CASH IS KING IN PLASTIC RECYCLING

AN EXPERIMENTAL STUDY ON HOW MONETARY INCENTIVES IMPACT INDIVIDUAL MOTIVATION FOR PLASTIC RECYCLING

LUCAS OTTERLING

KRISTOFFER ÖSTLIN

Abstract

This study aims to research, through an experimental study, how monetary incentives impact individual motivation for household plastic recycling. Sweden has one of the world's highest rates of plastic waste recycling. However, a large discrepancy exists between the recycling rates of PET bottles and non-PET bottle plastics, being 83 % respectively 42 % in 2018. The main difference between the two is that the recycling of the former is monetarily incentivised whilst the latter is not. The experiment, which was conducted through an online questionnaire with 352 respondents in Sweden, tested how different amounts of the monetary incentive impact people's motivation to recycle. Individual recycling behaviour is examined through the framework of the MARS Model, where we emphasise the motivational impact of monetary incentives through the Self-Determination Theory, Herzberg's Two-Factor Theory and McGregor's Theory X and Theory Y. Our findings prove that monetary incentives have a positive impact on individual recycling behaviour. Additionally, we found that this impact differs due to different behavioural factors, such as existing recycling behaviours. However, a similar effect could not be found due to ability and situational factors. Nonetheless, we also found that people who are extrinsically-motivated will over time internalise the act of recycling, which diminishes the need and impact of the monetary incentive. Hence, this study contributes with an indication of the most suitable waste management style for leaders, policy-makers and recycling systems, based upon people's different sources of individual motivation for recycling.

Keywords
Individual Motivation, Monetary Incentives, Recycling, Pantning, Plastic Waste, Waste Management

Authors
Lucas Otterling (24169) and Kristoffer Östlin (24040)

Supervisor
Marijane Luistro Jonsson, Affiliated Researcher, *Department of Entrepreneurship, Innovation and Technology*

Examiner
Laurence Romani, Associate Professor, *Department of Management and Organization*

Thank you.

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Lucas Otterling   Kristoffer Östlin

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Table 1: Dictionary

Word	*Definition*
Panta / Pantning	The act of receiving a monetary compensation (a deposit fee added by the seller) for returning plastic waste for recycling (Sweden.se, 2020).
Pant system	The technological and operational systems for collecting recyclable plastics, commonly driven by monetary incentives towards individuals (Sweden.se, 2020).
Pant (value)	The size of the monetary compensation received from pantning (Pantamera, 2020).
PET bottles	Plastic bottles constructed from high-density plastic (polyethylene terephthalate). Typically used to store consumer beverages such as water, juice and soft drinks. (PETRA, 2015)
Non-PET bottle plastics	All household plastic waste other than PET bottles. These are commonly not included in pant systems to the same extent as PET bottles (Sweden.se, 2020).

1. Introduction

Honestly, do you recycle? More specifically, do you recycle even without monetary compensation?

Humanity's usage of *plastics*, the "artificial substance that can be shaped into many forms and has many uses" (Cambridge Dictionary, 2020), has enabled the evolution of everything from cheap consumer goods to advanced medical equipment. The almost-magical material is cheaply produced and has enabled our modern "wear and tear" lifestyle. However, there is a catch; plastics require hundreds of years to degrade, thus continuously polluting our environment (O'Brine & Thompson, 2010). This indisputably means that we must use it wisely and not wastefully. Instead, only during the last half century, our global production of plastics has more than tenfold, from 35 million to over 380 million tonnes per year (Ritchie & Roser, 2020). Hence, we currently have a massive plastic management waste problem, illustrated by the alarming prediction that there will be more plastic than fish in our oceans by year 2050 (Impact Hub, 2019). The best solution is to recycle, rather than to produce, more plastics. However, only one fifth of the global production is currently being recycled (Ritchie & Roser, 2020), indicating that leaders, policy-makers and recycling systems have yet to find sustainable ways of incentivising recycling on a larger scale.

Incentives, either monetary or non-monetary, are used to encourage people to undertake particular actions (Bucciol, Montinari & Piovesan, 2011). These are used in many contexts to promote desired behaviours. Yet, modern recycling behaviour is mostly built upon voluntarism; in other words, without any direct incentives towards the individual. This lack of incentive systems may be a key explanatory aspect to our imperfect recycling systems and consequent plastic management waste problem.

Sweden is amongst the world-leading countries in regard to both the lowest plastic production per capita and most adequate waste disposals (Ritchie & Roser, 2020). During the 1990s, Sweden established a nationwide plastic PET bottle recycling system, a so-called *pant system*, which fundamentally builds upon *monetary incentives*. The pant system has enabled the recycling rate of PET bottles to exceed 83 % (Pantamera, 2018). Yet, there is a large leap down to recycling rates of non-PET bottle plastics. Other wastes such as glass, cardboard, metal and paper are recycled above or at a similar rate as PET bottles; however, other non-PET bottle plastics are significantly less recycled with the *collection for recycling* rate (meaning that the actual recycling rate can be even lower) as low as 42 % (FTI, 2018).

In a country like Sweden, with a culture of recycling, the goal of this study is to investigate how monetary incentives impact individual household plastic recycling, and consequently how these can be used to promote recycling behaviour. In argument for this, solutions to global challenges are said to begin with local actions (Collier & Löfstedt, 1997), hence there is a need for policy-makers in all parts of the system to better incentivise recycling. With a management perspective, emphasising impactful motivation factors and leadership styles, this study aims to understand why

Swedes do not recycle their plastic waste in the absence of monetary incentives. In short, what incentive motivates people to recycle plastics the most? Could the answer be as simple as *cash is king*?

1.1 Research Gap & Field Contribution

The interest for the recycling topic is broad, as discussed in this study's literature review (see section 2.1). In short, the vast interest may be explained by the alarming troubles of plastic overconsumption and the consequent increased investments into the sustainability field. The worldwide pressure on policy-makers to take pro-environmental action and encourage sustainable behaviours, such as recycling, continues to soar. Managerial motivation theories have long been implemented to increase individual performance in the business context, however not as extensively in the sustainability context. Thus, we aim to contribute with a new management perspective when implementing well-established motivation theories on individual recycling behaviour.

Prior studies have indicated that motivation for recycling differs between people and evolves over time. It has also been shown that monetary incentives, which act as key motivators in many recycling systems, have an impact on people's recycling behaviour. However, the incentive has mainly been researched in contexts where it is of a cost-type rather than of an income-type for the individual. In other words, where people only can lower their living costs rather than receiving money through recycling. We have identified a research gap concerning experimental studies assessing the impact of monetary incentives as a potential income source in recycling systems (coined as *pant* in Swedish). Hence, we choose to conduct an experiment attempting to isolate the external monetary income-type incentive. This in our pursuit to examine how to effectively motivate individuals to recycle, thus providing a bigger understanding for what leadership and management approaches are the most suitable to reach higher recycling rates.

1.2 Purpose & Research Question

It is widely considered that it is the management of plastic waste that determines the global risk of plastic pollution (Ritchie & Roser, 2020). This study centers around the identified research gap concerning the impact of monetary incentives on people's motivation for household plastic recycling and consequently how leaders, policy-makers and recycling systems can utilise these incentives in a pro-environmentally manner.

In argument for this, the aforementioned statistics are clear. A better understanding about Sweden's discrepancy between the highly recycled PET bottles and less recycled non-PET bottle plastics could help the country's policy-makers, in addition to the international management of recycling, in their aim towards higher recycling goals. The study investigates the potential explanation existing in the monetary incentive. Thus, the following research question:

> *How do monetary incentives impact individual motivation for household plastic recycling?*

1.3 Delimitations

The study is conducted on the Swedish user-base of PantaPå, a deposit app for recycling of non-PET bottle plastics (see section 3.2.1). Hence, limiting the study to respondents that are arguably more knowledgeable about how to panta non-PET bottle plastics compared to the general Swedish population. This since the population only associates the concept of *pantning* with PET bottles (Sweden.se, 2020). Hence there is no need to introduce new dimensions to the concept of pantning, in other words the possibility to *panta* non-PET bottle plastics, to the study's respondents. However, a possible selection bias emerges as the data might not be fully representative to all aspects of the population. Nonetheless, the approach enables a closer analysis of the impact of monetary incentives since we can isolate the independent monetary variable to a greater extent when not needing to differentiate pantning of PET bottles and other plastics; the respondents are already used to panta both waste types.

The study does not aim to employ *contingent valuation*, in other words economically determine the optimal amount of the monetary incentive, which would optimise the plastic recycling rates (FAO, n.d.). The answer to the research question is rather based upon indications of how monetary incentives impact plastic recycling behaviour and the relevant factors impacting the individual motivation behind recycling. This delimitation is due to the study's scope and the limitations of our management research.

The geographic limitation to Sweden can arguably hinder international findings, however a larger study outside the country is not possible due to the study's limited scope. The focus on the household sector's role in improving the recycling rates has been recommended by prior research (Ählström, 2004). We believe these delimitations building upon the sole focus on plastics, the resource with the lowest recycling rates at the time, can contribute to the identified research gap.

2. Theoretical Framework

2.1 Literature Review

Recycling is, in general, a widely researched field. Natural science research emphasises the technical aspects (O'Brine & Thompson, 2010; Arena, Mastellone & Perugini, 2003). Social science studies have mainly been within the economics field, especially behavioural and policy economics, finding that different societal policies impact people's motivation to recycle (Nyborg & Rege, 2003; Bénabou & Tirole, 2006; Bruvoll & Nyborg, 2004; Axelsson & Karlsson, 2010). Mapping of the plastic industry has concluded positive outlooks in regard to innovative opportunities as demand for recyclable plastics continuously surges (Ählström, 2004; Faisal, Gopakumar & Muneer, 2018).

The monetary incentives' impact on recycling behaviour and waste management has been confirmed, but mainly in contexts where the incentive is of a cost-type rather than of an income-type for the individual (which it is in *pant* systems). For example, a study titled "Do Not Trash The Incentive!" found that a "pay-as-you-throw" system, meaning per-weight pricing for garbage collection rather than a fixed fee, led to a 12.2 % increase in recycling rates (Bucciol et al., 2011). Furthermore, it has been shown that people who only pay a fixed fee typically recycle less compared to those whose fee depends on their actual garbage weight (Thøgersen, 2003).

From the motivation field's perspective, studies have identified different factors which impact people's recycling behaviour (Bicchieri & Xiao, 2009; Bénabou & Tirole, 2006; Ellefsson, 2018). These can broadly be categorised into two influences; *behavioural* followed by *ability* and *situational* factors. The former includes habitual factors such as existing pro-environmental behaviours. The latter includes the ability to recycle based upon the individual's situational context. In this study, we use these factors to break down the research question into manageable hypotheses, which individually illustrate different determinators of recycling behaviour. In other words, the motivational factors found by prior research are the fundamentals of our experiment.

Studies of experimental nature have focused on charitable incentives linked to individual recycling (Knutsson, Martinsson & Wollbrant, 2013; Ongondo & Williams, 2011; Norris, 2012). Our primary learning from these experiments is that people can be influenced towards specific recycling behaviours, for instance through *nudging* (Mont, Lehner & Heiskanen, 2014). To illustrate, one study successfully nudged participants, through sticking a smiley face to the donation button, towards donating rather than withdrawing money received from pantning of PET bottles (Avenius & Ljung, 2019). Hence, proving that recycling behaviour may be influenced by external factors. Our study's aim of experimentally manipulating the external monetary incentive, connected to individual plastic recycling, is fundamentally based upon this insight.

Furthermore, the study originates from the current debate advocating for larger management changes to the sustainability status quo (Aragon-Correa, 2013; NASPA, 2017). It has been argued

that sustainability, including recycling at its core, is a neglected societal focus (Pearce & Russill, 2003). The issue is further shown by non-academic social movements, such as climate activist Greta Thunberg's "Fridays for Future" (Kühne, 2019). Research has shown that leaders, policy-makers and recycling systems must take action to actualise sustainable change (Åberg, Renström, Shanahan & Säljö, 1996). In an attempt to contribute to this increased focus, we deem it valuable to investigate the monetary incentives' ability to motivate recycling behaviour and thus enable better waste management, and ultimately policy-makers to lead for pro-recycling change.

2.2 Usage of Theory

Because of our deductive approach, we start with identifying relevant motivation variables. These are embodied by the *MARS Model*, which attempts to broadly explain individual recycling behaviour by using the variables of *Motivation*, *Ability*, *Role Perception* and *Situational Factors* (see Appendix 8.1). based upon these encapsulating variables, we deem three motivation theories relevant to analyse the impact of monetary incentives and to break down our research question into testable hypotheses: *Self-Determination Theory (SDT), Herzberg's Two-Factor Theory* and *McGregor's Theory X & Theory Y.*

Firstly, SDT distinguishes between an individual's *extrinsic* and *intrinsic* motivation, illustrating a continuum of how external factors such as monetary incentives, affect the internalisation of a task. Internalisation means that an individual "accepts or absorbs the underlying values behind the task" (Cambridge Dictionary, 2020). Secondly, Herzberg's Two-Factor Theory describes how the presence or lack of external factors, so-called *hygiene factors* and *motivators*, affect a person's engagement and satisfaction. Thirdly, McGregor's Theory X and Theory Y recognise a higher leadership perspective with the impacts of using either rewards or punishments; in other words, either *authoritative* or *participative* leadership styles.

We believe that these three theories together can sufficiently provide enough concepts to formulate testable hypotheses and thus answer the research question. This is illustrated by our initial framework in Figure 1. In short, SDT provides a view on the sources of individual motivation; Herzberg illustrates the impact of external situational factors; and McGregor shows which management and leadership styles are the most suitable to motivate individual recycling based upon the former two theories' analysis.

Figure 1: Our Initial Framework
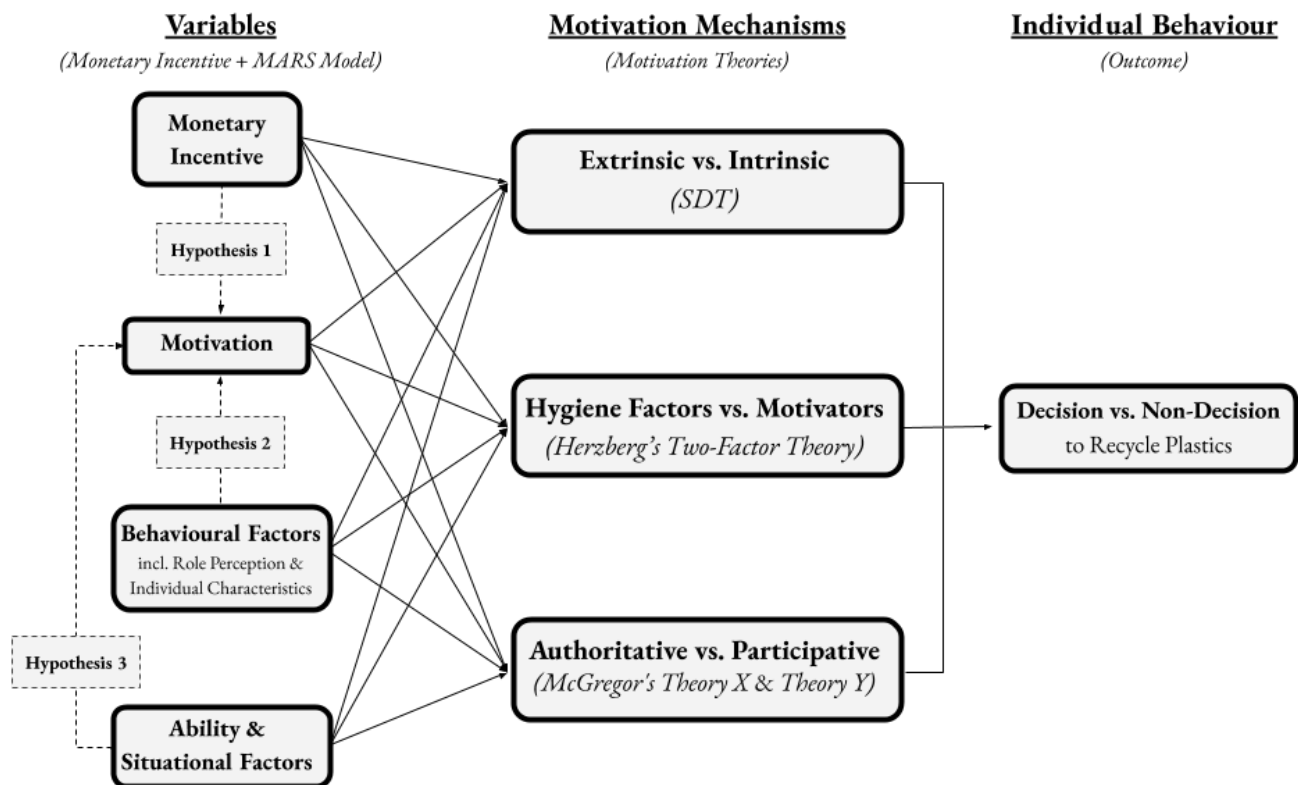
2.3 Variables Determining Individual Behaviour: The MARS Model

Initially, the *individual characteristics* set the fundamentals for an individual's behaviour according to the MARS model. The individual's *motivation* for the specific topic, in this study the motivation for recycling plastics, follows. Subsequently one's *ability*, based upon for example one's knowledge about recycling, determines one's possible lines of action. Personal *perceptions* of one's social *role* (such as to what extent one considers oneself as an environmentalist) together with *situational factors* (such as access to recycling stations), finally determine the individual's actual behaviour on whether they recycle their household plastics or not. (McShane & Von Glinow, 2010)

2.3.1 Individual Characteristics

The influential behavioural factors found by prior research partially consist of individual characteristics, which can be categorised as *values, personality, perceptions, emotions and attitudes* and *stress*. Values are relatively stable beliefs which motivate individual behaviour (Sagiv, Roccas, Cieciuch & Schwartz, 2017). For example, a person can deem recycling more or less important for environmental causes, which determine their recycling behaviour. Further, personality is the type of person one is, which is shown by their way of behaving, feeling and thinking (Cambridge Dictionary, 2020). Perception is a person's views of the world, defined as the "process of receiving and making sense of information", which research also has shown is impacted by a person's emotions and attitudes (McShane & Von Glinow, 2010). In addition, stress, interpreted as "worry caused by a difficult situation" (Cambridge Dictionary, 2020), was shown by early researchers Postman and Bruner (1948) to also have a negative effect on individual behaviour.

2.3.2 Motivation

Derived from the latin word *motiv*, motivation is "the level of enthusiasm for doing something" (Cambridge Dictionary, 2020). Maslow's Hierarchy of Needs (1943) were amongst the earliest frameworks, further nuanced by Herzberg's Two-Factor Theory (1964). McGregor's Theory X and Y (1960) later followed with a larger focus on motivational drivers and optimal settings for individual performance. Later the Reinforcement Theory, developed by Skinner (1965) building upon Pavlov's conditioning experiments (Luthans & Stajkovic, 1999), suggested that motivation could be either strengthened (through rewards) or weakened (through punishments). The separation between extrinsic (external) and intrinsic (internal) motivation was shown by early studies (Hebb, 1955; White, 1959; DeCharms, 2013) and further developed by Deci & Ryan in their SDT (2000).

2.3.2.1 Self-Determination Theory (SDT)

An individual's full capacity to take action is primarily driven by *intrinsic motivation* (Deci & Ryan, 2000a). However, intrinsic motivation is interfered by external conditions. For instance, monetary rewards have an undermining effect on intrinsic motivation, whilst other external rewards could have no or even an enhancing effect (Blomberg, 2017). To which extent extrinsic factors, such as monetary incentives, can be internalised into intrinsic motivation has been difficult for researchers to reach a consensus on. Nonetheless, it has been agreed upon that intrinsic and *extrinsic motivation* are two dimensions of motivational driving forces that are always present (ibid).

SDT derives a continuum of different degrees of external regulation on individual motivation. It is argued that pure intrinsic motivation and pure extrinsic motivation (amotivation) are never present in reality. Instead, factors as monetary incentives highlight the fact that people are extrinsically motivated. Hence, implementing monetary incentives on recycling behaviour can be interpreted as inducing extrinsically motivated behaviours. A monetary incentive can have varied extrinsic effects which the SDT covers in its *extrinsic motivation continuum*, with an increasing degree of perceived and experienced autonomy towards intrinsic motivation. (Deci & Ryan, 2000a)

The Extrinsic Motivation Continuum

The four levels of extrinsic motivation are: *external regulation, introjected regulation, identified regulation* and *integrated regulation* (see Appendix 8.2). External regulation is the most extrinsic and applies to tasks which are externally controlled by either punishments or rewards (Deci & Ryan, 2000b). The small degree of autonomy is that the individual can choose not to act and thereby miss a desired reward, such as collecting the monetary compensation from pantning. If the external regulation becomes partially internalised whilst the recycling behaviour remains as a non-part of the self, the source of motivation is introjected regulation. In this scenario, the monetary incentive is combined with the threat of feeling guilt or shame if the individual does not recycle (Deci & Ryan, 2000a). Furthermore, as a person starts to identify with the values of recycling, the motivation becomes more intrinsic and self-determined (ibid). With identified

regulation, the individual accepts the importance of recycling, but does not yet fully share its underlying values. Hence, a monetary incentive is still influential. Finally, in integrated regulation, the behaviour becomes fully internalised as it is self-regulated and self-determined (Deci & Ryan, 2000b). The recycling behaviour aligns with the person's perception of themself; however, it is still externally regulated as the action is yielded from receiving a desired outcome, for instance collecting the pant value (Deci & Ryan 2000a; Blomberg, 2017).

2.3.2.2 Herzberg's Two-Factor Theory

Built upon Maslow's Hierarchy of Needs (1943), Herzberg established his Two-factor Theory (see Appendix 8.3) on the fundament that people must satisfy their *hygiene factors* (fundamental needs) before their *motivators* (self-fulfillment needs) (Herzberg, 1964; Blomberg, 2017). Hygiene factors are extrinsic from the task itself and the absence of these leads to dissatisfaction. On the contrary, motivators are intrinsic in the task and the individual becomes engaged and satisfied in their presence. To illustrate, some people might only recycle when extrinsic hygiene factors, such as monetary incentives, are present whilst others might recycle to feel intrinsically rewarded, for example feeling proud. Thus, hygiene factors and motivators represent two different dimensions of motivation. If a monetary incentive is considered as a hygiene factor and is present, it would consequently prevent dissatisfaction; however, it would not imply satisfaction and engagement. These would only occur if the monetary incentive is a motivator, indicating that the recycling behaviour is somewhat intrinsically motivated (Herzberg 1964; Blomberg 2017).

2.3.2.3 McGregor's Theory X & Theory Y

Broadening the perspective of motivation from the individual, McGregor (1960) associates different sorts of assumptions about individual motivation with different styles of leadership (Blomberg, 2017). A supervising entity can either be *authoritative* or *participative*, the former being encapsulated by *Theory X* and the latter by *Theory Y* (McGregor, 1960; see Appendix 8.4).

Theory X emphasises external pressure, either by punishments or rewards, to motivate as people are assumed to act in their own self-interest (ibid). The theory suggests two different approaches: hard or soft (Blomberg, 2017). A hard approach is characterised by close supervision and motivation through threatening with punishments. The soft approach focuses on leniency and morale creation, with rewards such as monetary incentives, as the primary motivation factor (McGregor, 1960). A parable to the "carrot and whip" approach can describe the two approaches, as the most effective implementation in reality is a combination of both (ibid). To illustrate, leaders can either encourage recycling through rewarding pant values or discourage bad recycling behaviour through costly fines as punishments.

Theory Y assumes that people are internally motivated and has a more optimistic view of the individual. Hence, motivating recycling behaviour would require less direct rewards, enabling no or at least smaller monetary incentives, as the task itself instead gives a feeling of proudness, responsibility and further motivation (ibid). With a relatively large sense of autonomy in the recycling behaviour and the possibility of self-fulfillment, the self-interest to some extent

internalises the recycling act (Blomberg, 2017). Thus, it generates a stronger, more positive relation and trust to the system.

2.3.3 Ability

Highlighted by prior research, ability factors are defined as "the physical or mental powers needed to do something" (Cambridge Dictionary, 2020). They consist of both *natural aptitudes,* concerning natural abilities to learn new things, and *learned capabilities* relevant to the specific task (McShane & Von Glinow, 2010). For example, an individual's knowledge about recycling ultimately impacts their ability to recycle.

2.3.4 Role Perception

Part of both behavioural and ability factors, a person's role perception is the extent to which they understand their role and the expectations upon them (McShane & Von Glinow, 2010). Research has shown that individuals act heavily upon role perceptions (Saha, 2008). However, in reality many do not understand their roles fully, which decreases motivation and performance. To illustrate, in a large study only 39 % knew what to do to be successful in their roles (McShane & Von Glinow, 2010). To exemplify, this could, if true in the context of recycling, hinder people to develop their recycling behaviours.

2.3.5 Situational Factors

Situation-dependency are factors based upon the unique situation (Blomberg, 2017), which potentially can affect individual recycling behaviour. These include conditions beyond an individual's control and which can either facilitate or constrain behaviour, hence impacting individual behaviour (McShane & Von Glinow, 2010). For example, it is impossible for a person without access to a recycling station to recycle.

2.4 Hypotheses

Based upon the theories and influential factors identified by previous studies, we formulate three hypotheses in our pursuit of assessing how monetary incentives impact individual plastic recycling. The first (1) hypothesis examines if monetary incentives increase the motivation to, and thus the likeability to, recycle plastics. This is set in the SDT's discussion whether recycling is *extrinsically-* or *intrinsically*-motivated. In other words, motivated by either external (rewards) or internal (self-fulfilling) factors, which may indicate an optimal choice between McGregor's leadership styles. The second (2) and third (3) hypotheses investigate the *behavioural* respectively the *ability* and *situational* factors. These factors are highlighted by prior research and both are impactful in the MARS model's explanation of individual behaviour. Furthermore, the research of these is set in Herzberg's distinguishing between *hygiene factors* and *motivators*, likewise in McGregor's *Theory X* and *Theory Y.* In order to break down the factors into testable aspects, for example how the individual's existing pro-recycling behaviours and how their access to recycling stations impact, we

have designed measurable variables in the questionnaire (see section 3.2.3). Hence, the three hypotheses are:

Hypothesis 1: *Monetary incentives* increase individual motivation for plastic recycling.
Hypothesis 2: The impact of monetary incentives on individual motivation for plastic recycling differs due to *behavioural factors.*
Hypothesis 3: The impact of monetary incentives on individual motivation for plastic recycling differs due to *ability* and *situational factors.*

2.5 Theory Discussion

Despite the MARS model's broad perspective, it has been criticised for not being able to explain all variables determining individual motivation. In a 2018 study, the four variables only certainly amounted for 52 % of the proportional influence (Manik & Sidharta). Additional critique concerns the model's somewhat too general approach and lack of depth. However, we still deem the model valuable because of its ability to provide general motivation variables as prior research suggests that recycling behaviour is multilayered.

Furthermore, we recognise that several motivation theories, especially Herzberg's Two-Factor Theory and McGregor's Theory X and Theory Y, have been conducted in the context of a manager-employee relationship. This could be deemed misleading when interpreting the theories with respect to pure motivation and outside of that relational context. Regardless, we still reason that these theories can contribute with valuable and explanatory insights applicable to the motivational weight of monetary incentives, as well as the interpretation of the difference between extrinsic and intrinsic motivation. This as the theories nuance the perspective of individual motivation both intrapersonal and interpersonal. Additionally, SDT is limited to three fundamental psychological needs which omits other essential needs substantiating motivation. Hence, we acknowledge that it is important to be aware of the existence of other factors and needs related to motivation. However, these could not have been elaborated upon any further due to the study's limited scope.

Finally, the theories in this study are far from exhaustive in the field of individual motivation and leadership. The usage of other theories would have entailed other inputs of analysis and potentially other findings. In conclusion, we claim that the chosen theories cover essential motivational aspects and dimensions to explain how monetary incentives impact individual motivation in regard to plastic recycling.

3. Methodology

3.1 Choice of Method

3.1.1 Objectivist & Positivist Research

The study is based upon an objectivist ontology. The monetary aspect of recycling is interpreted as a social phenomena external to the individual and beyond its awareness of motivation, implying an objective reality. This means that the monetary incentives' external and objective impact on motivation can be measured through a questionnaire. A positivist epistemology is conducted where the three hypotheses, hypothesising that the size and context of monetary incentives impact an individual's recycling behaviour, are assessed and tested in the study. (Bell, Bryman & Harley, 2019)

3.1.2 An Experimental Study

The study is performed through a deductive approach, which is commonly associated with positivism. We initially decide on different theories which are used to generate three hypotheses about the motivational impacts of monetary incentives. Thus, the theory induces the empirics, motivating a deductive theory and hypotheses-testing study. Furthermore, with an objectivist, positivist and deductive approach in mind, the study is of quantitative nature. By performing an experiment using an online self-completion questionnaire, we aim to measure changes in individual motivation for plastic recycling due to manipulation of the monetary incentive. This enables us to quantify and delineate differences in the respondents' perception of the monetary compensation and motivation to recycle, which is not possible through a qualitative study. In addition, the same generalisability and number of observations would be difficult, if not impossible, to achieve in a qualitative study. (ibid)

3.1.3 The Experiment

The experiment consists of a control group and three treatment groups, with approximately equally weighted numbers of respondents in each group. All respondents are exposed to an image of a neutral and brandless plastic soap bottle with the Swedish standard symbol for the monetary compensation (the pant value) received for recycling (panta) the bottle. The control group receives 0 SEK (*0 kr*), which aligns with the amount ordinarily received from recycling non-PET bottle plastics. The treatment groups are exposed to either a low, medium or high monetary scenario; a low scenario being 0.5 SEK (*50 öre*); a medium scenario being two SEK (*2 kr*), comparable to the amount received when pantning a PET bottle; and a high scenario being five SEK (*5 kr*). As the respondents are asked to rate their tendency to recycle the bottle given the amount, the purpose of this staging procedure is to capture any potential differences yielded by the size of the monetary incentive.

To assess the dependent variable of the individual's tendency to recycle given changes in the independent variable of the monetary compensation (Hypothesis 1), we also collect data regarding the behavioural (Hypothesis 2) as well as the ability and situational factors (Hypothesis 3). This data collection is generic for all respondents, regardless of the type of initial experimental treatment, broken down into different variables including demographic, habitual and geographical data points (see section 3.2.3).

3.2 Questionnaire

3.2.1 PantaPå

Founded in 2015, the social startup's initial aim was to enable pantning of plastic bags. Currently, their Swedish award-winning app includes more waste types, such as shampoo bottles, bread bags and take-away mugs, through different retail-partnerships. PantaPå has a tens-of-thousands big user-base in Sweden and recently launched its service in the United States. The practical way of pantning is that the user goes to a recycling station, scans the barcode of the plastic waste they wish to recycle and in return receives the monetary compensation (pant value) directly in the app. (PantaPå, 2020)

3.2.2 Questionnaire Design

The questionnaire's design is based upon the three hypotheses and variable types of the experiment, which in turn are set in the theoretical framework (see Appendix 8.5). Before deciding on the questionnaire format, we concluded through research that it should be kept as short and respondent-friendly as possible to increase the response rate (Dillman, Sinclair & Clark, 1993). To achieve this, the questionnaire's anonymity and short completion time of two minutes are communicated directly in the introduction text.

In addition, the questions' phrasing has been carefully tailored to avoid any confusion likewise as all the questions are of the multiple choice type, creating a persistent way of answering for the respondent. The multiple choice design is chosen to both shorten the answering time and to simplify the data analysis, as the survey aims at collecting large amounts of data. Nonetheless, we are aware of the potential loss of additional information commonly collected via open questions. However, this approach is still favoured as the questionnaire is a four-version experiment focusing on one dependent variable in one question building upon *priming* theory, where the respondent must respond instantly.

Priming, first mentioned by Karl Lashley in 1951 (Bargh & Chartrand, 2000), is an experimental technique where one stimulus influences a response without conscious guidance or intention (Weingarten et al., 2016). In practice, it creates changes to the mental standards people use to make subconscious evaluations (Iyengar & Kinder, 1987). We use priming through manipulating the isolated independent variable. In other words, through showing different amounts of the monetary incentive to different respondents, consequently possibly resulting in different recycling

behaviours. Potential differences in the responses between different amounts are thus yielded from the manipulation of this isolated variable.

A *bipolar* scale (a continuum between two opposite end points) from one to six is used, forcing respondents to give nuanced responses by taking a stand in their opinions. Hence, answering either negatively (by choosing one to three) or positively (by choosing four to six). We choose this even-scale above an odd-scale (for example one to seven) to see more probable actual behaviour from the respondents. In addition, we consider the one to six scale to optimally balance the trade-off between having too many or too few answer alternatives (as in a one to eight scale or one to four scale, respectively). To end the questionnaire and make sure that the respondents have participated fully, two trap questions are included. These intend to capture respondents who have not paid enough attention to the questions, which can result in suboptimal or incorrect responses (Liu & Wronski, 2018). Our reasoning behind having two trap questions is to have one specific to the questionnaire and one based upon the general knowledge of the population. We believe this approach will be more successful rather than having one trap question.

3.2.3 Variables

The questions in the questionnaire are divided into three kinds of variables based upon the hypothesis-testing: experimental variables, behavioural variables and ability and situational variables.

3.2.3.1 Experimental Variables

The experiment is built on primarily two variables. First, the dependent variable is the *Likeability to Panta* which is consistent through all hypotheses, as it is the main focus of the study. The other experimental variable is the *Pant Value*, the independent variable which is subject to manipulation for the treatment groups in the experiment. A gradually increased amount in the monetary incentive is assumed to increase the likeability to recycle, which is stated in Hypothesis 1.

3.2.3.2 Behavioural Variables

The behavioural variables are constructed to capture characteristics indirectly connected to the monetary incentive aspect of recycling. Hypothesis 2, that the impact of monetary incentives differ due to behavioural factors, is operationalised through the effect of different behavioural variables.

To exemplify, personal values can affect the impact of monetary incentives differently. A person who values the monetary compensation higher can be assumed to be more likely to recycle if the monetary compensation increases. Meanwhile, if a person believes that the act of recycling is important in itself, the size of the pant value will not be as influential. Furthermore, already existing recycling behaviours might affect the impact of a monetary incentive. If a person already frequently recycles PET bottles or non-PET bottle plastics, it is believed that the monetary compensation will have less impact on their likeability to continuously recycle. Lastly, the individual perception of oneself, or by others, that one is an environmentally friendly person can influence the impact. This illustrates internalisation of the recycling behaviour, as it is believed that if these self-image values

are high, the monetary value will be less impactful. The formatting of these variables are carefully tailored to align with the theoretical framework, in order to examine nuances of the motivational factors correlated to the monetary incentive.

3.2.3.3 Ability & Situational Variables

The ability and situational variables are a mix of ordinal variables, such as people's age, and dichotomous variables, such as gender, (Bell et al., 2019) conducted to give explanatory value of the characteristics of the respondents. Hypothesis 3 states that the impact of monetary incentives differs due to ability and situational factors, and potential differences are believed to yield from *income*, *location*, *education*, *employment*, *access*, *age* and *gender* factors. When clustering different answering options, we aim to have supporting arguments for each cluster.

Hence, the division of income is based upon the general separation between *low-*, *average-* and *high*-income earners (Skatteverket, 2020). When choosing amongst current locations of residence, the respondents are able to choose between Sweden's ten largest municipalities (later clustered into *urban areas*) or a neutral "others" option representing more *rural areas* (SCB, 2019). Regarding educational levels, the three general levels of *elementary school, high school* and *university* are used to plot general differences. As one's occupation determines aspects such as free time and additional engagements, a question generally categorising the common groups (*student, unemployed, part-time employed, full-time employed* and *retired)* is included. Also a question concerning access, measured through distance, to recycling stations is included as it has been proven by prior research to impact individual recycling behaviour (González-Torre & Adenso-Díaz, 2005). Finally, people's age are clustered in a hypothetical approach, where people of different ages and stages in life are assumed to have different abilities and resources, in terms of for instance time and knowledge, to recycle. To illustrate, we hypothesise that people aged: *under 20 years old* are most likely to live in households where the recycling are determined by others (the parents); *between 20 and 40 years old* are most likely to live in smaller households (potentially with young children), thus determining their own recycling behaviours; *between 41 and 60 years old* are most likely to live in larger households with older children, thus influencing their own recycling behaviours; *over 60 years old* are most likely to once again live in smaller households affecting their recycling.

3.3 Data Collection

The questionnaire was distributed between March 24 and April 1 and generated a sample of 372 responses from different Swedish regional, age- and socioeconomic groups. However, 18 responses were excluded due to incompletion in addition to two responses that were excluded due to failing the trap questions. Hence, our aim of capturing more incomplete responses through having two trap questions (described in section 3.2.2) was successful, as the two managed to capture one false answer each. Consequently, this generated a total of 352 valid responses.

3.3.1 Data Analysis & Processes

Before performing the experiment, the questionnaire was given to a test group to verify its quality. Validation of the survey is of utmost importance as we only have one opportunity to execute the actual experiment, in other words to distribute the questionnaire. Another precaution is our attempt to reduce the risk of p-hacking, a problem highlighted by recent research (Benjamin et al., 2018). Thus, our statistical analysis was pre-programmed with the desired sorts of tests and analyses before looking at the data to avoid biases in the result and to enhance the replicability of the study.

To determine if monetary incentives impact an individual's likeability to recycle, *Pearson's Chi Square* test together with *Cramer's V* test are conducted to test the dependency and the strength between the variables. Additionally, a *Kruskal-Wallis* test is performed to test if different pant values affect the likeability to recycle. To further study the relationships between different behavioural as well as ability and situational variables, multiple *regression analyses* are performed. The regressions are performed using robust standard errors in order to reduce the risk of heteroskedasticity. The validation of the regressions are tested for multicollinearity through the *variance inflation factor* (VIF), where a value under 5 is considered as valid (Akinwande, Dikko & Samson, 2015). Overall, a significance level of 5 % is considered as statistically significant, as this is the standard within the field (Stigler, 2008). We process all data in the statistical software program Stata.

The three hypotheses are either *accepted* or *rejected* based upon the results from the tests and regressions. The acceptance or rejection of these are based upon the underlying variables' support or non-support in the experiment, with the requirement that a qualified majority of the variables should be significantly supported. In order to analyse the data and perform regressions, categorical variables are coded as presented in Table 2, where *Base* is the relative basis of comparison within the variables.

Table 2: Coding of Data

Variable Name	Coding
Access	No Access = 1 (Base) Connected to Household = 2 Walking Distance (0 - 500 m) = 3 Longer Distance (Over 500 m) = 4
Age	Under 20 Years Old = 1 (Base) 20 - 40 Years Old = 2 41 - 60 Years Old = 3 Over 60 Years Old = 4
Gender	Male = 0 (Base) Female = 1
Location	Other = 0 = Rural (Base) Stockholm, Göteborg, Malmö, Uppsala, Linköping, Örebro, Västerås, Helsingborg, Norrköping, Jönköping = 1 = Urban
Income	Low-Income Earner = 1 (Base) Average-Income Earner = 2 High-Income Earner = 3
Education	Elementary School = 1 (Base) High School = 2 University = 3
Occupation	Unemployed = 1 (Base) Full-Time Employment = 2 Part-Time Employment = 3 Student = 4 Retired = 5

3.4 Ethical Aspects & Critique of Methodology

As we examine a phenomenon concerning people, we early-on stressed the importance of considering ethical principles in our study. The questionnaire is distributed randomly and it is each respondent's own choice to participate, hence the survey is completely voluntary. Before being exposed to the experimental questions, the respondents are informed about the purpose of the study. This without revealing details which could have harmed the reliability and/or the validity of the research. If the respondents chose to proceed (intentionally pressing the "next" button) it is interpreted as an action of consent to participate in the study; moreover, the respondents are not obligated to finalise the survey once commenced.

Furthermore, the respondents are anonymous as we want them to maintain their privacy and thus be able to answer honestly. The choice of anonymity was presented to PantaPå as well. All data collection and data management have been according to the Swedish Data Protection Regulation

and GDPR guidelines for academic research (Regeringskansliets förvaltningsavdelning, 2017). Finally, we have used the collected information exclusively for the purpose of academic research for the study. With this in mind, we have followed the Swedish Research Council's four ethical principles in humanistic-socioscientific research: *Avoidance of harm*, *Informed consent*, *Privacy* and *Preventing deception.* (Vetenskapsrådet, n.d.; Bell et al., 2019)

The experimental design of the study enables a relatively high internal validity (Bell et al., 2019). The likeability to recycle given different pant values is measured through multiple tests as well as with regressions including other factors which potentially can interfere the relationship between the variables. Practically, the study is conducted on the Swedish user-base of PantaPå (see section 3.2.1). Hence, an already-discussed possible selection bias exists as the data sample might not be fully representative to the general Swedish population, which inevitably impairs our external validity. Nonetheless the digital data collection improves parameters such as randomisation between age groups, locations and socioeconomic backgrounds. This in comparison to alternative approaches such as a one-day field study in central Stockholm, which also is unpreferable due to the occuring Covid-19 outbreak. Furthermore, it is naïve to believe that our study is fully unaffected by the coronacrisis. For instance, it is difficult, if not impossible, to conclude to what extent the obtained responses reflect concerns about the virus and/or economical anxiety from failing financial markets. Fortunately, our aim to conduct an online questionnaire was still feasible and only slightly delayed by the extraordinary circumstances.

One limitation of our method is that it is difficult to significantly prove which underlying incentive is predominant for motivating individuals into plastic recycling. The conducting of an experiment in the form of a questionnaire inevitably means an disconnection from actual behaviour. Hence, the respondents could potentially act differently in reality compared to their anonymous responses. This potential disparity between self-reported behaviour and actual recycling behaviour has been shown by prior research (Corral-Verdugo, 1997). However, due to the scope of the study, it would have been impossible to collect real-world observations to compare with the questionnaire responses. Lastly, the chosen respondents are considered to have an equal level of knowledge about plastic recycling. This allows the manipulation of the monetary incentive to be more isolated and distinct, thus yielding clearer experimental results and providing a relatively high reliability of the study.

4. Empirical Data

4.1 Descriptive Statistics

Table 3: Ability & Situational Variables Data (Sample & Population)

Variable	Alternative	Total	% of Sample	% of Population*
Age	Under 20 Years Old	**19**	5.40 %	23.27%
	20 - 40 Years Old	**148**	42.05%	26.08%
	41 - 60 Years Old	**140**	39.77%	25.14%
	Over 60 Years Old	**45**	12.78%	25.50%
	Total	*352*	*100.00%*	*100.00%^^*
Gender	Female	**238**	67.61%	49.69%
	Male	**114**	32.39%	50.31%
	Total	*352*	*100.00%*	*100.00%^^*
Location	Rural area	**202**	57.39%	70.63%
	Urban area**	**150**	42.61%	29.37%
	Total	*352*	*100.00%*	*100.00%^^*
Income	Under 14 999 SEK	**112**	31.82%	26.17%
	15 000 - 41 999 SEK	**215**	61.08%	57.55%
	Over 42 000 SEK	**25**	7.10%	16.28%
	Total	*352*	*100.00%*	*100.00%^*
Education	Elementary School	**37**	10.51%	20.24%
	High School	**163**	46.31%	43.30%
	University	**152**	43.18%	36.46%
	Total	*352*	*100.00%*	*100.00%^*
Occupation	Unemployed	**37**	10.51%	3.61%
	Full-Time Employed	**190**	53.98%	37.38%
	Part-Time Employed	**45**	12.78%	7.42%
	Student	**36**	10.23%	10.60%
	Retired	**44**	12.50%	22.27%
	Total	*352*	*100.00%*	*81.27%^^*
Access	No Access	**6**	1.70%	N/A
	Connected to Household	**107**	30.40%	N/A
	Walking Distance (0-500 m)	**126**	35.80%	N/A
	Longer Distance (Over 500 m)	**113**	32.10%	N/A
	Total	*352*	*100.00%*	*N/A*

* These are estimates, in some cases gathered from multiple public reports, intended to be indications of the sample's proportions in relation to the Swedish population. Thus, disparities are possible. Population data on under 15 year-olds is not available, similarly as for over 65 year-olds in some cases.

** Sweden's ten largest municipalities (Stockholm, Göteborg, Malmö, Uppsala, Linköping, Örebro, Västerås, Helsingborg, Norrköping, Jönköping) are clustered.

Sources: SCB (2018, 2019) & Pensionsmyndigheten (2019). ^ represents year 2018 data and ^^ represents year 2019 data.

As shown in Table 3, the sample contains higher proportions of groups *age*d between 20 and 60 years old than the Swedish population. Prior research has shown that younger groups have a higher smartphone app usage than older groups (Andone et al., 2016), which may explain the low participation of the over 60 years old group. The low proportion of under 20 year-olds might be due to the hypothesis that these live in households where the recycling is mainly handled by the parents, thus no need for them to use PantaPå's service. A higher *female* proportion also exists, which aligns to prior findings indicating that females recycle more than *males* (Stevens, 2010).

The high proportion of *urban*-living and *university* educated respondents can be attributed to the fact that 32.67 % of the respondents live in Stockholm (73), Gothenburg (23) or Uppsala (16) compared to the population's corresponding 17.26 % (SCB, 2018). In these municipalities, 37.50 % of the population has post-high school education whilst solely 26.56 % do on average in the remaining municipalities of Sweden (ibid).

The proportions between the *income* groups is similar to the population's, except a slightly lower share of high-income earners. A possible explanation can be that PantaPå may have relatively fewer users in this income group, as their recycling behaviour is probably less monetarily-driven compared to other groups. This possible scenario, where high-income earners are less inclined to use a monetarily-compensating recycling app, is in accordance with our *ability* and *situational* hypothesis; that the higher income a person has, the smaller impact the monetary incentive has on their recycling behaviour.

Regarding *occupation*, the sample contains higher proportions of all groups other than retirees (lower) and students (equal). Retirees' low share may be explained by their typically lower smartphone app usage and the low age-proportion of over 60 year-olds. Subsequently, the high proportion of unemployed, part-time and full-time employed is likely attributed to the high participation of respondents aged between 20 and 60 year-olds - the typical working years.

Data on the population's *access* to recycling stations is not available, hence it is impossible to compare the sample to the population on this aspect. However, it is probable that the sample is skewed towards better access because of the many respondents living in urban areas, where more recycling stations are available in denser areas compared to in *rural* areas (FTI, 2020).

The sample's possibly exaggerated recycling behaviour is indicated in the *behavioural variables* data table (see Appendix 8.6). More high-scale points (five or six) are likely to have been chosen in relation to the population. For example, 88.35 % and 54.83 % of respondents reported that they always recycle PET bottles respectively other plastic products in comparison to 83 % (Pantamera, 2018) and 42 % (FTI, 2018) in Sweden as a whole. Additionally, there is a stable consensus on that monetary incentives are of great importance in order to motivate individuals into plastic recycling; illustrated by the fact that 72.50 % of the respondents answered that monetary incentives are important (see Appendix 8.7). Lastly, the responses to how important it is to recycle plastics also

showed a clear consensus as the graph solely ranges between three and six with 84.09 % answering the maximum (see Appendix 8.8).

Figure 2: Likeability to Recycle the Plastic Dish Soap Bottle For X SEK
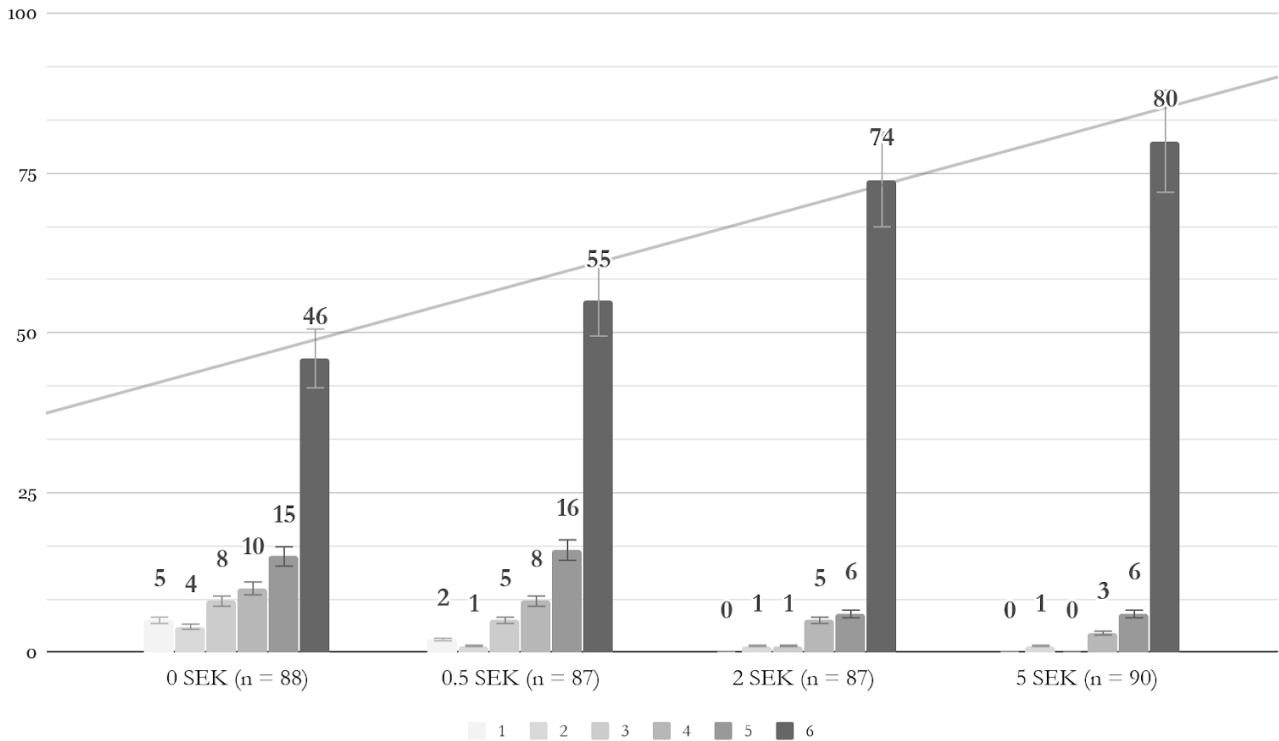
*The trendline illustrates the increase of respondents answering the maximum scale-point (six) between the different pant values.

Figure 2 visually illustrates the increase in individual motivation for recycling of the experiment's plastic bottle caused by the increases in the monetary incentive. Notable is the steady increase of reported selection of the maximum scale-point (six), shown by the trendline. All responses to the question, in which the experiment took place, is shown in the *experimental variables* data table (see Appendix 8.9). The discussed pro-recycling skewness of the sample showed, as only 7.95 % (28) of all respondents answered negatively (between one and three) regardless of the pant value.

Despite the fact that the sample is not in exact accordance to Sweden's population as a whole, it does not mean that the sample is unable to predict actual behaviour and yield generalisable findings. Instead, emphasis needs to be put on whether the behavioural responses, specifically the changes yielding from the manipulation of the monetary incentive, are in accordance with the population's (Harrison & List, 2004). As discussed, the study's sample might be skewed towards higher recycling rates as the respondents are arguably more knowledgeable within recycling than the general population because of the fact that they are PantaPå users. With that in mind, there is no other apparent reason to believe that the data sample will exhibit behaviours and insights that are much different from that of the Swedish population.

4.2 Hypothesis-Testing

4.2.1 Hypothesis 1

Table 4: Pearson's Chi Square Test & Cramer's *V* Test

Likeability to Panta (Scale-Point)	Pant Value (SEK)				Total
	0	**0.5**	**2**	**5**	
	Frequency				
	Contribution to Chi2				*Total*
1	5	2	0	0	7
	6	0	1.7	1.8	9.6
2	4	1	1	1	7
	2.9	0.3	0.3	0.3	3.9
3	8	5	1	0	14
	5.8	0.7	1.7	3.6	11.8
4	10	8	5	3	26
	1.9	0.4	0.3	2	4.6
5	15	16	6	6	43
	1.7	2.7	2	2.3	8.7
6	46	55	74	80	255
	4.9	1	1.9	3.4	11.2
Total	88	87	87	90	352
	23.2	5.2	8	13.3	49.8

Pearson Chi2(15) = 49.7579 Pr = 0.0001

Cramer's *V* = 0.2171

Table 4 shows a cross-sectional frequency table between the dependent variable *Likeability to Panta* and the experimental variable *Pant Value*. As the study aims to capture the impact of a monetary incentive, testing potential differences between all levels of recycling likeability are deemed to generate the most value. Hence, increases from lower to higher rates is equally interesting as differences between rates. Pearson's Chi Square test illustrates a significant association between the variables *Likeability to Panta* and the perceived *Pant Value* (χ^2 = 49.7579, df = 15[1], p < 0.0001), supporting the monetary incentive's impact on motivation to recycle. Further, Cramer's *V* test indicates that the strength of the association between the variables to be, given the degrees of freedom, moderately strong (*V* = 0.2171, df = 3[2]).

The means (standard deviations) of the *Likeability to Panta* variable given the perceived pant value are: 4.86 (1.53) given 0 SEK; 5.30 (1.16) given 0.5 SEK; 5.74 (0.72) given 2 SEK; and, 5.82 (0.60)

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[1] Degrees of Freedom of Chi2 = (r-1)*(c-1) = 5*3 = 15.
[2] Degrees of Freedom of *V* = Min[(r-1), (c-1)] = 3.

given 5 SEK. The Kruskal-Wallis test further supports the significant difference in recycling behaviour and monetary compensation (see Appendix 8.10). This implies that an individual's motivation and likeability to recycle plastics are not only dependent on the potential monetary incentive, but also that there are differences in the motivation for recycling dependent on the size of the monetary incentive.

Table 5: *Multiple Linear Regression*

MODEL	1	2	3	4	5	6	7
VARIABLES	Likeability to Panta						
Pant Value	0.165***	0.172***	0.166***	0.166***	0.178***	0.179***	0.180***
	-0.0266	-0.0278	-0.0276	-0.0275	-0.0279	-0.028	-0.0281
Importance of Monetary Pant		-0.0761*	-0.101***	-0.0833**	-0.0871**	-0.0937**	-0.0923**
		-0.0406	-0.0376	-0.0385	-0.0386	-0.0388	-0.0393
Frequency of Pantning PET Bottles			0.404***	0.365***	0.363***	0.354***	0.355***
			-0.139	-0.126	-0.124	-0.125	-0.126
Frequency of Recycling Other Plastics				0.229***	0.154*	0.0729	0.0747
				-0.0826	-0.0874	-0.103	-0.103
Importance of Recycling					0.375***	0.334***	0.336***
					-0.126	-0.126	-0.127
Perception of Oneself as Environmentally Friendly						0.156**	0.159**
						-0.0726	-0.0732
Importance to Be Perceived as Environmentally Friendly by Others							-0.00947
							-0.0332
Constant	5.120***	5.430***	3.190***	2.119**	0.351	0.345	0.33
	-0.0974	-0.176	-0.864	-0.894	-1.009	-1.003	-1.007
Observations	352	352	352	352	352	352	352
R-squared	0.082	0.093	0.141	0.172	0.195	0.206	0.207

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 5 shows the multiple linear regression performed on the dependent variable *Likeability to Panta*. In Model 1, an initial bivariate regression with the independent variable *Pant Value* predicts a significantly positive relation to the *Likeability to Panta* variable (R^2 = 0.082, p < 0.01). When adding different behavioural variables, which intuitively can impact people's likeability to panta (further elaborated upon in section 4.2.2), the explanatory value of the model increases to 20.7 % (R^2 = 0.207). This model predicts that despite the presence of other behavioural variables, the *Pant Value* variable still has a significant positive impact on the *Likeability to Panta* variable (p < 0.01). Additionally, the coefficient of the *Pant Value* variable in the final model implies that, ceteris paribus, for each additional SEK in pant value, a person's likeability to panta increases with 0.18

units on a scale from one to six. Hence, the model proves that a positive relation exists between the monetary incentive and an individual's motivation to recycle plastics.

In conclusion, Hypothesis 1, that monetary incentives increase individual motivation for plastic recycling, is **accepted** by the experiment.

4.2.2 Hypothesis 2

The multiple linear regression in Table 5 indicates that behavioural factors impact the likeability to recycle, as significant positive or negative relations are present. However, the model does not fully capture how behavioural factors impact the monetary incentives' impact on the motivation to recycle. Thus, these factors need to be regressed with the likeability to panta given the different pant values.

Table 6: *Multiple Linear Regression*

VARIABLES	MODEL 1	2	3	4
	Likeability to Panta 0 SEK	Likeability to Panta 0.5 SEK	Likeability to Panta 2 SEK	Likeability to Panta 5 SEK
Importance of Monetary Pant	-0.318***	-0.174**	0.0910*	0.0393
	-0.0878	-0.0678	-0.0501	-0.0678
Frequency of Pantning PET Bottles	0.447	0.561***	0.0473	-0.0613
	-0.407	-0.104	-0.203	-0.0733
Frequency of Recycling Other Plastics	-0.121	0.0891	0.266	0.0219
	-0.198	-0.196	-0.186	-0.0986
Importance of Recycling	0.819***	-0.242	0.367*	0.1
	-0.265	-0.391	-0.215	-0.13
Perception of Oneself as Environmentally Friendly	0.438**	0.262*	-0.08	0.00402
	-0.18	-0.143	-0.0714	-0.0512
Importance to Be Perceived as Environmentally Friendly by Others	-0.0288	0.122	0.0111	0.028
	-0.062	-0.0928	-0.0472	-0.0417
Constant	-2.675	1.988	1.867	5.191***
	-2.312	-2.564	-1.282	-0.616
Observations	88	87	87	90
R-squared	0.342	0.24	0.273	0.029

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 6 shows the multiple linear regression between the behavioural variables and the *Likeability to Panta* variable given the different pant values. The VIF values for the regression ranged from 1.52

to 1.04 with a mean of 1.21, proving that there is no risk of multicollinearity between the variables (see Appendix 8.11). Hence, this is true for the regression regarding Hypothesis 1 as well.

The regressions imply that the *Importance of Monetary Pant* variable has a significant negative impact when a person is exposed to low monetary amounts ($p < 0.01$ for 0 SEK and $p < 0.05$ for 0.5 SEK), whilst it is not possible to significantly state the same for 2 SEK and 5 SEK. However, there is a clear tendency of a declining negative effect of the importance of money when the monetary incentive increases. Furthermore, an initiation of a monetary incentive has a significant positive effect in the regard to the variable *Frequency of Pantning PET Bottles* ($p < 0.01$ for 0.5 SEK). For higher amounts of 2 SEK and 5 SEK no effect could be seen, which is true in the case of not receiving any monetary compensation at all. The variables *Importance of Recycling* and *Perception of Oneself as Environmentally Friendly* have a significantly positive impact in the scenario with no monetary compensation ($p < 0.01$ and $p < 0.05$ respectively). There is not possible to see any significant effect when monetary compensation is present.

In conclusion, Hypothesis 2, that the impact of monetary incentives on individual motivation for plastic recycling differs due to some behavioural factors, is **accepted** by the experiment.

4.2.3 Hypothesis 3

Table 7 shows the multiple linear regression of different ability and situational variables and the *Likeability to Panta* variable given the different pant values. The VIF values range from 1.35 to 1.05 with a mean of 1.15, indicating that the variables are not multicollinear (see Appendix 8.12).

Table 7: *Multiple Linear Regression*

MODEL	1	2	3	4
VARIABLES	Likeability to Panta 0 SEK	Likeability to Panta 0.5 SEK	Likeability to Panta 2 SEK	Likeability to Panta 5 SEK
Income: Average-Income Earners	0.886**	0.0594	-0.175	-0.39
	-0.384	-0.458	-0.264	-0.269
Income: High-Income Earners	1.264	-0.089	0.177	-0.239
	-0.9	-0.756	-0.315	-0.383
Access: Connected to the Household	0.543	-0.334	-0.225	-0.166
	-0.423	-0.292	-0.17	-0.236
Access: Walking Distance: 0 - 500 m	0.527	-0.579	-0.00961	-0.221
	-0.398	-0.419	-0.155	-0.299
Access: Longer Distance: Over 500 m		-0.49	-0.157	-0.0992
		-0.366	-0.206	-0.253
Location: Urban Areas	-0.13	-0.0108	-0.241	-0.173
	-0.348	-0.303	-0.184	-0.2
Occupation: Full-Time Employment	-0.832**	0.189	-0.157	0.296
	-0.408	-0.853	-0.281	-0.283
Occupation: Part-Time Employment	0.428	0.303	-0.117	-0.225
	-0.363	-0.844	-0.251	-0.309
Occupation: Student	-0.884	0.632	-0.416	0.055
	-0.788	-0.641	-0.603	-0.135
Occupation: Retired	0.0682	0.213	0.03	0.247
	-0.542	-0.674	-0.213	-0.254
Education: High School	-0.934	-0.720***	-0.188	0.0638
	-0.655	-0.265	-0.28	-0.148
Education: University	-0.736	-0.696*	-0.145	0.031
	-0.674	-0.357	-0.29	-0.138
Age: 20 - 40 Years Old	-1.012	0.953***	-0.0207	0.142
	-0.999	-0.244	-0.527	-0.196
Age: 41 - 60 Years Old	-0.343	0.841**	0.156	-0.041
	-1.003	-0.405	-0.572	-0.245
Age: Over 60 Years Old	-0.248	1.204***	0.0556	-0.0906
	-1.102	-0.396	-0.563	-0.323
Gender: Female	0.0592	0.382	-0.0407	0.250**
	-0.39	-0.329	-0.161	-0.118
Constant	5.733***	4.982***	6.299***	5.945***
	-0.968	-0.68	-0.688	-0.135
Observations	**88**	**87**	**87**	**90**
R-squared	0.235	0.112	0.126	0.163

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

In the scenario of no monetary incentive, average-income earners are significantly more likely to recycle than low-income earners ($p < 0.05$), which is an effect not significant for high-income earners. Further, people with a full-time employment are significantly less likely to recycle than people who are unemployed ($p < 0.05$). However, for other occupations (part-time employment, student and retired) such an effect is not as clear.

This sporadic significance, in other words almost random findings across factors, can be seen in other variables as well. For people above the age of 20, the initiation of a monetary incentive (0.5 SEK) increases the likeability to recycle ($p < 0.01$ for 20-40 years old, $p < 0.05$ for 41-60 years old and $p < 0.01$ for over 60 years old); however, it cannot be supported for any other amounts. Similarly, females are significantly more likely to recycle ($p < 0.05$) when the monetary compensation is high (5 SEK), but no effect can be seen in any other amount. Likewise, individuals with a high school degree are significantly less likely to recycle for 0.5 SEK compared to people who only have attended elementary school ($p < 0.01$); however, the same effect does not appear for university respondents or for any other amounts. These sporadic outcomes, which possibly is an effect of outliers in the data combined with few respondents in the baseline category, indicates that the ability and situational factors' influence on the impact of monetary incentives is not supported.

In conclusion, Hypothesis 3, that the impact of monetary incentives on individual motivation for plastic recycling differs due to some ability and situational factors, is **rejected** by the experiment.

4.2.4 Hypothesis-Testing Summary
The results of our hypotheses-testing experiment are summarised below:

Hypothesis 1: *Monetary incentives* increase individual motivation for plastic recycling.	**Accepted**
Hypothesis 2: The impact of monetary incentives on individual motivation for plastic recycling differs due to *behavioural factors.*	**Accepted**
Hypothesis 3: The impact of monetary incentives on individual motivation for plastic recycling differs due to *ability and situational factors.*	**Rejected**

5. Analysis

The results from the performed tests and regressions, together with the descriptives of the collected data, are analysed in this section. The analysis is set in our initial framework (see Figure 1) and structured after the three hypotheses.

5.1 Monetary Incentives Increase Individual Plastic Recycling

Hypothesis 1, stating that monetary incentives increase individual motivation for plastic recycling, is accepted by the experiment. Therefore, it is shown that external rewards impact individual recycling behaviour in accordance with the MARS model (McShane & Von Glinow, 2010). This implies recycling being *extrinsically*-motivated since monetary incentives are individual rewards set in the external setting. Hence, aligning to the SDT's reasoning that extrinsic motivation is predominant in reality. However, where on the theory's continuum the act of recycling belongs, when incentivised by the monetary compensation, is debatable.

In *integrated regulation*, the closest level to pure intrinsic motivation, the action of recycling is the most autonomous and assimilated with the individual. Similarly, this means that the individual recycles solely to fulfill their *motivators* and highest hierarchical needs, such as self-actualisation (Herzberg, 1964; Maslow, 1943). So-called "die-hard recyclers", people who heavily recycle without any apparent individual external rewards (New York Times, 2014), are the most likely to associate with this almost-intrinsic regulation. However, recycling for the general population is arguably more extrinsically-driven, as implied by our experiment. Hence, the action of recycling is likely to neither belong to the next level, *identified regulation*. The level means that individuals recycle because they find it personally important beyond the monetary incentive, which is necessarily not true for the average person. This is shown by our performed Cramer's *V* test, which illustrates the moderately strong connection between an individual's likeability to panta and the monetary incentive, thus indicating that external factors impact recycling motivation. Regarding the two closest levels to pure extrinsic motivation, *introjected regulation* and *external regulation,* it can on the one hand be argued that recycling is partially internalised and intrapersonal. Meaning that the individual recycles without thinking about it. But on the other hand, the experiment showcasts a rapid and linear increase in likeability to panta due to the continuous increase of monetary incentives. This indicates that the action is more likely to be almost-purely controlled by the external monetary compensation. Hence, we conclude that the action of recycling is mainly extrinsically-motivated, implying being either introjected- or externally regulated in the SDT (Deci & Ryan, 2000a).

From a leadership perspective, the extrinsically-driven recycling behaviour is most compatible with a soft *Theory X* management approach (McGregor, 1960). This implies that generous monetary incentives are the most effective method for motivating individuals to recycle plastics. In addition, monetary incentives can thus be classified as *hygiene factors* (Herzberg, 1964), necessary to motivate

the majority of the population. The fact that the recycling rates of non-PET bottle plastics (which is commonly *not* monetarily incentivised) only amounts to approximately half of the recycling of PET bottles (which is monetarily incentivised) in both the study's and population's data, suggests that monetary incentive-based recycling systems are superior. A parable to Skinner's *Reinforcement Theory* (1965) can be made, where desired actions are repeatedly rewarded extrinsically to create prolonging behaviours. Recycling systems' purpose should be to promote individual recycling in order to tackle the plastic management waste problem as efficiently as possible.

First partial conclusion:

This experimental study concludes that extrinsic rewards, in the form of monetary incentives, *significantly increase* individual motivation for household plastic recycling.

5.2 The Impact Differs Due to Some Behavioural Factors

Hypothesis 2, stating that the impact of monetary incentives on individual motivation for plastic recycling differs due to behavioural factors, is accepted by the experiment. This is further supported by a majority of the behavioural variables tested in the experiment.

The MARS model argues that *individual characteristics* fundamentally impact individual behaviour (McShane & Von Glinow, 2010), which our experiment deemed true for recycling. For instance, it is supported that personally valuing money higher leads to an increase in the impact of monetary incentives. This aligns with the aforementioned analysis that the action of recycling is mainly extrinsically-motivated, belonging to either *introjected regulation* or *external regulation* in the SDT (Deci & Ryan, 2000a). Contradicting is, however, the findings that (1) thinking it is more important to recycling leads to an decrease in the impact of monetary incentives and (2) that considering oneself to be more environmentally friendly has a similar effect. These indicate a more intrinsically-motivated recycling behaviour, belonging to either *integrated regulation* or *identified regulation* in the SDT. This further nuances the motivational source of individual recycling.

It can be argued that different individuals value the same conditions differently as either *hygiene factors* or *motivators* (Herzberg, 1964), based upon their unique behavioural factors. This implies that extrinsic rewards, such as monetary incentives, may motivate some individuals whilst others are more intrinsically-motivated depending on their behavioural factors. This difference might derive from the individual's *role perceptions,* where different people can put more or less pro-recycling responsibilities on themselves to fulfill in the MARS model (McShane & Von Glinow, 2010). Including Herzberg's theory, this can be summarised by the following; the behavioural factors of individuals affect their interpretation of monetary incentives. Hence resulting in the incentives being seen as either essential *hygiene factors* to recycle or somewhat unnecessary as other *motivators,* originating from one's *individual characteristics*, intrinsically-motivate the recycling instead.

In addition, the study shows that if an individual frequently recycles PET bottles, it decreases the impact of the monetary incentive. However, this effect does not similarly occur for individuals who frequently recycle non-PET bottle plastics. The only difference between the two materials is that, as clarified earlier, recycling of PET bottles are monetarily incentivised whilst the others are not. Hence, it can be argued that frequent recycling behaviours of monetarily-compensated waste types decrease the impact of these monetary incentives, as this is shown in the recycling system of PET bottles and not in the system for non-PET bottle plastics. To clarify, this indicates that individuals that already tend to panta PET bottles are relatively less motivated by the monetary incentive compared to those who do not frequently recycle. However, the same can not be supported regarding non-PET bottle plastics. Hence, the initiation of monetary incentives could be interpreted as a trigger point similar to a *hygiene factor*, for individuals with an already existing pant-recycling behaviour. In other words, just by adding any monetary incentive, even as small as 0.5 SEK, it can motivate more people to recycle. Implying that once individuals are familiarised with monetarily-incentived recycling, they will require less monetary incentives to remain motivated to sustain this recycling behaviour.

Nuancing the analysis further, McGregor's different leadership styles (1960) contributes a larger societal perspective on how these monetary incentives can be used to motivate as many individuals as possible to continuously recycle. It is clear that people with different sources of motivation for recycling optimally need different management styles. For individuals who interpret the monetary incentives as *hygiene factors,* it can be assumed that they act out of self-interest, hence a soft *Theory X* with external rewards (monetary incentives) would motivate the most. In the case of individuals who are more intrinsically-motivated, by for example self-fulfilling *motivators*, it can be assumed that *Theory Y* management is preferable. This implies allowing for a more optimistic view of the individual, which requires less external rewards as the action of recycling in itself gives joyment and the possibility of intrinsic self-fulfillment.

Furthermore, the possilibity that the source of recycling motivation changes due to developments in an individual's behavioural factors, such as the establishment of a recycling habit, indicate that the implemented leadership style can be changed over time. In other words, it means that it would be possible to change from the more costly and extrinsically-driven Theory X to the more lenient and intrinsically-driven Theory Y when the individual's recycling behaviour has matured. Hence, it can be argued that leaders, policy-makers and the recycling systems can be adaptive, looking at short-term and long-term aims of increasing recycling rates. This would gradually move individuals towards intrinsic motivation in the SDT continuum, as the leadership style emphasises internalisation of the recycling behaviour itself.

Second partial conclusion:

This experimental study concludes that the significant impact of monetary incentives on individual motivation for household plastic recycling *differs* between individuals due to *some behavioural* factors. Hence, implying that different leadership styles and incentives are needed to optimise recycling rates.

5.3 The Impact Does Not Differ Due to Ability & Situational Factors

Hypothesis 3, that the impact of monetary incentives on individual motivation for plastic recycling differs due to ability and situational factors, is rejected by the experiment.

Consequently, the hypothesis rejection provides no further nuance to whether individual recycling is extrinsically- or intrinsically-motivated. Hence, the MARS model's emphasis on that individual behaviour is based upon a person's *ability* and *situation* (McShane & Von Glinow, 2010) could not be supported for recycling behaviour. Additionally, where on the SDT's continuum the action of recycling, caused by the added monetary incentives, is undetermined (Deci & Ryan, 2000a). Furthermore, the reasoning that similar conditions can be seen as either *hygiene factors* or *motivators* by different individuals in contrasting situations can not be made. For example, it is not clear whether individuals with better monetarily prerequisites, and consequently more satisfied hygiene factors, will be less motivated by monetary incentives to recycle.

Regarding the most suitable management style (McGregor, 1960), prior research has shown differences in recycling between demographic groups, implying on the need of multilayered incentive systems to encourage more wide recycling. For instance, it has been found that females generally recycle more than males (Stevens, 2010) and that highly educated groups recycle more than less educated groups (Reschovsky & Stone, 1994). However, this study is unable to support these findings as monetary incentives do not have an impact on recycling behaviour based upon ability and situational differences.

Third partial conclusion:

This experimental study concludes that the significant impact of monetary incentives on individual motivation for household plastic recycling *does not differ* between individuals due to *ability* and *situational* factors.

6. Discussion & Conclusions

6.1 Answering the Research Question

By conducting an experimental, quantitative study we researched the impact of monetary incentives on individual motivation to recycle. Our framework is rooted in variables explaining individual behaviour, with emphasis on motivation theories from an individual and leadership perspective. This framework generated three hypotheses which, together with the results from the experiment, were analysed with the aim of answering the following research question:

How do monetary incentives impact individual motivation for household plastic recycling?

The study's hypothesis-testing resulted in three partial conclusions, which each contribute to answering the research question. The first (1) hypothesis supports that *cash is king in plastic recycling*, with a positive increase of recycling motivation tied to the increase of the monetary incentive. This indicates that the individual motivation for recycling is to some extent extrinsically-driven and that monetary incentives are necessary to, as effectively as possible, motivate people to recycle. However, the second (2) hypothesis supports that the impact of monetary incentives differs due to some behavioural factors. A person's individual characteristics and behaviour can internalise the motivation to recycle as the act itself becomes more self-fulfilling. This separates the optimal leadership style, used by leaders, policy-makers and recycling systems, into being authoritative for extrinsically-motivated people and participative for intrinsically-motivated people. Additionally, it implies a development where eventually the rewards-based authoritative leadership can be replaced by an intrinsically-motivating participative leadership due to people's internalisation of the act of recycling. Hence, the optimal management approach to increase individual motivation for household plastic recycling is two-parted. Lastly, the third (3) hypothesis could not support that a similar effect is caused by ability and situational factors.

These findings develop our initial framework into a more detailed, theoretical and experimentally-supported framework, illustrated in Figure 3, showing how monetary incentives impact individual household plastic recycling. We want to emphasise that the illustration does not determine any predominance of behavioural factors leading to either extrinsic or intrinsic motivation. Neither does it determine any time aspect of the potential internalisation of the act of recycling behaviour. Thus, it should be interpreted as a visualisation scheme of how monetary incentives impact individual household plastic recycling behaviour.

Figure 3: Our Developed Framework
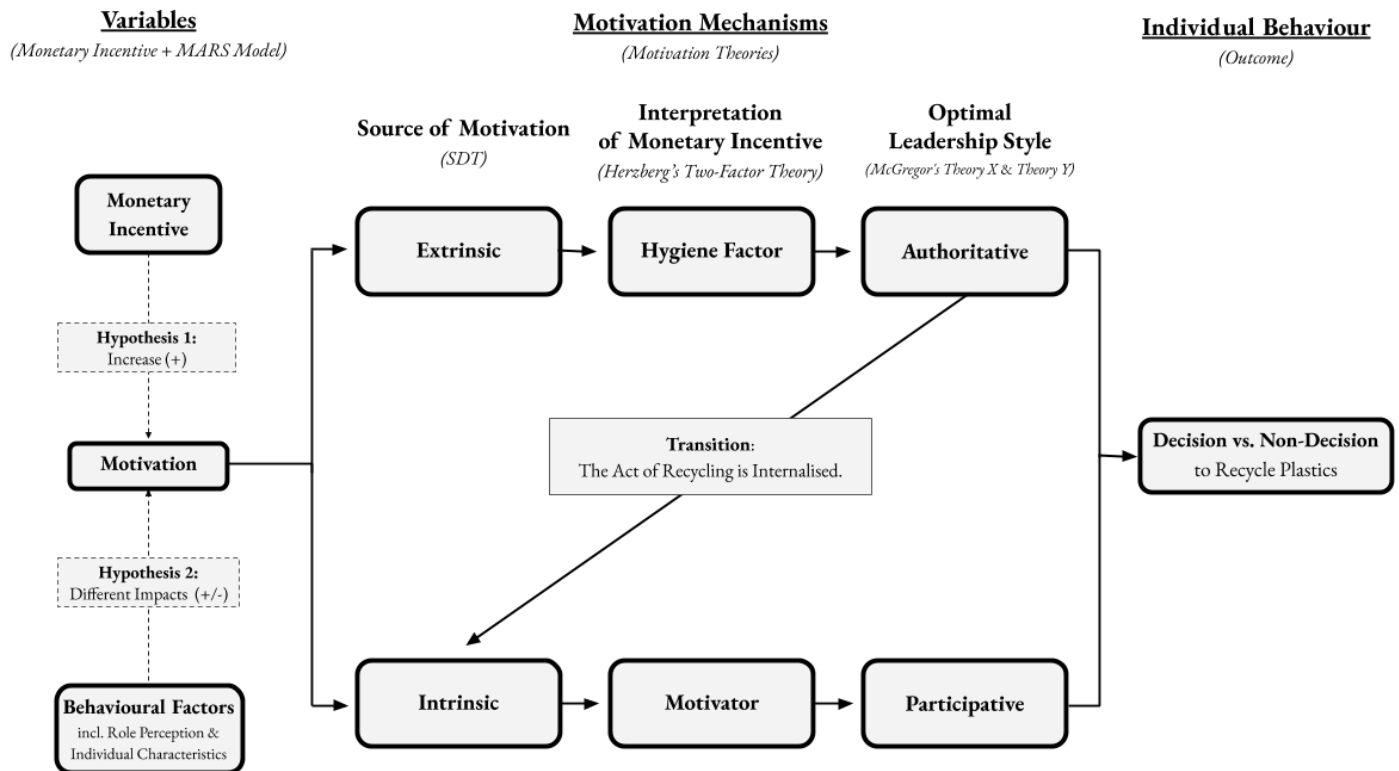
6.2 Discussion

6.2.1 The Study's Contribution

The study supports that extrinsic monetary incentives have a significant impact on individual recycling behaviour and subsequently that this impact differs amongst individuals due to some behavioural factors. The implications of this is that leaders, policy-makers and recycling systems should utilise monetary incentives, in other words reward-based leadership, to increase plastic recycling rates. This is further supported by the finding that recycling behaviour is mostly extrinsically-motivated rather than intrinsically. Fortunately, the development that rewards-based leadership can be replaced by an intrinsically-motivating leadership due to internalisation of the act of recycling over time, indicates a more realistic implementation of our findings. In other words, policy-makers can initially implement generous monetary incentives to boost recycling, to at a later stage when people are less motivated by these incentives, remove or decrease them.

This contribution means that the study is a complement to the recycling field's prior research, providing quantitative proof that monetary incentives impact individual plastic recycling and indications on how these can be used to increase individual recycling. Hopefully, this can lay the foundation for a better understanding on how policy-makers can use monetary incentives, both in the short- and long-term, to optimise individual recycling from a management and leadership perspective.

6.2.2 Proposed Future Research

More research is needed before any definite conclusions regarding the most efficient usage of monetary incentives in recycling systems can be done. Other than replicating and confirming this study's quantitative contributions, future research must continue to study the social elements of individual recycling in order to tackle the vast management problem of plastic waste.

An interesting area to research further is this study's non-support for the influence of ability and situational factors. It would be interesting to look into the cultural context concerning these, which would be possible through a larger international study. Additionally, incorporating to what extent other factors, such as social norms and environmental attitudes, affect individual recycling could yield interesting results. It could furthermore indicate an optimal size of the monetary incentive, by employing *contingent valuation* of pantning (FAO, n.d.), which would be valuable for policy-makers. Also, it could potentially measure the durability of the monetary incentives' impact on individual motivation to recycle from both a short- and long-term perspective. Furthermore, we would find it interesting to see whether the study's findings regarding plastic recycling differ from recycling of other materials. Lastly, more general research concerning the industry around the recycling and re-usage of plastic would be valuable in the global attempt to solve the plastic waste and overconsumption problem.

6.2.3 Concluding Constraints of the Study

The study's generalisability may have been altered because of the sample's possible selection bias, existing due to the limitation of only conducting the experiment on the Swedish user-base of PantaPå. In addition, the potential disparity between actual behaviour and self-reported behaviour shown by prior research (Corral-Verdugo, 1997) can have impacted. Ergo, the risk of collecting inaccurate responses might have increased due the conductance of the experiment in the form of a questionnaire, and not actual real-world observations.

Furthermore, there are also aspects in the theoretical framework which might constrain our study. For instance, our work may have been blurred by our interpretation and simplification of the used theoretical concepts. Adding to this is the fact that the study, and in particular the analysis, is solely based upon our analytical capability. Hence, the possibility that other researchers might have concluded other analytical findings exists.

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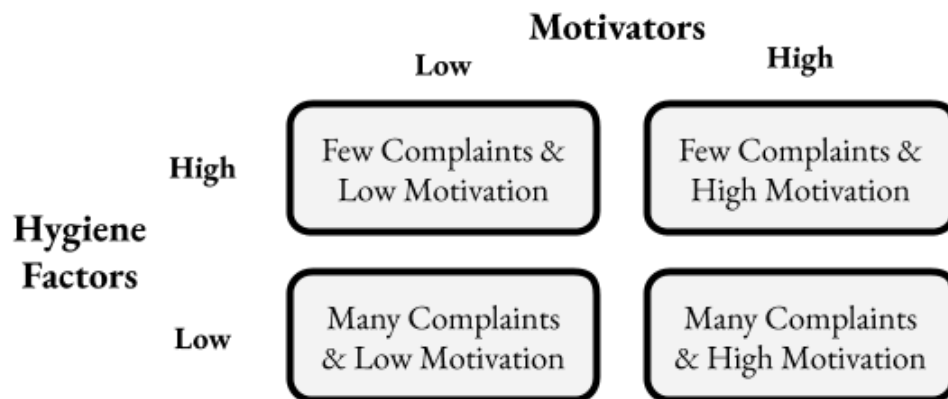
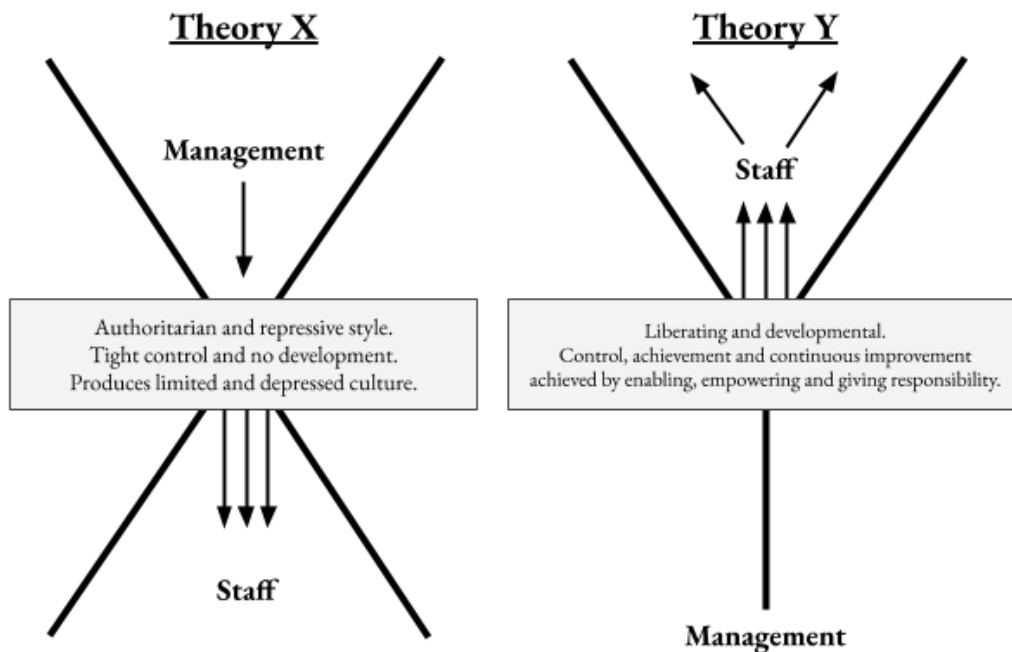# 8. Appendices

8.1 Figure: The MARS model
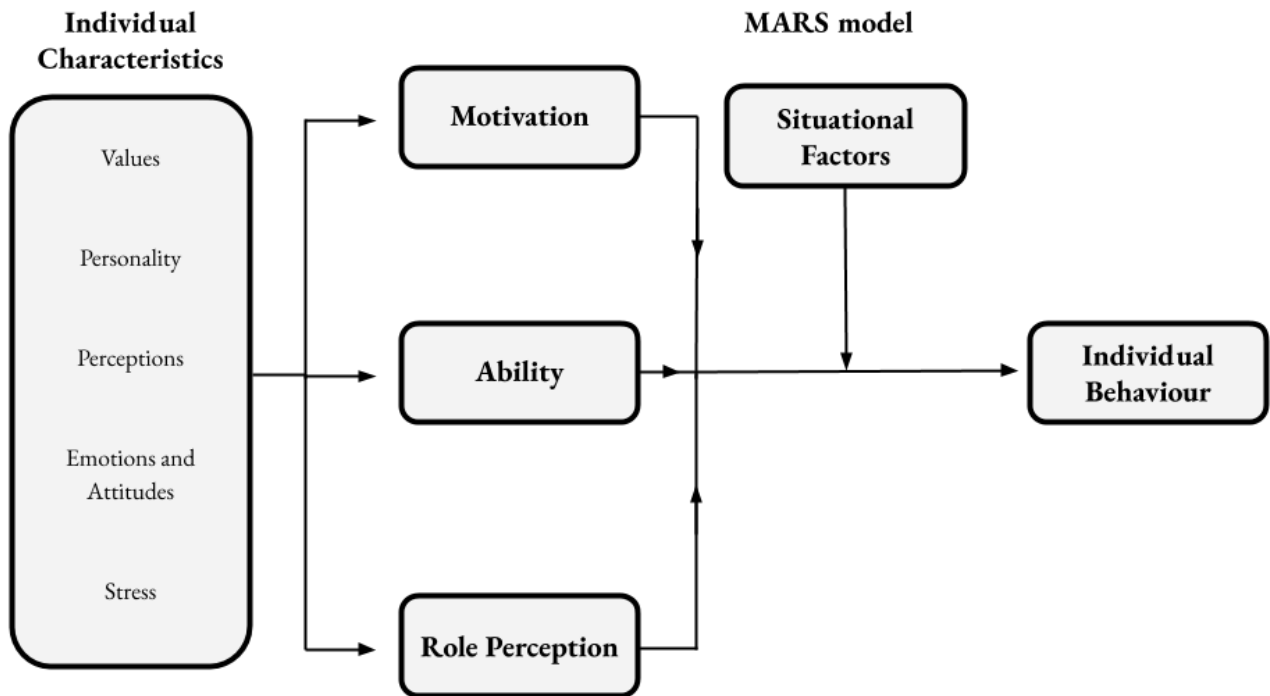
8.2 Figure: Self-Determination Theory (SDT)
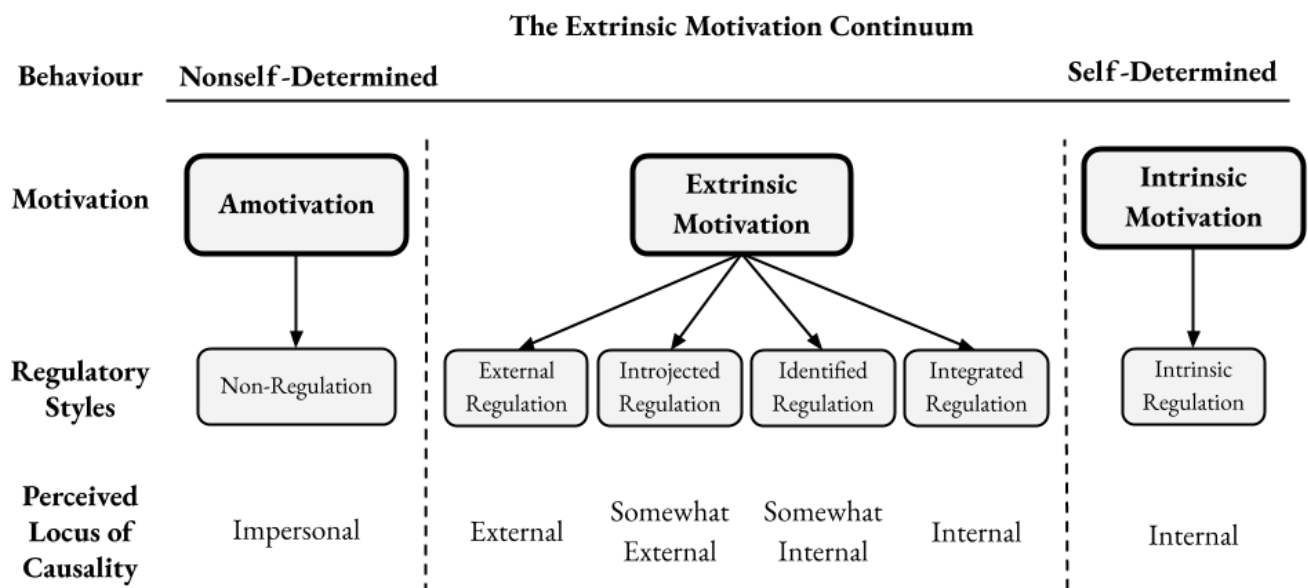
8.3 Figure: Herzberg's Two-Factor Theory

8.4 Figure: McGregor's Theory X & Theory Y

8.5 Questionnaire [Original, Swedish]

Introduktion:

Hej anonyma hjälte! Tack för att du deltar i denna undersökning skapad av två studenter vid Handelshögskolan i Stockholm i samarbete med PantaPå. Enkäten tar 1-2 minuter att genomföra.

Datan samlas enbart i ett akademiskt syfte och dina svar är helt anonyma.

Om du har några frågor eller kommentarer, kontakta oss på 24169@student.hhs.se eller 24040@student.hhs.se. Tack!

Frågor: Alla flervalsfrågor på en 1-6 skala (om inget annat nämns).

1. Hur benägen skulle du vara att panta denna diskflaska gjord av plast för X kronor? (Inte alls - Väldigt mycket) **(X = 0, 0.5, 2 or 5 kronor)**

2. Hur viktigt är pant i form av pengar för dig när du ska panta? (Oviktigt - Väldigt viktigt)

3. Hur ofta pantar du PET-flaskor i en pantmaskin? (Aldrig = inga flaskor, Alltid = alla flaskor)

4. Hur ofta lämnar du andra plastprodukter för återvinning? (Aldrig = återvinner ingen plast, Alltid = återvinner all plast)

5. Hur viktigt tycker du att det är att återvinna plast? (Oviktigt - Väldigt viktigt)

6. Uppfattar du dig själv som en miljövänlig person? (Inte alls - Väldigt mycket)

7.   Hur viktigt är det för dig att uppfattas som en miljövänlig person av människor i din omgivning? (Oviktigt - Väldigt viktigt)

8.   Hur nära har du till din närmaste återvinningsstation?
   a.   Ingen tillgång
   b.   I anslutning till bostad / bostadsområde (t.ex. återvinningsrum finns i lägenhetsbyggnad)
   c.   Promenadavstånd (0 - 500 meter)
   d.   Längre avstånd (över 500 meter)

9.   Hur gammal är du?
   a.   Under 20 år
   b.   20 - 40 år
   c.   41 - 60 år
   d.   Över 60 år

10. Vad är ditt kön?
   a.   Kvinna
   b.   Man
   c.   Annat

11. I vilken ort bor du? (Flervalsmeny): Stockholm; Göteborg; Malmö; Uppsala; Linköping; Örebro; Västerås; Helsingborg; Norrköping; Jönköping; Annan

12. Vad är din genomsnittliga månadsinkomst? (SEK per månad)
   a.   Under 14 999 SEK
   b.   15 000 - 41 999 SEK
   c.   Över 42 000 SEK

13. Vad är din högst påbörjade eller avklarade utbildning?
   a.   Grundskola (åk 1-9)
   b.   Gymnasium / Högskoleförberedande program
   c.   Universitet / Högskola

14. Vad är din nuvarande huvudsakliga sysselsättning?
   a.   Deltidsarbete
   b.   Heltidsarbete
   c.   Arbetslös
   d.   Student
   e.   Pensionerad

15. Vad handlade denna enkät om?
   a.   Återvinning
   b.   Semesterresor
   c.   Matlagning
   d.   Sport

16. Vem är Sveriges nuvarande statsminister?
   a.   Stefan Löfven
   b.   Zlatan Ibrahimovic
   c.   Astrid Lindgren
   d.   Greta Thunberg

8.6 Table: Behavioural Variables Data

Scale-point	1	2	3	4	5	6	Total
How important is monetary pant for you? (Not important - Very important)	**30**	**20**	**47**	**83**	**76**	**96**	352
% of sample	8.52%	5.68%	13.35%	23.58%	21.59%	27.27%	100.00%
How often do you panta PET bottles in reverse vending machines? (Never - Always)	**3**	**0**	**2**	**6**	**30**	**311**	352
% of sample	0.85%	0.00%	0.57%	1.70%	8.52%	88.35%	100.00%
How often do you return other plastic products for recycling? (Never - Always)	**2**	**1**	**9**	**40**	**107**	**193**	352
% of sample	0.57%	0.28%	2.56%	11.36%	30.40%	54.83%	100.00%
How important do you think it is to recycle plastics? (Not important - Very important)	**0**	**0**	**1**	**12**	**43**	**296**	352
% of sample	0.00%	0.00%	0.28%	3.41%	12.22%	84.09%	100.00%
Do you consider yourself to be an environmentally friendly person? (Not at all - Very)	**2**	**3**	**12**	**104**	**132**	**99**	352
% of sample	0.57%	0.85%	3.41%	29.55%	37.50%	28.13%	100.00%
How important is it for you to be perceived as environmentally friendly by others? (Not at all - Very important)	**56**	**25**	**62**	**92**	**66**	**51**	352
% of sample	15.91%	7.10%	17.61%	26.14%	18.75%	14.49%	100.00%

8.7 Figure: The Importance of Monetary Incentives When It Comes To Recycling
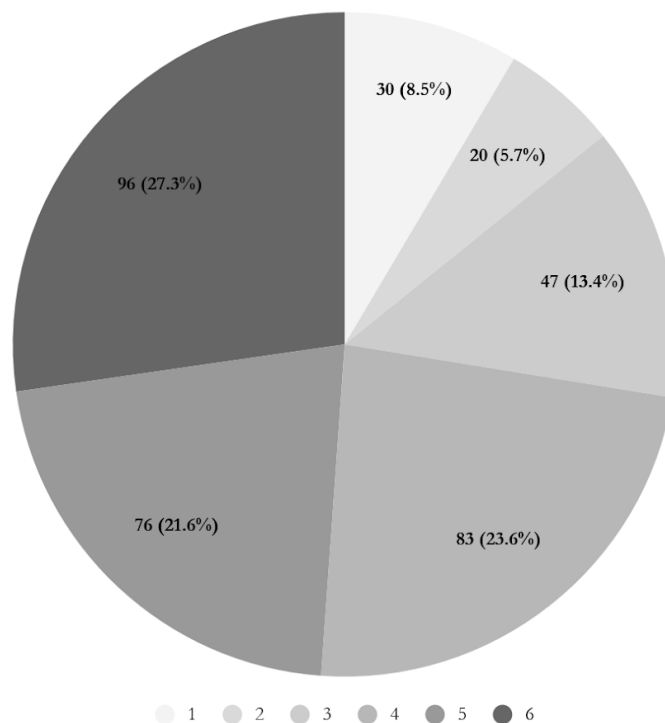
8.8 Figure: The Importance of Recycling Plastics
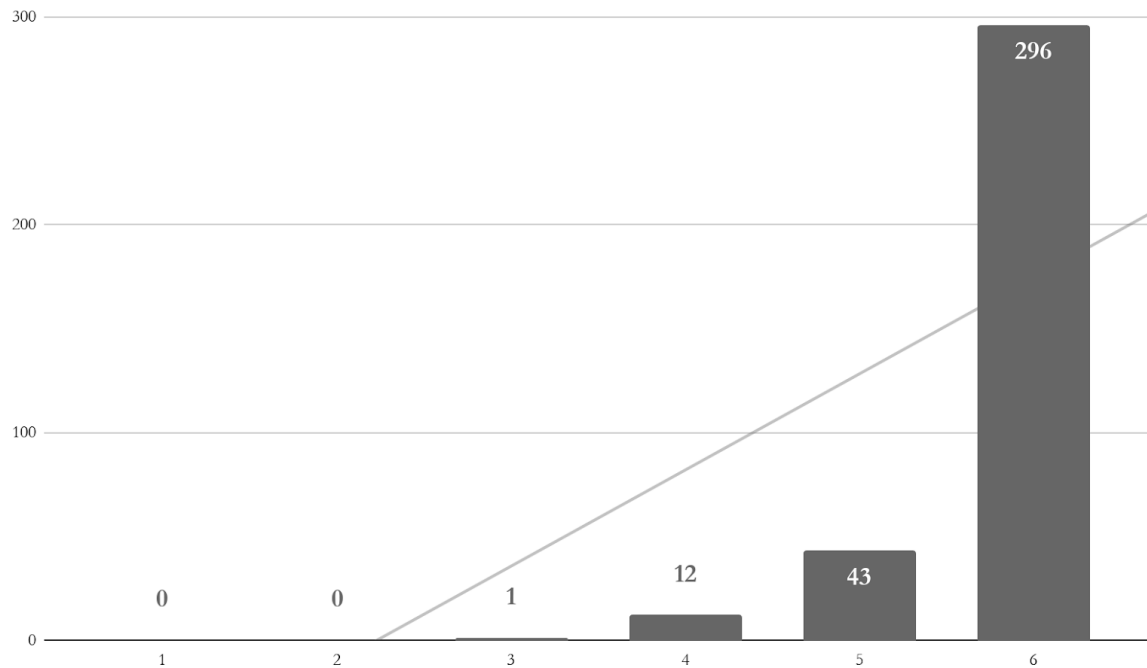
8.9 Table: Experimental Variables Data

How likely would you be to panta this plastic dish soap bottle for X SEK? (Not at all - Very)	1	2	3	4	5	6	Total
0 SEK	5	4	8	10	15	46	88
% of sample	5.68%	4.55%	9.09%	11.36%	17.05%	52.27%	100.00%
0.5 SEK	2	1	5	8	16	55	87
% of sample	2.30%	1.15%	5.75%	9.20%	18.39%	63.22%	100.00%
2 SEK	0	1	1	5	6	74	87
% of sample	0.00%	1.15%	1.15%	5.75%	6.90%	85.06%	100.00%
5 SEK	0	1	0	3	6	80	90
% of sample	0.00%	1.11%	0.00%	3.33%	6.67%	88.89%	100.00%
Total	7	7	14	26	43	255	352

8.10 Table: Kruskal-Wallis Test

Pant Value	Observations	Rank Sum
0	88	12141
0.5	87	14049.5
2	87	17346
5	90	18591.5

Chi-squared = 26.771 with 3 d.f.

probability = 0.0001

Chi-squared with ties = 43.353 with 3 d.f.

probability = 0.0001

The Kruskal-Wallis test shows that there are statistically significant differences between the respondents' likeability to panta due to the monetary incentive (χ^2 (adjusted for ties) = 26.771, df = 3[3], p = 0.0001)

8.11 Table: Variance Inflation Factor (A)

Variable	VIF	1/VIF
Frequency of Recycling Other Plastics	1.53	0.65357
Perception of Oneself as Environmentally Friendly	1.49	0.670868
Importance of Recycling	1.19	0.839019
Importance to Be Perceived as Environmentally Friendly by Others	1.12	0.892568
Importance of Monetary Pant	1.09	0.920775
Frequency of Pantning PET Bottles	1.05	0.955053
Pant Value	1.04	0.963607
Mean VIF	1.21	

8.12 Table: Variance Inflation Factor (B)

Variable	VIF	1/VIF
Income	1.35	0.741219
Education	1.22	0.822646
Age	1.19	0.839938
Employment	1.19	0.840906
Access	1.06	0.943188
Female	1.06	0.944517
Urban Areas	1.06	0.947866
Pant Value	1.05	0.953673
Mean VIF	1.15	

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[3] Degrees of Freedom of Kruskal-Wallis = (k-1) = 3.