongly Disagree (1)	Disagree (2)	Somewhat Disagree (3)	Neither Agree nor Disagree (4)	Somewhat Agree (5)	Agree (6)	Strongly Agree (7)
The protection of the environment	○	○	○	○	○	○	○
The reduction of landfill waste	○	○	○	○	○	○	○
The preservation of natural resources	○	○	○	○	○	○	○
The conservation of energy	○	○	○	○	○	○	○
The saving of money	○	○	○	○	○	○	○
The creation of a better environment for future generations	○	○	○	○	○	○	○

Q5: How Important it is for you:

	Not at all Important (1)	Slightly Important (2)	Moderately Important (3)	Unsure (4)	Important (5)	Very Important (6)	Extremely Important (7)
The protection of the environment	○	○	○	○	○	○	○
The reduction of landfill waste	○	○	○	○	○	○	○
The preservation of natural resources	○	○	○	○	○	○	○
The conservation of energy	○	○	○	○	○	○	○
The saving of money	○	○	○	○	○	○	○
The creation of a better environment for future generations	○	○	○	○	○	○	○

3rd Block: Perceived Behavioral Control

*Questions **Q6_a)**, **Q7_a)**, **Q8_a)**, and **Q9_a)**, displayed only when* **Scenario a)** (Deposit - Return Scheme) was presented.

Q6_a): Regarding the **Deposit-Return Scheme:**

	Strongly Disagree (1)	Disagree (2)	Somewhat Disagree (3)	Neither Agree nor Disagree (4)	Somewhat Agree (5)	Agree (6)	Strongly Agree (7)
If I want to, I will easily be able to recycle through the deposit-return scheme:	○	○	○	○	○	○	○

Q7_a): Regarding the **Deposit-Return Scheme:**

	Extremely Difficult (1)	Moderately Difficult (2)	Slightly Difficult (3)	Neither Easy nor Difficult (4)	Slightly Easy (5)	Moderately Easy (6)	Extremely Easy (7)
For me, recycling through the deposit-return scheme is:	○	○	○	○	○	○	○

Q8_a): Regarding the **Deposit-Return Scheme:**

	No Control (1)	Very Little Control (2)	Little Control (3)	Unsure (4)	Slight Control (5)	Moderate Control (6)	Complete Control (7)
How much control do you think you have over your ability to recycle though the deposit-return?	○	○	○	○	○	○	○

Q9_a): Regarding the **Deposit-Return Scheme:**

	Numerous (1)	Many (2)	Some (3)	Unsure (4)	A Few (5)	Very Few (6)	None at All (7)
The number of external influences that may prevent me from recycling through the deposit-return scheme are:	○	○	○	○	○	○	○

*Questions **Q6_b)**, **Q7_b)**, **Q8_b)** and **Q9_b)**, displayed only when* **Scenario b)** (Current Recycling Collection System) was presented.

Q6_b): Regarding the **Current Recycling Collection System:**

	Strongly Disagree (1)	Disagree (2)	Somewhat Disagree (3)	Neither Agree nor Disagree (4)	Somewhat Agree (5)	Agree (6)	Strongly Agree (7)
If I want to, I will easily be able to recycle through the current recycling system:	○	○	○	○	○	○	○

Q7_ b): Regarding the **Current Recycling Collection System:**

	Extremely Difficult (1)	Moderately Difficult (2)	Slightly Difficult (3)	Neither Easy nor Difficult (4)	Slightly Easy (5)	Moderately Easy (6)	Extremely Easy (7)
For me, recycling through the current recycling system is:	○	○	○	○	○	○	○

Q8_ b): Regarding the **Current Recycling Collection System:**

	No Control (1)	Very Little Control (2)	Little Control (3)	Unsure (4)	Slight Control (5)	Moderate Control (6)	Complete Control (7)
How much control do you think you have over your ability to recycle through the current recycling system?	○	○	○	○	○	○	○

Q9_ b): Regarding the **Current Recycling Collection System:**

	Numerous (1)	Many (2)	Some (3)	Unsure (4)	A Few (5)	Very Few (6)	None at All (7)
The number of external influences that may prevent me from recycle through the current recycling system are:	○	○	○	○	○	○	○

4th Block: Personal Norms

Q10: Regarding the following statements:

	Strongly Disagree (1)	Disagree (2)	Somewhat Disagree (3)	Neither Agree nor Disagree (4)	Somewhat Agree (5)	Agree (6)	Strongly Agree (7)
I feel I should not waste anything if it could be used again	○	○	○	○	○	○	○
It would be wrong of me not to recycle my household waste	○	○	○	○	○	○	○
Waste management problems are another people's concern, not mine	○	○	○	○	○	○	○
I would feel guilty if I did not recycle my household waste	○	○	○	○	○	○	○

Not recycling goes against my principles	○	○	○	○	○	○	○
I do not need to recycle as enough is being done by others to clean up the environment	○	○	○	○	○	○	○
Everybody should share the responsibility to recycle their household waste	○	○	○	○	○	○	○

5th Block: Ascription of Responsibility

Q11: Regarding the following statements:

	Strongly Disagree (1)	Disagree (2)	Somewhat Disagree (3)	Neither Agree nor Disagree (4)	Somewhat Agree (5)	Agree (6)	Strongly Agree (7)
Recycling efforts of all households will reduce landfill	○	○	○	○	○	○	○
Recycling my household waste is always worth the effort	○	○	○	○	○	○	○
There is no need to conserve natural resources because in the long run things will balance out	○	○	○	○	○	○	○
There is not much that anyone can do for the environment	○	○	○	○	○	○	○
There are only limited natural resources	○	○	○	○	○	○	○
It is up to all individuals to preserve natural resources where they can, and recycling will improve the quality of the environment.	○	○	○	○	○	○	○

6th Block: Intention to Recycle

*Question **Q12_a)** displayed only when* **Scenario a)** (Deposit - Return Scheme) was presented.
*Question **Q12_b)**, displayed only when* **Scenario b)** (Current Recycling Collection System) was presented.

Q12_a): How likely is that you will recycle your packages made of _____ through **the Deposit-Return Scheme, in the next 3 months**? (ranging from (1) extremely unlikely to (7) extremely likely)

	Extremely Unlikely (1)	Moderately Unlikely (2)	Slightly Unlikely (3)	Neither Likely nor Unlikely (4)	Slightly Likely (5)	Moderately Likely (6)	Extremely Likely (7)
Glass	o	o	o	o	o	o	o
Plastic	o	o	o	o	o	o	o
Ferrous Metals	o	o	o	o	o	o	o
Aluminum	o	o	o	o	o	o	o

Q12_b): How likely is that you will recycle your packages made of _____ through **the Current Recycling Collection System, in the next 3 months**? (ranging from (1) extremely unlikely to (7) extremely likely)

	Extremely Unlikely (1)	Moderately Unlikely (2)	Slightly Unlikely (3)	Neither Likely nor Unlikely (4)	Slightly Likely (5)	Moderately Likely (6)	Extremely Likely (7)
Glass	o	o	o	o	o	o	o
Plastic	o	o	o	o	o	o	o
Ferrous Metals	o	o	o	o	o	o	o
Aluminum	o	o	o	o	o	o	o

Glass

Plastic

Ferrous Metals (ex: Tuna or tomato cans)

Aluminum (ex: Beverage Cans)

7th Block: Large Commercial Surfaces Attendance

Q13: On average, how often do you go to large commercial surfaces?

- o Never
- o Less than once a month
- o Once a Month
- o 2-3 times a Month
- o Once a week
- o More than once a week

Q14: What transportation do you use to go to a large commercial surface? (you can choose more than one)

- ○ Bus
- ○ Subway
- ○ Train
- ○ Motorcycle or similar (bicycle)
- ○ Personal Car
- ○ On foot
- ○ Other car services (carsharing, uber…)
- ○ Other: _____

*Question **Q15_a)** and **Q16_a)** displayed only when* **Scenario a)** (Deposit - Return Scheme) was presented.

Q15_a): The location of the Deposit-Return Scheme **would positively** ...

	Strongly Disagree (1)	Disagree (2)	Somewhat Disagree (3)	Neither Agree nor Disagree (4)	Somewhat Agree (5)	Agree (6)	Strongly Agree (7)
... Impact my choice of which large commercial surface I would visit	○	○	○	○	○	○	○
... Impact the number of times I visit a large commercial surface I would visit.	○	○	○	○	○	○	○

Q16_a): The location of the Deposit-Return Scheme **would not** ...

	Strongly Disagree (1)	Disagree (2)	Somewhat Disagree (3)	Neither Agree nor Disagree (4)	Somewhat Agree (5)	Agree (6)	Strongly Agree (7)
... Impact my choice of which large commercial surface I would visit	○	○	○	○	○	○	○
... Impact the number of times I visit a large commercial surface I would visit.	○	○	○	○	○	○	○

8th Block: Demographic Section

Q17: Gender

- Male
- Female
- Prefer not to say

Q18: Age

- Under 18
- 18 – 24
- 25 – 34
- 35 – 44
- 45 – 54
- 55 – 64
- 65 or older

Q19: Marital Status

- Single
- Separated
- Divorced
- Widowed
- Married

Q20: What is the highest level of education you have completed?

- Less than high school
- High school graduate
- Bachelor's degree
- Master's degree
- Phd (Doctorate) or higher
- Other

Q21: Occupation

- Student (High - school)
- Student (bachelor/master or higher)
- Working Student
- Employed
- Unemployed
- Retired

Q22: Where are you from?

- Drill down with the list of countries

Q23: Net Monthly Income

- Less than €500
- €500 - €999
- €1000 - €1999

- €2000 - €2999
- €3000 - €3999
- More than €3999
- Prefer not to say

The End

Appendix 7: Sample Characteristics

Frequency Statistics - Sample Characterization

n=258		Scenario Shown	
		Deposit-Return Scheme n= 129	Current Recycling System n=129
Gender	Male	52,30%	47,7%
	Female	48,80%	51,2%
Age	Under 18	50,00%	50,00%
	18 - 24	45,10%	54,90%
	25 - 34	47,90%	52,10%
	35 - 44	71,40%	28,60%
	45 - 54	61,90%	38,10%
	55 - 64	58,30%	41,70%
	65 or older	100,00%	0,00%
Marital Status	Single	46,90%	53,10%
	Divorced/Separated	63,60%	36,40%
	Married/cohabiting	58,80%	41,20%
Highest Level of Education Completed	Less than high school	60,00%	40,00%
	High school graduate	42,60%	57,40%
	Bachelor's degree	51,60%	48,40%
	Master's degree	50,60%	49,40%
	Other	66,70%	33,30%
Occupation	Student (High-school)	50,00%	50,00%
	Student (bachelor/ master or higher)	48,80%	51,20%
	Working Student	52,80%	47,20%
	Employed	50,90%	49,10%
	Unemployed	30,80%	69,20%
	Retired	80,00%	20,00%
Net Montly Income	Less than €500	47,20%	52,80%
	€500 - €999	40,60%	59,40%
	€1000 - €1999	56,70%	43,30%
	€2000 - €2999	57,90%	42,10%
	€3000 - €3999	20,00%	80,00%
	More than €3999	83,30%	16,70%
	Prefer not to say	53,20%	46,80%
Nationality	Portugal	47,20%	52,80%
	United Kingdom	87,50%	12,50%
	Norway	0,00%	100,00%
	Austria	0,00%	100,00%
	Belgium	100,00%	0,00%
	Germany	50,00%	50,00%
	Luxembourg	50,00%	50,00%
	Other *	68,20%	31,80%

* Albania, Angola, Brazil, Canada, Egypt, France, Ghana, Italy, Latvia, Mozambique, Peru, Poland, Romania, Tunisia and United Stated of America.

Frequency Statistics - Recycling Habits

		Scenario Shown			
		Deposit-Return Scheme	**Current Recycling System**	Total	
Household Recycling	Yes	94	103	197	Count
		47,70%	52,30%	100,00%	%
	No	35	26	61	Count
		57,40%	42,60%	100,00%	%
	Total	129	129	258	Count
		50,00%	50,00%	100,00%	%
Household Recycling: Glass	Never	0,00%	100,00%		
	Very Rarely	40,00%	60,00%		
	Rarely	66,70%	33,30%		
	Sometimes	53,80%	46,20%		
	Frequently	48,30%	51,70%		
	Very Frequently	36,80%	63,20%		
	Always	50,00%	50,00%		
	Total	47,70%	52,30%		
Household Recycling: Plastic	Never	0,00%	100,00%		
	Very Rarely	50,00%	50,00%		
	Rarely	60,00%	40,00%		
	Sometimes	35,70%	64,30%		
	Frequenty	50,00%	50,00%		
	Very Frequenty	47,30%	52,70%		
	Always	49,00%	51,00%		
	Total	47,70%	52,30%		
Household Recycling: Ferrous Metals	Never	20,00%	80,00%		
	Very Rarely	66,70%	33,30%		
	Rarely	70,00%	30,00%		
	Sometimes	51,70%	48,30%		
	Frequently	39,10%	60,90%		
	Very Frequently	47,10%	52,90%		
	Always	45,20%	54,80%		
	Total	47,70%	52,30%		
Household Recycling: Aluminum	Never	42,90%	57,10%		
	Very Rarely	66,70%	33,30%		
	Rarely	33,30%	66,70%		
	Sometimes	58,30%	41,70%		
	Frequently	45,80%	54,20%		
	Very Frequently	41,90%	58,10%		
	Always	47,30%	52,70%		
	Total	47,70%	52,30%		
Disposal of recycled waste (excluding glass)	Door-to-door pickup	55,80%	44,20%		
	Centralized pickup (“ecopontos”)	47,40%	52,60%		
	Other: _____	28,60%	71,40%		

	Total	50,00%	50,00%

Frequency Statistics - Large Commercial Surface Attendance

n=258		Scenario Shown	
		Deposit-Return Scheme	Current Recycling System
Frequency attendance	Never	100,00%	0,00%
	Less than once a month	53,60%	46,40%
	Once a month	42,50%	57,50%
	2-3 times a month	48,90%	51,10%
	Once a week	50,60%	49,40%
	More than once a week	52,40%	47,60%
	Total	50,00%	50,00%
Transportation used: (Allowed to choose more than one)	Bus	54,20%	45,80%
	Subway	45,80%	54,20%
	Train	44,00%	56,00%
	Motorcycle or similar	28,60%	71,40%
	Personal Car	51,30%	48,70%
	On foot	52,90%	47,10%
	Other car services	50,00%	50,00%
	Other: _____	100,00%	100,00%

Appendix 8: Reliability test for multi-item scales

Reliability Statistics					
Construct	**Cronbach's Alpha**	**Nº of Initial Items**	**Nº of Items Deleted**	**Cronbach's Alpha after items deleted**	**Quality ***
Attitudes Towards Recycling	0,859	12	-	-	Good
Ascription of Responsibility	0,667	6	1	0,752	Acceptable
Personal Norms	0,764	7	-	-	Acceptable
Perceived Behavior Control	0,844	4	-	-	Good
Recycling Intention	0,906	4	-	-	Excellent

*Evaluated based on the guidelines proposed by George, D., & Mallery, (2003). According to the authors, reliability values under 0,5 are considered unacceptable; between 0,5 and 0,59 are considered has poor; between 0,6 and 0,69 are labeled as questionable; between 0,70 and 0,79 are considered acceptable; between 0,80 and 0,89 are good and above 0,90 are excellent.

Appendix 9: SPSS Output – Linear Regression – Attitudes Towards Recycling & Behavior Intention

Attitudes Towards Recycling & Recycling Intention

Model Summary [a,c]

	R	R Square	Adj. R Square	Std. Error of the Estimate	Durbin-Watson
Model 1	,482[a]	0,232	0,229	0,6936	1,774

a Predictors: (Constant), Attitudes_T_Recycling
b Dependent Variable: Intention
n=258

ANOVA a,b

Model 1	Sum of Squares	df	Mean Square	F	Sig.
Regression	37,201	1	37,201	77,328	,000[b]
Residual	123,158	256	0,481		
Total	160,359	257			

a Dependent Variable: Intention
b Predictors: (Constant), Attitudes_T_Recycling

Coefficients a,b

	Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model 1	**B**	**Std. Error**	**Beta**	**t**	**Sig.**	**Tolerance**	**VIF**
(Constant)	2,922	0,371		7,883	0,00		
Attitudes_T_Recycling	0,549	0,062	0,482	8,794	0,00	1,000	1,000

a Dependent Variable: Intention

Appendix 10: SPSS Output – Independent Samples T-Test – Attitudes Towards Recycling

Group Statistics

	Scenario_A_B	N	Mean	Std. Deviation	Std. Error Mean
ATR	Deposit Return Scheme	129	5,835	0,71515	0,06297
	Current Recycling System	129	5,9599	0,66734	0,05876

Independent Samples Test

		t-test for Equality of Means						
		t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
ATR	Equal variances assumed	-1,451	256	0,148	-0,12495	0,08612	-0,29455	0,04464
	Equal variances not assumed	-1,451	254,78	0,148	-0,12495	0,08612	-0,29455	0,04465

Appendix 11: SPSS Output – Linear Regression – Perceived Behavior Control & Behavior Intention

Perceived Behavior Control & Recycling Intention

Model Summary a,c

	R	R Square	Adj. R Square	Std. Error of the Estimate	Durbin-Watson
Model 1	,539a	0,290	0,287	0,66685	1,594

a Predictors: (Constant), PBC
b Dependent Variable: Intention
n=258

ANOVA a,b

Model 1	Sum of Squares	df	Mean Square	F	Sig.
Regression	46,52	1	46,52	104,613	,000b
Residual	113,84	256	0,445		
Total	160,359	257			

a Dependent Variable: Intention
b Predictors: (Constant), PBC

Coefficients a,b

	Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model 1	**B**	**Std. Error**	**Beta**	**t**	**Sig.**	**Tolerance**	**VIF**
(Constant)	3,370	0,276		12,221	0,00		
PBC	0,510	0,05	0,539	10,228	0,00	1,000	1,000

a Dependent Variable: Intention

Appendix 12: SPSS Output – Independent Samples T-Test – Perceived Behavior Control

Group Statistics

	Scenario_A_B	N	Mean	Std. Deviation	Std. Error Mean
PBC	Deposit Return Scheme	129	5,3314	0,95972	0,0845
	Current Recycling System	129	5,6143	0,66218	0,0583

Independent Samples Test

		t-test for Equality of Means						
		t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
PBC	Equal variances assumed	-2,756	256	0,006	-0,28295	0,10266	-0,48511	-0,08078
	Equal variances not assumed	-2,756	227,36	0,006	-0,28295	0,10266	-0,48523	-0,08066

Appendix 13: SPSS Output – Linear Regression – Personal Norms & Behavior Intention

Personal Norms & Recycling Intention

Model Summary [a,c]

	R	R Square	Adj. R Square	Std. Error of the Estimate	Durbin-Watson
Model 1	,601[a]	0,361	0,359	0,63243	1,785

a Predictors: (Constant), Personal_Norms
b Dependent Variable: Intention
n=258

ANOVA a,b

Model 1	Sum of Squares	df	Mean Square	F	Sig.
Regression	57,967	1	57,967	144,929	,000b
Residual	102,392	256	0,4		
Total	160,359	257			

a Dependent Variable: Intention
b Predictors: (Constant), Personal_Norms

Coefficients a,b

	Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model 1	**B**	**Std. Error**	**Beta**	**t**	**Sig.**	**Tolerance**	**VIF**
(Constant)	0,963	0,433		2,222	0,03		
Personal_Norms	0,843	0,07	0,601	12,039	0,00	1,000	1,000

a Dependent Variable: Intention

Appendix 14: SPSS Output – Independent Samples T-Test – Personal Norms

Group Statistics

	Scenario_A_B	N	Mean	Std. Deviation	Std. Error Mean
Personal Norms	Deposit Return Scheme	129	6,124	0,55102	0,04851
	Current Recycling System	129	6,2013	0,57481	0,05061

Independent Samples Test

		t-test for Equality of Means						
		t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
Personal Norms	Equal variances assumed	-1,102	256	0,271	-0,07729	0,07011	-0,21535	0,06077
	Equal variances not assumed	-1,102	255,54	0,271	-0,07729	0,07011	-0,21535	0,06077

Appendix 15: SPSS Output – Process Model 1 – Ascription of Responsibility (moderator) & Personal Norms

Run MATRIX procedure:

********** PROCESS Procedure for SPSS Version 3.4.1 **********

Written by Andrew F. Hayes, Ph.D. www.afhayes.com
Documentation available in Hayes (2018). www.guilford.com/p/hayes3
****
Model : 1
Y : Intentio
X : Personal
W : Ascripti

Sample
Size: 258
****
OUTCOME VARIABLE:
Intentio

Model Summary

R	R-sq	MSE	F	df1	df2	p
,6048	,3657	,4004	48,8243	3,0000	254,0000	,0000

Model

	coeff	se	t	p	LLCI	ULCI
constant	-2,9511	3,3865	-,8714	,3843	-9,6203	3,7181
Personal	1,4690	,5755	2,5528	,0113	,3358	2,6023
Ascripti	,6545	,5416	1,2084	,2280	-,4121	1,7210
Int_1	-,1041	,0908	-1,1465	,2527	-,2829	,0747

Product terms key:
Int_1 : Personal x Ascripti

Covariance matrix of regression parameter estimates:

	constant	Personal	Ascripti	Int_1
constant	11,4685	-1,9377	-1,8133	,3048
Personal	-1,9377	,3311	,3040	-,0517
Ascripti	-1,8133	,3040	,2933	-,0489
Int_1	,3048	-,0517	-,0489	,0082

Test(s) of highest order unconditional interaction(s):

	R2-chng	F	df1	df2	p
X*W	,0033	1,3145	1,0000	254,0000	,2527

Focal predict: Personal (X)Mod var: Ascripti (W)

Data for visualizing the conditional effect of the focal predictor:

Paste text below into a SPSS syntax window and execute to produce plot.

```
DATA LIST FREE/
  Personal  Ascripti  Intentio  .
BEGIN DATA.
   5,5994   5,4443   5,6644
   6,1627   5,4443   6,1727
   6,7259   5,4443   6,6809
   5,5994   6,2248   5,7203
   6,1627   6,2248   6,1828
   6,7259   6,2248   6,6453
   5,5994   7,0000   5,7758
   6,1627   7,0000   6,1929
   6,7259   7,0000   6,6099
END DATA.
GRAPH/SCATTERPLOT=
 Personal WITH    Intentio BY      Ascripti .
```

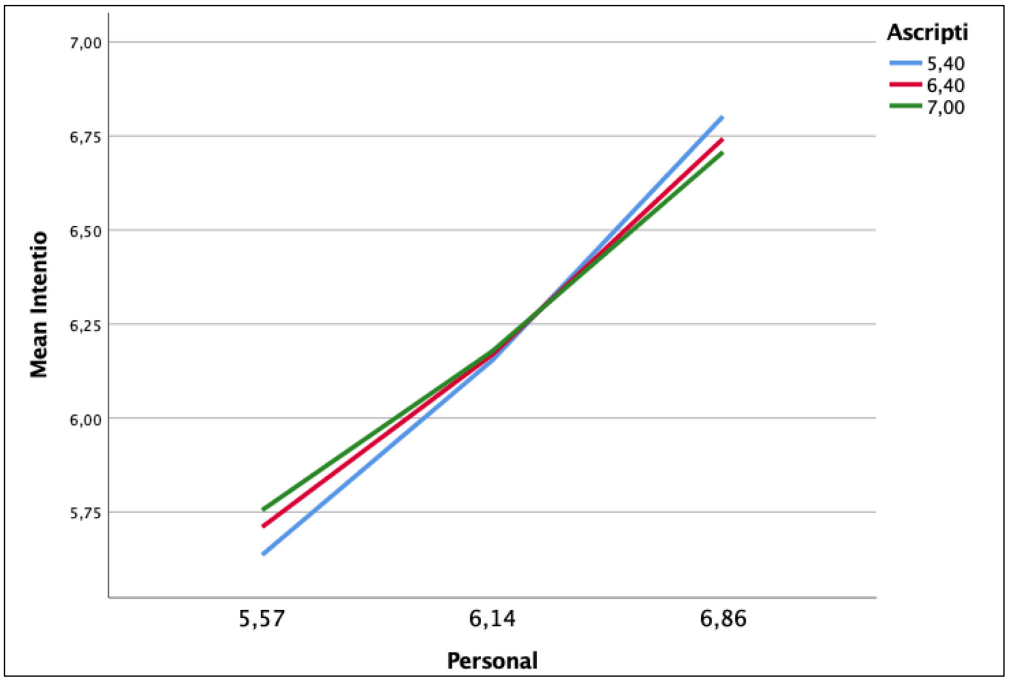
********** ANALYSIS NOTES AND ERRORS **********

Level of confidence for all confidence intervals in output:
 95,0000

NOTE: One SD above the mean is above the maximum observed in the data for W,
so the maximum measurement for W is used for conditioning instead.

NOTE: Variables names longer than eight characters can produce incorrect output.
Shorter variable names are recommended.

------ END MATRIX -----



Appendix 16: SPSS Output – Independent Samples T-Test – Recycling Intention

Group Statistics

	Scenario_A_B	N	Mean	Std. Deviation	Std. Error Mean
Recycling Intention	Deposit Return Scheme	129	5,9767	0,85493	0,07527
	Current Recycling System	129	6,3411	0,67455	0,05939

Independent Samples Test

		t-test for Equality of Means						
		t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
							Lower	Upper
Recycling Intention	Equal variances assumed	-3,800	256	0,000	-0,36434	0,09588	-0,55316	-0,17553
	Equal variances not assumed	-3,800	242,86	0,000	-0,36434	0,09588	-0,55321	-0,17548

Appendix 17: SPSS Output – Multiple Regression – Variables from TPB - DRS

DEPOSIT RETURN SCHEME

Model Summary [a,c]

	R	R Square	Adj. R Square	Std. Error of the Estimate	Durbin-Watson
Model 1	,622b	0,387	0,377	0,67481	2,041

[a] Scenario_A_B = Deposit Return Scheme
[b] Predictors: (Constant), PBC, Attitudes_T_Recycling
[c] Dependent Variable: Intention

ANOVA [a,b]

Model 1	Sum of Squares	df	Mean Square	F	Sig.
Regression	36,179	2	18,089	39,725	,000c
Residual	57,377	126	0,455		
Total	93,555	128			

[a] Scenario_A_B = Deposit Return Scheme
[b] Dependent Variable: Intention
[c] Predictors: (Constant), PBC, Attitudes_T_Recycling

Coefficients [a,b]

	Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model 1	**B**	**Std. Error**	**Beta**	**t**	**Sig.**	**Tolerance**	**VIF**
(Constant)	1,457	0,54		2,697	0,01		
Attitudes_T_Recycling	0,413	0,086	0,345	4,821	0,00	0,948	1,055
PBC	0,396	0,064	0,444	6,204	0,00	0,948	1,055

[a] Scenario_A_B = Deposit Return Scheme
[b] Dependent Variable: Intention

Appendix 18: SPSS Output – Multiple Regression – Variables from TPB – CRS

CURRENT RECYCING SYSTEM

Model Summary [a,c]

	R	R Square	Adj. R Square	Std. Error of the Estimate	Durbin-Watson
Model 1	,624[b]	0,390	0,380	0,53109	1,730

[a] Scenario_A_B = Current Recycling System
[b] Predictors: (Constant), PBC, Attitudes_T_Recycling
[c] Dependent Variable: Intention

ANOVA [a,b]

Model 1	Sum of Squares	df	Mean Square	F	Sig.
Regression	22,703	2	11,352	40,246	,000[c]
Residual	35,539	126	0,282		
Total	58,242	128			

[a] Scenario_A_B = Current Recycling System
[b] Dependent Variable: Intention
[c] Predictors: (Constant), PBC, Attitudes_T_Recycling

Coefficients [a,b]

	Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model 1	**B**	**Std. Error**	**Beta**	**t**	**Sig.**	**Tolerance**	**VIF**
(Constant)	1,934	0,494		3,915	0,000		
Attitudes_T_Recycling	0,379	0,076	0,375	4,970	0,000	0,853	1,173
PBC	0,383	0,077	0,376	4,991	0,000	0,853	1,173

[a] Scenario_A_B = Current Recycling System
[b] Dependent Variable: Intention

Appendix 19: SPSS Output – Multiple Regression – Overall Model - DRS

DEPOSIT RETURN SCHEME

Model Summary [a,c]

	R	R Square	Adj. R Square	Std. Error of the Estimate	Durbin-Watson
Model 1	,731b	0,535	0,524	0,59008	2,163

[a] Scenario_A_B = Deposit Return Scheme
[b] Predictors: (Constant), Personal_Norms, PBC, Attitudes_T_Recycling
[c] Dependent Variable: Intention

ANOVA [a,b]

Model 1	Sum of Squares	df	Mean Square	F	Sig.
Regression	50,031	3	16,677	47,896	,000[c]
Residual	43,524	125	0,348		
Total	93,555	128			

[a] Scenario_A_B = Deposit Return Scheme
[b] Dependent Variable: Intention
[c] Predictors: (Constant), Personal_Norms, PBC, Attitudes_T_Recycling

Coefficients [a,b]							
	Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model 1	**B**	**Std. Error**	**Beta**	**t**	**Sig.**	**Tolerance**	**VIF**
(Constant)	-0,943	0,606		-1,555	0,12		
Attitudes_T_Recycling	0,139	0,087	0,117	1,609	0,11	0,710	1,408
PBC	0,310	0,057	0,348	5,388	0,00	0,894	1,118
Personal_Norms	0,728	0,115	0,469	6,307	0,00	0,673	1,485

[a] Scenario_A_B = Deposit Return Scheme
[b] Dependent Variable: Intention

Appendix 20: SPSS Output – Multiple Regression – <u>Overall Model - CRS</u>

CURRENT RECYCING SYSTEM Model Summary [a,c]					
	R	**R Square**	**Adj. R Square**	**Std. Error of the Estimate**	**Durbin-Watson**
Model 1	,690[b]	0,476	0,463	0,49425	1,602

[a] Scenario_A_B = Current Recycling System
[b] Predictors: (Constant), Personal_Norms, PBC, Attitudes_T_Recycling
[c] Dependent Variable: Intention

ANOVA [a,b]					
Model 1	**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
Regression	27,707	3	9,236	37,808	,000[c]
Residual	30,535	125	0,244		
Total	58,242	128			

[a] Scenario_A_B = Current Recycling System
[b] Dependent Variable: Intention
[c] Predictors: (Constant), Personal_Norms, PBC, Attitudes_T_Recycling

Coefficients [a,b]							
	Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
Model 1	**B**	**Std. Error**	**Beta**	**t**	**Sig.**	**Tolerance**	**VIF**
(Constant)	0,679	0,537		1,266	0,208		
Attitudes_T_Recycling	0,259	0,076	0,256	3,427	0,001	0,749	1,335
PBC	0,292	0,074	0,286	3,93	0,000	0,790	1,266
Personal_Norms	0,400	0,088	0,341	4,526	0,000	0,740	1,351

[a] Scenario_A_B = Current Recycling System
[b] Dependent Variable: Intention

Appendix 21: Large Commercial Surfaces Attendance – <u>Impact on chosen surface</u>

The location of the Deposit-Return Scheme would ... - ... positively impact my choice of which large commercial surface I would visit.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	9	3,5%	7,0%	7,0%
	Disagree	12	4,7%	9,3%	16,3%
	Somewhat disagree	3	1,2%	2,3%	18,6%
	Neither agree nor disagree	14	5,4%	10,9%	29,5%
	Somewhat agree	33	12,8%	25,6%	55,0%
	Agree	23	8,9%	17,8%	72,9%
	Strongly agree	35	13,6%	27,1%	100,0%
	Total	129	50%	100%	
Missing	System	129	50%		
Total		258	100%		

Appendix 22: Large Commercial Surfaces Attendance – <u>Impact on frequency</u>

The location of the Deposit-Return Scheme would ... - ... positively impact the number of times I visit a large commercial surface I would visit.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly disagree	11	4,3%	8,5%	8,5%
	Disagree	18	7,0%	14,0%	22,5%
	Somewhat disagree	9	3,5%	7,0%	29,5%
	Neither agree nor disagree	23	8,9%	17,8%	47,3%
	Somewhat agree	24	9,3%	18,6%	65,9%
	Agree	25	9,7%	19,4%	85,3%
	Strongly agree	19	7,4%	14,7%	100,0%
	Total	129	50%	100%	
Missing	System	129	50%		
Total		258	100%		