UNIVERSIDADE CATÓLICA PORTUGUESA

SELF-LICENSING IN RECYCLING BEHAVIOR: INVESTIGATING THE EFFECTS OF ECONOMIC INCENTIVES ON RESOURCE CONSUMPTION

Dissertation submitted to Universidade Católica Portuguesa to obtain the Master's Degree in Psychology in Business and Economics

By

Deniz Marangoz

Faculty of Human Sciences

November 2021

UNIVERSIDADE CATÓLICA PORTUGUESA

SELF-LICENSING IN RECYCLING BEHAVIOR: INVESTIGATING THE EFFECTS OF ECONOMIC INCENTIVES ON RESOURCE CONSUMPTION

Dissertation submitted to Universidade Católica Portuguesa to obtain the Master's Degree in Psychology in Business and Economics

By

Deniz Marangoz

Faculty of Human Sciences

Under the supervision of Dr. Ian Scott

November 2021

Acknowledgements

I would like to express my sincere appreciation to my advisor Dr. Ian Scott for the convenient guidance, remarks and encouragement he provided throughout the learning process of this study. I am really grateful that Dr. Scott has taught me how to generate a structured paper from intricate content. I also owe a deep sense of gratitude to Prof. Joana Carneiro Pinto, for her keen interests and precious times spent for providing me the feedback I needed while preparing this dissertation.

I would also like to thank my friends and family, for the helps and supports they provided throughout the challenging moments that I have experienced during the formation process of this study.

Abstract

Accepted as a negative spillover in behavioral research, the concept of self-licensing states that performing good behavior tends to make individuals feel better or less guilty about themselves, which decreases the likelihood of engagement in subsequent good acts. Self-licensing is also observed in recycling behavior. Performing recycling might have environmentally undesired outcomes like increasing subsequent consumption due to positive feeling enhancement or guilt reduction. However, although real-life waste-management policies often financially reward or penalize households for their recycling behavior, no studies in the recycling behavior literature investigate potential licensing effects of economic incentives. To reduce this gap in literature, an experimental setting to test the effects of recycling incentives on the licensing relationship was created via an online survey, where participants were randomly assigned to two groups. In order to capture the licensing effects created by recycling incentives, income and substitution effects (another impact of economic incentives on consumption) were controlled in the model. Following previous self-licensing studies, "donations" was also included as an alternative dependent measure, to see whether recycling incentives lead to self-licensing in different behavioral domains. Furthermore, the moderating roles of environmental self-identity, different cultural dimensions and the difficulty of the recycling task were checked to see if they alleviated or exacerbated the licensing effect. Results revealed significant positive indirect effects between recycling rewards and both of the dependent measures (consumption and donations), via positive feelings. This means that although recycling incentives may increase consumption by enhancing positive feelings, they might also have pro-social outcomes (i.e., increase in donations). These mixed results indicate that more empirical studies on the licensing effects of economic incentives are needed, in order to give better insights for future waste-management policies.

Keywords: Recycling; self-licensing; economic incentives; pro-environmental behavior; negative spillover; pro-social behavior

Resumo

Entendido como um efeito de transbordamento negativo na pesquisa comportamental, o conceito de auto licenciamento afirma que o bom comportamento tende a fazer com que os indivíduos se sintam melhor ou menos culpados consigo mesmos, o que diminui a probabilidade de envolvimento em boas ações subsequentes. O auto licenciamento é também observado na reciclagem. Reciclar pode ter resultados ambientalmente indesejáveis como aumentar ainda mais o consumo, devido ao aumento do sentimento positivo ou redução da culpa. No entanto, embora muitas vezes as políticas de gestão de resíduos na vida real recompensem ou penalizem financeiramente as famílias pelo seu comportamento na reciclagem, não há estudos que investiguem os seus potenciais efeitos de auto licenciamento de incentivos. Para reduzir essa lacuna, foi criado um cenário experimental para testar os efeitos dos incentivos à reciclagem na relação de auto licenciamento, por meio de uma pesquisa online na qual os participantes foram aleatoriamente divididos em dois grupos. Para registar os efeitos do auto licenciamento criados pelos incentivos à reciclagem, os efeitos da renda e da substituição (outro impacto dos incentivos económicos sobre o consumo) foram controlados no modelo. Na sequência de outros estudos de auto licenciamento anteriores, "doações" também foram incluídas como um fator condicionante alternativo, para ver se os incentivos de reciclagem levam ao auto licenciamento em diferentes domínios comportamentais. Além disso, foram verificados os papéis moderadores da autoidentidade ambiental, as diferentes dimensões culturais e a dificuldade da tarefa de reciclagem, para ver se atenuavam ou exacerbavam o efeito do auto licenciamento. Os resultados revelaram efeitos indiretos positivos significativos entre a recompensa na reciclagem e ambos os fatores dependentes (consumo e doações), por meio de sentimentos positivos. Isso significa que, embora os incentivos à reciclagem possam aumentar o consumo ao aumentar os sentimentos positivos, também podem ter resultados pró-sociais (ou seja, aumento nas doações). Esses resultados mistos indicam que mais estudos empíricos sobre os efeitos do auto licenciamento de incentivos económicos são necessários, a fim de fornecer melhores informações para futuras políticas de gestão de resíduos.

Palavras-chave: Reciclagem; auto licenciamento; incentivos económicos; comportamento pró-ambiental; efeitos de transbordamento negativos; comportamento pró-social

Table of Contents

List of Figures

List of Tables

List of Appendices

1. Introduction and the Theoretical Framework

Since the beginning of the 20th century, various human activities like industrial manufacturing, rapid urbanization, agricultural production and so forth have been putting pressure on environmental resources amid exponential growth in global population. While the non-renewable environmental resources like ground water bodies or fossil fuels continue to deplete at a fast pace, greenhouse gases (GHG) like CO_2, CH_4, N_2O and so on are accumulating exponentially in the atmosphere, causing the global temperature to rise towards critical levels. Along with these environmental risk factors, the steep rise in the global population is resulting in unsustainable waste creation. According to a recent report by the World Bank (2018), a total of 3.40 billion tons of waste per year is expected to be created on a global scale, which is around 70% higher than the level in 2016. Figure 1 below shows the World Bank's projected increases in waste creation by each region, between 2016 and 2050.

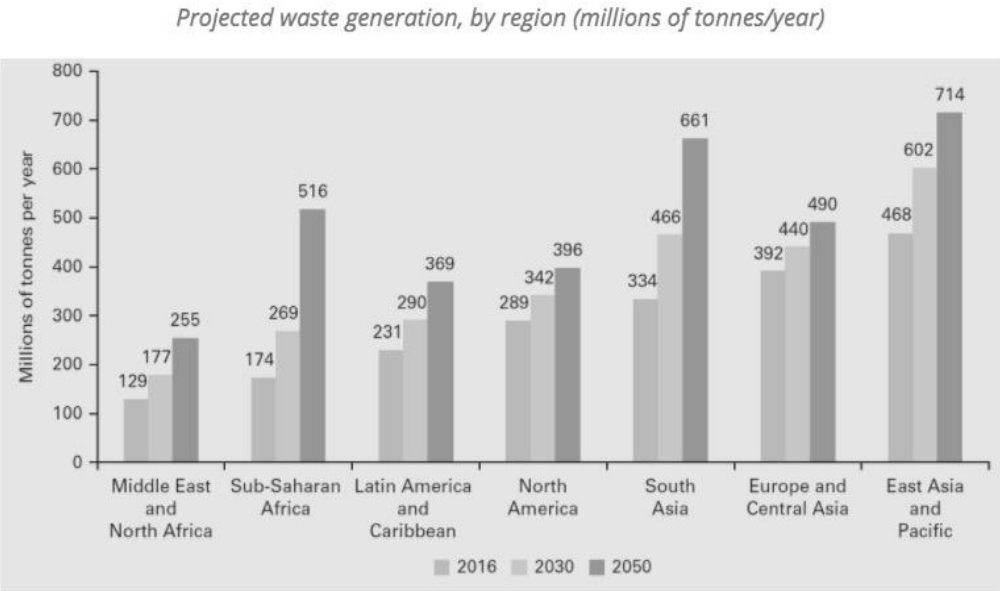

Figure 1. *Regional increases in waste creation 2016-2050* (World Bank, 2018)

If not managed properly, domestic and industrial wastes would contribute substantially to environmental degradation. The most prevalent techniques in waste management include waste minimization, recycling, reuse, energy recovery and landfill (Dajic et al., 2016). Among these methods, landfill takes place at the last stage, which is the process of burying the waste in a landfill site. However, landfill sites jeopardize the environment since they can

create several poisonous gases that in turn contribute to the GHG emissions. These sites can also result in the leakage of some toxic material into groundwater systems which contaminate fresh water resources. Since landfill is the last step of the waste management cycle, it is very important to minimize, reuse and recycle the waste coming from domestic or industrial sites. According to Eurostat (2020), between 1995 and 2017, GHG emissions resulting from waste has declined by 42% in the EU. Figure 2 shows the types and levels of waste treatment practices took place within the EU during the period 1995-2017.

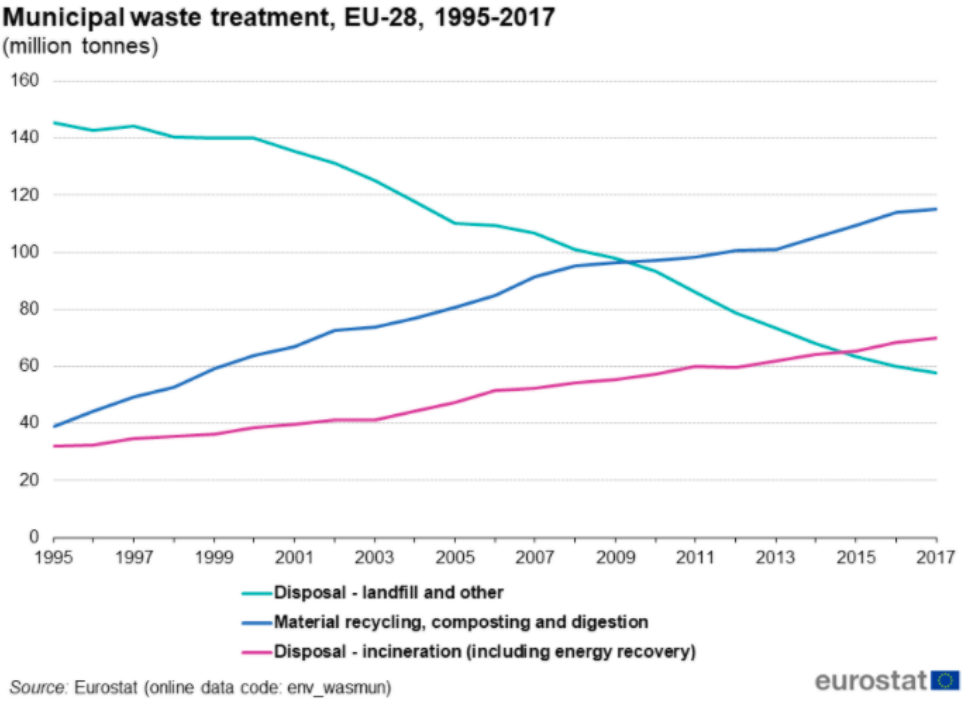

Figure 2. *Municipal waste treatment in the EU 1995-2017* (Eurostat, 2020)

Although a non-negligible decrease (increase) is observed in the landfill (recycling, composting, digestion and incineration) practices within the EU from 1995 to 2017 (Figure 2), there is still room for improvement in waste management on a global scale. Waste sector was still the fourth biggest area of contribution to climate change, as it corresponded to the 3% of total GHG emissions as of 2017 (Eurostat, 2020).

Until recently, there was very little response from the society to confront the ongoing environmental degradation. However, as climate change and its effects started to become more and more obvious, society has started to respond to these changes. For example, citizens are becoming more conscious in terms of acts that might have unwanted

consequences for our limited natural resources. Conscious consumption and efficient waste management policies are among the most important societal actions to counteract to environmental degradation. Yet, while promoting more efficient waste management methods like recycling, governments have typically only taken economic factors into consideration, as the default mindset is to penalize or incentivize households in accordance with their recycling efforts (Thøgersen, 2003). However, according to the same study by Thøgersen (2003), it becomes obvious that pure monetary regulations are not sufficient to encourage society to manage its waste in the most efficient way since the change in recycling behavior cannot be explained only with the price effect caused by economic incentives. Instead, governmental policies should also aim to invoke intrinsic motivation. According to Bolderdijk and Steg (2015), mere referral to money's instrumental function cannot fully explain the influence of money on behavior, and there is the possibility that the persuasive power of incentives may be restricted by psychological factors. For instance, paying a penalty for not recycling may interact with personal norms by letting people purchase the "right" to not to recycle. In that sense, it should not be expected from monetary rewards or punishments to have long term behavioral changes.

Despite the rapid growth in the recycling sector and the substantial increase in environmentally friendly consumption, the psychological factors underlying recycling behavior are still not fully understood. According to previous research, the intention-behavior gap in recycling is salient (Taufik, Bolderdijk and Steg, 2016). One suggestion provided by Taufik and colleagues in order to better understand why this gap occurs is to examine the role of feelings in recycling behavior. They claim that people might be more willing to engage in recycling when they expect their positive feelings to be enhanced after recycling. Supporting this view, in their recent study regarding recycling in the Middle East - a region with very high solid waste per capita rates – Haj-Salem and Al-Hawari (2021) found out that the main predictors for the intention to recycle were actually emotional or self-perceived: anticipated guilt, subjective norms, perceived effort and recycling knowledge. In a more general study on pro-environmental behavior, Schneider et al. (2017) discovered that anticipated pride also may translate into higher pro-environmental intentions. Hence, different emotions might actually play a big role in the determination of recycling behavior.

A deeper investigation in pro-environmental behavior literature also indicates that emotions might even affect subsequent pro-environmental behavior performed after recycling. This problem is labeled as the concept of "self-licensing", which is also accepted as a negative spillover in the pro-environmental behavior research. A negative spillover occurs when engaging in one pro-environmental behavior decreases the likelihood of engaging in further pro-environmental behaviors via affective and cognitive mechanisms (Truelove et al., 2014). However, there is no consensus on pro-environmental literature in terms of spillover effects. A number of studies provide evidence for positive spillovers where an external intervention or an internal attribution result in further pro-environmental behavior, whereas a number of studies instead found that negative spillover effects are also noteworthy (Nash et al., 2017; Truelove et al., 2014). In this study, the focus is on self-licensing in recycling behavior, and therefore the negative spillover effects in this context are the center of attention.

In general, economists and psychologists have different approaches while explaining negative spillovers. Economists often refer to such undesired consequences as "rebound effects", as they try to explain these with price, income and substitution effects. On the other hand, psychologists explain the same negative outcomes with "moral licensing" or "self-licensing", where for instance purchasing an energy efficient product is an interruption of previous routines and thereby may lead to behavioral change that might result in an increase in overall energy use (Dütschke et al., 2018). According to the same study by Dütschke and colleagues (2018), rebound effects and negative spillovers vary extensively in terms of magnitude and existence. This variability in behavioral responses therefore raises the question of which factors, beyond the monetary factors, can explain this diversity.

Since they often neglect the potential psychological influences, economic incentives are prone to negative spillovers and other undesired consequences (Bolderdijk and Steg, 2015). More importantly, effects of regulatory interventions on follow-up behaviors are not usually targeted by the intervention (Truelove et al., 2014). In that sense, it is vital to understand how negative spillovers work in the recycling context for making more effective regulatory policies. Distinguishing the psychological effects (i.e., self-licensing) from the direct economic effects of economic incentives on the outcome behavior is therefore necessary to improve the understanding of negative spillovers.

Self-licensing studies are highly informative for policy interventions since they account for the role of feelings in pro-environmental behavioral contexts. The licensing effect acts similar to other guilt-reducing mechanisms, as it manifests itself through an increase in positive feelings (e.g. pride), a boost in moral self-image, or a decrease in negative feelings (e.g. guilt) after engaging in a pro-environmental, or in more general terms, a virtuous act. This change in feelings or boost in self-image in turn licenses people to choose a subsequent option that is often attached to negative moral attributions (Sun and Trudel, 2017). A great example for self-licensing lies in the diversity of perceptions towards eating a salad. If a person who is eating a salad perceives the process as a commitment (i.e. as a way of living), that person is less likely to order a dessert afterwards. However, if an individual perceives the same process as a progress (i.e., as a task that is completed), that person is more likely to order the dessert afterwards since eating the dessert becomes justifiable (Dütschke et al., 2018). In the latter, the individual engages in self-licensing, therefore allowing himself/herself to behave in an unhealthy way after performing the healthy behavior. In more general terms, a lack of moral dimension prevents the maintenance of the good behavior and leads to potential negative spillovers, if the behavior is motivated by non-moral goals like cost saving, safety and comfort (Dütschke et al., 2018).

As mentioned above, self-licensing is also observed in the recycling context. According to Ma et al. (2019), after showing recycling efforts, people experience an increase (decrease) in their positive (negative) feelings, which eventually leads to an increase in overall consumption of goods. Figure 3 shows the licensing effect in recycling behavior leading to the undesired outcome of an increase in resource consumption. It is especially important to test these post recycling effects, as individuals tend to make sequential decisions (Meijers et al., 2019).

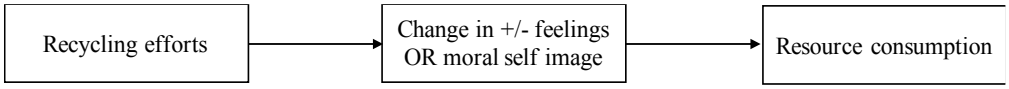

Figure 3. *Self-licensing in recycling behavior*

There is then a need to test for potential variables that intervene the relationship illustrated in Figure 3, in order to better understand how self-licensing works in recycling. More specifically, as suggested by previous studies on self-licensing and pro-environmental

behavior, seeking out some moderators between these factors (Figure 3) would reveal different conditions under which the licensing effect is provoked or alleviated. Once these relations are better understood, more effective recycling policy suggestions can be made.

In line with the suggestions from previous work, this dissertation project focuses on potential variables that intervene the licensing effects in recycling. However, a full understanding of how self-licensing functions in the recycling context requires more than checking the mere influence of psychological variables in the licensing relationship. Although self-licensing studies take psychological factors into account while investigating the potential undesired outcomes of recycling behavior, they often neglect the role of economic incentives. Nevertheless, economic incentives should be included in such studies since real life recycling policies usually reward or punish households for their waste management behavior via recycling taxes or incentives. In general, by bringing economic incentives to the table, this study extends the conventional self-licensing model used in recycling behavior studies (Figure 3). Therefore, this study adopts a multi-disciplinary approach to self-licensing by combining the frameworks retrieved from both psychology and economics.

Although they usually display temporary effects (Bolderdijk and Steg, 2015), economic incentives for recycling also play a major role in shaping household behavior. Investigating the role of economic incentives in the licensing relationship (Figure 3) is vital in the sense that such monetary rewards require perpetual and cautious monitoring of the outcome behavior (Varotto and Spagnolli, 2017). Furthermore, a better understanding of how these monetary rewards influence household behavior is needed in order to come up with more effective waste management policy solutions because of the following reason: although incentivizing households for their recycling efforts is one of the most prevalent waste management policies (Matheson, 2019), most of these recycling programs often neglect the psychological dimension and depend only on the functionality of economic markets (Matheson, 2019). Therefore, empirical research is needed to observe the influence of such monetary interventions on human affective mechanisms and on subsequently performed pro-environmental behaviors. Correspondingly, it is essential to check whether economic incentives lead to a licensing effect which in turn results in a higher consumption level, and also to see if different factors suggested by previous studies on self-licensing intervene this relationship. While doing so, it is vital to separate the licensing effects from

the other economic effects of the monetary rewards on the outcome behavior, since these effects usually function similarly while impacting the outcome behavior. As mentioned above, the separation of self-licensing and economic effects of the monetary rewards on consumption would yield a clearer understanding of how negative spillovers work in the recycling context. The hypothetical framework section (Section 2.1) discusses the economic influence of monetary rewards on consumption (income and substitution effects) in more detail.

In general, this study contributes to the previous self-licensing literature on recycling behavior with the multidisciplinary approach it adopts. There are no studies standing out in the recycling literature that investigate the effects of economic incentives on self-licensing. There are some studies investigating the psychological impacts of economic incentives on recycling (Thøgersen, 2003; Bolderdijk and Steg, 2015), however these do not mention any licensing effects. In the light of all these information, this study is a pioneer in the recycling behavior field since it reckons in the influence of external recycling interventions on affective mechanisms, as well as on the subsequent consumption behavior - two important subjects that are overlooked in the recycling behavior literature and current waste management policies.

Briefly, the aim of this research is to discover whether the negative consequences of self-licensing hold in our sample. More importantly, the main purpose of this study is to understand how recycling incentives influence self-licensing, and hence to investigate how do such incentives affect subsequent consumption. Furthermore, following the suggestions from previous self-licensing studies, the moderating roles of environmental self-identity, difficulty of the recycling task and three cultural dimensions (individualism-collectivism scale, long-term orientation and uncertainty avoidance) are also checked to see whether they exacerbate or alleviate the licensing effect. In order to fulfill these purposes, an experimental setting in which participants are randomly assigned to different conditions is created. Each of these aforementioned model variables are discussed in more detail in the methodology section, along with the model formation process.

The following section (Section 2) gives detailed information on the literature review conducted for this work, while also addressing the hypothetical framework. Representing the methodology section, Section 3 introduces the conceptual framework, survey creation and data collection processes, as well as the expected results. In Section 4, data analysis

results are discussed. Lastly, as a concluding remark, Section 5 mentions the limitations of this research and gives insights for future studies on self-licensing in recycling.

2. Literature Review

As discussed in the previous section, there is a variety of studies investigating the role of emotions in the pro-environmental context. However, there is no consensus on which emotions would trigger intentions that lead to pro-environmental action. For instance, in a study on the impact of guilt and pride on sustainable consumption choices, Antonetti and Maklan (2014) mention that both guilt and pride might motivate individuals to make more sustainable consumption decisions. On the other hand, Schneider and colleagues (2017) found that inducing anticipated pride rather than anticipated guilt seems to have a more intensified effect on pro-environmental intentions. Interestingly, in a more recent study, Haj-Salem and Al-Hawari (2021) state that anticipated pride is not a predictor of intention to recycle. These mixed results might be an outcome of cultural differences in the retrieved samples, as the participants in Haj-Salem and Al-Hawari's study (2021) are individuals from the Middle East, while the participants of Antonetti and Maklan (2014) and Schneider et al. (2017) are from the US. Nonetheless, there is still room for advancement in the understanding of the effect of positive and negative emotions on pro-environmental intentions. Therefore, further examinations in this context are a must.

To have a better understanding of the impact of emotions on pro-environmental behavior, a deeper research in the field of psychology is required. One of the most important research areas that investigates the role of emotions in a similar context is moral behavior. In the literature of moral behavior, there is an emphasis on guilt reducing mechanisms and their impact on subsequent behavior – a guiding light for this study. A substantial number of moral behavior studies so far have mentioned "moral licensing and cleansing", a concept referring to the tendency to act generous after being selfish, or vice versa (Branas-Ganza et al., 2013). This idea indicates that if an individual engages in an act that creates guilt, the next behavior performed by the same individual would most likely be altruistic or virtuous. It might also indicate an increase in the likelihood of a selfish act after a behavior that is associated with a positive feeling (e.g. pride) is performed. According to the meta-analysis conducted by Blanken et al. (2015), moral licensing theory states that prior good deeds provides a "license" that allows one to perform morally questionable behavior later on (p. 540). Nevertheless, how moral licensing is affected by different contextual factors is not yet clear since it contradicts with many well-established theories from psychology that emphasize the consistency of human behavior, such as cognitive dissonance theory

(Festinger, 1957), foot-in-the-door effect (Freedman and Fraser, 1966) and self-perception theory (Bem, 1972). Yet, the reach of domains that address moral licensing is wide: consumer behavior (Khan and Dhar, 2006), deceitful behavior (Mazar and Zhong, 2010), pro-social behavior (Conway and Peetz, 2012), pro-environmental behavior (Clot et al., 2013) and so forth. In this project, the focus is on licensing effects in pro-environmental behavior, more specifically in recycling behavior. Potential undesired after-effects of recycling are often neglected, which in turn prevents effective policy development. It is then essential to account for such negative effects to achieve better outcomes for future recycling policies. That is exactly why this study aims to contribute to the pro-environmental behavior literature in relation to licensing effects.

As mentioned above, previous literature on pro-environmental behavior shows mixed results in terms of the subsequent effects of environmentally friendly acts (Truelove et al., 2014). Nevertheless, a handful of empirical findings regarding the negative effects of recycling efforts on overall consumption are present. Similar to moral licensing, these negative effects of recycling efforts on resource consumption are often framed as "self-licensing" in the pro-environmental behavior literature. Yet, the studies investigating self-licensing in recycling are still fairly few.

The self-licensing concept is not limited only to recycling, it can be observed in many different behavioral settings like moral behavior (Clot et al., 2013; Khan and Dhar, 2006; Branas-Garza et al., 2013; Mullen and Monin, 2016), energy use (Jacobsen et al., 2012), exercise and healthy eating (Buyalskaya and Shum, 2020), climate-relevant behavior (Nash et al., 2017) and green consumption (Mazar and Zhong, 2010; Meijers et al., 2019).

In their experimental study on moral behavior, Clot et al. (2013) found out that paid good deeds as imaginary pro-environmental activities are less likely to induce self-licensing, whereas an unpaid good deed encourages purely selfish behavior (i.e., $0 of subsequent donations). In contrast, Khan and Dhar (2006) found out that engaging in a good deed (community service) under external motives (court ordered punishment) softens the licensing effect. Branas-Garza et al. (2013) also found some moral licensing effects in their dictator-game setting, where participants performed a sequence of donating decisions.

Another study on the electricity use in Memphis, Tennessee reveals that participating in a green electricity program (an environmentally friendly act) increases the subsequent electricity consumption by 2.5% for the households who participated at the minimum

threshold level (Jacobsen et al., 2012). In their research on the negative spillovers within the healthy eating domain, Buyalskaya and Shum (2020) also found out that exercising before lunch has a licensing effect on the healthy lunch choice. Self-licensing is also observable in climate-relevant behavior, as results from the literature review performed by Nash and colleagues (2017) show that endeavors for climate change mitigation may affect later behavior in the same domain or in other domains negatively.

Self-licensing studies on green consumption present similar results. For instance, Mazar and Zhong (2010) found out that people act less altruistically and are more likely to engage in bad behaviors like cheating or stealing after purchasing green products, relative to the behaviors performed during the post-purchase of conventional products. Similarly, Meijers et al. (2019) suggest that the purchase of a green product leads to a decrease in environmentally friendly behavioral intentions during post purchase, and this effect is moderated by "environmental self-identity". In other words, individuals who had higher concerns for the environment (individuals with strong environmental identity) did not show any licensing effect in their subsequent behavior, whereas individuals with weak environmental self-identity expressed lower environmental concern after purchasing the green product.

The literature review on self-licensing reveals some key variables that are included in various studies. To start with, environmental self-identity is an outstanding variable in the self-licensing literature, because it may act both as a mediator (Ma et al., 2019) and a moderator (Sun and Trudel, 2017; Meijers et al., 2019) in the relationship between recycling efforts and change in positive/negative emotions that eventually lead to an increase in overall consumption. Sun and Trudel (2017) also claim that individuals may feel stronger positive emotions from demonstrating relatively more compelling virtual acts (recycling 10 pieces of paper vs 4 pieces), which in turn may increase the intensity of the licensing effect, thus leading to an even higher level of consumption. As suggested by Ma et al. (2019) for future research, there are some other potential moderating variables between recycling efforts and change in positive/negative feelings that are worth testing, such as psychological costs of recycling (i.e., time required to recycle, or the distance of the recycling bin from the household). Similarly, Mintz et al. (2019) suggest that distinguishing between the recycling tasks as "easy" or "difficult" with regards to the availability or distance of the bins prove to be effective in observing the motivations to perform pro-environmental behaviors.

According to the same study by Mintz and colleagues (2019), compliance with social norms in different cultural contexts also predicted pro-environmental behavior.

In addition to the aforementioned key variables suggested by previous self-licensing studies, it is well-known that economic incentives have substantial effects on behavior on a variety of domains like health, retirement plans, pro-social behavior, pro-environmental behavior, and so forth. To start with, in their literature review regarding the impact of financial incentives on health behavior, Sutherland and colleagues (2008) mention some studies with results showing that price reductions in healthy products sold in school cafeterias significantly increased healthy snack purchases. However, Sutherland et al. (2008) also refer to the importance of choosing the right size and framing of the financial incentive, as well as the way of communicating it. If these aspects of the incentive are not determined optimally, the policy might not work properly and would be ineffective in changing behavior towards the desired outcome (Sutherland et al., 2008). In another study focusing on pension plans, Saez (2009) state that economic incentives have a clear impact on individual savings for retirement. Moreover, the informational and presentational characteristics of such incentives may even have a stronger impact on retirement savings, hence making the policy more effective. When it comes to pro-social behavior research, there are a lot of studies investigating the effects of incentives on pro-social behavior in a variety of subdomains: blood donations (Lacetera and Macis, 2010; Lacetera et al., 2012); efforts for creating positive social externalities like selling condoms (Ashraf, Bandiera and Jack, 2012); common pool resource use (Travers et al., 2011). In all of these studies, results show that economic incentives are actually successful in altering pro-social behavior, however, the framing of the incentive is also very important for the policy to be effective. Economic incentives also seem to function well in the pro-environmental context: if used in synergy with proper information sharing, incentives are very effective in promoting environmentally friendly consumption (Stern, 1999). In another study on voluntary environmental management among tourism firms, Blanco et al. (2009) also found out that incentive structure should include genuine information sharing to prevent policy failure. If accompanied with proper information sharing, economic incentives can be beneficial instruments that encourage tourism firms to engage in voluntary environmental management practices.

In general, one of the most prevalent research areas in the pro-environmental literature is the effects of incentives on recycling behavior, and the impact of such rewards seem to be drastic in terms of the outcome. According to an extensive literature review conducted by Mwanza and Mbohwa (2017), the studies that focus on the economic drivers for developing sustainable systems for recycling behavior suggest that household solid waste should be viewed as a valuable resource for recycling, both on municipal and household levels. In another literature review conducted by Dahlen and Lagerkvist (2009), it is stated that although some studies question economic incentives' undermining influence on intrinsic environmental morals and motivation, the reported effects of such monetary rewards on household waste management behavior are not quite understood since the results are contradictory. Another pile of studies compares the influence of financial rewards versus penalties on recycling behavior (Shaw and Maynard, 2008; Calvo, Varela-Candamio and Novo-Corti, 2014; Long et al., 2020). Lastly, in their search for potential determinants of plastic water bottle recycling behavior, Viscusi et al. (2011) claim that compared to private values and social norms, economic incentives or bottle deposits would be more effective in promoting the desired outcome since they reduce inconvenience costs.

In short, all of this aforementioned previous research on recycling incentives neglect the psychological effects of such monetary rewards and focus directly on the behavioral outcomes. Focusing merely on the economic influence of recycling rewards means measuring the change in the level of recycling performed after the application of the policy, and the "how" part in the process therefore is ignored. To have a better understanding of how recycling incentives function, it is crucial to account for psychological impacts of recycling incentives. This way, the gap in the recycling incentives research would also be reduced. In the next paragraph, some studies focusing on the psychological impacts of recycling rewards are mentioned in detail.

There are some studies in the literature that investigate the psychological impacts of economic incentives on recycling exist (Thøgersen, 2003; Bolderdijk and Steg, 2015). In another study by Viscusi, Huber and Bell (2011), psychological factors (i.e., personal and social norms) are considered as important determinants of recycling behavior, along with economic incentives. These studies are extremely important since they give an overall opinion on how financial incentives influence the motivation to recycle, instead of focusing solely on money's instrumental function. For instance, Bolderdijk and Steg (2015) claim

that incentives create some psychological effects such as changing the level of trust, or narrowing people's attention. These kinds of cognitive responses in turn may limit the persuasive power of monetary incentives. Thus, such monetary rewards may fail to have long term impacts on the desired behavior. For instance, by paying a penalty for not recycling at the desired level, people actually purchase the right to continue performing the undesired behavior. Nevertheless, small incentives can be used to promote behavior that requires little effort since the benefit of the incentive in this case may be perceived to predominate the cost of the behavior. However, small incentives might also act counterproductively when used to stimulate high-effort behavior (Bolderdijk and Steg, 2015). Likewise, Thøgersen (2003) states that large incentives undermine the intrinsic motivation for pro-environmental behavior, whereas small incentives enhance it. This information is highly important for this research, since the moderating role of psychological costs (i.e., the perceived difficulty of the recycling task in terms of the distance of the recycling bin) is also checked in the licensing relationship (see Figure 4) when an economic incentive is introduced. Lastly, reward schemes or incentives rather than penalties or "command and control" approaches are way more effective regulatory regimes since they provide individuals autonomy (Thøgersen, 2003), whereas information dissemination is claimed to have a more permanent effect on recycling relative to incentives (Iyer and Kashyap, 2007).

Although there is a substantial amount of recycling behavior studies that investigate the psychological impacts of economic incentives, a literature review on the role of monetary rewards in self-licensing shows that the current research in this area is very premature. Research on recycling behavior put aside, there are hardly any studies on pro-environmental/pro-social behavior mentioning the role of economic incentives in self-licensing. In one study on the effects of economic incentives on pro-social acts, Lacetera (2016) calls attention on the "substitution effects" that the economic incentives on pro-social behavior would create. Here, Lacetera gives self-licensing as a subtle example for such substitution effects, stating that a pro-social act performed after receiving the incentive might decrease the tendency to act pro-socially in the future. In another study on the use of economic incentives on biodiversity, Clot et al. (2015) address the importance of the link between self-licensing and external incentives (monetary and non-monetary) aimed at improving ecosystem conversation. However, the effect of self-licensing on subsequent economic decisions are tested (Clot et al., 2015). In a similar study, Clot and colleagues

(2016) also refer to the influence of external incentives on self-licensing by arguing that constraining people to act in a desired way instead of letting them freely choose the virtuous act might lead to counter-productive licensing effects. Yet, they test the effects of non-monetary incentives as external motivation factors in their model and make the suggestion for future studies to test the interference of economic incentives with the licensing effect (Clot et al., 2016). Nonetheless, there are still no studies investigating the effects of economic incentives on self-licensing in pro-environmental research, including recycling behavior.

Despite the lack of studies mentioning the influence of recycling incentives on self-licensing, there is only one empirical study that investigates the impacts of economic interventions on self-licensing in moral behavior (Clot et al., 2013). According to Clot et al. (2013), engaging in an unpaid good deed leads to pure selfish behavior (donating $0 subsequently), whereas the same selfish behavior is not observed when the good deed is paid. However, as mentioned above, these findings contradict with those of Khan and Dhar (2006). In that sense, there is still no consensus on how self-licensing functions when external attributions like punishments or economic incentives are put into force. In their extensive review on the spillovers in pro-environmental behavior, Truelove et al. (2014) introduce "causal attributions" as a major factor that shapes the influence of the initial behavior on the subsequent behavior. According to this framework, external attributions tend to reduce intrinsic motivation and therefore may lead to negative spillovers, whereas internal attributions trigger environmental identity and tend to result in positive spillovers. Nevertheless, the effects of economic incentives as external interventions on self-licensing are still ambiguous, and therefore more empirical studies and randomized control trials are needed. In an extensive review of evidence from the fields of economy and psychology, it is indicated that policies targeting environmentally friendly acts must guarantee the consideration of self-licensing (Dütschke et al., 2018). Therefore, this study aims to shed light on future waste management policies by giving policymakers insights on the influence of monetary rewards on self-licensing and the effects of such incentives on subsequent consumption behaviors in the post-recycling phase.

2.1. Hypothetical framework

As mentioned above, the economic and the self-licensing effects of monetary rewards on consumption work in the same direction. Monetary incentives may increase consumption due to the licensing effect (see Section 1), or due to the income and substitution effects. While the former is a psychological influence, the latter is an economic impact. It is important to note here once again the vitality of distinguishing these effects from each other, in order to better understand the potential negative spillovers stemming from the introduction of recycling incentives.

Similar to the licensing effect, the introduction of the economic incentive – both in the form of a promotion payment and a recycling incentive - should increase consumption, due to income and substitution effects. Both of the income and substitution effects result from a change in the price of a good and service. More specifically, the substitution effect refers to the effect of the price change on the purchasing power on that good so that a substitute with a lower price would be preferred more, or less (Griffiths and Wall, 2000). On the other hand, the income effect refers to the effect of the change in price of a good or service on real income, which allows one to buy more (or less) of all other commodities, including the same good or service that went through the price change (Griffiths and Wall, 2000). For instance, let's say that the price of a can of drink is 2€. If there is a discount of 0.5€ in that drink's price, the purchasing power of the consumer increases by 0.5€. So, this consumer can choose to consume more of the same drink or any other good through the income effect because he/she actually has an excess 0.5€ left after each purchase. Or alternatively, due to the substitution effect, the consumer would prefer to consume the drink with the discount more than a substitute drink without any discounts (e.g. Coca Cola and Pepsi) as the one with the discount actually becomes cheaper than the substitute. The recycling incentive on a canned drink included in this research would work the same as the discount, leading to a change in preferences in between substitute drinks and an increase in purchasing power which results in an increase in overall consumption. However, since the focus here is on the licensing effect, the analyses regarding self-licensing were controlled for income and substitution effects. The methodology section (Section 3) points out the separation process of the licensing effect from the income and substitution effects in more detail.

The hypothetical model of this study first tests the licensing effect of economic incentives on consumption, excluding the income and substitution effects. Moreover, in line

with the suggestions from previous literature, the moderating roles of environmental self-identity (Ma et al., 2019), difficulty of the recycling task in terms of distance (Sun and Trudel, 2017), and different cultural dimensions such as individualism-collectivism scale (IND), long term orientation (LTO) and uncertainty avoidance (UAD) (Mintz et al., 2019) are also checked to see whether these factors affect the licensing relationship in our model. Figure 4 below summarizes the hypothetical model used in this study. According to the hypothetical model presented in Figure 4, the following hypotheses were tested in data analyses.

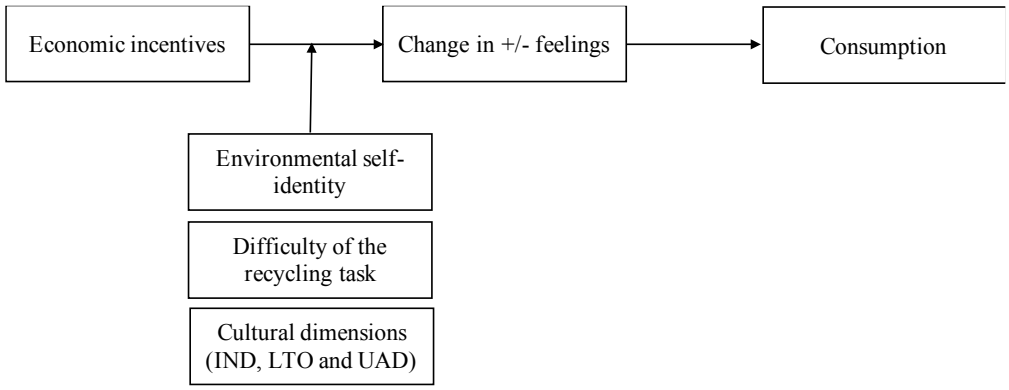

Figure 4. *Hypothetical model testing the role of economic incentives and other psychological factors in the licensing relationship*

H1. Economic incentives result in an increase in consumption due to an increase in positive feelings or a decrease in negative feelings (i.e., guilt).

With the first hypothesis, the mediating role of positive feelings and guilt are checked for the licensing relationship between economic incentives and consumption responses. In line with the suggestions from previous studies on self-licensing, it is expected that the introduction of economic incentives on recycling would enhance positive feelings or reduce guilt, which consequently increases consumption. Nonetheless, the income and substitution effects of the economic incentives were controlled in the analyses, since these economic effects are expected to affect the outcome behavior in the same direction with the licensing effect. As mentioned above, this study focuses only on the licensing effects of economic incentives on consumption.

H2. Stronger (weaker) environmental self-identity values weakens (strengthens) the licensing effect, therefore repressing (provoking) the increase in consumption.

In line with the findings of Meijers et al. (2019), individuals with higher environmental values or concerns are expected to experience an alleviated licensing effect, relative to those who carry less concerns about their environmental acts. Therefore, individuals who have stronger environmental self-identity values would consume less than those who have weaker environmental self-identity values, after the recycling incentive is introduced.

H3. As the recycling task gets more difficult (easier), the licensing effect is strengthened (weakened) so that the increase in consumption is provoked (alleviated).

Here, the "difficulty of the recycling task" refers to the distance of the recycling bins. So, the further the distance of the recycling bin, the more difficult the recycling task gets. Following the suggestion of Sun and Trudel (2017), individuals who have the recycling bins closer to where they live would not experience the licensing effect as strong as those who have the recycling bins further away from their homes.

H4a. The licensing effect is provoked (alleviated) for participants from more individualistic (collectivistic) cultures, therefore a higher (lower) amount of consumption is observed.

According to Mintz et al. (2019), individualism-collectivism scale may determine the tolerance to waste production, meaning that individuals from more collectivistic cultures might give more importance to the negative outcomes of their waste production since they care more about the common good, relative to individuals from more individualistic cultures. Starting from this point of view, participants who stand nearer to the individualistic (collectivistic) end in the sample of this study are expected to experience a stronger (weaker) licensing effect and therefore to consume more (less) after the introduction of the recycling incentive.

H4b. Participants from more (less) long term orientated cultures values experience a weaker (stronger) licensing effect, and therefore consume less (more) eventually.

According to findings of Ma and colleagues (2019), individuals who are more considerate of future consequences are less likely to be influenced emotionally from performing recycling. Adapted from the findings of Ma et al. (2019), the cultural level variable "long term orientation" is expected to work in the same way. Therefore, after the introduction of the recycling incentive, the licensing effect should be provoked for the cultures who are concerned more with the present, and alleviated for those who are more long term orientated.

H4c. Participants from more (less) uncertainty avoidant cultures experience a stronger (weaker) licensing effect, and therefore consume more (less) eventually.

Similar to long-term orientation, cultures that are avoidant about uncertainties would be less considerate of future consequences of their environmentally friendly acts. Thus, a stronger licensing effect would be observed (Ma et al., 2019) in the responses of the participants from more uncertainty avoidant cultures relative to those who are less uncertainty avoidant.

3. Methodology

Introducing recycling incentives in the self-licensing context is crucial since such incentives are usually inseparable from recycling policies. Thus, the inclusion of economic incentives in the models suggested by previous licensing studies from the recycling behavior literature are expected to give more accurate policy insights.

Meeting the objectives of this study requires the formation of an experimental setting. Since the aim here is to check how self-licensing works in the recycling context while economic incentives are present, it was suitable to create 2 different conditions in which participants were assigned randomly. Therefore, an experimental setting is created, which involves the random assignment of participants to different groups where the variable economic incentive is manipulated.

Figure 5 below summarizes the hypothetical framework used for this study. This framework enables to check whether the introduction of: first, the recycling option, second, economic incentives for showing recycling efforts and third, a combination of these two options would lead to an increase in the consumption of the recyclable drink (bottled or canned) via a change in positive or negative feelings. All participants are first asked to state their preference from a bundle of recyclable drinks. Then, they are introduced to different situations where they are asked to share their predictions of their monthly consumption levels of the recyclable drink they have chosen. In the first two situations, it is clear that the consumed drink cannot be recycled. However, in one of these no recycling situations, there is the option of receiving a monetary payment for bringing the consumed drink back to the hypothetical store.

In order to compare the effects of these no-recycling conditions on self-licensing and self-licensing in the presence of a recycling incentive, two more conditions are also created: introduction of the recycling machine and the introduction of the recycling machine with refund. In between those 2 conditions, participants are randomly and evenly assigned to one of each. Both of these in-between participants conditions involve the introduction of a hypothetical in-store machine with the capability of 100% recycling the canned/bottled drink. In the recycling machine condition, the machine does not give a monetary refund for the use of it, whereas in the recycling machine with refund condition, the machine refunds 0.25€ after it is used. In both of these conditions, participants are again asked to share their predictions of their monthly consumption levels of their preferred recyclable drink, and their

predicted recycling levels from these monthly consumption amounts. In addition, for measuring the licensing effect, participants were also asked to state their positive feeling and guilt levels with Likert scale questions. In line with the previous studies on self-licensing, the use of the machine in both conditions (with or without the recycling incentive) is expected to boost feelings of pride, or to dissipate feelings of guilt. Then, the change in feelings are expected to increase subsequent monthly consumption. Therefore, the introduction of the recycling machine in both conditions (with or without the recycling option) is expected to elevate consumption to higher levels, relative to the baseline condition where no recycling option is available. Nevertheless, the income and substitution effects stemming from the introduction of the economic incentives (see Section 2.1) were controlled in the model, since the main focus of this study is on the licensing effects of economic incentives.

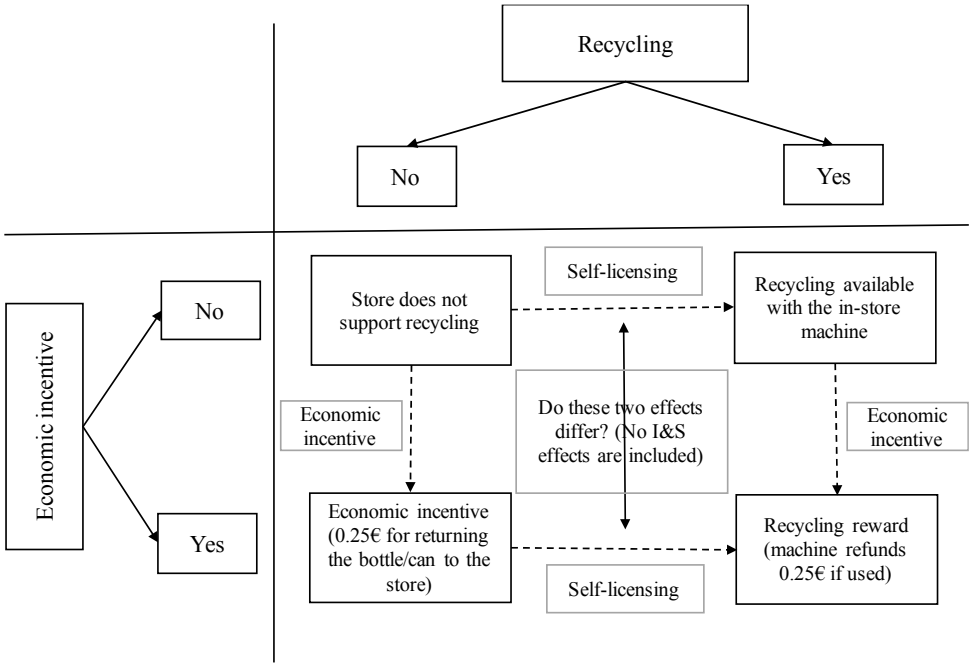

Figure 5. *The hypothetical framework comparing the licensing effects in the presence vs absence of economic incentives*

Note. Income and substitution effects (I&S) are eliminated from the economic incentive with the use of the recycling machine condition

The separation of the income and substitution effects from the licensing effect is done by measuring the consumption differences between the recycling machine with refund and

economic incentive as promotion conditions, as shown in Figure 5 with the self-licensing vector at the bottom. The upcoming variables section (Section 3.3) further explains how the influence of economic incentives on consumption via income and substitution effects are controlled in the data analyses conducted, along with other variables included in the hypothetical model to test the relations shown in Figure 4 in Section 2.1.

3.1. Survey creation and flow

An online survey was created within the Qualtrics platform, in order to retrieve data for the self-licensing model formed for this study. The snowball sampling method, which is a very useful technique in behavioral research, is adopted to obtain enough participants. This method provides an easy way to reach out to potential participants by benefiting from the referrals of the initial subjects (especially by the help of the social media) to generate additional subjects. However, snowball sampling may lead to biases since it is highly probable that the participants would come from similar social networks (Biernacki and Waldorf, 1981). Hence, population might not be represented by the research sample. Obstacles faced during the data collection and analysis processes are discussed in further detail in the limitations section (Section 5.1).

The survey is comprised of two different parts, and includes a total of 21 questions on average. It takes 15 minutes to complete the survey. The survey starts with 2 filter questions on recycling, to eliminate those who do not perform recycling at all in their daily lives. After the filter questions, in the first part, the participants are asked to state their current consumption preferences and recycling behaviors, with some distraction questions in between to avoid any realizations of the main purpose: the relationship between recycling and consumption. The first part also includes two hypothetical baseline conditions to measure the consumption levels of the suggested bundle of preferred drinks - canned soft drink, bottled juice or flavored milk box - answered by all participants: estimated monthly consumption amounts when there is neither a recycling option nor an economic incentive is present, and when there is an economic incentive available in the form of a promotion payment (not as a recycling award) is available if the preferred drink is returned back to the hypothetical store. It is important to note here that this specific bundle of consumer goods was chosen since all of the products included are recyclable. As this study investigates self-

licensing in the recycling behavior context, having participants select from a bundle of recyclable goods was a must, especially for the second part of the survey.

The second part of the survey is where the experimental manipulation takes place: participants are randomly and evenly divided into 2 separate groups. Each of these conditions involves the introduction of a recycling machine in a hypothetical store. However, while the participants in the first group only have the opportunity to fully (100%) recycle the consumed drink by using the machine inserted in the hypothetical store, the participants in the second group receive a monetary refund (i.e., the recycling incentive) of 0.25€ by fully (100%) recycling their consumed drink in the same machine.

Then, in order to estimate the licensing effect, participants in both groups are asked to share their positive feelings and guilt after they use the relevant recycling machine via Likert scale items, and to state their estimated monthly consumption levels of their preferred drink. Lastly, as an alternative dependent variable to consumption performed after recycling, participants in both groups were asked to state how much would they be willing to donate (from 0€ to 100€) for a good environmental cause. "Donations" is a well-accepted dependent variable in the licensing literature (Clot et al., 2013; Branas-Garza et al., 2013). Therefore, questions regarding subsequent donations are present in the model to see whether self-licensing holds in different behavioral domains.

Another important point to mention is that within all of the four situations (see Figure 4), participants are also asked to state their estimations of the monthly consumption (and recycling) levels for their peers, in order to eliminate potential self-report biases. Self-report biases are often present in survey responses since the participant's response may be altered by factors like social desirability, sensitivity of the construct, dispositional characteristics of the respondent and situational characteristics of the survey environment (Miller, 2011; Donaldson and Grant-Vallone, 2002). Therefore, responses for peers might actually reflect true opinions of participants more than responses regarding the self.

After the manipulation conditions, the survey concludes with some sociodemographic questions to gather data on age, gender, income, education level, household situation and professions of the participants. As a last note, questions on environmental self-identity and the difficulty of the recycling task in terms of the distance of the bin are also included in the survey, for further moderator analyses suggested by previous studies on self-licensing in recycling. In order to access the complete survey flow, see Appendix A.

3.2. Data collection process

As mentioned in Section 3.1, the data collection process is made through the online survey created in the Qualtrics platform. The complete survey took around 15 minutes to complete, and it was active from 12/04/2021 to 17/08/2021. For the sake of preventing participants from quitting the survey without completing, the number of questions were minimized to keep the survey's duration short. Yet, from a total of 284 responses received, only 219 participants managed to complete the full survey. Moreover, 30 of those 219 participants were eliminated in the filter questions part, since they did not perform any recycling in their households. Hence, a total of 189 valid responses were retrieved. Nonetheless, only 165 of these responses were found eligible for data analyses. The remaining 24 participants were eliminated based on 2 selection criteria: survey completion duration and inconsistent consumption responses. According to the duration criterion, responses that took longer than 25 minutes or shorter than 4 minutes were dismissed. This is simply because very short or very long survey completion durations indicate that the participant either did not pay enough attention, or got distracted by losing a lot of time in between the two parts of the survey. In addition to this, some of the estimated monthly consumption responses were inconsistent in between different conditions. For instance, some participants stated that they would consume much less of their preferred drink with the introduction of the economic incentive, which is contradictory to income and substitution effects and does not make sense. Some other estimated monthly consumption responses were also inconsistent in the sense that there was a difference of more than 100 drinks in between the conditions where recycling machine and economic incentive as promotion payment were introduced. All of these inconsistent responses were also dismissed, and the data analysis process was proceeded with the remaining 165 responses.

According to the survey data, the remaining 165 participants were comprised of 122 females and 43 males. Since the sample distribution was skewed towards females, the variable "gender" was dismissed from any moderation analyses. The information gathered from Qualtrics also revealed that the geographical locations of the 165 participants who were found eligible for further analyses were diverse. This diversity allowed the creation of some variables with regards to different cultural dimensions, which is discussed in further detail in the following section. Figure 6 below shows the count of participants from each location where the survey was taken. However, these locations may not represent the actual

nationalities and therefore might not be representative of the cultural values of the participants. The data would carry more accurate information if the participants were asked their nationality and the country they currently resided in in the sociodemographic questions part. This drawback of the survey in terms of the geographical location of the responses is discussed further in the limitations section.

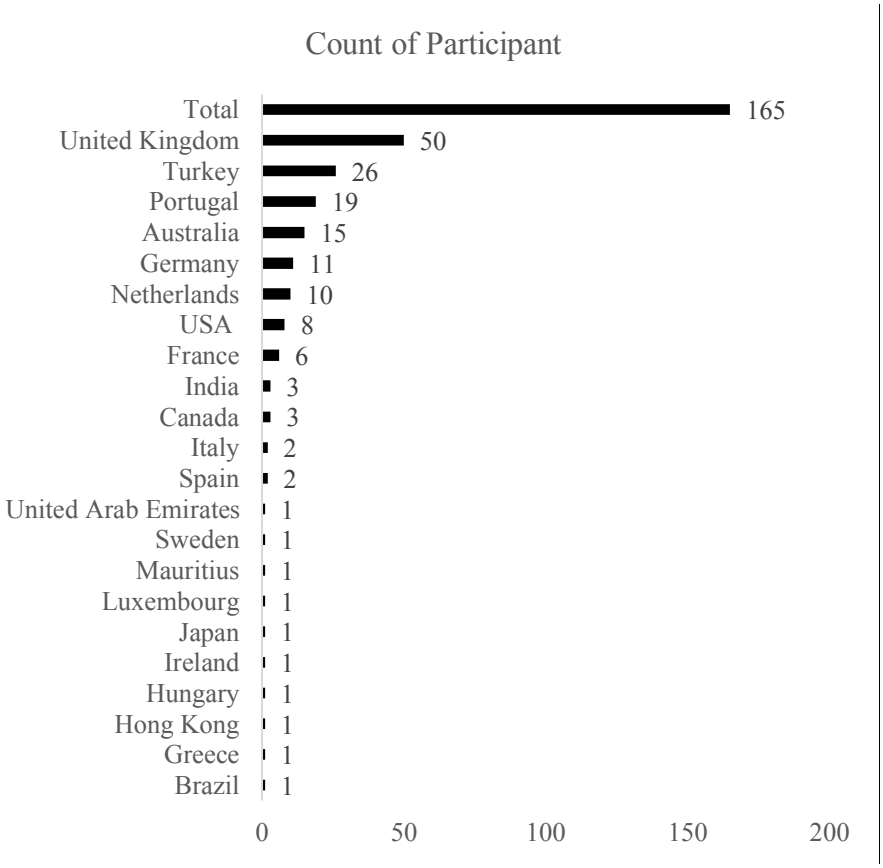

Figure 6. *Count of participants from each location where the survey was taken*

3.3. Variables for testing potential self-licensing relations in the hypothetical model

As mentioned above, the main purpose of this study is to measure the licensing effect in the recycling behavior context when economic incentives are present. Considering the survey flow, this aim can be met by replacing the independent variable used in previous studies in the licensing relationship (recycling efforts) with economic incentives (Figure 7).

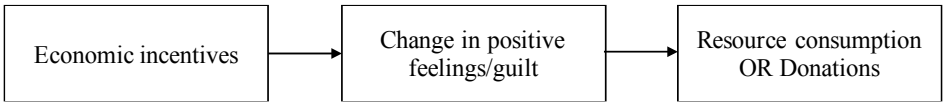

Figure 7. *Economic incentives as an independent variable in the licensing relationship*

By testing whether economic incentives result in a licensing effect (Figure 7), this study contributes to the previous studies on self-licensing in two ways: first, none of the studies mentioning self-licensing investigate the direct influence of economic incentives on other factors included in the licensing relationship (i.e., change in feelings and the subsequent behavior). Second, although real-life recycling policies are not separable from economic incentives, there are no studies in the recycling behavior literature investigating whether recycling incentives lead to self-licensing. By investigating the role of recycling incentives in the licensing relationship, the effects of economic incentives on self-licensing could be understood better and insights for recycling policies can be improved.

Furthermore, in line with the suggestions from previous studies, the moderating roles of environmental self-identity (Ma et al., 2019) difficulty of the recycling task in terms of distance (Sun and Trudel, 2017) and different cultural dimensions such as individualism-collectivism scale, long term orientation and uncertainty avoidance (Mintz et al., 2019) are also checked to see whether these factors affect the licensing relationship in our model (see Figure 4). A total of sixteen variables were derived from the survey data to test these relations. The following paragraphs are dedicated to explain each of these variables in detail.

Cultural dimensions – As suggested by Mintz et al. (2019), some cross-cultural factors may determine individual tolerance to waste production. Starting from this point of view, such factors may also have an influence on consumption performed after showing recycling efforts. That is why in this research, different cultural dimensions are tested as potential moderators for the relationship shown in Figure 4. Since the sample harbors responses from several countries across the globe (Figure 6), variation in constructs for different cultural dimensions could be obtained.

Based on Hofstede's model on cultural dimensions (Hofstede, 2011), a total of 3 cultural variables were included in this work: individualism-collectivism scale (IND), uncertainty avoidance (UAD) and long-term orientation (LTO). Since they vary from country to country, all of these variables are expected to affect participant responses with regards to self-licensing constructs included in the survey. Data regarding these variables

was retrieved from Hofstede Insights, a global consulting firm that bases its business on Hofstede's academic theories. Hofstede Insight's website allows free access to country level estimations for each of the variables IND, UAD and LTO (Hofstede Insights, n.d.) However, since some of the scores attributed to these variables were quite close to each other between some countries, the IND, UAD and LTO scorings included in this study were put through a normalization process. Normalizing the data retrieved from Hofstede Insights' website was necessary for this study in the sense that normalized values help capture the value differences in the sample of countries more accurately (Jayalakshmi, and Santhakumaran, 2011). The min-max method suggested by Jayalakshmi, and Santhakumaran (2011) was followed in this study for the normalization process, since this method has the advantage of maintaining the exact relationships observed in the original dataset. In the min-max method, scores for each data point are calculated as:

$$\text{Normalized Value} = [(x_i - x_{min})/(x_{max} - x_{min})] \qquad (1)$$

where x_i is the original value, $x_{min/max}$ is the minimum/maximum value within the dataset. The normalization equation (1) allows the dataset to fit into the range (0,100). Hence, the highest value in the dataset gets the score 100, whereas the lowest value gets the score 0. As a last note, normalized datasets for each cultural variable (IND, UAD and LTO) are also expected to yield improved results for the moderation analyses.

Location of the recycling bins (bin_loc) – In their search for potential variables expected to predict household recycling behavior, Mintz and colleagues (2019) use recycling bin availability as a measure of difficulty of the recycling task performed. Furthermore, Sun and Trudel (2017) and Ma et al. (2019) mention that physical costs of recycling such as time spent for recycling or the spatial distance of the recycling bins might intensify emotions, therefore may strengthen the licensing effect. Following these suggestions from previous literature, "location of the recycling bins" is determined as a measure of the difficulty of the recycling task, and it is used in the moderation analysis illustrated in Figure 4. In the survey, participants were asked to choose between five locational categories (in my building, nearby in the street, nearby in a different street, relatively far away in the neighborhood, far away, outside of the neighborhood) for each of the plastic, paper and glass bins they used for recycling. Then, the responses were converted into categorical values from 1 to 5, and the

average of these values were taken for each response in order to calculate a bin location index. As a double check, locations for each bin separately (plastic, paper and glass) were also included in the moderation analyses, next to the bin location index.

Environmental identity (EnvID) – A well-accepted measure in self-licensing studies conducted in various pro-environmental behavior domains, environmental identity is introduced both as a moderator (Truelove et al., 2014; Meijers et al., 2019) and as a mediator (Truelove et al., 2014; Ma et al., 2019), to predict undesired consequences of environmentally friendly acts. Yet, from among these studies, only Ma et al. (2019) investigate the effects of environmental identity on the self-licensing relationship between recycling (as an environmentally friendly act) and the potential increase in consumption. Specifically, Ma et al. (2019) found that repetitive recycling may boost environmental self-identity, which in turn can reduce negative emotions connected to environmentally irresponsible behavior like being wasteful, therefore increasing the likelihood of wasteful consumption. Nevertheless, individuals with different environmental self-identities may experience a stronger/weaker change in their emotions associated with behaving environmentally irresponsible. So, it is necessary to check whether environmental self-identity acts as a moderator in the licensing relationship between economic incentives on recycling and consumption (Figure 4). To measure environmental identity, 5 environmental value items were retrieved from Ma et al. (2019). These items are shown in Table 1 below.

Table 1. *Environmental self-identity items* (Ma et al., 2019)

Construct	Item
Environmental self-identity (adopted from Ma et al., 2019)	I think of myself as someone who is very concerned about environmental issues
	I think everyone should contribute to environmental protection
	I am willing to sign a petition to support an environmental cause
	I am not willing to pay more taxes such that the government can do more against environmental pollution
	I am not willing to boycott a brand that is known to pollute the environment during production

As shown in Table 1, five environmental identity items retrieved from Ma et al. (2019) include 2 reverse items (last two rows), in order to check if the participants are responding consistently. The responses were collected with a Likert scale of 1-5 (strongly agree-strongly disagree). The average of each response value was calculated for each participant, in order to obtain an environmental identity index (EnvID) to be used in moderation analysis shown in Figure 4. As a back-up check, responses for each environmental identity separately (Table 1) were also included in the moderation analyses, next to the environmental identity index.

Economic incentive (EcIn) – The only manipulated variable of this study, economic incentive is derived from the survey responses as a dummy variable, meaning that for the group that was introduced to the recycling machine without any monetary refunds, *EcIn* was given the value 0. On the other hand, for the group that received the monetary incentive of 0.25€ by using the recycling machine inserted in the hypothetical store, *EcIn* was attributed the value 1. This way, it could be used as the independent variable for the relation illustrated in Figure 7. Dummy variables, by nature, can both be used as independent variables and moderators since they represent categories (Okun, Benin and Brandt-Williams, 1996; Garavaglia and Sharma, 1998).

Effect of recycling (Rec_Eff) – This variable measures the level of change between estimated consumption responses for the option where there is no recycling available and the case where participants are introduced to the machine that can 100% recycle the consumed drink without offering any monetary rewards (i.e., the licensing effect). In other words, it is calculated by subtracting the consumption level under the no recycling option from the consumption level stated under the recycling machine condition (Figure 5). This variable was created twice for further analyses, one for monthly consumption estimations regarding the self, and one for peer estimations (2). As explained above, the reason for including peer questions in the survey is basically to eliminate any potential self-reporting biases.

$$\text{Rec\_Eff (peers)} = \text{Consumption}_{\text{recycling\_machine (peers)}} - \text{Consumption}_{\text{no\_recycling (peers)}} \qquad (2)$$

Effect of the recycling incentive (RecIn_Eff) – Similar to the effect of recycling, this variable is created to measure the difference between the consumption levels when there is no recycling option available and the case where participants are introduced to the machine

that can 100% recycle the consumed drink that refunds 0.25€ after the use of it (i.e., the licensing effect under the presence of the recycling incentive). In other words, it is calculated by subtracting the consumption levels under the no recycling option from the consumption levels stated under the recycling machine with refund condition (Figure 5). Again, this variable was created twice for further analyses, one for monthly consumption estimations regarding the self, and one for peer estimations (3).

$$\text{RecIn\_Eff}(\text{peers}) = \text{Consumption}_{\text{machine\_with\_refund (peers)}} - \text{Consumption}_{\text{no\_recycling (peers)}} \quad (3)$$

As a last note, this variable carries not only the licensing effect, but also the income and substitution effects caused by the recycling incentive involved in it. Since it contains income and substitution effects, this variable is not used as the main dependent measure in the model. Nonetheless, it is used to check if consumption increases significantly after the introduction of the economic incentive as a recycling reward. Mean comparison test results to check the size of the income and substitution effects carried by this variable are discussed in more detail in the following section.

To eliminate the potential income and substitution effects carried by the effect of the recycling incentive, variable, another effect variable (licensing effect of recycling) was created to control for the income and substitution effects, and to capture the pure licensing effect on consumption responses.

Licensing effect of recycling incentive (SL_RecIn) – This variable was created to get rid of the income and substitution effects carried by the overall effect of the recycling incentive on consumption. With the incorporation of this variable into the model, the pure licensing effect of the machine with refund on consumption can be captured. The licensing effect of the recycling incentive is simply calculated by measuring the difference between consumption responses under the economic incentive as promotion payment condition and under the scenario where recycling machine with monetary reward is introduced (Figure 5). In other words, the pure licensing effect of the recycling incentive is calculated by subtracting the consumption responses given in the economic incentives as promotion payment condition from the consumption responses under the machine with monetary refund condition. As in the case of all effect variables, this variable was also created twice for

further analyses, one for monthly consumption estimations regarding the self and one for the peer estimations (4).

$$\text{SL\_RecIn (peers)} = \text{Consumption}_{\text{machine\_with\_refund (peers)}} - \text{Consumption}_{\text{econ\_incentive (peers)}} \quad (4)$$

Recycling effects – Since the economic incentive variable (*EcIn*) is used as a dummy in the analyses, the effect variables derived from the consumption responses of two groups (recycling machine with and without the monetary refund) had to be combined to avoid correlation errors between variables. More precisely, since economic incentive is the manipulated variable between the two groups, the effect of *EcIn* on only one of the groups cannot be measured.

Thereby, the recycling effect variable integrating the effect of recycling (difference between the consumption levels of recycling machine without refund and no-recycling conditions) and the licensing effect of the recycling incentive (difference between the consumption levels of recycling machine with refund and economic incentive conditions) was created to measure the licensing effect of the economic incentive on consumption, while controlling for the income and substitution effects. Since each effect variable was created also for peers, the recycling effect variable also has the secondary measure for peers.

Positive feelings and guilt (and for peers) – As in the case of the recycling effects variable, positive feelings and guilt responses retrieved from the two groups also had to be combined in order to eliminate correlation errors observed between each group's positive feelings/guilt answers' relation with the variable EcIn.

Donations – Although the economic incentive measure (*EcIn*) has no correlation issues with the donations variable, donation responses of the two groups were also combined in a single variable for the analyses to be consistent with each other. As mentioned above, following previous studies on self-licensing, donations were used as an alternative to the main dependent variables that measure the change in consumption (i.e., the recycling effects measure).

As mentioned above, the effects of economic incentives on the change in consumption represent the primary investigation of this research. Due to income and substitution effects (see Section 2.1), introduction of the economic incentive is expected to increase consumption, regardless of the licensing effect. However, since the main purpose of this

study is to detect licensing effects, income and substitution effects that would arise due to the introduction of economic incentives in the model are controlled in data analyses. As explained in the previous paragraphs, the licensing effect of the recycling incentive variable was created for this purpose. Computing the difference between the consumption responses under the recycling machine with refund and the economic incentive conditions enables to detect the pure licensing effect of the economic incentive on consumption, while eliminating any income and substitution effects caused by the economic incentives. In addition, since the economic incentive variable is a dummy (see Section 3.3), pure effect of recycling was combined with the effect of recycling to be used as the dependent variable in this research. This way, the combined responses collected from the two independent groups could be tested with the dummy variable (*EcIn*). The following table (Table 2) explains the dependent variable's creation process further.

Table 2. *Calculation of the dependent variable (DV)*

Participant	C_NR	C_EcIn	C_Rec	C_RecIn	Rec_Eff	SL_Rec	DV
1	4	5	5		1		1
2	3	5		8		3	3
3	5	7	6		1		1
4	7	8		10		2	2

Note. C_NR is consumption with no recycling option, C_EcIn is consumption with the economic incentive, C_Rec is consumption with the recycling machine with no refund, and C_RecIn is consumption with the recycling machine with refund

Table 2 portrays an example of how the dependent variable "recycling effects" is calculated. The columns C_NR and C_EcIn represent the estimated monthly consumption responses for the no recycling option and economic incentive as promotion payment conditions collected from all participants before they were randomly assigned to the two independent recycling machine groups. The C_Rec column refers to the estimated monthly consumption responses collected from the first group (recycling machine with no refund), whereas the C_RecIn column represents the consumption estimations retrieved from the second group (recycling machine with refund). Since the participants were randomly assigned to these two groups, row 2 and 4 are empty in the C_Rec column, and row 1 and 3 are empty in the C_RecIn column. Then, by subtracting the consumption responses under the no recycling option condition (C_NR) from the consumption responses under the

recycling machine with no refund condition (C_Rec), the variable "effect of recycling" is calculated (represented by the column Rec_Eff). Similarly, the column SL_Rec (i.e., the variable "licensing effect of the recycling incentive") is calculated by simply subtracting the consumption responses given under the economic incentive as promotion payment condition (column C_EcIn) from the consumption responses given under the recycling machine with refund condition (column C_RecIn). As a last step, the effects of the recycling machines are aggregated into a single dependent variable "recycling effect", by combining the Rec_Eff and SL_Rec columns into one column (DV).

3.4. Expected results

As presented in Section 2.1, the hypothetical model of this study includes 4 hypotheses. In addition, the donations variable was also included in the model as the alternative dependent measure to have a double check on whether self-licensing holds in different behavioral domains. The following scheme represents the expected relationships between the variables included in the hypothetical model (Figure 8).

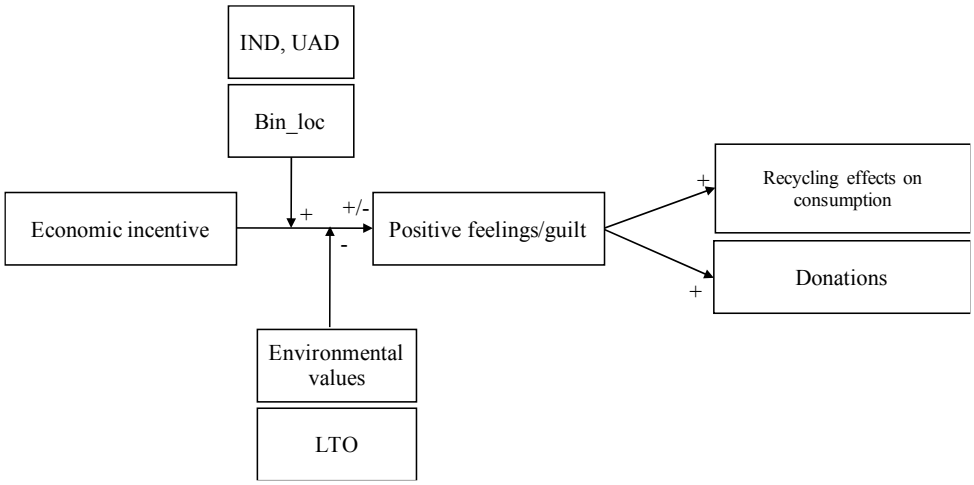

Figure 8. *Expected variable relations in the hypothetical model*

According to Figure 8 and the hypotheses mentioned in Section 2.1, the introduction of the economic incentive is expected to increase consumption (or alternatively, donations) in between the two groups, via an increase in positive feelings or a reduction in guilt. Since the first (second) group represents the participant responses under the influence of the recycling machine without (with) refund, the dummy variable (*EcIn*) is able to predict the

change in consumption between the responses collected from two groups. This is why the mediators and the dependent variables in the model embody the combination of the two groups' responses. Furthermore, the primary dependent variable (recycling effects) is determined as the combination of *Rec_Eff* and *SL_Rec* (Table 2), in order to control for any income and substitution effects that would occur in the model. This way, mere licensing effects after the introduction of the recycling incentive can be captured.

Moreover, environmental values, difficulty of the recycling task (*bin_loc*) and cultural dimensions (IND, UAD and LTO) are also expected to moderate the relationship between economic incentives and positive feelings/guilt, therefore further affecting consumption. To be more specific, the licensing effect for individuals who carry higher environmental values is expected to be mitigated, since these individuals would not feel as good or as less guilty as those who carry lower environmental values when they receive the recycling incentive. A more difficult recycling task (i.e., a further away recycling bin) is expected to strengthen the licensing effect, since individuals would be prompted to feel more positive or less guilty about themselves, relative to the situation where they spent less time/effort to reach the recycling bin. Lastly, the three cultural dimensions included in this study are also expected to affect the licensing relationship in different ways. Individuals with more individualistic cultural backgrounds (IND) are expected to experience a stronger licensing effect since they tend to give less importance to the common good. Thus, these individuals would feel relatively better or relatively less guilty about themselves compared to the individuals from more collectivistic cultures when they engage in an environmentally friendly act. So, they may be more prone to act less environmentally responsibly after using the recycling machine. Uncertainty avoidance (UAD) could also escalate the licensing effect, since individuals from more uncertainty avoidant cultures are more prone to experience more heightened positive feelings or lower guilt after performing recycling, relative to the individuals from cultures that are less uncertainty avoidant. Long-term orientation (LTO) is expected to weaken the licensing relationship, since individuals from cultures where people are more considerate for future consequences of their actions would be less affected in their positive feelings/guilt after using the recycling machine, therefore would not increase their consumption as much as those who carry lower long-term orientation values.

4. Results

From a total of 284 responses retrieved from Qualtrics, only 165 (43 males, 122 females) were found eligible for data analyses. The age range of the participants was between 18 and 55, and there was at least one participant from each continent (Figure 6). For the analyses, SPSS and PROCESS v3.5 by Hayes were used.

To start with, to check whether economic incentive on recycling lead to an increase in consumption via the income and substitution effects, mean comparison tests were conducted between consumption responses used to calculate the variable *RecIn_Eff* (see Section 3.3). *Rec_Eff* was not involved in the mean comparison tests since this effect does not include any economic incentives, therefore does not carry any income and substitution effects.

To measure the overall effect size of the recycling incentive on consumption, one sample t-test was performed on the consumption responses between no recycling and recycling machine with the economic refund conditions. Results show that on average, participants in the recycling machine with economic refund condition reported a higher level of monthly consumption (M = 9.93, SD = 17.740) than the no recycling condition (5.28). This difference (M_{diff} = 4.649, SE = 1.924, 95% CI [0.82, 8.48]) was statistically significant, with t (84) = 2.416, p = 0.018, d = 0.527. Here, Cohen's d (0.527) indicates that recycling incentives have an intermediate effect on consumption. Hence, there is a non-negligible amount of income and substitution effects occurring in the model, next to the licensing effect. One sample t-test results for peer consumption responses between the same conditions (no recycling and recycling machine with refund) indicated that the estimated peer consumption average of the recycling machine with refund condition (M = 10.48, SD = 15.880) is higher than the mean of no recycling condition (6.74). The difference (M_{diff} = 3.742, SE = 1.722, 95% CI [0.32, 7.17] showed statistical significance with t(84) = 2.173, p = 0.033, d = 0.474. In the case for peers, recycling incentives again had an intermediate effect on consumption (Cohen, 1988).

The one sample t-test results between the recycling machine with refund and no recycling option conditions indicate that it is necessary to control the income and substitution effects in the sample. As mentioned above, this problem is solved by the formation of the variable "licensing effect of the recycling incentive" that is embedded in the dependent measure *recycling effects*.

To test the first hypothesis of the model (Section 2.1), simple regression analyses were conducted in between the variables *EcIn* (independent variable), *positive feelings/guilt* (potential mediators) and *recycling effects/donations* (dependent variables). Results show that neither positive feelings nor guilt mediate the relationship between economic incentive and consumption (*recycling effects*) or donations. However, there is an indirect effect of the economic incentive on consumption performed after recycling, via an increase in positive feelings (Figure 9). According to the indirect effect test conducted with PROCESS, the mediator "positive feelings" is significant because when it is not included in the model, the direct effect of the independent variable (*EcIn*) on the dependent variable (*recycling effects*) is not significant (p = 0.6297). Again, according to PROCESS results, there is an indirect effect (16.14%) of the economic incentive on consumption through the mediator "positive feelings" (Table 3). Similarly, there is also an indirect effect (199.43%) of the economic incentive on donations given after the recycling act (Table 4). According to PROCESS results, the direct effect of *EcIn* on donations is not significant (p = 0.1325) when the mediator "positive feelings" is not included in the model. This means that the first hypothesis is partially valid, and the indirect effect of economic incentives on donations (Figure 10) is rather big relative to the indirect effect observed on the change in consumption. The huge difference between the indirect effect sizes for consumption and donations might be a result of the suggested range for donations (0€-100€). By being given the opportunity to donate up to 100€ after performing recycling, participants were actually encouraged to give higher donation responses (μ = 42.01€), relative to their monthly consumption estimations (μ = 7.76).

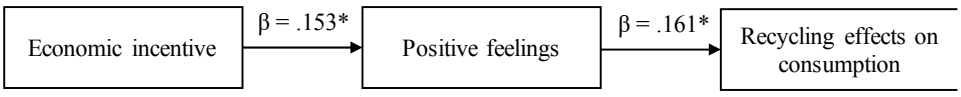

Figure 9. *Simple linear regression results for the relations between economic incentives, positive feelings and recycling effects on consumption*

Note. Path values are standardized beta weights

*p<0.05

Table 3. *Indirect effect of economic incentive on consumption (represented by recycling effects)*

Direct effect of the economic incentive on consumption (excluding income and substitution effects)				**95% Confidence Interval**	
Effect	**se**	**t**	**p**	**LLCI**	**ULCI**
-0,2386	0,4939	-0,4831	0,6297	-1,2139	0,7367
Indirect effects via positive feelings					
Mediator		**Effect**	**BootSE**	**BootLLCI**	**BootULCI**
Positive feelings		0,1614	0,0948	0,0054	0,3752

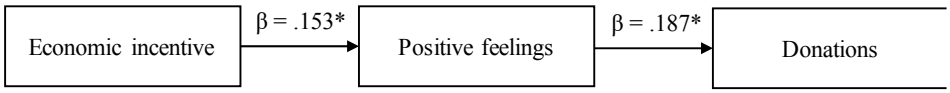

Figure 10. *Simple linear regression results for the relations between economic incentives, positive feelings and donations*

Note. Path values are standardized beta weights

*p<0.05

Table 4. *Indirect effect of economic incentive on donations*

Direct effect of the economic incentive on donations				**95% Confidence Interval**	
Effect	**se**	**t**	**p**	**LLCI**	**ULCI**
-7,4421	4,9229	-1,5117	0,1325	-17,1634	2,2792
Indirect effects via positive feelings					
Mediator		**Effect**	**BootSE**	**BootLLCI**	**BootULCI**
Positive feelings		1,9943	1,3048	0,1273	4,9793

In advance of the moderation tests conducted for the second hypothesis (H2), a reliability analysis was performed on the five environmental self-identity items included in the survey. As a reminder, the queries on environmental values included 2 reverse item

questions. These items were first reversed in SPSS in order to proceed with the reliability analysis.

Reliability test results show that the Cronbach's alpha is equal to 0.684 for the five environmental self-identity items, as shown in Table 5. A Cronbach's alpha at this level allows the creation of an environmental self-identity index with an acceptable level of reliability.

Table 5. *Reliability test results for the five environmental self-identity items (Mean values represent Likert scale averages, where 1 = strongly agree and 5 = strongly disagree)*

Items	Mean	Standard Deviation	N
I think of myself as someone who is very concerned with environmental issues	1,94	0,76	165
I think everyone should contribute to environmental protection	1,39	0,67	165
I am willing to sign a petition to support an environmental cause	1,72	0,89	165
I am not willing to pay more taxes such that the government can do more against environmental pollution (Reversed)	2,90	1,15	165
I am not willing to boycott a brand that is known to pollute the environment during production (Reversed)	2,25	1,17	165

Cronbach's Alpha	N of items
0,684	5

The moderating role of the environmental self-identity index for the licensing relationship was tested within PROCESS. However, the test results showed no significance. The same applies to the rest of the potential moderators (bin locations, individualism-collectivism scale, uncertainty avoidance and long-term orientation). None of the moderation tests included in the hypothetical model yielded significant results. Hence, all the remaining hypotheses (H2, H3, H4a, H4b and H4c) are not valid. This problem might have emerged due to the deficiency in measuring the change in positive feeling or guilt responses. Although previous studies on self-licensing state that the negative spillover occurs through a change in positive feelings or a change in guilt, the responses regarding feelings in our model actually reflect snapshot answers. The limitations part (Section 5.1) addresses this issue in more detail.

Lastly, a qualitative analysis on one-word responses retrieved by participants in both groups was conducted to see if the overall feelings after using the recycling machine differed between the two conditions (machine with and without refund). To be more specific, the qualitative analysis was done by categorizing one-word responses into groups in terms of the level and direction of their sentimentality (very positive, positive, neutral, negative and very negative).

In the first group where participants were prompted to use the hypothetical recycling machine that offered no refund, a total of 7 participants gave very positive one-word answers (fantastic, great, happy and proud, overjoyed) whereas 67 participants in total responded in a positive way (happy, good, relieved, better, satisfied etc.). The remaining 5 participants responded neutrally (indifferent, not very different, same, I don't mind), and only 1 participant responded negatively (uninterested). In the second group where the recycling machine with refund is introduced, 12 very positive responses were detected, whereas there were no negative responses. 68 participants in the second group gave one-word feeling answers which are classified as positive, and only 5 participants responded neutrally. Figure 11 compares the qualitative analysis results for both groups (recycling machine with and without refund). According to Figure 11, the responses collected from the second group (recycling machine with refund) contain 5 more very positive, 1 more positive and 1 less negative responses, relative to the first group (recycling machine without refund). There was no difference between the two groups regarding neutral responses. In general, Figure 11 indicates that in both groups, a majority of one-word responses were either positive or very positive, and only a few participants in both groups stated "indifference". This means that introducing the recycling option regardless of the recycling incentive actually enhances positive feelings, which is in line with the licensing studies in general.

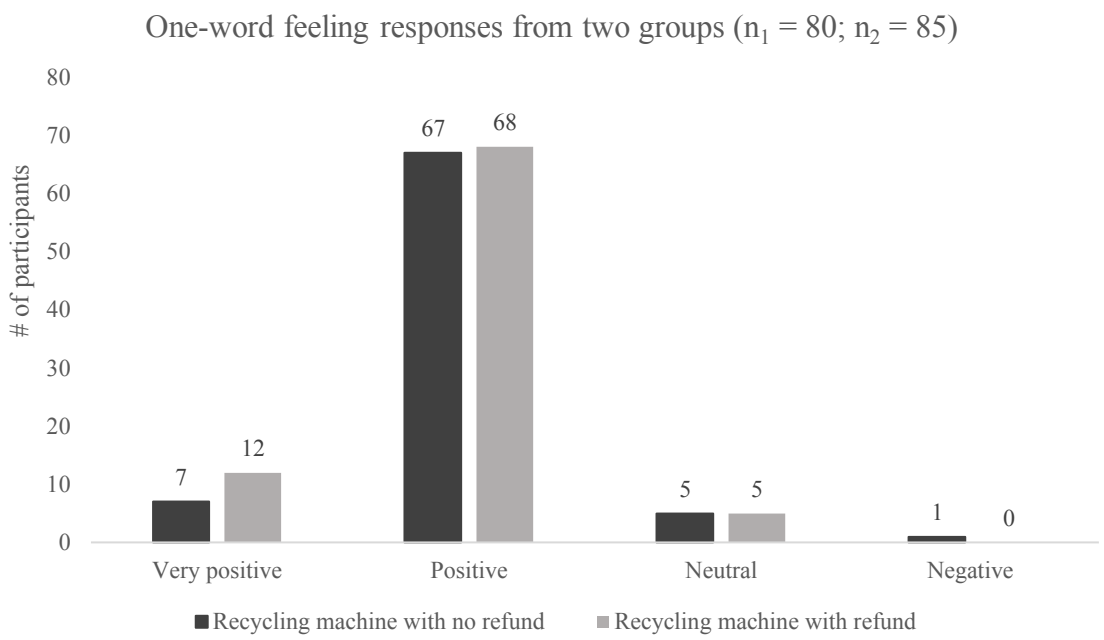

Figure 11. *Qualitative analysis results for one-word answers collected from the two groups (recycling machine with and without refund)*

5. Concluding Remarks

This dissertation project aims to contribute to the knowledge on self-licensing, a well-accepted phenomenon in behavioral research. Self-licensing states that individuals who perform pro-social, pro-environmental or any type of good behavior are more prone to act in an undesired way afterwards, due to an increase in positive feelings or a reduction in guilt. However, different individual and contextual factors such as environmental self-identity, the psychological state of the individual, different cultural values, difficulty of the pro-social/pro-environmental task and so forth may influence self-licensing. Unfortunately, very little is known regarding the factors that might affect the licensing relations since self-licensing research is still not very developed. When it comes to recycling - the main focus of this study - self-licensing studies on this domain are also not many. Furthermore, although real-life recycling policies usually contain economic penalties or rewards, there are no previous studies investigating the effects of recycling incentives on self-licensing. In order to reduce this gap in literature, this study introduces recycling incentives to the self-licensing context.

What previous self-licensing studies on recycling state is that showing recycling efforts would eventually lead to an increase in consumption and therefore more waste creation, which is an environmentally undesired outcome. Also accepted as a "negative spillover", the licensing effect of recycling on consumption happens through an enhancement of positive feelings (e.g. pride), or a reduction in guilt. In other words, people tend to feel better about themselves (or less guilty) after performing recycling so that they might become more prone to justify the subsequent increase in their consumption.

On the other hand, microeconomic theory states that economic incentives would lead to an increase in consumption through income and substitution effects for a normal good. Since this dissertation project is a multidisciplinary study that benefits from the disciplines of economics and psychology, it was essential to separate the licensing effect from the income and substitution effects. Otherwise, the additional psychological effects of the economic incentive on consumption would not have been fully captured. As the main investigation of this study was to check whether economic incentives increase consumption due to self-licensing, it was necessary to control for income and substitution effects during data analyses.

To further contribute to the existing self-licensing literature on pro-environmental behavior, the moderating roles of environmental self-identity, individualism-collectivism characteristics, long-term orientation, uncertainty avoidance and the difficulty of the recycling task were also checked to see whether these additional variables exacerbate or alleviate the licensing effect of the economic incentive on consumption.

In order to test the licensing effect created by the economic incentive and to check the follow-up moderating relations, participants were asked to state their consumption preferences in different hypothetical situations. The first two of these situations involved no recycling options with only one of them including the introduction of an economic incentive, whereas the remaining two conditions included the introduction of a hypothetical in-store machine that can fully (100%) recycle the preferred canned/bottled drinks for consumption. Participants were randomly assigned to the two recycling machine conditions, where the variable "economic incentive" was manipulated. In other words, participants assigned to the first recycling machine group did not receive any recycling rewards after using the machine whereas the participants in the second recycling machine group were refunded 0.25€ after using the machine to recycle their preferred drink. In addition, participants were also asked to state their monthly consumption estimations for their peers in each condition, in order to prevent any self-report biases (see Section 3.1). As a last note, for the moderation analyses, various questions on environmental values, locations of the recycling bins that participants used in real life and general sociodemographic questions were included in the survey. To access the full survey flow, see Appendix A.

Results show that first, the economic incentive introduced in the hypothetical model increases consumption due to a combination of the licensing effect and the income and substitution effects, with an intermediate effect size (Cohen's d = 0.527, Cohen's d for peers = 0.474). Therefore, it was necessary in the model to separate the income and substitution effects from the licensing effect. That is why the specific dependent variable for measuring the change in consumption responses (*recycling effects*) was included in further mediation analyses (see Section 3.3).

Data analysis results for the potential licensing effects in the model did not show any significant mediation relationships. More specifically, neither positive feelings nor guilt mediate the relationship between the independent variable "economic incentive" and the dependent measure (*recycling effects*) created to track the change in consumption (or

alternatively, donations). Yet, for both dependent variables, there is an indirect effect observed via positive feelings. In other words, although the variable "economic incentives" does not directly increase consumption (or predict the level of subsequent donations), it indirectly affects the change in consumption (or donation decisions) via positive feelings. In addition, the economic incentive introduced in the model indirectly increases consumption substantially (16.14%). On the other hand, the indirect effect of economic incentives on donation decisions are rather big (199.43%). This means that rewarding individuals for their recycling efforts would encourage them to act pro-socially afterwards. Since economic incentives on recycling represent paid good deeds, this result is in line with what Clot et al. (2013) discovered. In short, although economic incentives on recycling might lead to undesired effects like increasing subsequent consumption, they might also motivate individuals to act in less selfish ways. The mixed results obtained from this study once again underline the importance of different dimensions that should be taken into consideration by the authorities during the preparation of recycling policies. Nevertheless, to have more effective policy suggestions, further studies need to be conducted on the various psychological effects of recycling incentives. With more empirical studies in effect, self-licensing literature can reach a consensus on how certain relevant psychological factors influence subsequent behavior. Thus, the undesired or desired consequences of recycling incentives can be understood in better ways.

Although some significant results were yielded from this study, there were some limits to the hypothetical model and data collection processes. The next section addresses some rooms for improvement in the survey and the model, while giving some suggestions for further studies on self-licensing in recycling.

5.1. Limitations and suggestions for further studies

One of the biggest challenges for this study was founding the model on hypothetical scenarios, instead of real-life cases. In hypothetical scenarios, individuals may be less willing to exhibit undesirable behaviors that need to be justified as it is relatively effortless to display good behavior in hypothetical cases. In other words, it is easier to claim to act in a good way (talk is cheap), and this might not reflect the behavior performed in real terms. Thus, one could expect that the moral licensing effect is larger when the dependent behavior consists of actual compared to hypothetical behavior (Blanken et al., 2015). Previous

research also revealed that people want to appear moral while avoiding the cost of being moral (Batson & Thompson, 2001). Hence, the licensing effects detected in this study might be underestimated, and more empirical research is needed to capture the licensing effects on actual behavior.

Another major room for improvement for this research is to include baseline positive feelings/guilt questions in the survey. Previous self-licensing studies state that the licensing effect occurs via a change in positive feelings or guilt. However, the survey of this study only includes the feeling questions in the second part where participants are randomly assigned to the recycling machine conditions. Thus, the positive feeling/guilt responses gathered represent snapshot answers, instead of representing a change. In other words, a similar distribution of positive feelings was assumed for all participants before the manipulation took place, which in turn reduces the chance to identify the true change in feelings.

The absence of any significant moderators in the model might also be an outcome of not tracking the change in feelings with the survey. This problem can be overcome by simply asking all participants how positive/guilty they feel in general before randomly assigning them to groups. In general, future studies on self-licensing should include an additional measure to track the change in feelings in order to yield more accurate results.

Results can also be improved for the cultural-level variables (individualism-collectivism scale, uncertainty avoidance and long-term orientation) by obtaining data on participants' nationalities. As the survey does not include any questions on nationalities, the cultural-level variables included in the model are based on the location data automatically created by Qualtrics. However, participants may have been temporarily residing in these locations and thus, real cultural values might have not been incorporated into the model. Obtaining data regarding the nationalities of the participants instead of their instantaneous locations might result in significant moderation relations for the three cultural dimension variables included in the model.

To summarize, this study investigated the effects of economic incentives on self-licensing in two different behavioral domains: consumption and donation giving. According to the results, financially rewarding people for their recycling efforts might increase subsequent consumption by making people feel better or less guilty about themselves, which is an undesirable outcome that can also be framed as a "negative spillover". At the same

time, subsidizing recycling might also enhance the subsequent donations given, which is considered as a positive outcome. These mixed licensing effects of economic incentives can be better understood by conducting more empirical studies, preferably within realistic scenarios instead of hypothetical ones. Furthermore, an interesting path for future studies investigating the licensing effects of recycling incentives would be to compare the effects of higher versus lower financial rewards on the outcome behavior. By doing so, an optimal level for recycling incentives can be derived and insights for future waste management policies can be improved.

References

Antonetti, P., & Maklan, S. (2014). Feelings that make a difference: How guilt and pride convince consumers of the effectiveness of sustainable consumption choices. *Journal of business ethics,* 124(1), 117-134. doi: 10.1007/s10551-013-1841-9

Ashraf, N., Bandiera, O., & Jack, B. K. (2014). No margin, no mission? A field experiment on incentives for public service delivery. *Journal of public economics*, 120, 1-17. doi: 10.1016/j.jpubeco.2014.06.014

Batson, C. D., & Thompson, E. R. (2001). Why don't moral people act morally? Motivational considerations. *Current directions in psychological science*, 10(2), 54-57. doi: 10.1111/1467-8721.00114

Bem, D. J. (1972). Self-perception theory. In *Advances in experimental social psychology* (Vol. 6, pp. 1-62). Academic Press. doi: 10.1016/S0065-2601(08)60024-6

Biernacki, P., & Waldorf, D. (1981). Snowball sampling: Problems and techniques of chain referral sampling. *Sociological methods & research*, 10(2), 141-163. doi: 10.1177/004912418101000205

Blanco, E., Rey-Maquieira, J., & Lozano, J. (2009). Economic incentives for tourism firms to undertake voluntary environmental management. *Tourism Management*, 30(1), 112-122. doi: 10.1016/j.tourman.2008.04.007

Blanken, I., van de Ven, N., & Zeelenberg, M. (2015). A meta-analytic review of moral licensing. *Personality and Social Psychology Bulletin*, 41(4), 540-558. doi: 10.1177/0146167215572134

Bolderdijk, J. W., & Steg, L. (2015). Promoting sustainable consumption: The risks of using financial incentives. In L. A. Reisch & J. Thøgersen (Eds.), *Handbook of research on sustainable consumption* (pp. 328-342). Edward Elgar Publishing. doi: 10.4337/9781783471270.00033

Brañas-Garza, P., Bucheli, M., Espinosa, M. P., & García-Muñoz, T. (2013). Moral cleansing and moral licenses: experimental evidence. *Economics & Philosophy*, 29(2), 199-212. doi: 10.1017/S0266267113000199

Buyalskaya, A., & Shum, M. (2020). Self-Regulation Failures in the Field: Investigating Spillovers from Morning Exercise to Food Choice. *Available at SSRN 3527698*. doi: 10.2139/ssrn.3527698

Calvo, N., Varela-Candamio, L., & Novo-Corti, I. (2014). A dynamic model for construction and demolition (C&D) waste management in Spain: Driving policies based on economic incentives and tax penalties. *Sustainability*, 6(1), 416-435. doi: 10.3390/su6010416

Clot, S., Andriamahefazafy, F., Grolleau, G., Ibanez, L., & Méral, P. (2015). Compensation and Rewards for Environmental Services (CRES) and efficient design of contracts in developing countries. Behavioral insights from a natural field experiment. *Ecological Economics*, 113, 85-96. doi: 10.1016/j.ecolecon.2015.02.021

Clot, S., Grolleau, G., & Ibanez, L. (2013). Self-licensing and financial rewards: is morality for sale? *Economics Bulletin*, 33, 2298-2306.

Clot, S., Grolleau, G., & Ibanez, L. (2016). Do good deeds make bad people? *European Journal of Law and Economics*, 42(3), 491-513. doi: 10.1007/s10657-014-9441-4

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. New York, NY: Routledge Academic

Conway, P., & Peetz, J. (2012). When does feeling moral actually make you a better person? Conceptual abstraction moderates whether past moral deeds motivate consistency or compensatory behavior. *Personality and Social Psychology Bulletin*, 38(7), 907-919. doi: 10.1177/0146167212442394

Dahlén, L., & Lagerkvist, A. (2010). Evaluation of recycling programmes in household waste collection systems. *Waste Management & Research*, 28(7), 577-586. doi: 10.1177/0734242X09341193

Dajić, A., Mihajlović, M., Jovanović, M., Karanac, M., Stevanović, D., & Jovanović, J. (2016). Landfill design: need for improvement of water and soil protection requirements in EU Landfill Directive. *Clean Technologies and Environmental Policy*, 18(3), 753- 764. doi: 10.1007/s10098-015-1046-2

Donaldson, S. I., & Grant-Vallone, E. J. (2002). Understanding self-report bias in organizational behavior research. *Journal of Business and Psychology*, 17(2), 245-260. doi: 10.1023/A:1019637632584

Dütschke, E., Frondel, M., Schleich, J., & Vance, C. (2018). Moral licensing—another sourceof rebound? *Frontiers in Energy Research*, 6, 38. doi: 10.3389/fenrg.2018.00038

Eurostat (2020). *Greenhouse gas emissions from waste*. Retrieved from: https://ec.europa.eu/eurostat/web/products-eurostat-news/-/DDN-20200123-1

Festinger, L. (1957). *A theory of cognitive dissonance* (Vol. 2). Stanford university press.

Freedman, J. L., & Fraser, S. C. (1966). Compliance without pressure: the foot-in-the-door technique. *Journal of personality and social psychology*, 4(2), 195. doi: 10.1037/h0023552

Garavaglia, S., & Sharma, A. (1998). A smart guide to dummy variables: Four applications and a macro. In *Proceedings of the northeast SAS users group conference* (Vol. 43)

Griffiths, A., & Wall, S. (2000). *Intermediate microeconomics: theory and applications*. Pearson Education.

Haj-Salem, N., & Al-Hawari, M. A. (2021). Predictors of recycling behavior: the role of self-conscious emotions. *Journal of Social Marketing*, 11(3), 204-223. doi: 10.1108/JSOCM-06-2020-0110

Hofstede, G. (2011). Dimensionalizing cultures: The Hofstede model in context. *Online readings in psychology and culture*, 2(1), 2307-0919. doi: 10.9707/2307-0919.1014

Hofstede Insights (n.d.). *Compare countries*. Hofstede Insights. https://www.hofstede-insights.com/product/compare-countries/

Iyer, E. S., & Kashyap, R. K. (2007). Consumer recycling: Role of incentives, information, and social class. *Journal of Consumer Behaviour: An International Research Review*, 6(1), 32-47. doi: 10.1002/cb.206

Jacobsen, G. D., Kotchen, M. J., & Vandenbergh, M. P. (2012). The behavioral response to voluntary provision of an environmental public good: Evidence from residential electricity demand. *European Economic Review*, 56(5), 946-960. doi: 10.1016/j.euroecorev.2012.02.008

Jayalakshmi, T., & Santhakumaran, A. (2011). Statistical normalization and back propagation for classification. *International Journal of Computer Theory and Engineering*, 3(1), 1793-8201

Khan, U., & Dhar, R. (2006). Licensing effect in consumer choice. *Journal of marketing research*, 43(2), 259-266. doi: 10.1509/jmkr.43.2.259

Lacetera, N. (2016). Incentives for prosocial activities. *IZA World of Labor*. doi: 10.15185/izawol.238

Lacetera, N., & Macis, M. (2010). Do all material incentives for pro-social activities backfire? The response to cash and non-cash incentives for blood donations. *Journal of Economic Psychology*, 31(4), 738-748. doi: 10.1016/j.joep.2010.05.007

Lacetera, N., Macis, M., & Slonim, R. (2012). Will there be blood? Incentives and displacement effects in pro-social behavior. *American Economic Journal: Economic Policy*, 4(1), 186-223. doi: 10.1257/pol.4.1.186

Long, H., Liu, H., Li, X., & Chen, L. (2020). An evolutionary game theory study for construction and demolition waste recycling considering green development performance under the chinese government's reward–penalty mechanism. *International Journal of Environmental Research and Public Health*, 17(17), 6303. doi: 10.3390/ijerph17176303

Ma, B., Li, X., Jiang, Z., & Jiang, J. (2019). Recycle more, waste more? When recycling efforts increase resource consumption. *Journal of Cleaner Production*, 206, 870-877. doi: 10.1016/j.jclepro.2018.09.063

Matheson, M. T. (2019). *Disposal is Not Free: Fiscal Instruments to Internalize the Environmental Costs of Solid Waste*. International Monetary Fund.

Mazar, N., & Zhong, C. B. (2010). Do green products make us better people? *Psychological science*, 21(4), 494-498. doi: 10.1177/0956797610363538

Meijers, M. H., Noordewier, M. K., Verlegh, P. W., Willems, W., & Smit, E. G. (2019). Paradoxical side effects of green advertising: how purchasing green products may instigate licensing effects for consumers with a weak environmental identity. *International Journal of Advertising*, 38(8), 1202-1223. doi: 10.1080/02650487.2019.1607450

Miller, A. L. (2011). Investigating Social Desirability Bias in Student Self-Report Surveys. *Association for Institutional Research (NJ1)*

Mintz, K. K., Henn, L., Park, J., & Kurman, J. (2019). What predicts household waste management behaviors? Culture and type of behavior as moderators. *Resources, Conservation and Recycling*, 145, 11-18. doi: 10.1016/j.resconrec.2019.01.045

Mullen, E., & Monin, B. (2016). Consistency versus licensing effects of past moral behavior. *Annual review of psychology*, 67, 363-385. doi: 10.1146/annurev-psych-010213-115120

Mwanza, B. G., & Mbohwa, C. (2017). Drivers to sustainable plastic solid waste recycling: a review. *Procedia Manufacturing*, 8, 649-656. doi: 10.1016/j.promfg.2017.02.083

Nash, N., Whitmarsh, L., Capstick, S., Hargreaves, T., Poortinga, W., Thomas, G., ... & Xenias, D. (2017). Climate-relevant behavioral spillover and the potential contribution of social practice theory. *Wiley Interdisciplinary Reviews: Climate Chang*e, 8(6), e481. doi: 10.1002/wcc.481

Okun, M. A., Benin, M., & Brandt-Williams, A. (1996). Staying in college: Moderators of the relation between intention and institutional departure. *The Journal of Higher Education*, 67(5), 577-596. doi: 10.1080/00221546.1996.11780277

Saez, E. (2009). Details matter: The impact of presentation and information on the take-up of financial incentives for retirement saving. *American Economic Journal: Economic Policy*, 1(1), 204-28. doi: 10.1257/pol.1.1.204

Schneider, C. R., Zaval, L., Weber, E. U., & Markowitz, E. M. (2017). The influence of anticipated pride and guilt on pro-environmental decision making. *PloS one*, 12(11), e0188781. doi: 10.1371/journal.pone.0188781

Shaw, P. J., & Maynard, S. J. (2008). The potential of financial incentives to enhance householders' kerbside recycling behaviour. *Waste Management*, 28(10), 1732-1741. doi: 10.1016/j.wasman.2007.08.008

Stern, P. C. (1999). Information, incentives, and proenvironmental consumer behavior. *Journal of consumer policy*, 22(4), 461-478. doi: 10.1023/A:1006211709570

Sun, M., & Trudel, R. (2017). The effect of recycling versus trashing on consumption: Theory and experimental evidence. *Journal of Marketing Research*, 54(2), 293-305. doi: 10.1509/jmr.15.0574

Sutherland, K., Christianson, J. B., & Leatherman, S. (2008). Impact of targeted financial incentives on personal health behavior. *Medical Care Research and Review*, 65(6_suppl), 36S-78S. doi: 10.1177/1077558708324235

Taufik, D., Bolderdijk, J. W., & Steg, L. (2016). Going green? The relative importance of feelings over calculation in driving environmental intent in the Netherlands and the United States. *Energy Research & Social Science*, 22, 52-62. doi: 10.1016/j.erss.2016.08.012

The World Bank (2018). *Global Waste to Grow by 70 Percent by 2050 Unless Urgent Action is Taken: World Bank Report* [Press Release].

https://www.worldbank.org/en/news/press-release/2018/09/20/global-waste-to-grow-by-70-percent-by-2050-unless-urgent-action-is-taken-world-bank-report

Thøgersen, J. (2003). Monetary incentives and recycling: Behavioural and psychological reactions to a performance-dependent garbage fee. *Journal of Consumer Policy*, 26(2), 197-228. doi: 10.1023/A:1023633320485

Travers, H., Clements, T., Keane, A., & Milner-Gulland, E. J. (2011). Incentives for cooperation: The effects of institutional controls on common pool resource extraction in Cambodia. *Ecological Economics*, 71, 151-161. doi: 10.1016/j.ecolecon.2011.08.020

Truelove, H. B., Carrico, A. R., Weber, E. U., Raimi, K. T., & Vandenbergh, M. P. (2014). Positive and negative spillover of pro-environmental behavior: An integrative review and theoretical framework. *Global Environmental Change*, 29, 127-138. doi: 10.1016/j.gloenvcha.2014.09.004

Varotto, A., & Spagnolli, A. (2017). Psychological strategies to promote household recycling. A systematic review with meta-analysis of validated field interventions. *Journal of Environmental Psychology*, 51, 168-188. doi: 10.1016/j.jenvp.2017.03.011

Viscusi, W. K., Huber, J., & Bell, J. (2011). Promoting recycling: private values, social norms, and economic incentives. *American Economic Review*, 101(3), 65-70. doi: 10.1257/aer.101.3.65

Appendix A

Welcome and thank you for participating in this research on recycling behavior. I am conducting this survey as part of my Master Thesis. This survey consists of 2 short unrelated studies, in which you'll be asked to imagine a couple of situations and how you would behave in them. It will take about 5 minutes in total to complete.

Please answer as honestly as possible. All answers are anonymous and they will be kept strictly confidential. The data collected will be used for research purposes only. There are no known adverse effects from participating, however if you wish to, you might drop your participation at any moment. If you have any questions about the studies in this survey, please send an email to s-dmarangoz@ucp.pt. This study is supervised by Ian Scott, PhD. By continuing you agree to participate. Thank you!

In the first study, you will be asked some questions on your current recycling and consumption behavior and on how you would expect to behave in certain hypothetical situations.

Please complete this study in one go, without distractions (please do not leave the study tab). It is very important to follow these instructions as not doing so undermines the quality of the results and impacts the whole study. Thank you so much for your collaboration!

Q1. Do you have a recycling option available nearby where you live?

- Yes (1)
- No (2)

Q2. Do you typically recycle? (Display This Question: If Q1 = 2)

- Yes (1)
- No (2)

Skip To: End of Survey If Q2 = 2

Q3. What is the location of the recycling point where you typically deposit your waste? (Choose only one option for each waste type - plastic, paper and glass)

(Display This Question: If Q1 = 1 Or Q2 = 1)

	Inside my building (1)	Nearby in the street (2)	Nearby in a different street (3)	Relatively far away in the neighborhood (4)	Far away, outside of the neighborhood (5)
Plastic (1)	○	○	○	○	○
Paper (2)	○	○	○	○	○
Glass (3)	○	○	○	○	○

Q4. Please rate your agreement with the following statements.

I usually separate and dispose of all recyclable materials (plastic, paper, glass)

- Strongly agree (1)
- Somewhat agree (2)
- Neither agree nor disagree (3)
- Somewhat disagree (4)
- Strongly disagree (5)

I tend to buy products which can be recycled

- Strongly agree (1)
- Somewhat agree (2)
- Neither agree nor disagree (3)
- Somewhat disagree (4)
- Strongly disagree (5)

Q5. Which one of these goods you consume the most?

- canned soft drink (1)
- bottled juice (2)
- flavored milk box (3)

Q6. Imagine that it is no longer possible to watch any form of television or movies (including streaming services like Netflix). In this case;

	Number of books (per month)
How many books do you believe you would read per month in total?	
How many books do you think your peers would read on average per month?	

Q7. You have chosen ${Q5/ChoiceGroup/SelectedChoices} as your preferred drink. Imagine that this drink cannot be recycled, and the price of the ${Q5/ChoiceGroup/SelectedChoices} = €1.50. In this situation;

	Number of ${Q5/ChoiceGroup/SelectedChoices}(s) (per month)
How many ${Q5/ChoiceGroup/SelectedChoices}(s) on average would you consume in a typical month?	
How many ${Q5/ChoiceGroup/SelectedChoices}(s) do you think that your peers would consume on average in a typical month?	

Q8. Imagine that the company of your favourite ${Q5/ChoiceGroup/SelectedChoices} announces that a 0.25€ of discount would be provided for the next purchase of the ${Q5/ChoiceGroup/SelectedChoices} if the consumed container is returned to the store. In this situation, the ${Q5/ChoiceGroup/SelectedChoices} cannot be recycled, and the price of the ${Q5/ChoiceGroup/SelectedChoices} = €1.50.

	Number of ${Q5/ChoiceGroup/SelectedChoices}(s) (per month)
How many ${Q5/ChoiceGroup/SelectedChoices}(s) would you consume on average in a typical month in this condition?	
How many ${Q5/ChoiceGroup/SelectedChoices}(s) do you think that your peers would consume on average in a typical month in this condition?	

Q9. Imagine that it is announced that you can no longer live in your current neighborhood and that you have 3 months to move out to another. What would be the preferred location of your new neighborhood in terms of the distance from the old one?

- In the same district (very close) (1)
- In another district which is close (relatively close) (2)
- In another district which is far (relatively far) (3)
- In another municipality (very far) (4)

Q10. Imagine that it is announced that your peers could no longer live in their current neighborhood and that they have 3 months to move out to another. Which location do you think your peers would prefer for the new neighborhood in terms of the distance from their old one?

- In the same district (very close) (1)
- In another district which is close (relatively close) (2)
- In another district which is far (relatively far) (3)

- In another municipality (very far) (4)

Thank you for participation in this study. Now you will proceed to the second study.

This study aims to collect data on individual acts performed in different recycling contexts. You will be asked some questions about your preferences and beliefs, as well as some demographic questions. This study takes no more than 3 minutes.

Please complete this study in one go, without distractions (please do not leave the study tab). It is very important to follow these instructions as not doing so undermines the quality of the results and impacts the whole study. Thank you so much for your collaboration!

GROUP 1

Q11. Imagine that it is announced that a new machine is capable of sorting the ${Q5/ChoiceGroup/SelectedChoices}(s) out from the recycling bin, and it is guaranteed that any ${Q5/ChoiceGroup/SelectedChoices} deposited in the recycling bin will be completely recycled. Also assume that the bin is located inside the store where the beverage is purchased, and the price of the ${Q5/ChoiceGroup/SelectedChoices} = €1.50.

In this situation;

1) How many ${Q5/ChoiceGroup/SelectedChoices}(s) would you consume on average in a typical month?
How many ${Q5/ChoiceGroup/SelectedChoices}(s) would you recycle from your average monthly consumption?

2) How many ${Q5/ChoiceGroup/SelectedChoices}(s) do you think that your peers would consume on average in a typical month?
How many ${Q5/ChoiceGroup/SelectedChoices}(s) do you think your peers would recycle from their average monthly consumption?

Please state your answers in the matrix below (Number of recycled ${Q5/ChoiceGroup/SelectedChoices}(s) should be less than or equal to the consumed amount)

	You	Your peers
Number of consumed ${Q5/ChoiceGroup/SelectedChoices}(s) (per month)		
Number of recycled ${Q5/ChoiceGroup/SelectedChoices}(s) (per month)		

Q12. How does the fact that now your favourite ${Q5/ChoiceGroup/SelectedChoices}'s waste will be completely recycled make you feel? (Please describe your feelings in one word)

_____

Q13. Please rate your agreement with the following statements.

Recycling makes me feel good when I use the in-store machine that can completely recycle my waste.

- Strongly agree (1)
- Somewhat agree (2)
- Neither agree nor disagree (3)
- Somewhat disagree (4)
- Strongly disagree (5)

Recycling makes me feel less guilty about the environment when I use the in-store machine that can completely recycle my waste.

- Strongly agree (1)
- Somewhat agree (2)
- Neither agree nor disagree (3)
- Somewhat disagree (4)
- Strongly disagree (5)

Q14. Now imagine that the introduction of this new recycling machine has increased the recycling rates in your neighborhood. The local government decides, after a 6-months display of consistently high recycling efforts, to reward each citizen €100 for their role in this improvement.

Imagine also that you have showed consistent recycling efforts and therefore matched the qualifications to claim the €100 after 6 months. You can choose to donate a proportion of this reward to an environmental NGO like Greenpeace or WWF. Please state the amount that you are willing to donate (you can enter an amount between €0 and €100). _____

GROUP 2

Q11. Imagine that it is announced that a new machine is capable of sorting the ${Q5/ChoiceGroup/SelectedChoices}(s) out from the recycling bin, and it is guaranteed that any ${Q5/ChoiceGroup/SelectedChoices} deposited in the recycling bin will be completely recycled. In addition, the machine refunds €0.25 as a recycling reward if the consumed ${Q5/ChoiceGroup/SelectedChoices} is deposited inside the bin. Also assume that the bin is located inside the store where the beverage is purchased, and the price of the ${Q5/ChoiceGroup/SelectedChoices} = €1.50.

In this situation;

1) How many ${Q5/ChoiceGroup/SelectedChoices}(s) would you consume on average in a typical month?

How many ${Q5/ChoiceGroup/SelectedChoices}(s) would you recycle from your average monthly consumption?

2) How many ${Q5/ChoiceGroup/SelectedChoices}(s) do you think that your peers would consume on average in a typical month?
How many ${Q5/ChoiceGroup/SelectedChoices}(s) do you think your peers would recycle from their average monthly consumption?

Please state your answers in the matrix below (Number of recycled ${Q5/ChoiceGroup/SelectedChoices}(s) should be less than or equal to the consumed amount).

	You	Your peers
Number of consumed ${Q5/ChoiceGroup/SelectedChoices}(s) (per month)		
Number of recycled ${Q5/ChoiceGroup/SelectedChoices}(s) (per month)		

Q12. How does the fact that now your favorite ${Q5/ChoiceGroup/SelectedChoices}'s waste will be completely recycled make you feel? (Please describe your feelings in one word)

_____

Q13. Please rate your agreement with the following statements.
Recycling makes me feel good when I use the in-store machine that can completely recycle my waste and rewards me with €0.25 every time after I deposit the waste of my favorite ${Q5/ChoiceGroup/SelectedChoices} inside the recycling bin.

- Strongly agree (1)
- Somewhat agree (2)
- Neither agree nor disagree (3)
- Somewhat disagree (4)
- Strongly disagree (5)

Recycling makes me feel less guilty about the environment when I use the in-store machine that can completely recycle my waste and rewards me with €0.25 every time after I deposit the waste of my favourite ${Q5/ChoiceGroup/SelectedChoices} inside the recycling bin.

- Strongly agree (1)
- Somewhat agree (2)
- Neither agree nor disagree (3)
- Somewhat disagree (4)
- Strongly disagree (5)

Q14. Now imagine that the introduction of this new recycling machine has increased the recycling rates in your neighbourhood. The local government decides, after a 6-months display of consistently high recycling efforts, to reward each citizen €100 for their role in this improvement. Imagine also that you have showed consistent recycling efforts and therefore matched the qualifications to claim the €100 after 6 months. You can choose to donate a proportion of this reward to an environmental NGO like Greenpeace or WWF. Please state the amount that you are willing to donate (you can enter an amount between €0 and €100).

_____

Q15. Please rate your agreement with the following statements.
I think of myself as someone who is very concerned with environmental issues

- Strongly agree (1)
- Somewhat agree (2)
- Neither agree nor disagree (3)
- Somewhat disagree (4)
- Strongly disagree (5)

I think everyone should contribute to environmental protection

- Strongly agree (1)
- Somewhat agree (2)
- Neither agree nor disagree (3)
- Somewhat disagree (4)
- Strongly disagree (5)

I am willing to sign a petition to support an environmental cause

- Strongly agree (1)
- Somewhat agree (2)
- Neither agree nor disagree (3)
- Somewhat disagree (4)
- Strongly disagree (5)

I am not willing to pay more taxes such that the government can do more against environmental pollution

- Strongly agree (1)
- Somewhat agree (2)
- Neither agree nor disagree (3)
- Somewhat disagree (4)
- Strongly disagree (5)

I am not willing to boycott a brand that is known to pollute the environment during production

- Strongly agree (1)
- Somewhat agree (2)
- Neither agree nor disagree (3)
- Somewhat disagree (4)
- Strongly disagree (5)

Congratulations, you are almost done! In this last part, I want to collect some demographic data for statistical purposes

Q16. What is your age?

_____

Q17. What is your gender?

- Male (1)
- Female (2)
- Non-binary / third gender (3)
- Prefer not to say (4)

Q18. What is your level of education?

- None (1)
- High school (2)
- Trade/tech school (3)
- Undergraduate degree (4)
- Post-graduate degree (5)
- PhD or more (6)

Q19. What is the monthly income level after taxes in your household?

- Minimum wage (or < €700) (1)
- €701-€1200 (2)
- €1201-€2000 (3)
- >€2000 (4)

Q20. How many people are living in your household?

- Only me (1)
- 2 people including me (2)
- 3 people including me (3)
- 4 people including me (4)
- More than 4 people including me (5)

Q21. What is your professional situation?

- Self-employed (1)
- Employee (2)
- Unemployed (3)
- Retired (4)
- Student (5)

Thank you for your participation in this survey.