Waste sorting at the household level.

-A study of motivation and behavior behind sorting of household waste when an external incentive is present.

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Preface

This thesis is the final assignment for obtaining a master's degree in International Environmental Studies at Noragric, University of life sciences (UMB), Ås 2010. It is a part of a larger project, Environmental Policy and Human Action (ENVACT), financed by the Norwegian Research Council and led by professor Arild Vatn at Noragric, UMB. The thesis is a 30-credit work and is written under his supervision during the spring semester 2010.

Writing a master's thesis has been both challenging and interesting. Developing a questionnaire is a thorough task and dealing with statics and software for handling it has been a demanding procedure. Still, when standing close to the finish line, working with the thesis has been a great educational experience.

Lastly, I would like to thank the librarians at Noragric for all help finding literature, Marit Heller for inputs when developing the questionnaire, and those who stood by me during my struggles with statistical procedures. But most of all, I would to thank my supervisor Arild Vatn, for invaluable hours of supervision.

Declaration

I, Mona Trehjørningen, declare that this thesis is a result of my research investigations and findings. Sources of information other than my own have been acknowledged and a reference list has been appended. This work has not been previously submitted to any other university for award of any type of academic degree.

Date: Ås 18.05.2010

Signature

Abstract

It has been recognized that individuals are representing a source contributing to a great proportion of environmental pollution as private consumption has elevated as a response to increased purchasing power. Today's culture where there exists a substantial consumption of new products, followed by a use and disposal culture, is not surprisingly resulting in increased disposal of waste at the household level. In 2008, on average, each citizen threw away 434 kilos of household waste. Of this, only 227 kilos were sorted (SSB_1, 2009).

Although there is an increased awareness of how to use common resources on earth sustainably to secure future generations the same possibilities as today's generations, we face the situation of a social dilemma. This is represented by the beneficial effect for society when all cooperates and contributes with desired behavior, which is here sorting of household waste, whereas for the individual, it is not rational to cooperate with sorting, as he or she reaps the benefits of other's contribution anyway. Hence, although sorting has been regarded as a moral act, if everyone thinks and acts according to reaping the greatest benefits individually, society loose, and a collective choice problem has appeared. Therefore, policies must be developed to promote socially desirable behavior since there seems to be a competition between rationality anchored in what is best for society, a 'we-focus' versus a rationality anchored in what is best at an individual basis, the 'I-focus'.

From January 2009, it is no longer legal to deposit organic waste, something that has led authorities to developing waste regimes for increasing sorting at source. Each municipality could, however, decide what kind of regime to develop and use. Ulstein, a municipality located in the south of Møre and Romsdal, Norway, introduced a differentiated fee on unsorted waste, to increasing incentives for sorting. The system is based on weighing households' unsorted waste when collected, which is taxed with 2.24 NOK per kilo in addition to a moderate flat yearly fee (1356 NOK in 2009).

Turning to theory, one finds different explanations for what motivates behavior when introducing an economic incentive. In this study I have mainly made use of neoclassical economic theory, classical institutional theory, and theory from social psychology. According to the neoclassical assumption, behavior is guided by external incentives, and individuals should not voluntarily be sorting household waste because

it represents a cost in time and effort. Therefore, as the economic incentive is introduced, one expects a different response; no sorting now represents a cost through the fee and, accordingly, individuals will earn more if they sort by paying less. The classical institutional position, on the other hand, takes its point of departure in societal values based on moral and 'the right thing to do'. Sorting of household waste is regarded as a moral contribution to society, which, by the introduction of an economic incentive, may be undermined by a shift in logic of why one is sorting. Nevertheless, there are different aspects contributing to explaining behavior. Habits are found by the social psychologists to play a substantial role because it represents routinized behavior, which may not be based on continuous reasoning of why undertaking an act. The institutional position also recognizes habits, but finds habits to stem from conventions and norms. Lastly, how individuals perceive themselves or wish to be perceived by society may contribute to explaining behavior, by focusing on feelings within the individuals when acting in accordance with what is seen as morally right.

The goal of this thesis has been to investigate the effects of the waste regime in Ulstein, and its effect on motivation, and hence, behavior, to see what motivates sorting of waste at the household level. This is specified through the following research questions:

1. What is the level of waste sorting in Ulstein? Has it changed with the introduction of the new regime?
2. What motivates sorting of household waste in a regime using an economic incentive to promote sorting?
3. What role do motivational factors play when explaining waste sorting behavior? And how could a change in fee affect sorting?

Information about the households' motivation and behavior related to sorting of waste has been collected through a web-based survey. The sample exists of 197 randomly chosen households in Ulstein. It is a quantitative study where the results are based on findings from statistical analyses of data.

The results are represented by a sample with an overrepresentation of males, 66%, where 67.5% of the respondents are in age level 40-66 years. 43.7% holds a university degree, and 90.9% of the respondents live in houses. The findings from the

study shows that the motivational factors for sorting of household waste are economic incentives, personal norms, social norms and encouragement from the authorities. The regimes infrastructure also seems to play a role for respondents to increase or begin sorting of household waste. Knowledge about the attributes of the regime and attitude toward it did not prove to be a statistical significant factor for explaining behavior. Neither did neighborhood institutions.

There exists no numbers on earlier levels of household waste for comparison, but after the implementation of the new regime in January 2009, making use of a differentiated fee, 48% of the respondents states they have increased their sorting level. 51% of the respondents have stated their sorting level to be high, 20% that they are sorting quite much, and the rest rather low: 28%. Hence, there is still a potential for improvements. When looking at sorting of different waste categories, categories that are arranged for at source by the regime, like paper and plastic, are sorted at a high level. Categories that the individuals have to arrange for he or her self, by bringing to return points, have a slightly lower sorting level. Organic waste, a category that needs to be arranged for at source by the individual when not arranged for by the regime, is sorted at a very low level. Nearly half states they are not sorting any of their organic waste, and this represents a challenge for the regime. When asking about how hypothetically changes in the differentiated fee would affect sorting level, 26% states they would increase sorting and 54% would continue sorting at present level if it was increased from 2,24 NOK to 5,00 NOK, whereas if decreased to 0,50 NOK, 76% would maintain and 10% would increase.

The findings show that motivation clearly is important for explaining behavior. In this study economic incentives have been found to be a significant factor for explaining behavior together with personal norms and habits. Theory suggests a crowding out of personal norms when introducing economic incentives. I cannot conclude whether or not there has been a crowding out as the incentive may have led to a compensated level of sorting. If hypothetically decreasing the fee, on the other hand, would lead many to decreasing their effort, a crowding out effect could have been observed since a low fee would equal just a minor incentive, and hence, those solely motivated by the incentive would lower their efforts.

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1. Introduction

"Recycling is neither mysterious nor difficult;
the biggest problem has shown to be to changing the habit from throwing everything into one bin to having several bins for different types of waste. However, when a new habit is achieved; it does not take longer time, it is not more expensive, and it does not cause other problems than before. A large part of the problem lies in the habits we choose to have regarding our disposal of the waste"
(Teknologisk Institutt, 1995:47).

1.1 Background

During the last forty years mankind has used the same amount of goods and services as all the past generations together. Most of these products are produced and used in the industrialized part of the world due to continuous improvements in technology and production processes. The increased supply of goods and services, elevated standards of living and a society ridden with time scarcity, has led to the development of a culture where use and disposal of goods is regarded as normal. People choose simple and cheap products instead of lasting quality products, and throw away easily before buying new. According to Statistics Norway (SSB_1, 2009), household waste has increased substantially, and in 2008, on average, each citizen threw away 434 kilos of household waste. Of this, only 227 kilos were sorted. Hence, one of the main challenges for the authorities is to reduce the amount of waste by increasing recycling and reuse at the household level through using policies that are promoting environmentally desirable behavior, since waste has become a result of our modern and consuming lifestyle (Teknologisk Institutt, 1995).

Enhanced awareness of the consequences that our lifestyles have on the environment and its ecosystem services, has led to elevated focus on pro environmental behavior. Pro environmental behavior can be defined as behavior aimed at reducing stress on natural resources as well as wise and sustainable use. Increased consumption, leading to rising levels of household waste, has led to elevated attention in relation to the designing, and implementation of environmental policies and regimes. Sorting and recycling of waste at the

household level is an area that has gained attention in the last couple of decades because it has been widely recognized that private consumption aggregates a substantial amount of waste.

Because the environment, from which humans extract resources often is a common good, like for example air and water, the actions of one will affect opportunities faced by others. Even if polluting on private, open or state grounds, one man's actions have the potential to affect others. For example, if my neighbor pollute, it will eventually affect me, and the opposite. Keeping this effect in mind, it should therefore be in the interest off all to contribute to preventing this effect by decreasing the impact on nature and people, as everyone then is better off. In real life, however, it is seen that people do not always act in ways that are socially optimal; rather, they behave rational on an individual basis, pursuing what is best for themselves, regardless if their actions do not benefit society. Although society would benefit more from cooperation in these situations, individuals reap greater benefits by not cooperating, and hence, we have a social dilemma situation. Social dilemmas or "collective choice problems" are situations where conflicting interests arise and where outcomes may be rational for individuals but socially detrimental (Vatn, 2005:1). Further, in situations where everybody seems to act in accordance with what is in the interest of all, individuals will cheat, or free ride because it benefits them more. A free rider wants everyone to participate, whereas he himself does not, but only reap the benefits from others' contribution (Vatn, 2005).

Until recently, in Norway, sorting efforts have, to a large extent, been a voluntary activity, mostly driven by a moral obligation to contributing to a cleaner and healthier environment. As a contribution to the common good, the more recycling, the less burning and depositing of waste, the better it is for the environment and, hence, the better it is for us. Household waste is collected through different renovation facilities provided by the municipalities and transported to combustion facilities or deposits, both contributing to, amongst other things, increased emission of climate gases, environmental toxins and dust, all substances that have long term damaging effects on the environment and on human health.

The authorities have, in several countries, implemented market-based instruments in order to promote desired behavior related to environmental concerns. Weight based or volume based fee systems are introduced as an economic incentive for households to increase their levels of

sorting and thereby gain more in the form of lower fees and, in addition, to underlining the importance of the activity by giving it a value.

1.2 Purpose of the study

The purpose of this study is to increase our knowledge regarding how motivational factors affect behavior when there eventually are environmental effects and indentify what is the motivation behind behavior under a specific regime using an economic incentive to promote sorting of household waste. By assessing whether the regime has a positive or negative effect on motivation and behavior, the results may be of interests when the regime is evaluated, or when policies are developed to target a certain behavior. Increasing our understanding of how motivation affect behavior as well as looking into what factors that are motivating individuals to behave in a desired manner, is important in situations where social dilemmas may occur, like sorting of waste.

By looking into how a regime is affecting behavior at the individual or household level, this study will be able to help highlighting factors that need to be taken into consideration when designing environmental policies when what is desirable at the individual level, is not socially desirable. Since avoiding social dilemmas is preferable, the policies aimed at targeting behavior should be designed to promote behavior that takes the welfare of all into consideration. Because motivation is an important issue in this regard, identifying which motivational factors are dominating should be looked at. It should also be worth remembering "the environmental impact of personal, private sphere environmentalism is important only in the aggregate when many people do the same thing" (Stern, 2000:10786). This may influence on individuals' willingness to comply with regimes and institutions because if not implemented properly, the result may be limited acceptance of the regime if the average interpretation is that people do not comply or that the regime does not work, and hence, lack of will to contribute.

1.3 Objective and research questions

Objective:

The main objective of this study is to look at what motivates socially desirable behavior, sorting of waste, in a regime where a market based instrument in the form of an economic incentive, has been implemented to influence behavior. Since sorting of waste historically has been based on a voluntary contribution to the common good, it is of interest to studying how or whether a market based mechanism is affecting motivation and hence behavior. Is socially desirable behavior guided by norms, hence an institutional approach of how to behave in society or do economic gains and focusing on individual utility dominate, or are there other factors for explaining behavior?

The research questions for this paper are the following:

1. ***What is the level of waste sorting in Ulstein? Has it changed with the introduction of this new regime?***

2. ***What motivates sorting of household waste under a regime using an economic incentive to promote sorting?***

3. ***What role do motivational factors play when explaining waste sorting behavior? And how could a change in fee affect sorting?***

2. Background information

2.1 Historical perspective on waste

Waste can briefly be defined as "something we do not want, or something we do not manage to use for its real intention or creation. It can be an undesired bi-product stemming from a process, it can be something that is transformed to waste when its owner do not want to possess it any longer, or finally, when something is used in a way which does not fulfill its original purpose, it is transformed into waste" (Torstenson, 1995:6, my translation).
Waste is perceived as something dirty and, culturally and historically recognized as pollution and an unwanted element (Torstenson, 1995).

Organizations and large firms have been regarded as the greatest polluters, it is, however, more and more recognized that individuals act as a source contributing to a great proportion of environmental pollution. Stern (2000) points to the reduction in pollution emanating from large firms due to formal regulations, which has led to an increased focus on individuals as becoming "an increased source of pollution" (Stern 2000:10785). Although benefits from pro environmental behavior and awareness of the consequences of not acting in a pro environmental manner are widely recognized, the level of recycling and sorting of waste should become greater. Today, sorting and recycling can be seen both as a response to increased consciousness, but also due to policies implemented by the authorities and information campaigns (Berglund, 2003; SSB_1, 2009).

Recycling is not a modern phenomenon, and by going back in history, literature reveals that waste recycling was also emphasized in earlier time periods. Modern recycling is suggested to have begun during the World War II "as households were exhorted to save paper, cardboard, metals, rubber and other materials to contribute to the war effort […]. Monetary reward or environmental concern, it is concluded, was not the main motivation for participating" (Ackerman, 1997:15-16).

Recently a field of environmental history, emphasizing waste and pollution and its influence on ecology, has started to emerge (Torstenson, 1995). The increased awareness today regarding how waste is polluting and thus affecting the environment surrounding us, has led the authorities to designing and implementing different policies for trying to increase peoples' motivation to enhancing their level of sorting. Solid waste can be transformed through a

process of burning and organic waste can be transformed to dung, however, much can be reused and, therefore, has the potential to leave the chain and decrease the amount of unwanted waste and hence the level of pollution (Torstenson, 1995).

2.2 The Norwegian regulations for management of household waste

The main goal of Norwegian waste policy is to reduce the production of waste in addition to encouraging reusing and recycling. In July 2009, a formal prohibition entered Norwegian law banning all dumping of organic dissolvable waste. However, municipalities in Norway currently pursue different strategies for encouraging waste sorting at source; no communal available arrangement for sorting - which is leaving households to decide for themselves the degree of sorting, municipalities with sorting and a flat fee and, lastly sorting with a differentiated fee in relation to volume or weight (Loop, 2009).

Managing of household waste is in Norway under the jurisdiction of the Ministry of Environment and the Norwegian Authorities of Pollution Control. These are the organs providing guidelines for waste management regulations. The government's objective is to enhance the level of knowledge about the burden our way of living is inflicting on the environment and stimulate to sustainable use of natural resources. This objective, amongst other, is in accordance with the Brundtland-report of 1987; to avoiding harm on people and nature by emphasizing lessening of the burden we are putting on the environment, and thereby also to minimizing damage on people and land caused by waste. This is done through focusing on the development of economic incentives and regulations, and policy instruments at this level, in addition by increasing knowledge and information. The target at the national level regarding generating of waste is to keep it at a lower rate than the economic growth in the country (Miljøverndepartementet, 2007).

The different municipalities hold the full responsibility of the collecting of waste and must decide on appropriate taxes to cover their expenditures on waste handling and management, for example a differentiated fee based on the weighing of household waste as seen in Ulstein. According to §34 in the regulations for waste, the municipalities should contribute to enhanced levels of recycling activities and emphasize waste reduction, and this can be done through introducing differentiated taxes. Many waste companies are owned by more than one municipality and carry out their services across municipalities, in the private sector as well as

in the public sector. The waste company, according to the operation of the company, suggests the fees but the municipality has the last say through voting in the commune-board (Miljøverndepartementet, 2007).

Household waste is normally picked up by the curbside by waste trucks. Other kind of trucks collects sorted waste like paper and plastic. Waste that is not picked up by the trucks should be delivered to collection/return points that are placed in the local neighborhood. This is typically clothing, glass without refund, metal, and environmentally harmful components like for example paint, oil and used batteries. Electronic articles should be handed in to the nearest shop selling electronic articles. In most municipalities in Norway, a system for collecting sorted paper and plastic as well as smaller amounts of special waste is established, and some have subsidized systems for compost (Miljøverndepartementet, 2007; Loop, 2009).

2.3 Study Area

Ulstein is a municipality situated in Møre and Romsdal in the south of Sunnmøre. Measured last time, 01.07.2009, the number of inhabitants were 7 228. Its city centre is Ulsteinvik with approximately 5000 of the inhabitants. The municipality is rather small with an area of just 97 km^2. According to statistics Norway only 0.3% of the inhabitants live in blockhouses or apartments, indicating that most of the inhabitants in the municipality live in houses (Garshol, 2010).

Ulstein did in 2009 establish a system for picking up household waste using trucks with a weight system for measuring the amount of household waste delivered by the households. The waste service is taxed with a rather modest fixed fee (1356 NOK) to pay for the services and, in addition, a differentiated fee (2,24 NOK) depending on the amount measured in kilograms of unsorted household waste delivered. This structure of the renovation regime is intending to give households an economic incentive to increasing their efforts and levels of sorting as those who sort much are rewarded economically by paying less. The more sorted waste one delivers-the less waste fee one has to pay and the more money one save (Reinhaldsverket, 2009).

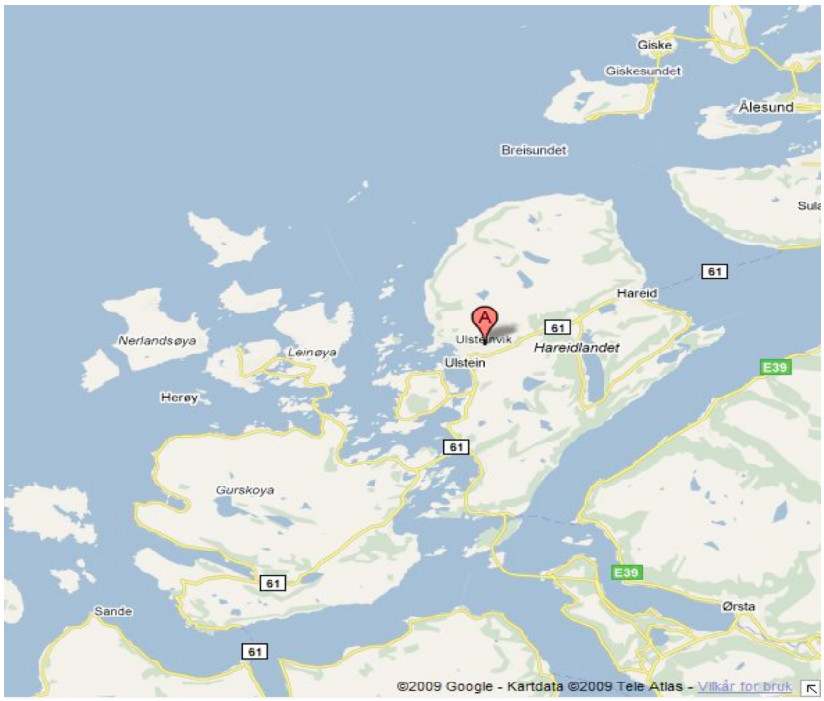


Figure 1. Picture of the area surrounding Ulstein. (Source: Google maps, 2010)

3. Theory

In this study the main task is to study what motivate behavior when desired behavior puts a cost on the individual but benefits the society. Desired behavior, which here is synonymous with sorting of household waste, has originally been interpreted and carried out as a voluntary act, however, since modern consumption patterns have led to massive amounts of waste accumulation together with a new law banning the use of landfills, new policies, using incentives to altering behavior, are being introduced.

Sorting of waste is by no means a new phenomenon and it is of interest to assessing the effect of an inclination of an economic incentive because it is doubtful that the desired behavior can solely be explained by economic motivation. Research has found that introducing external motivating factors, like economic incentives, in contexts where internal motivation dominates, may lead to a crowding out of the internal motivation. A shift to a dependency on the external motivation may thus occur for maintaining the behavior based on internal motivation (Frey, 1997). Considering this, it is of interest to study what motivates behavior, when an external incentive is introduced.

This study is based on theory from neoclassical economic theory, game theory, classical institutional economic theory, sociology and social psychology, and in the following sections core aspects of these theories are presented.

There are two main points of departure used in this study from which human behavior can be explained; the position regarding man as mainly pursuing his own interest, which we find in neoclassical economic theory, and the position holding institutions as important for man and where reality is seen as socially constructed guided also by social norms. Alternative explanations are offered as well which are explaining behavior by using the utility function as a point of departure, and the existence of habits. The different positions are presented in the following sections.

3.1 Individual explanation: Neoclassical economic theory

In line with the neo-classical position, individuals are assumed to be individually rational. Rational is in this position synonymous with maximization of individual utility. The assumption is that individuals hold stable and given preferences and predefined capabilities, leading them to choosing the best option given these preferences and capabilities. The position assumes information to be cost free and complete implying that transaction costs are zero. Rationality is, according to Vatn (2005:113) "universally defined as maximizing individual utility". Vatn (2005) finds that acting rationally is consisting of two things, rational preferences and ability to make calculations. Preferences are only rational if they are complete; they can be ranked, transitive; the ranking is logic, and continuous, they are distinguishable. In neoclassical economic theory, equilibrium outcomes are created by rational individuals that are holding stable preferences, voluntarily participating and interacting to maximize utility (individual). Because information- and transaction costs are held to be external, and private property rights for exchanged goods are ascribed to the individuals, the equilibrium outcomes are possible (Dobson and Palfreman, 1999).

According to neoclassical economic theory, preferences are independent of contexts, which imply that "the choice is independent also of the social context – the institutional setting" (Vatn, 2005:114). Maximizing own utility is what motivates, and "institutions are only regarded as external rules which are not forming individuals, rather, they only establish the stage at which the individuals act" (Vatn, 2005:11). Etzioni (1988:5) holds, "the neoclassical paradigm either does not recognize collectives at all, or sees them as aggregates of

individuals, without causal properties of their own, and as external to the person. The individual is viewed as standing detached from the community and from shared values, calculating whether or not to be a member, whether or not to heed the values' dictates".

Policymaking is by the neoclassical stance, regarded as "a technically rational procedure" which is divided between the market and the state. The latter's task is to maximize social welfare, and this is especially important in situations where market failure occur. Market failure is defined as situations where the costs arising are external to the market and where the role of the state is to "create solutions as if markets had existed" (Vatn, 2005:103). In many situations, the individual utility maximization may be a good way of explaining how choices are made at the individual level; however, one may observe actions, which, according to neoclassical economic theory seems irrational by not being maximizing. In the neoclassical position independency is emphasized; preferences are not influenced by other contexts. This, however, can be questioned as people are seen to make choices that are depending on others' choices. This interdependency can be shown in game theory.

Game theory

According to the neoclassical position, social organization is accomplished through exchange (Etzioni, 1988). When externalities occur, like pollution, one can say that the actions of one affect the opportunities faced by others. In the case of pro environmental behavior and sorting of waste, negative externalities will be equivalent to pollution caused on the society by the waste from a household not sorting. According to neoclassical economic theory, "members of a household will seek to maximize their total utility, which is just another way of saying that members of households try to make themselves as well of as they possibly can in the circumstances in which they find themselves" (Lipsey and Steiner, 1975 quoted in Etzioni, 1988:24). Thus, if sorting of waste is perceived as costly, undertaking the activity is not rational and should therefore not take place in the individual's household. The same individual, however, will seek to reap the gains from others' sorting of waste, and hence he or she would want others to sort.

When externalities arise, predicting human behavior on the basis on maximization is not as easy. In real life interdependency becomes apparent, as individuals will face situations in which trade-offs have to be made to avoid too large costs. For example would costs associated with compensation in relation to household waste in this case be tremendous and,

the question is, how do individuals adjust in a situation where transaction costs are substantial? The prisoner's dilemma is a classical example used to show various outcomes of behavior when an individual is faced with different options of choice.

The Prisoner's Dilemma

Game theory can be translated into many real-life situations, for example environmental problems like sorting of waste. It aims to predict "how rational individuals make decisions when they are mutually interdependent" (Romp, 1997:1). Game theory shows that in many situations, the welfare of one depends on another person's actions. Most often the games are found to be non-cooperative, and players are individualistic and self-regarding (rational), and not able to make binding agreements, unless it is in their self-interest. This means that individuals have incentives to act strategically so as to reap the greatest benefits according to their preferences. This can be illustrated through a prisoner's dilemma game:

A prisoner's dilemma game is a game played by two prisoners, which are held in confinement. They do not have the possibility to talk to each other, and the game is about how they are faced with an opportunity to lower their imprisonment depending on their level of cooperation. In this game, options are viable, but the one player does not know the move of the other player (italics added) (Romp, 1997).

Individuals face two options, either to cooperate or to defect/free ride. If the collective is to benefit, however, everyone must participate. It is, on the other hand, rational on an individual basis not to cooperate and thereby save time, effort or money as the individual would gain if all others but him or her cooperates. In addition, the individual might think that his or her action would not make a substantial contribution for the environment, and thereby, what is rational for the individual is socially detrimental. Following figure is an example on a prisoner's dilemma game between a household and the collective.

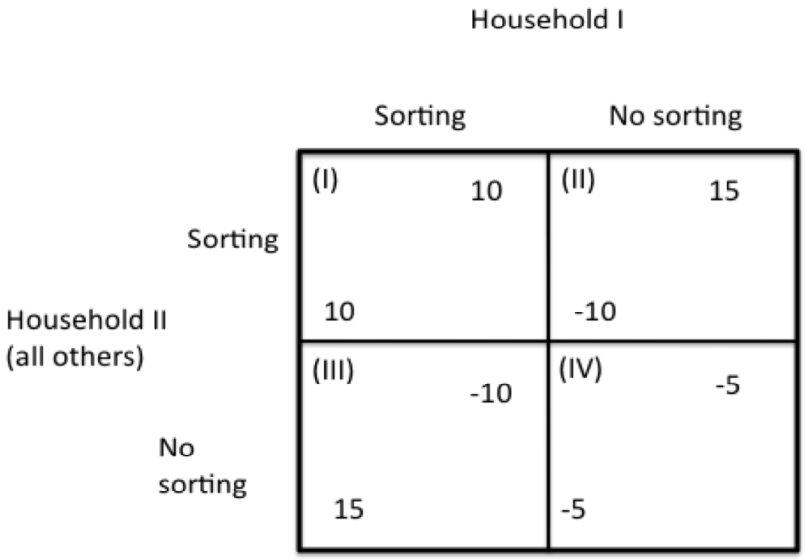


Figure 2. Matrix on the prisoner's dilemma. Source: (Vatn 2005)

Household I face two options: sorting (cooperating) or no sorting (defecting). Household I will be better off if other households are sorting whereas household I itself does not (II). Thereby household I will avoid the costs associated with the activity like smell, time-use, pests and vermin, and at the same time enjoy the benefits stemming from the activity undertaken by other households, like less pollution, smell, and so on. If other households (II) defect, then household I stand to loose from sorting (III) as it will face all individual costs but only minimal, if any, effect of pollution. An eventual optimum would be if every household mutually agrees to cooperate (I). This optimum, however, is not reached because all households are choosing strategically, that is defecting, and the outcome is that no one are sorting (IV) which is not the best option for society at all.

The prisoner's dilemma represents a problem of social order, and can be described as a war of all against all, indicating that there is a gain for all by cooperating, however, from an individual point of view, it is most rational to defect as the individual assumes that the other chooses strategic and rational. The neoclassical paradigm is according to Etzioni (1988:ix) "utilitarian, rationalistic-individualistic and, applied not only to the economy, but also to the full array of social relations".

3.2 Classical Institutional Economic Theory

Questions have been raised about the approximation of interpreting individuals as maximizing own utility and using this when explaining behavior, and Etzioni (1988) find people to have more than one 'want', utility, as seen in neoclassical economics. Accordingly, they do live up to moral values, he claims, and are choosing means not only on the basis of selfishness and rationality, but based on emotions and values. Individuals are members of a community and shaped by the institutions within this community, thus acting within a larger system, the social context, a context that consists of institutions. This context is, according to Etzioni (1988:5) perceived as "a legitimate and integral part of one's existence, a '*we'*, a whole of which individuals are constituent elements" which leads us to the next position of importance in this paper.

Classical institutional economic theory represents an alternative way of explaining human behavior and motivation. Society is interpreted as consisting of institutions that are built up over time and, which by Berger and Luckmann (1967:71) are defined as "shared habitualized actions available to all members of a social group". Humans are shaped and regularized by processes rooted in institutions, which are socially defined constructs that regularize human action in situations where many individuals are involved and without holding the same interests (Vatn, 2005).

Institutions can be defined as "cognitive, normative, and regulative structures that provide stability and meaning to social behavior" (Scott, 1995 quoted in Vatn, 2005:10) by "mediating the contexts of choice" (Vatn, 2009:188). Defining what is seen as the right thing to do socially by highlighting which rationality should be pursued, plural rationality, which is rationality based on what is best for society, is seen as one of the functions of institutions. Institutions present in society today, and well known by all, are: language; how to communicate, throwing trash in bins placed on public places, and finally, the law which is legally defining what one may or may not do.

The role of institutions: the institutionalization process.

"People are the products of the social conditions under which they grow up and live, they are formed by the institutions of society", and everything is socially constructed. Society is "perceived through concepts that are collectively produced" (Berger and Luckmann, 1967 quoted in Vatn, 2005:11).

Institutions function to help humans act in the right way, more precisely, doing what is rational and expected in society in which they live. Since humans can only be said to be boundedly rational, meaning that in a complex world they have no possibility knowing about every option available, and therefore are choosing the best option that is available for them, institutions work as guidance for their choices. What is considered as the right behavior in a situation affect preferences and it is not always individual preferences that count. Nevertheless, different settings are supporting different rationalities, and in some contexts what matters for society is of utter importance whereas in other contexts pursuing own interest is regarded as the right act, depending on the present institution (Vatn, 2005).

Vatn (2005:79) argues, "a high level of (local) acceptance of rules and rights largely creates a self-policing environment. People will normally abstain from causing what is considered to be a nuisance. Those who still violate the rules will have to face the reactions of people living there". Hence, institutions are often "formed to secure that the cooperative outcome becomes a viable option" (Vatn, 2009:189). Berger and Luckmann (1967:99) conclude "institutions have a tendency to persist" when a pattern of behavior is established in society, and by adhering to institutions under different societal settings, human behavior is guided towards a state agreed upon by society or decided upon by authorities. Not complying may lead to sanctions; moral or legal, or, both, depending on the situation (Vatn, 2005). Institutions consist of conventions, norms and formal rules, and are presented below.

Conventions

Conventions are "codes of behavior" (North, 1990:4); they simplify life by "coordinating behavior through creating regularity"(Vatn, 2005:6). Vatn (2005:63) states, "the typical characteristic of a convention is that it solves a coordination problem by structuring and classifying".

A convention can be said to be developed from below, that is, behavior that is *learned* and *repeated* and which eventually becomes the norm; how things should be done. North (1990) is defining conventions as informal, as they have no roots in formal regulations but are developed over time as the most rational way of doing things. Conventions are first of all how things are being done practically. Then they can be transformed into norms, which imply that individuals accept the rationality behind the acts and begin to conduct the behavior

because it is interpreted as the right way of doing things, they have become socially accepted cues. Examples of conventions are language, greeting by shaking the right hands, or throwing litter in the trashcan - to keep it tidy.

Norms

Schwartz (1970:130) defines norms as "social specifications of desirable behavior in particular situations that provide the actor with potential directions for his or her action to take". Norms are by Vatn (2005:7) defined as "responses to questions regarding what is considered the right or appropriate behavior" and, thus, internalized through processes in life. Norms support the values around which they are formed as they are followed, and in general Vatn (2005:7) holds that norms are "concerned how we treat our fellows".

A norm says what you ought to do or not, and failure to adhere to recognized social norms might entail a threat of social sanctions, either imagined or real, and if that is the case, the norm cannot be said to be internalized in the individual. "If norms are fully internalized, they are followed independently of whether others know and can punish those breaking the norm" (Vatn, 2005:123). Additionally, not following the norm may lead to a feeling of guilt because behavior deviates from what the individual regard as morally desirable behavior. When the guilt feeling occurs, external sanctions will not be necessary because the right behavior is chosen over the undesired one. Further, when norms become internalized: this is how one should do it, and the act is routineously performed, it may develop into a habit. Since individuals interpret behavior that is accepted by society easily, a behavioral pattern is generalized as a norm and eventually internalized so as to become the pattern of behavior. Normative behavior may indeed also be a response to reasoning done by the individual to avoiding either social sanctions or the guilt feeling occurring from not adhering to a social norm or an internalized norm (Berger and Luckmann, 1967).

Both conventions and norms may transform into habits, because when "learned sequences of acts […] have become automatic responses to specific cues" […], the result is a habit (Verplanken and Orbell, 2003:1314). A habit is behavior that originally was intentional but that has developed into behavior based on routine and repetition, no matter whether the behavior is regarded as morally correct or not. Habits can be developed through a learning process, either internalized via conventions; like a child seeing how its parents perform an action and then the child repeats it, norms; interpreting that this is how it should be done, or

habits can be developed through experience and due to bounded rationality. Hence, habits can be explained differently; originating from conventions and as a repetitive response to a coordination problem, or from norms as a response to how procedures are interpreted as morally right or because individuals are boundedly rational and has an established routine.

Vatn (2005:119) understand habits as "forms into which satisfying rules materialize […] via procedures that are seen as capable of producing satisfactory results". Verplanken and Orbell (2003:1314) hold that "behavior may become automatic through satisfactory repetition of a specific response that is triggered by a specific cue in the environment". Accordingly, when a habit is developed, individuals no longer need to make decisions but act automatically, however, as a side effect; the reasoning behind performing an act is lost. This makes habits efficient in the sense that "they free mental capacity to do other things at the same time, for example in situations with too much information, time pressure or distraction" (Verplanken and Orbell, 2003:1317). On the other hand, when behavior is performed only based on routine, the side effects may become an issue, like for example pollution from always driving a car when going somewhere, always throwing household waste into the same bin, or non responsiveness to price signals and other behavior performed on routine.

Bargh (1994,1996, quoted in Verplanken and Orbell, 2003:1317) find that automatic processes in our daily lives are characterized more or less by four different features, "unintentionality, uncontrollability, lack of awareness and, efficiency". Accordingly, "habits can be characterized as behavior that is intentional in its origin, is controllable to a limited extent, is executed without awareness, and lastly, is efficient" (p.1317). Social psychologists find habits to be intentional by being functional and goal directional, rather than to being conscious and planned, like taking the car automatically to go somewhere. The goal is to efficiently reach the destination. On the other hand, they find that habits have an ability to appear uncontrollable by being tough to overrule, and additionally, habits work as triggers of future behavior. "In principle, habits should be controllable by deliberate planning and thinking" (Verplanken and Orbell, 2003:1317), but "given that fully rational deliberation about all aspects of behavior is impossible because of the amount of information and computational competence involved, human agents have acquired mechanisms for relegating particular ongoing actions from continuous rational assessment" (Hodgson, 1988:125).

From a social psychological angle, the fact that since "habits are part of how we organize everyday life" […], they are seen as a possible reflection of "[…] identity or personal style" (Verplanken and Orbell, 2003:1317). Habits are also held to play a role in economic behavior, due to the embossment of routine, but the neoclassical economists do not recognize the importance of habits as routine. Rather, habits are seen as purposeful and rational action undertaken because it will be too costly to changing the behavior (Hodgson, 1988). This view is questioned as it is argued, "in general, people do not knowingly perceive or calculate the cost of dropping a habit. Nor do they always acquire habits from conscious and rational choice" (Hodgson, 1988:125). In addition follows the question of bad habits if habits are seen to represent optimality.

Formally sanctioned rules

Formal rules are the last institutional construct. "Rules are backed by the formalized power and sanctions of the collective; of third parties like the state" (Vatn, 2005:7). These rules, backed by the authorities, will have the ability of sanctioning behavior classified as forbidden by law. For example, violating private property rights may lead to formalized punishment, like a fine, but also stricter methods exists, like prison. Formal rules help creating order where interests may be conflicting in the collective era, like for example when social dilemmas arise like shown in the section presenting game theory, and helps maintaining different regimes (Vatn, 2005). Formal rules are the last institutional tool used to create order in society, and they are implemented when situations occur where behavior must be regulated and gains must be transferred from rational individuals to society. Formally sanctioned rules are based upon adopted proposals from political parties, and environmental policy has gained increased attention the last decades as it has become more and more evident that human lifestyle is degrading the environment and, hence, is limiting the possibilities for future generations.

Environmental policy

Policies are by the neoclassical stance regarded as a technically rational procedure, divided between the market and the state. The latter's task is to maximize social welfare, and this is especially important in situations where market failure occur. Market failure is defined as situations where the costs arising are external to the market and where the role of the state is to "create solutions as if markets had existed" (Vatn, 2005:103). Pollution can be seen to be a market failure and is an outcome of a practical problem. People pollute because they solve

the problem they face in the cheapest way they can. The main task for policy is thus to create solutions to the pollution problem by establishing incentives or rules preventing the actual behavior by providing alternatives. One such alternative is incentives. Incentives are "something that attracts or repels people and leads them to modify their behavior in some way" (Field and Field, 2002:6). An economic incentive have the effect of channeling effort in a certain direction, and most often economic incentives are related to payoffs in economic terms. There are, however, incentives that, appearing non-material, also may direct behavior in the desired way. Examples are "the desire to preserve a beautiful visual environment or the desire to set good examples for others" (Field and Field, 2002:6). The welfare of the individual is for some, and most often economists, considered being the major desideratum of public policy. However, social regulation should not be grounded in individual values and preferences. For environmentalists, the welfare of society is of high importance and regulation should be based on the values shared by society as a whole (Field and Field, 2002).

In Ulstein a new way of paying for renovation services was introduced at the beginning of 2009, which use economic incentives to alter behavior related to sorting of household waste. The idea is that providing an economic incentive for reduced delivery of household waste would encourage households to increase their sorting an thereby limit their household waste production as this would cost them less than if they were sorting little or moderately. In addition, it provides incentives to search for other ways to reducing the production of waste, for example by buying foods without wrapping and start composting organic waste. Before the new system, households were paying a flat annual fee for having their waste picked up. This old system, however, offered no incentives beside moral values for households to increase their sorting, as the price did not differ whether one sorted all or nothing.

3.3 Rational choice and expanding the individual utility function

In addition to the institutional explanation holding institutions and plural rationality as most important when explaining behavior, and the neoclassical position focusing on individual maximization, there is another way of explaining behavior, which is an expansion of the neoclassical economic theory, regarded as a response to the institutional orientation. This is an alternative to plural rationality, which is focusing on expansion of the utility function, however, in another way than economic. Rational choice is here synonymous with maximizing individual utility and expansion of the utility function like in neoclassical theory, however, instead of seeing utility in monetary terms, the individual's personal and inner

feelings are held to be the motivating factor and which is leading to certain behavior in various situations (see for example Deci, 1975; Frey, 1997, Andreoni, 1990; Thøgersen, 1994).

3.3.1 The intrinsic motivation model

Psychologists find that individuals behave following motives coming from within; they are "induced by inner feelings" (Frey, 1997:13). Intrinsic motivation can be defined as motivation coming from within by the underlying desire or pleasure experienced by performing the action. The reward is the activity, which leads to the feeling of pleasure or desire (Frey, 1997).

Action based on intrinsic motivation expands the individual's utility function through producing a satisfaction in the individual, and which will lead to the continuing of performing such acts. By behaving supportive to social norms, the individual may experience a good feeling when undertaking the action because he or she knows this is the right behavior. Extrinsic motivation, on the other hand, is behavior motivated by factors external to the individual, like the fear of sanctions for not complying with social norms, economic incentives or legislation.

Theory on motivation suggests that intrinsic motivation can be both motivated, but also substituted by external incentives. For example, Frey (1997) has suggested that, in the psychological process, external incentives like economic incentives undermine intrinsic motivation due to what he calls the 'the hidden cost of reward', which has a function of crowding out the original motivation. When introducing external incentives that crowds out internal motivation, the individual now only will carry out the behavior if compensated for. The original motivation has been crowded out and substituted by selfish reasoning of whether carrying out the behavior or not. Thøgersen (1994) finds that the inner feelings may be affected in different ways, and presumably by the outside interferences. The damaging effect, leading to a passing of responsibility related to the task to the intervening force, together with a cease in the feeling of being acknowledged for undertaking the performance, is followed by a removal of the exhibition of motivation. If personal norms through the use of an external incentive like an economic incentive are found to being rendered irrelevant, Thøgersen (2003:200) has found "the behavioral impact of the regulation could be severely reduced and perhaps even reversed". He further holds that "a person's own interest in the behavior

becomes discounted when he or she is given an extrinsic reason for doing something he or she would have done anyway" (Thøgersen, 2003:198).

3.3.2 The warm glow of giving hypothesis:

Literature reveals that behavior can be based on maximizing individual utility based on the inner feelings of warm glow within an individual. These feelings arise when the individual is acting in ways sympathetic to others, for example contributing to something that is interpreted as socially desirable, and thereby provides the individual with a good inner feeling - a warm glow. The warm glow is perceived as a gain to the individual, whereas the contribution as a cost (Andreoni, 1990). Behaving in ways sympathetic to others often represents a cost on the individual, both in economic terms, but also regarding time and effort. The costs are, however, "outweighed by a satisfaction which is at least as great as the offer involved" (Vatn, 2005:124).

This warm glow is also referred to as selfish or impure altruism, as it presents an altruistic act that is founded upon maximization of individual utility. People do actually get rewards for behaving altruistically as they from the act alleviates their own feelings of sympathy for, in example, another person in pain. Thereby, the motive is not actually altruistic, however, but to relieve a feeling in one self and thereby feel better (Darley and Latané, 1970). Sober and Wilson (1998) calls pursuing the warm glow egoism because even though an act may be other-regarding, the act is, as an end, self-regarding because the preferences of an egoistic individual is satisfied when others are better off, because it produces the good feeling. According to Sen (1977:326) "it can be argued that behavior based on sympathy is in an important sense egoistic, for one is oneself pleased at others' pleasure and pained at others' pain, and the pursuit of one's own utility may thus be helped by sympathetic action. It is action based on commitment rather than sympathy, which would be non-egoistic in this sense".

Often acts are performed because this is how one is raised, but social pressure, sympathy or guilt, pursuit of prestige, respect, as well as "other social or psychological objectives" (Olson 1965 quoted in Andreoni, 1990:464) are factors contributing to the decision of performing an act. Nevertheless, helping an old lady crossing the street may in fact be an internalized norm working via a guilt feeling if not adhered to (Vatn, 2005; Biel and Thøgersen, 2007).

3.3.3 The self-image hypothesis:

Research reveals that people do contribute to charity and do participate on a voluntary basis even though these contributions represent a cost. Neoclassical theory finds it hard to explain why individuals still contribute. Brekke *et al.* (2003:1967), have used an economic model to explaining moral motivation, and found that "consumers prefer regarding themselves as socially responsible individuals, […] and are contributing to public goods by this preference".

The self-image hypothesis assumes individuals to "think of themselves as socially responsible individuals" (Brekke *et al.* 2003:1969), acting within a set of institutions that more or less signals what is the appropriate behavior, and, hence, must decide upon how to act; trading off desires for leisure with desires for acting in a socially desirable manner to achieve a good self-image. "Self-image is determined by a comparison of one's actual effort to the morally ideal effort" (p.1969). By deviating from behavior regarded as socially desirable, the individual may face the feeling of guilt, which can be seen to representing a cost.

3.4 Theory of cognitive dissonance.

When things do not make sense psychologically, they produce dissonance. According to Bem (1956, in Aronson 1978:194), "a person is the observer of his own behavior, […] and if a person observes that he performed for a large reward; he is less apt to believe that the behavior was a reflection of his real attitudes than if he performed it for a small reward" (p.194). Cognitive theories in social psychology suggest that people act in order to obtain rewards and that "activities which are associated with rewards tend to be repeated" (p.200).

"Dissonance is a negative drive state which occurs whenever an individual simultaneously holds two cognitions (ideas, beliefs, opinions) which are psychologically inconsistent" (Aronson, 1978:182). It is argued to be an unpleasant state that the individual seeks to reduce by altering the cognitions to make them more compatible, by adding consonant cognitions, with each other. Aronson (1978:183-184) holds that "dissonance theory does not rest upon the assumption that man is rational, rather it suggests that man is rationalizing – that he attempts to appear rational, both to others and to himself"; people reduce dissonance by "emphasizing the positive aspects and deemphasize the negative aspects of the chosen alternative while doing the opposite with the un-chosen one" (p.184).

Summary of different types of motivation

In summary, motivation plays a significant role for explaining behavior. The figure below gives a clear overview of the different types of motivations.

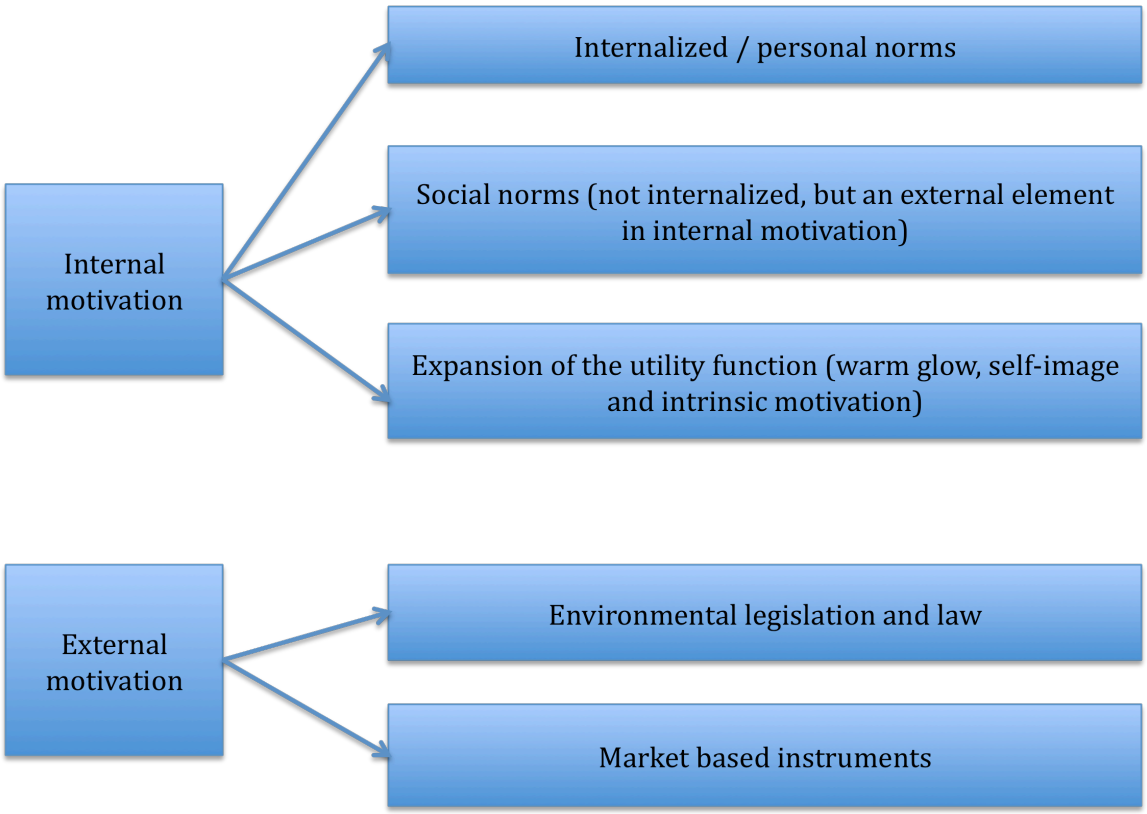


Figure 3. Different motivations.

Internal motivation is constituted by personal norms and social norms, and may if or when transformed into routinized behavior, transform into habits. Habits are persistent behavior, which may be difficult to alter because the reasoning behind the behavior eventually is lost when routinized. Expansion of the utility function is another theory that can also be a part of internal motivation. Through the achievement of good feelings and warm glow, increased self-image and so forth by acting, the individual is motivated to continuing the behavior.

External motivation is motivation based on external incentives. This can be legal prohibitions or market based instruments like economic incentives, which intends to promoting desired behavior by "changing the relative costs and benefits of environmentally beneficial behavior in order to make it profitable for the individual to behave in accordance with the collective interest" (Thøgersen, 1994:409). Additionally, external motivation has the ability to create

norms by influencing on individuals' interpretation of the importance of the reason for implementing external incentives.

3.5 Analytical framework for explaining behavior

Many factors may play a role in shaping motivation behind socially desirable behavior. The new system for sorting household waste in Ulstein, introduced in 2009, is based on economic incentives to promoting socially desired behavior by making it individually favorable to comply. Sorting has, nevertheless, and as mentioned in the introductory part, taken place without external incentives, and hence has been carried out on a voluntary basis. Therefore, since sorting of waste has not been enforced by formal law at any time, and perceived as a voluntary act, other explanations should be added. In chapter 3.1 – 3.3 different theories for explaining motivation and behavior were introduced, showing how individuals face different options regarding choice of behavior. In reality, however, the situation is more complex. Various factors may influence on the choices made by individuals, and therefore, I have developed a framework to try to explain how these factors may influence on behavior. According to the theory used, it has been relevant to develop a framework based on work by Vatn (2005) and Ajzen (1991) [2].

Vatn's (2005) framework for analyzing issues regarding use of resources is mainly depending on attributes of the resource and available technology, agents and agents' choices, institutions and, patterns of interaction. Ajzen's (1991) framework 'theory of planned behavior' holds subjective norms, attitudes and perceived behavior control to be of importance for the individual's intentional behavior because intention and perceived control are factors explaining behavior. The original frameworks are included in appendix III.

[2] For more information about the original frameworks used as point of departure for my framework, see Vatn (2005) and Ajzen (1991).

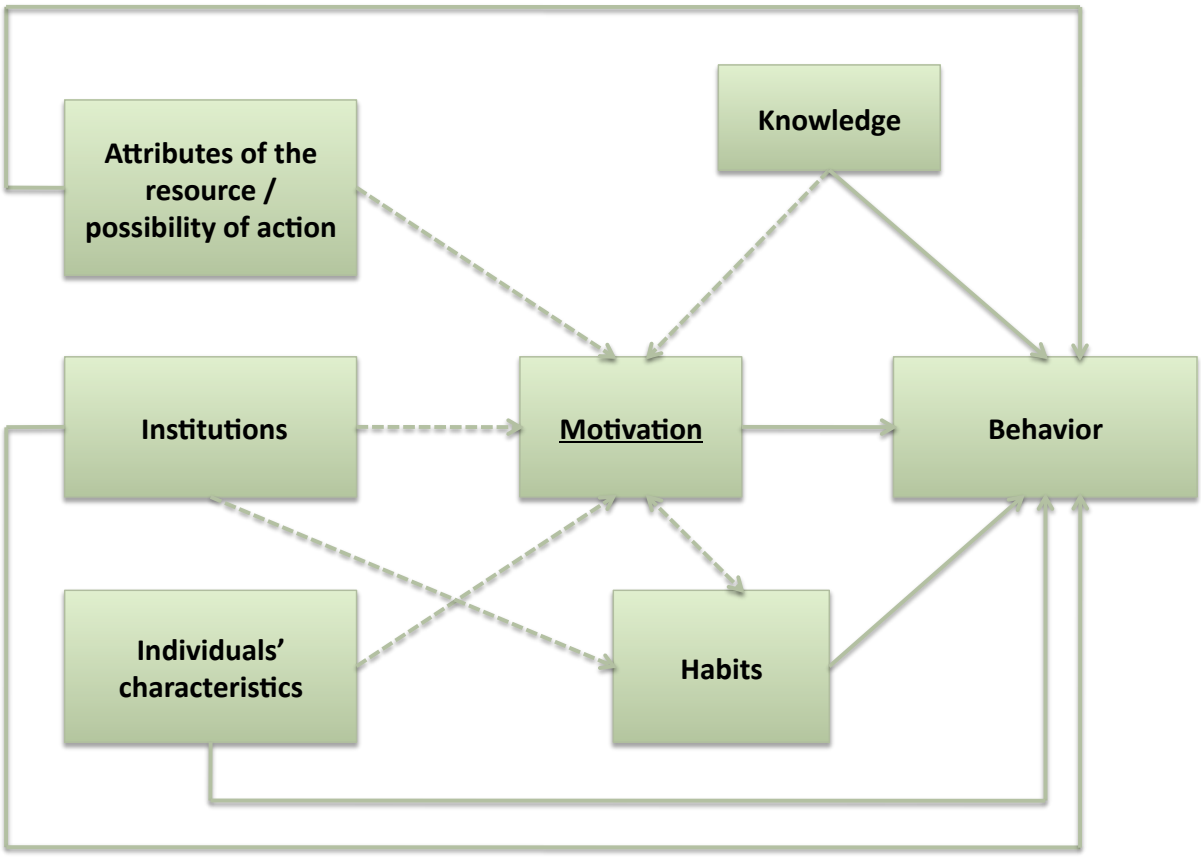


Figure 4. Framework for analyzing behavior. Source: Vatn (2005) Ajzen (1991).

In the modified framework for this study, the upper left box represents attributes of the resource, which in this case will be equal to the perceived possibility of action based on the type of housing the respondent posits. The middle left box represents institutions like conventions, norms and legal rules. Because this study only looks at one regime, the most important institution, the regime, is constant in this analysis. However, social norms represented by how neighborhood institutions are perceived, is included. The lower left box represents characteristics of the individuals, including socioeconomic variables. Socioeconomic variables are used as control variables in the statistical analysis and therefore no hypotheses are developed for these variables.

Attributes of the resource/perceived possibilities of action, institutions and individuals' characteristics all have the potential to influence on an individual's motivation and behavior, as well as on habits. Habits are, like already mentioned, routineously performed behavior where the original reasoning behind the behavior is 'lost'. Thus, habits may stem from conventions and norms and from internal as well as external motivation. I will not look at what affects habits, but how habits affect behavior. Knowledge also has the potential to affect

behavior; through increased knowledge about, for example, the damaging effect on the environment, people may get motivated to sort. By gathering information about the regime and its function, people also may get motivated to sort. I will only look at how knowledge may affect behavior. The stippled arrows represent relationships that I will not focus on in this study.

In the following sections I will present the different variables and related hypotheses.

Attributes of the resource/ possibility of action

Type of housing may be of importance for the level of sorting due to the issue of space in the kitchen. Other studies have found this to be an important factor influencing on the level of sorting (see for example Sannerød, 2003). Because houses have larger room sizes than apartments, it is easier to change the sorting facilities without considering space limitations, and thereby have capacity to sort more. When living in houses, the possibility of having composting facilities in your garden increases as well.

Hypothesis 1: *Respondents living in houses sort more than respondents living in apartments.*

Individuals' characteristics

Individuals' characteristics may be of importance for both motivation and behavior. Literature shows that women are more environmentally concerned than men (see for example Robbins, 2004). Some also hold that well educated individuals and those with higher income take more action to reduce negative environmental impacts (Vining, 1990). Further, since environmental concern is a topic of high relevance of today, one may think that younger people should be more aware of consequences of our consuming lifestyle. Due to insecurity of who in the household has actually replied, there may be some insecurity related to the list of respondents. The variables on individuals' characteristics have no related hypothesis but are included in the analyses.

Institutions

Behavior and motivation are depending on institutions that are present in society, and to which extent individuals can be seen to follow or act in accordance with these. Since conventions represents learned responses to solving a problem, norms what ought to be done both in personal terms (internal) and social (external) terms, and legal rules are regulations by

law ordering or forbidding certain behavior, these are all factors affecting behavior both trough creation of habits and motivation. Since I do not have information on the situation in Ulstein before the waste regime was introduced, this institution is constant in this study. However, some indications on how institutions work may be possible to draw through examining the issue of perceived social norms in the neighborhood.

Hypothesis 2: *Neighborhood institutions in the form of perceived neighborhood norms influence on behavior.*

Habits

Waste is something most of us relate to every day through different kinds of packaging, like food and other household items, and through disposal of these items. Therefore, habits may have developed and affect how we behave by becoming performance based on routines and not reflection.

Hypothesis 3: *Respondents who sort their waste habitually have a high level of sorting.*

Knowledge

Knowledge about the waste regime and the fee implemented to influence respondents' sorting of household waste has the potential to affect motivation for performing the desired behavior. Hence, it is interesting to assess whether respondents with system-knowledge have a higher level of sorting than those who have not, because if the individual knows how the system works and how much the fee is, this knowledge should influence behavior. In addition to knowledge, individuals' perception and attitude towards the regime may have an effect.

Hypothesis 4a: *System knowledge increases the level of sorting.*

Hypothesis 4b: *Attitude to the system is related to sorting.*

Environmental concern

Individuals with a high environmental attitude or concern are expected to be aware of the consequences our consumption and thus waste production have for the environment. Therefore, one believes that a high environmental concern is equivalent with a high level of sorting.

Hypothesis 5: *Environmental concern has a positive effect on sorting.*

Behavior and motivation for sorting of waste

Motivation is, accordingly, the most important factor for explaining behavior. Like shown in the figure summarizing the differences between internal and external motivation, individuals can be motivated differently by different factors. Both external and internal factors may influence motivation, and hence, for policy makers it is quite interesting to see how and whether external factors have the ability to influencing behavior.

Hypothesis 6a*: Holding a personal norm concerning sorting of waste results in increased sorting.*

Hypothesis 6b: *The economic incentive motivates to increased sorting.*

Hypothesis 6c*: Acknowledging a social norm concerning sorting of waste results in increased sorting.*

Hypothesis 6d*: Encouragement from the authorities increases the sorting level.*

Crowding out

Crowding out, presented in the theory part, is an issue that cannot be included in the analysis here; however, I will include some comments on this phenomenon, as it can be present. Like presented in the chapter about intrinsic motivation, crowding out is when external rewards crowds out or undermines internal motivation and there is a shift to motivation or behavior solely based on external incentives.

4. Methods

The design of this study is based on descriptive and explorative design. The intention is to describe the situation in a defined area by investigating the subject closer. To collecting data for testing my hypotheses, I developed a questionnaire together with a PhD student who will use this study as a pilot. The original questionnaire contains 35 questions. The development of the questionnaire is presented in section 4.2. To be able to analyzing the raw data I have from the survey, I need to make use of different statistical analytical tools. The statistical procedures are described in section 4.2.

4.1 Method for data collection

The collection of data was carried out through using a questionnaire. We chose a questionnaire because this is a good way of gathering information. 500 randomly chosen respondents where drawn from a provided member list from Søre Sunnmøre waste company (SSR) containing over 2000 subscribers to the waste service. We did this to make sure that all the participants were related to the same regime.

The intention was at first to mail the questionnaire out by post mail. However, this proved to be very expensive, and therefore, it was decided that the invitation letter should be sent by post mail, whereas the questionnaire should be a web based survey. The advantages with a web based survey are: limited costs, less job for the respondent not having to send anything back, less work with plotting statistics and, of course, less use of paper.

4.1.2 The questionnaire

Developing a good questionnaire is said to be a comprehensive task requiring appropriate consideration and evaluation of each question and when developing a questionnaire, it is important not to have leading questions, have clear formulations, and most important; having questions that measure what is of importance for the study (Bryman, 2004).

The questionnaire was tested on neighbors and friends before it was published to assess whether it was valid (measuring what it is supposed to measure), whether the questions were understandable and clear and to avoid having repetitive questions.

The questionnaire has 35 questions, which can be divided into 6 sub sections.
Part 1. System knowledge and level of sorting
Part 2. Questions on motivation
Part 3. General attitudes
Part 4. Alternative regimes
Part 5. Socioeconomic variables
Part 6. Other comments

The questionnaire is developed together with PhD students Marit H. Heller and Marianne Aasen, who both are taking part in the larger project 'Environmental Policy and Human Action' (Envact). The questions are, in addition, developed by gathering inspiration from earlier studies on the topic, by Berglund (2003) and Sannerød (2003).

The first two parts of the questionnaire are most important regarding the topic in this study, and are therefore put first. The reason for this is that some respondents may loose interest after answering half the questionnaire, and by having the most important questions first; they have a higher probability of being answered. The questions asking for socioeconomic background are placed at the end. This is so due to two reasons; respondents may not want to give this kind of information before they know what the survey is about (sensitivity issue), or respondents are tired of answering, and thus these are questions not requiring evaluation and consideration about which alternative to chose. Some of the respondents did in fact not wish to give up their age. The last section was intended for other comments and was open for all. Only a few, however, used this opportunity.

4.1.3 Questions and available response alternatives

The questions are developed to help answering my research questions. The available responses are mostly given as close ended, but there are also a few questions with an open ending. Advantages with using close-ended questions are that they are easily quantifiable and thus easy to use in a statistic analysis without needing to recode. A disadvantage with close-ended questions is the limitations for respondents' personal meaning. Open-ended questions, on the other hand, need to be coded if they are to be used in statistical analysis. However, they may give more detailed answers compared to close-ended questions. Another disadvantage is that open-ended questions may demand more effort from the respondent and therefore may result in non-response.

In the questionnaire we have made use of routing, which is a function guiding respondents filling certain criteria, further on to the next question of importance to them. For example, respondents who answer 'nothing' on the question about level of waste sorted are routed around the question asking about level sorted of the various waste categories. Using this function may prevent respondents to dropping out because they do not need to answer questions not applicable to them. The limitation using this function is that some variables may contain too little data to be used in statistical analyses, however, in this study these questions are not of high relevance, but rather add some perspective to the topic.

The response alternatives under the close-ended questions are presented with alternatives where the respondent is to pick one on scales from 1-4 with 'do not know' as the 5th. In the questionnaire for this study we provided the respondents with an alternative for 'do not know' at the end of the scale. Including 'do not know' into a question has been debated, and the argument is that by including it, respondents are not forced to "express views they do not really hold" (Bryman, 2004:156). However, the use of the term is controversial as it may be easy to pick 'do not know' if one does not bother to think about the subject of matter, or if one becomes tired of answering the questions (Bryman, 2004).

The 'do not know' alternatives were, where it was logical that it represented indifference towards the topic, recoded into a middle score. For some other questions, 'do not know' is, if not providing information needed for this study, coded as a missing variable to be left out of the analysis together with non-responses.

4.1.4 Sampling

The questionnaire was published on Søre Sunnmøre waste company's web site and the randomly selected respondents received an invitation letter via post mail. They were encouraged to answering the questionnaire within eight days and by participating they would take part in the lottery of a gift-card. The lottery was an attempt to increase the response rate, which tends to be rather low in web-based surveys (Bryman, 2004). In addition, we called the local newspaper to ask if they could write an announcement and encouraging the invitees to participate, which they gladly did.

After two weeks we called the respondent to ask them if they would take the time to participate in the survey. We redid this after another two weeks to remind the ones who had

agreed to participate, but also to ask those who were not reachable the first time we called. By making use of the phone, the invitees had the ability to ask questions about the survey right away, as well as get guidance in logging into the questionnaire.

4.1.5 Reliability and validity

According to Bryman (2004:28), some of "the most prominent criteria for the evaluation of social research are reliability […] and validity". These are factors "concerned with the adequacy of measures" (p.29). In this case this refers to the questions in the questionnaire and how well, or how consistent the questionnaire is helping us measure what we are really measuring (Holme and Solvang, 1986).

The reliability of a study is depending on how the measurement of concepts is managed and then followed by the processing of data. High reliability is the outcome if one has independent measures of a phenomenon giving approximately the same result. To test for reliability, one may compare the results from independent surveys from a phenomenon (Bryman, 2004; Holme and Solvang, 1986). A measure may be affected by random errors, and, hence, is more reliable the less random errors there are. A random error could, for example, be misinterpretation of the wording of a question. It is enough that only some respondents misinterpret, and this can be seen by the following equation: $X_o=X_r+X_s+X_e$ (Gripsrud *et al*. 2004). The equation tells us that the value we do observe (X_o) is equal to the real value (X_r) plus a systematic error (X_s) and a random error (X_e). Maximal validity is equal to ($X_o=X_r$). That is, the observed value is equal to real value. If the measurement is completely reliable, random errors will be zero, ($X_s=0$), but this is seldom the case, because systematic errors are never equal to zero. Hence, Gripsrud *et al.* (2004:119) hold "there are different degrees of reliability and validity in relation to surveys."

"Reliability is a necessary, but not a sufficient premise for validity" (Gripsrud *et al.* 2004:118), and can be measured through stability over time and by internal consistence in the answers given. The study's validity is concerned about "how well one measure what one intends to measure" (p.72), and is dependent on whether what is being measured actually represents characteristics one wish to clarify through the research questions. Bryman (2004:28) finds validity to be "concerned with the integrity of conclusions that are generated from a piece of research", and points to the issue of whether "a measure that is devised of a concept really does reflect the concept that it was supposed to be denoting" (p.28). Gripsrud

et al. (2004) calls this content validity, and find that using open questions in addition to closed ones are beneficial in this case because respondents are asked about other factors than the ones specified by the researcher. Thereby, the method is closer to measure the whole domain of the theoretical concept.

A further important characteristic of validity is construct validity, which is "concerned with the extent to which a particular measure relates to other measures consistent with theoretically derived hypotheses concerning the concepts that are being measured" (Carmines and Zeller, 1979, quoted in Gripsrud *et al.* (2004:120)). This definition is divided into two: convergent and discriminant validity. Convergent validity is concerned with whether the indicators that are measuring the same theoretical variable are highly correlated, whereas discriminant validity is concerned with whether indicators measuring different theoretical variables have low or no correlation (Gripsrud *et al.,* 2004).

4.1.6 Sources of error/limitations

When doing a survey like in this study, there may be several sources of errors. For example, there may be errors related to the selection of respondents, participation in the survey, errors related to handling of the raw data material and so forth.

For this survey it is possible that those with a certain meaning about the waste regime, attitude towards the subject or concern for the environment as well as people with a higher education are over-representative. If the selection is biased, the results might not be representative to the population from which I drew my sample. The respondents' answers may also contribute as a source of error because they do not properly understand the questions, they are biased, or lastly, they answer what they believe is expected or wanted. Further, they may not answer consequently on questions made to ask nearly the same.

Because Ulstein was considering to changing the fee related to household waste, it was important to publish the survey before this eventually happened as this could have an effect on peoples' perceptions of the regime. This led the questionnaire to be developed pretty fast, which may have led to some limitations in the creation and wording of questions.

In cases where a subgroup is more likely to answer, the result is a response bias. In this study the use of a web-based survey has excluded people who lack technical knowledge and people

who may not have access to computers of various reasons. In addition, people lacking interest in the topic as well as people angry at the regime in the municipality may have refused to participate. Self -reporting questionnaires also have the effect that the respondents wishing to appear consistent may be affecting answers by providing answers they think are compatible with social desirable views. Lastly, the time of conducting the survey may have inflicted on the response rate as the survey was published late November, a time of the year when people often are busy.

Moreover, when calling the ones who had not responded, it became evident that many were older people, who had no interest in participating in the survey or they lacked access to computers, as well as technical skills. Some had in fact passed away the last month and some were residing in a nursery home. Others were listed as individuals, but in fact represented a firm. Evidently, a firm cannot represent a household, and therefore was excluded from the list. There is also another problem with calling people by phone; many of the younger only has a cell phone, which either is not listed in the phonebook or is registered on one of the parents. This made it harder to reach them because I had to try several numbers to reach the right person. Others were not even listed, due to reservation or other causes and could not be reached at all. Finally, when talking to some from the list, they had not received the invitation letter at all and had to be given the opportunity and invitation by phone.

4.2 Statistical analyses used to analyze the information.

To analyze the information and find relations between variables, various statistical methods are utilized.

4.2.1 Cronbach's alpha

This technique is used to measure internal consistency by estimating the reliability coefficient and thereby also getting indications of the correlation between the items and how closely they are related. It is further a measure of an underlying construct, which can be followed by a factor analysis to study dimensionality of scale (Holme and Solvang, 1986).

4.2.2 Confidence interval

Confidence interval is an interval estimate of a parameter and an interval is given that is likely to include an unknown parameter. Assuming normal distribution, the confidence level is determining how likely the parameter is contained. Using a 95% level, 95% of the intervals

will include the unknown parameter, and the width gives an indication of the uncertainty about the parameter. Hence, a confidence interval also indicates the reliability of an estimate (Howitt and Cramer, 2003).

4.2.3 Factor analysis

According to Howitt and Cramer (2003:209) "factor analysis is commonly used when trying to understand the pattern of responses of people completing closed-ended questionnaires. The items measuring similar things can be identified through factor analysis". The analysis can be used when trying to analyze interrelationships between a large numbers of variables and to explain these variables in terms of their common underlying dimensions. Highly correlated measures most probably are influenced by the same factors, and hence, helps uncover latent structures. The goal is to being able to explain most of the observed correlation using the explaining latent variables found (Eikemo and Clausen, 2007).

4.2.4 Regression

Regression analysis is a statistical method used to assess the connection between one or more independent variables (X_1, X_2, X_3,…..,X_n) and a dependent variable (Y), and especially how variation in the independent variables can explain variation in the dependent one. "The limitation with regression is that it is only possible to test whether possible connections are significant different from zero, and not prove any causal relationships" (Holme and Solvang, 1986:264). Ordinal logistic regression is a method that is used when the dependent variable is ordinal, that is, its values can be ranked and counted/ordered, but not measured. In ordinal logistic regression one assumes that the effect of the independent variables is equal for each level of the dependent variable. This is tested by the test of parallel lines, which has to be non significant. What is predicted in this type of analysis is a transformation of the raw value of the dependent variable.

4.2.5 Multicollinearity

Multicollinearity occurs when some of the independent variables used in the regression model are correlated with each other and contributes redundant information because one variable's contribution in the model is overlapping with another variable's contribution. The phenomenon in itself is not uncommon, but it may cause to problems if it is too high as the regression results may be misleading or confusing. If variables are correlated at .8 or above,

they should be investigated further. Multicollinearity above 30 should be looked into as this level can represent a problem.

5. Results and data analysis

5.1 Response rate

The response rate after two rounds of remarking the non-responding respondents is 42%, which according to Magione quoted in Bryman (2004:135) "is not acceptable". With such a low response rate, questions can be asked about the representativeness of the sample. I realize the limited ability to generalize from this sample, and care is necessary concerning interpretation of the results. I now present the data that represent my independent variables.

5.2 Who has responded?

Even in a random selection of respondents, it is difficult to get a completely representative selection of the real distribution of the population. Below is the distribution of males and females shown followed by tables showing socioeconomic variables.

Table 1. Gender distribution.

Gender	My sample	Møre & Romsdal	Norway
Male	66 %	50.4%	49.9%
Female	32.5%	49.6%	49.9%

Sources: the questionnaire and SSB_2 (2010).

From the figure, the share of males is very large in my sample compared to Møre and Romsdal and the country on average. Even though there is an overweight of males in Ulstein (Garshol, 2010), my sample has clearly an underrepresentation of females. This can be so because the list from which the respondents randomly were drawn consists of names of the ones in the household responsible for the subscription to the renovation services. Often the ones responsible for certain administrative services in the homes are males. Additionally, if both names are on the list, the name of the male usually is listed first. In addition, I cannot be sure who in the household has responded as the wife could answer in the man's name.

Table 2. Age level.

Age	My sample	Møre & Romsdal	Norway
16 - 39	18.8%	37.4%*	39.9%*
40 - 66	67.5%	44.7%*	43.9%*
67 -	12.2%	18%*	16%*

(*Given that the population above 16 is the whole population when summing to get 100%)

Sources: the questionnaire and SSB_3 (2010)

According to the age distribution in Møre and Romsdal and in Norway, I have an underrepresentation of respondents in age level 1, 16-39. Possible reasons for this could be that young people live with their parents until they pass the age of 20, many live together with friends, or they go away for studying. There were 3 respondents who missed to give up their age in the questionnaire.

Table 3. Education level.

Education	My sample	Møre & Romsdal	Norway
Primary/Secondary School	11.7%	30.4%	28.6%
High School	18.3%	45.5%	41.3%
Technical School	21.8%	No data	No data
Academy/University	43.7%	20.8%	25.5%
Other	3 %	3.4%	4.6%

Sources: the questionnaire and SSB_4 (2010)

The education level in my selection is high compared to Møre and Romsdal and the rest of the country. 43.7% has a university degree. 21.8% has technical school, which is also a high education. Compared with numbers from Møre and Romsdal and the rest of the country, I have an overrepresentation of well-educated people in my sample and an underrepresentation of people with lower education. The high level of well-educated people could be affecting the income level in my sample, which is presented next.

Table 4. Households' income level.

Income level (before tax)	**My sample**	**Income level** (after tax)	**Ulstein**	**Møre & Romsdal**	**Norway**
< 150 000	0.5%	< 150 000	15.9%	19.5%	19.4%
150 000 - 400 000	20.3%	150 000 - 399 999	45.2%	48.8%	50.1%
400 001 - 650 000	26.4%	400 000 - 499 999	18.9%	15.9%	14.5%
650 001 - 800 000	22.3%	> 500 000	20 %	15.8%	16 %
800 001 - 1 000 000	17.3%				
> 1 000 000	10.2%				

SSB_5 (2010) *(In the questionnaire respondents are asked about the household's income level before taxes, therefore my sample presents income before tax, Statistics Norway, however, only provides income levels after taxes are paid.)*

In the table presenting my sample, only 0.5% has less than 150 000 NOK/year in total income, whereas 27.5% has 800 001 NOK or above. That means I have an underrepresentation of low-income households in my study. In the figure presenting Ulstein, Møre and Romsdal and Norway, income levels are only provided after taxes, however, when subtracting approximately 50% tax from the highest income group, it is evident that people in Ulstein, 20%, has 500 000 NOK or above after taxes. Compared to Møre and Romsdal and the rest of the country, this is rather high, implying that many in Ulstein have well paid work and hence, high income.

Possibility to perform the action, sorting, is depending on what kind of housing facility the household posits. Houses are often larger than apartments, and hence, people living in houses often have more space in the kitchen to install sorting facilities, which simplifies their sorting of household waste. Table 5 shows the distribution of housing facilities.

Table 5. Housing.

Housing	**My sample**	**Western Norway**	**Norway**
House	90.9%	79 %	73 %
Apartment	6.6%	21 %	24 %
Other	1.5%	6 %	5 %

Sources: the questionnaire and SSB_6 (2010)

Most of the respondents live in houses, 90.9%, which seems to be a little above the average for Western Norway, and higher than in the rest of Norway. Only 6.6% live in apartments, and hence, I have an underrepresentation of people living in apartments. On the other hand, the area where I did my selection is rather rural with a small city-center, which may explain the high percentage living in houses. Also, 79.2% of my respondents are above 40 years, which implies that many have settled down with their family, and either bought or built a house. This may have had an effect on Table 6 as well, as 87.8% states they are 2 or more persons in the household. In Møre and Romsdal the number is 85.9% and in Norway 83.6%. There seems to be a small underrepresentation of single person households in my sample, this may, however be connected to the underrepresentation of young people, age category 1, as shown in Table 2.

Table 6. Number of persons in household.

Pers. in household	**My sample**	**Møre & Romsdal**	**Norway**
1	11.2%	14.2%	16.5%
2	36.5%	22.2%	23.9%
3	18.6%	17.9%	18 %
4 or more	32.5%	45.8%	41.7%

Sources: the questionnaire and SSB_7 (2010)

5.3 Level of waste sorting

To gather information about the level of waste sorting, the respondents were asked to state how much of their household waste is sorted. They were asked on a general basis. Figure 5 show how the respondents have answered regarding their level of sorting.

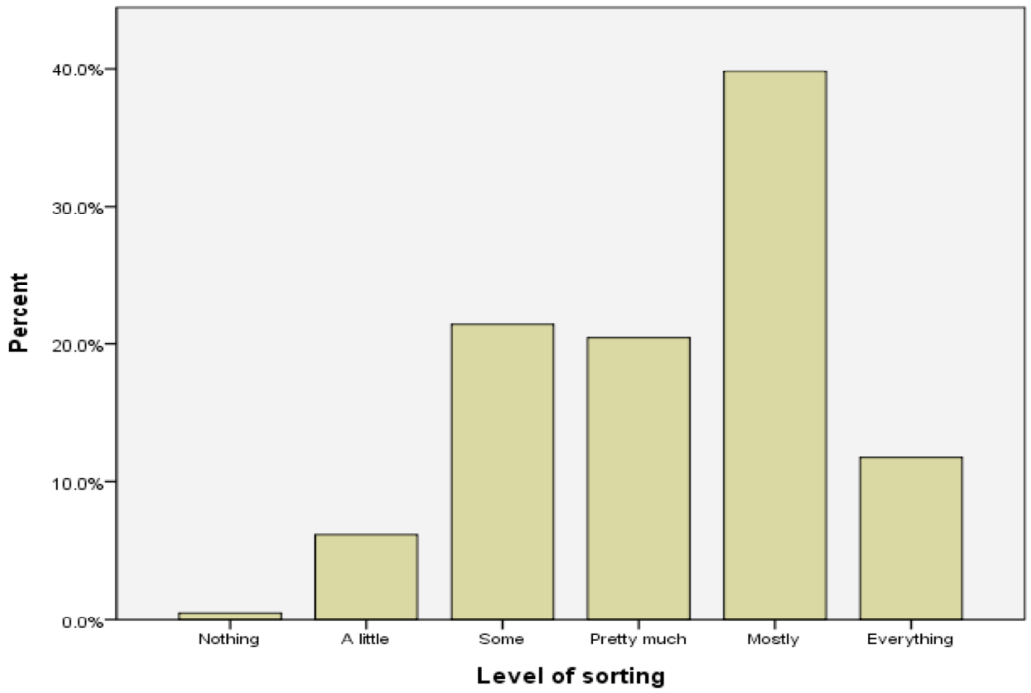


Figure 5. Sorting level (5:"How large share of your household waste is sorted"?)

We see that 11.7% sort everything, and 39.8% states they sort most of their household waste. This gives us 51.5% stating they have a high sorting level. 20.4% are sorting pretty much and the rest, 28.1% has a rather low level of waste sorting. One respondent states that he or she does not sort anything at all. In addition to this, we asked how much of the different waste categories they actually sort. This can be seen in Figure 6.

Different waste categories

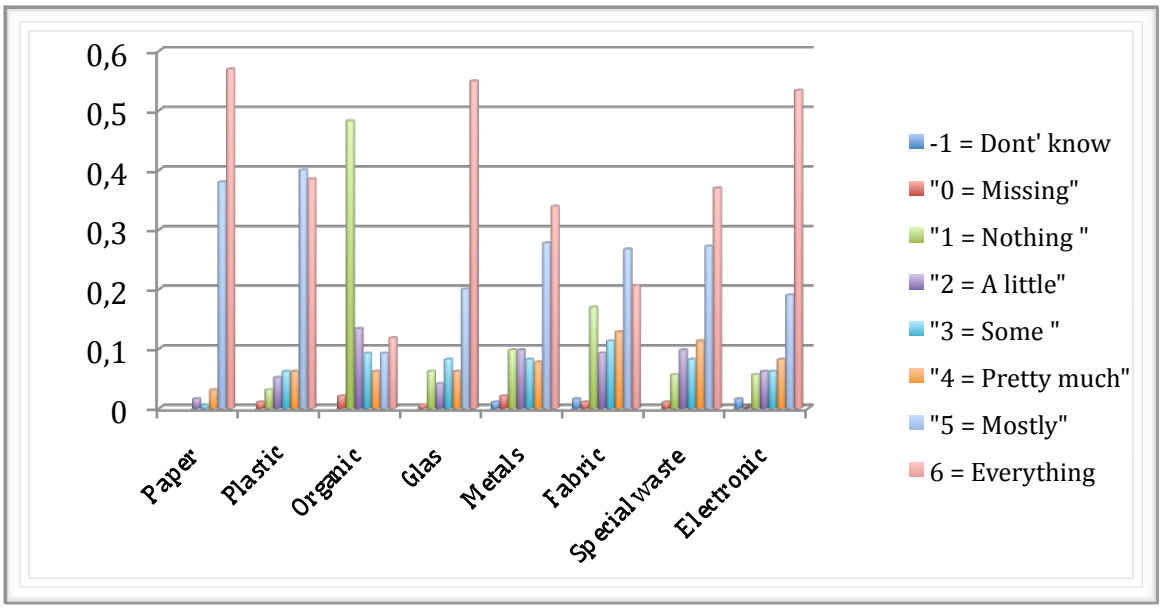


Figure 6. Waste categories (6:"How large shares of the different waste categories are sorted"?)

Table 7. Percent of share sorted in various waste categories.

	Paper	Plastic	Organic	Glass	Metals	Clothing	Special waste	Electronic
Everything	56.9%	38.9%	12.0%	55.2%	34.6%	20.7%	37.3%	53.3%
Mostly	37.9%	40.4%	9.4%	20.1%	28.3%	26.9%	27.5%	19.0%
Pretty much	3.1%	6.2%	6.3%	6.2%	7.9%	13.0%	11.4%	8.2%
Some	0.5%	6.2%	9.4%	8.2%	8.4%	11.4%	8.3%	6.2%
A little	1.5%	5.2%	13.6%	4.1%	9.9%	9.3%	9.8%	6.2%
Nothing	0.0%	3.1%	49.2%	6.2%	9.9%	17.1%	5.7%	5.6%
Don't know						1.6%		1.5%

From Figure 6, we see that 56.9% of the respondents are sorting everything of their paper, and 37.9% are sorting most of their paper, which gives 94.8%, which is a relatively high level. Turning to plastic and, adding the two categories implying high level of sorting, there are 79.3% who sort most or everything of their plastic.

Sorting of organic waste requires some sort of compost facilities near the house. 49.2% are not sorting this type of waste at all. Only 21.4% sort all or most of their organic waste. From an open-ended question about organic waste, it became clear that many are smallholders holding animals and, hence, feed the animals the organic waste. Others have answered that

organic waste makes good soil for their flowers, and thus, even though they are not sorting much of their organic waste, they do in fact sort a little, hence, 23% sort some or a little of their organic waste.

Glass without refund and metals must be delivered at 'return-points' provided by the authorities or the responsible unit for renovation services in the municipality. Often these points are placed in the front of gas stations, shopping malls and other gathering places. However, these kinds of waste need to be transported to these facilities. 75.3% states that they sort everything or most of their glass, and 62.9% of metals.

Clothing/fabrics and electronic waste also require other ways of delivery/disposal. Clothing are collected by aid-organizations placing containers around the town whereas electronic waste need to be returned to the shops they were bought. Both categories, however, have in common that they are not so often thrown away or replaced as the other categories. 47.6% state that they sort everything or most of their clothing. This does not, however, include things that are broken because these cannot be reused and have no value for the aid organizations. 17.1% state that they sort nothing, which may be because they do not get rid of clothes before they are broken, and hence throw them in the household waste due to lack of other possibilities. 54.3% are sorting their electronic waste, which requires delivery at shops. Special waste is collected by the renovation service at certain pre given dates for the household to gather their special waste and place it at the curbside. 64.8% states they are sorting everything or most of their special waste.

To better see how and if the various waste categories are overlapping, I have calculated the categories' confidence intervals. A confidence interval is a method of using data from a sample to say something about the population from which the sample was drawn. By calculating the confidence intervals of the categories in the question asking for level sorted of various waste categories, these gives an overview of how the categories are placed in relation to each other. Table 8 shows the confidence intervals.

Table 8. Confidence intervals for various waste categories.

Waste category	95% Confidence Interval of the Difference	
	Lower	Upper
Paper	**5.38**	**5.58**
Plastic	**4.74**	**5.11**
Organic	**2.23**	**2.75**
Glass without refund	**4.74**	**5.17**
Metal	**4.08**	**4.60**
Clothing	**3.53**	**4.06**
Special waste	**4.35**	**4.79**
Electronic waste	**4.59**	**5.06**

A confidence interval provides a range of values that are likely to contain the parameter for the population. A 95% confidence interval cover 95% of the probability of observing a value outside the given area is less than 0.05, indicating that if many samples were collected and confidence intervals were computed for these, 95% would contain the true mean. In this study, the confidence interval is used to check for differences between the categories, and from Table 8, we can clearly see that organic waste and clothing differs significantly from the other categories; there is no or little overlap.

Since the regime was implemented in January 2009, and hence, is rather new, it is interesting to see whether households in Ulstein has adapted to it and are behaving in accordance with what was intended; increasing their sorting. There exists no legal enforcement system that can control that the regime is complied with, but it is illegal to get rid of waste in public places, like for example forest areas, parks and so on, and if detected, non compliers may get a ticket. Complying with the authorities' waste management strategies, on the other hand, can be regarded as a norm due to the issue on how to treat common resources. The new regime makes use of a differentiated fee to underline the importance of the waste issue, and in addition to increase incentives for complying. Figure 7 is showing whether today's system has affected peoples' level of sorting.

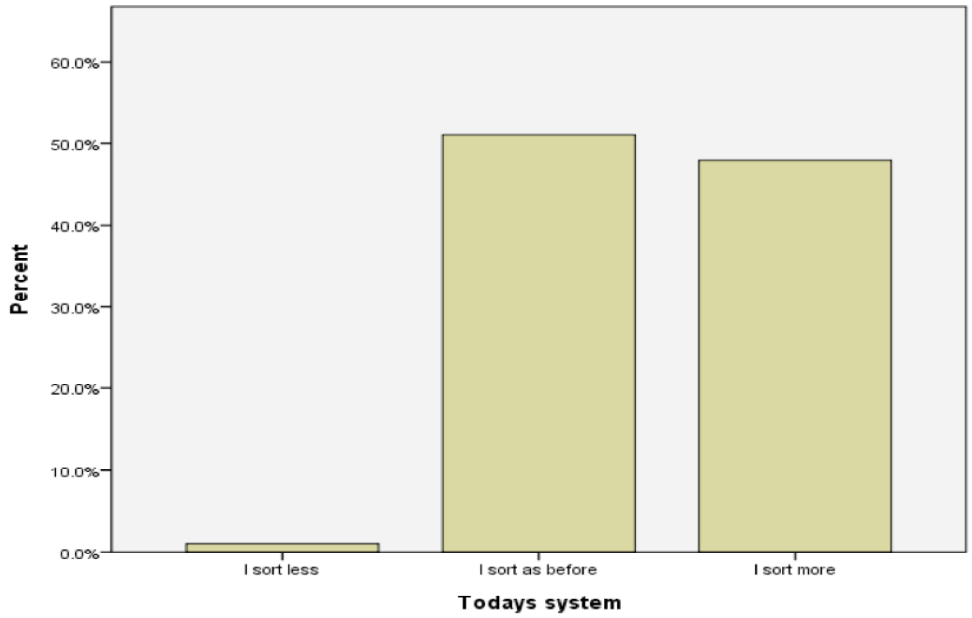


Figure 7. Today's system (19:"How has today's system affected your level of sorting"?)

Considering the differentiated fee based on amount of household waste, the households stand free to choose their level of sorting, and accordingly, how much they must pay. If one chooses to sort everything possible, the fee is lower than if sorting little or nothing. After the introduction of the system, 48% states they have increased their level of sorting. Only 1% appears to be sorting less, whereas 51% sort as before the regime was implemented.

5.4 What motivates sorting?

5.4.1 Motivation for sorting

Motivation for performing an act can be based on different reasons. In Figure 8 various statements, 1-9, were presented for the respondents, and for simplicity the mean value of the different factors of motivation were computed. The highest score was 5, implying that the statement is interpreted as very correct, and the lowest score 1. Do not know was recoded into 3 representing indifference. Cronbach's alpha was used to see how closely related the items were as a group, and >0.7 indicates a relatively high internal consistency. See appendix II for statistical details.

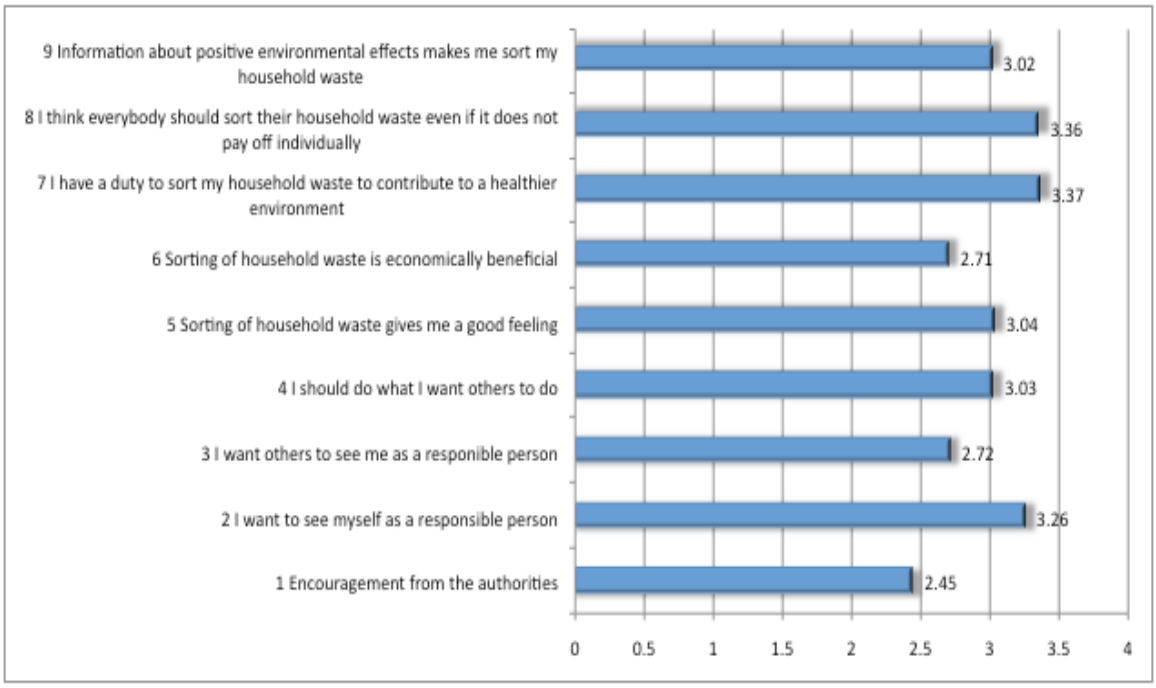


Figure 8. Motivation (7:"What makes you sort your waste"?)

Table 9. Percentage replies in different motivational categories.

	1	2	3	4	5	6	7	8	9
Not correct at all	17.5%	3.2%	14.2%	9.8%	6.0%	15.5%	1.1%	1.1%	4.8%
A little correct	29.5%	9.0%	24.0%	13.0%	17.6%	23.5%	12.8%	9.1%	22.0%
Quite correct	41.0%	46.6%	36.6%	40.8%	41.2%	28.3%	33.5%	42.2%	37.6%
Very correct	10.4%	41.3%	24.6%	35.9%	34.1%	27.3%	52.1%	46.5%	33.9%
Don't know	1.6%		0.5%	0.5%	1.1%	5.3%	0.5%	1.1%	1.6%

As seen in Table 9 above, and when adding the percentage replies in the 'quite correct' and 'very correct' categories, 51.4% state that encouragement from the authorities (1) to a large extent is motivating them. 17.5% is not considering this to be motivating at all. 87.9% are motivated by the ability of seeing themselves as responsible persons (2). 61.2% states the ability of being regarded as responsible persons by others motivates them (3). 76.7% get motivation by behaving in accordance with how they think others should behave (4). 75.3% are motivated to sort their waste because it gives them a good feeling (5) and, 55.6% because sorting is economically beneficial (6). 85.6% are motivated by a feeling of duty to contribute taking care of the environment (7) and, 88.7% think everybody should sort regardless of payoffs (8). 71.5% holds information about effects of sorting to be motivating (9).

Further, for this question, I used a factor analysis to reveal the latent dimensions of a set of variables by reducing attribute space from a larger number of variables to a smaller number of factors (Eikemo and Clausen, 2007). The technique can be used to study the correlation structure of a set of variables, and further to examine factor loadings of indicator variables to determine if they are loading on latent variables as predicted. Because factor analysis, according to Howitt and Cramer (2003:209), "includes a variety of techniques and approaches which may seem bewildering […] a standard approach will serve the purpose of most researchers well". I followed their guidelines in '*A guide to computing statistics with SPSS for Windows'*. The questions in the questionnaire were structured to be covering both personal and social norms, and from the analysis, which is presented in greater detail below, I found a pattern that fits quite well to the theory. The factor loadings are interpreted in light of this when constructing and naming the new variables.

Table 10. Excerpt from factor analysis question 7, motivation.

Rotated Component Matrix[a]

	Component			
	Personal norms	Social norms	Encouregement from authorities	Economic incentives
I have a duty to sort my waste	.852			
Everybody should sort their waste	.801			
Warm glow	.671	.367		
Information about effects	.637		.407	
See myself as responsible	.584	.515		
I should do what I want others to do		.856		
Other see me as responsible		.773		
Encouragement from authorities			.939	
Economic incentives				.967

Table 10 is an excerpt from the factor analysis that shows how the various factors are distributed within the categories. From the table, it is evident that personal norm is the factor with most loading variables followed by social norms. Personal norms is an internal motivational factor, and when looking at the components loading at and constituting the new variable 'personal norms', we see that it is constituted by a feeling of duty to following a norm combined with a warm glow for undertaking the action, enhanced self-image as well as benefits of information. The variable 'social norms' also consists of warm glow and self-image in addition to a sense of duty for behaving in ways one wants others to behave and, image in others' presence. Respondents that are responsible both in relation to him or her self

as well as in relation to society should answer yes on these statements, and hence, the factors 'warm glow' and 'I see myself as responsible', are loading on both personal norms and social norms, which is not unexpected. 'Encouragement from the authorities' is mainly based on the component encouragement from authorities, but also has information about effects as a loading factor, however lower than under personal norms. Lastly, 'economic incentives' is a variable only constituted by the component economic incentives and hence, is not sharing other components with any of the other factors. These new factors are counting for 74% of the variance explained.

Procedure for factor analysis

When doing a factor analysis, one should according to the Kaiser criterion extract factors with an eigenvalue above 1. Eigenvalues are the factors' variance. In addition to the rotated component matrix, a scree-plot graphs the eigenvalue against the factor number and gives an indication of how many factors are accounting for variance. Since the Kaiser criterion is not a given cut-off value, I chose to extract 4 factors to avoid loosing too much information. The scree-plot is presented below. For more statistical details from the analysis, see appendix II.

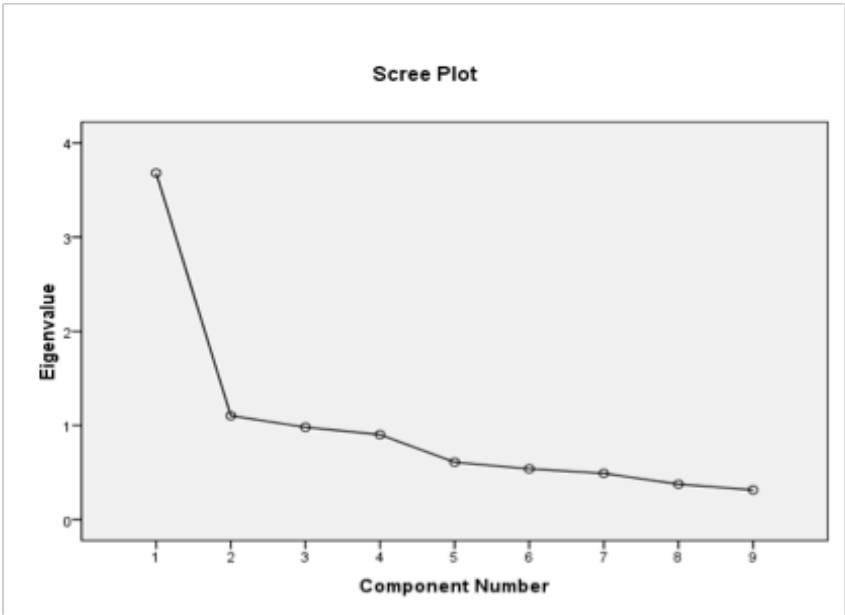


Figure 9. Excerpt from factor analysis: Scree-plot.

The first factor counts for most of the variance, 41%. The second counts for 12% whereas the last two for 11% and 10%. The new factors created from the factor analysis were shown in Figure 10.

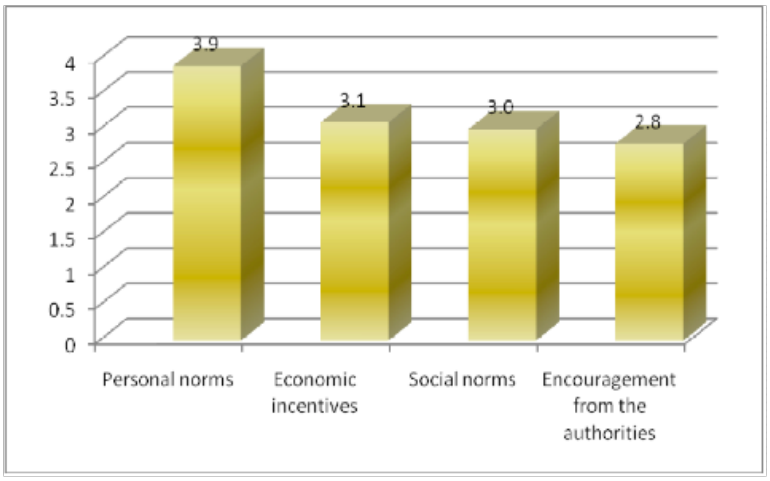


Figure 10. Factors of motivation

The new variable personal norms has the highest value with a mean score 3.9 of 5, encouragement from the authorities 2.8, economic incentives 3.1 and, lastly, social norms 3.0.

5.4.2 Motivation for starting or increasing sorting

We also asked the respondents to consider various factors that could motivate them to begin sorting if they did not sort at all, as well as to increase their current level of sorting. Figure 11 shows the replies for the different alternatives.

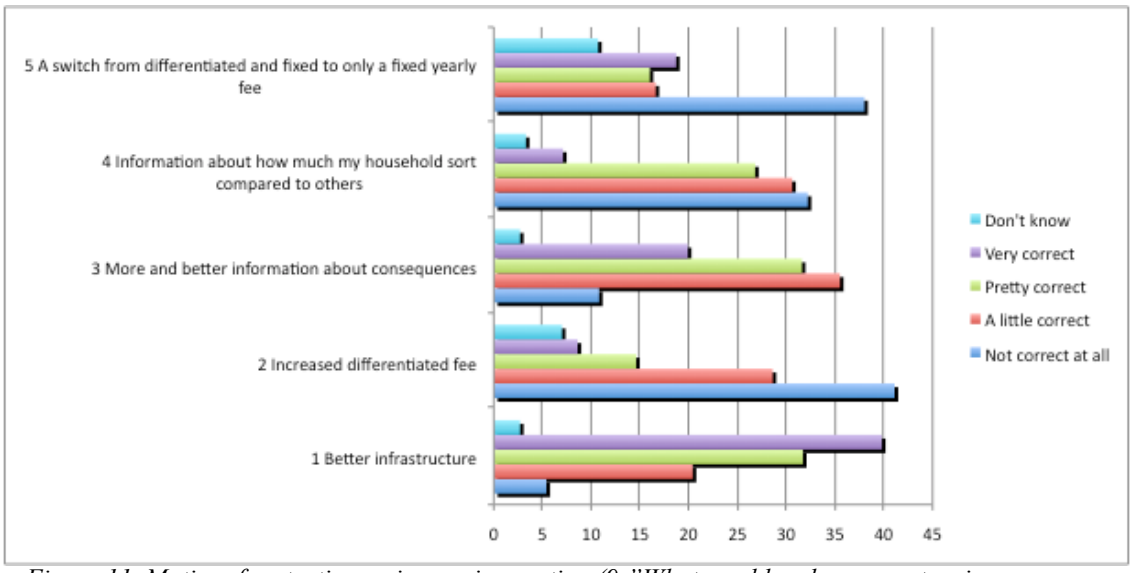


Figure 11. Motives for starting or increasing sorting (9:"What would make you sort or increase your sorting"?)

Table 11. Percentage response

	1	2	3	4	5
Not correct at all	5.4%	41.1%	10.8%	32.2%	38.0%
A little correct	20.4%	28.6%	35.5%	30.6%	16.6%
Quite correct	31.7%	14.6%	31.2%	26.8%	16.0%
Very correct	39.8%	8.6%	19.9%	7.1%	18.7%
Don't know	2.7%	7.0%	2.7%	3.3%	10.7%

Looking at Figure 11 and Table 11, 71.5% finds better infrastructure to have an important impact on sorting (1). When considering the opportunity of increasing the differentiated fee (2), 23.2% would be motivated, whereas 41.1% states that this would not motivate them at all, 51.1% finds information about the beneficial effects of sorting (3) to be a motivating factor and 33.9% find motivation in information about own level of sorting compared to other households (4). 38% are not motivated by a change in type of fee (5), whereas 34.7% say they are.

An open ended question, asking about other factors that would make the respondent start sorting, or sort more than today, was filled out by 37 respondents. 48% of those responding hold improvements in the system in general as a motivating factor, 24% think more or better information about whether their contribution is actually beneficial, and 13.5% hold recycling itself as the main motivating factor. Lastly, 5.4% states that economic benefit is of importance.

5.5 What explain behavior?

Below the framework is like presented in chapter 3.5. Data on motivation and stated sorting level (behavior) has already been presented and now other motivational variables are added that may explain behavior.

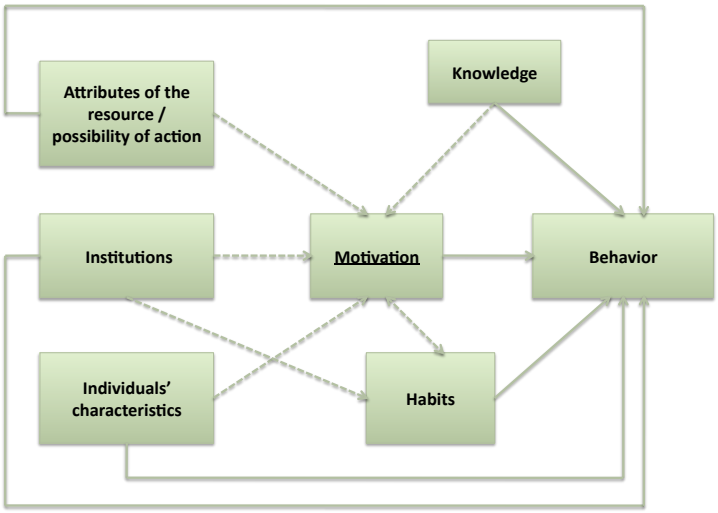


Figure 12. Reproduced framework

5.5.1 General environmental attitude

Peoples' attitudes and concern for the environment also may play a role regarding their willingness to sort waste. When asking the respondents if they regard themselves as more environmentally concerned than the average, however, only 30.7% stated they did. 39.1% did not see themselves as more concerned than the average and, 30.2% did not know. When asked about feelings of responsibility of contributing to solving the environmental problems, the attitudes can be seen in Figure 13.

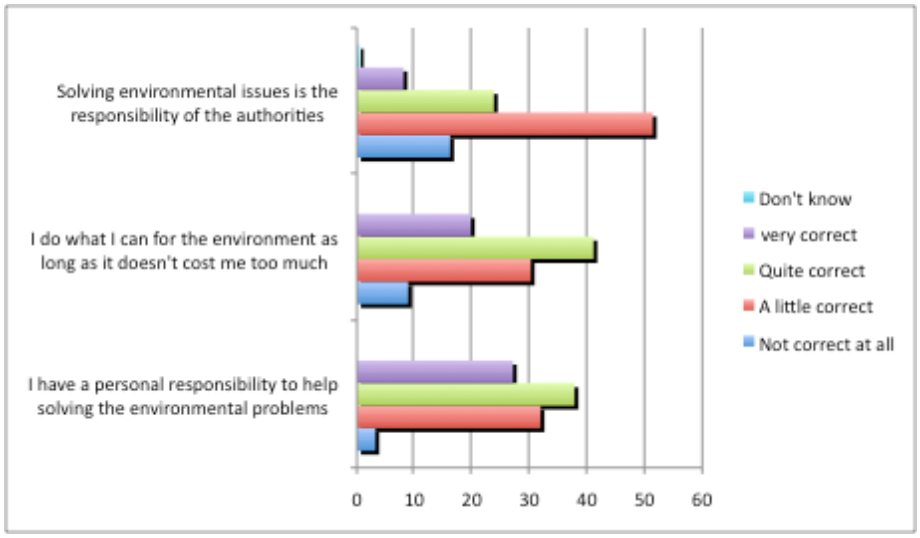


Figure 13. General environmental attitudes (17:"Consider the following statements").

31.9% think that environmental problems are the responsibility of the authorities, and 51.4% think this is quite correct. Only 16.2% disagrees, implying that individuals do have a

responsibility as well. 60.9% do what they can if it is not perceived to be too costly, 30.2% finds this to be quite correct. Only 8.9% have replied 'not correct at all', indicating that costs in time or money has little importance for their behavior. 64.9% find it very or quite correct that they have personal responsibility for contributing to solve the environmental issues. 31.9% find this to be a little correct whereas 3.2% do not see it as their personal responsibility at all. General environmental attitude is not represented in the framework, but could be included under knowledge.

In addition to general environmental attitudes, how people perceive a regime may influence on their attitudes and, hence, motivation to act in accordance with the regime. When asked about their attitude or perception of the regime, 65% are negative to the regime, 5,1% are neutral and, 21,3% are positive. 8,6% did not answer this. Figure 14 illustrates attitude toward the waste regime.

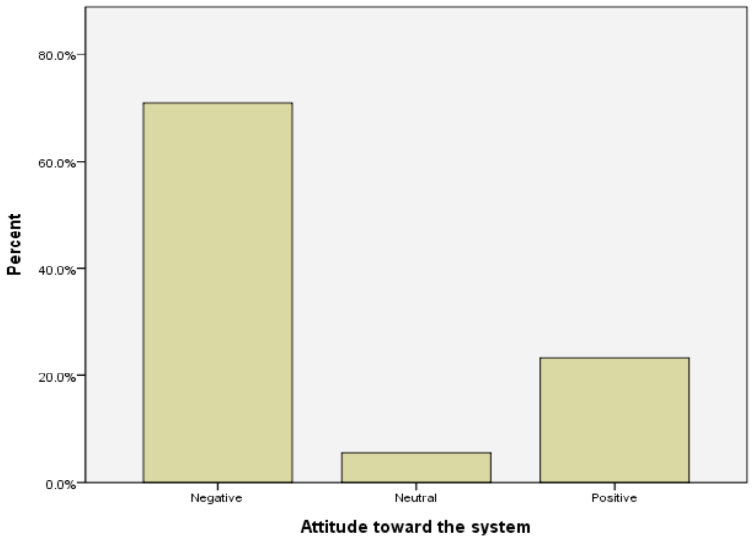
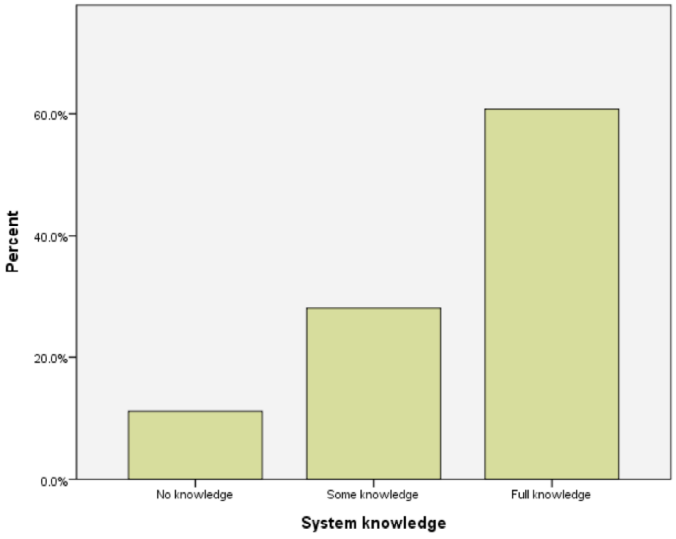


Figure 14. Attitude toward the system (18:"Consider following statements")

5.5.2 Knowledge about the system

Attitude toward the system may be related to knowledge about the system and how it works. Therefore it is of interest to see if the respondents know how the system actually works, because if a respondent believes there is a fee based solely on the weight of the waste, one should believe this would motivate him or her to sort more than if he or her had full system

knowledge and, hence, know that there is both a fixed fee and a differentiated fee. Figure 15 a) and b) show level of knowledge related to the system.



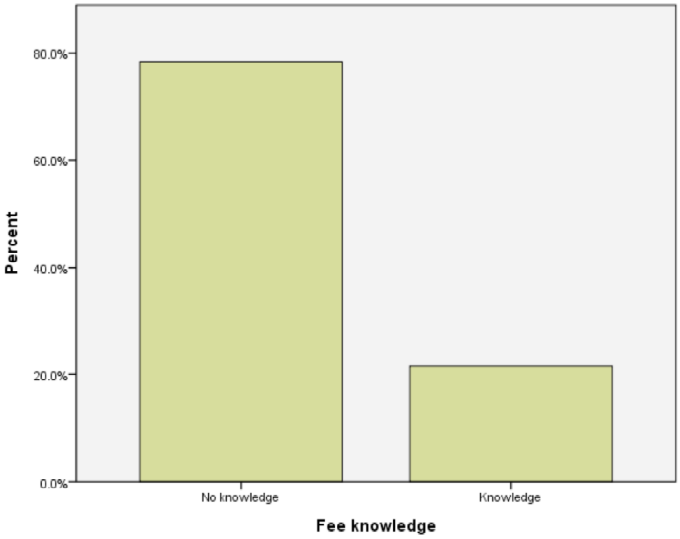


Figure 15 a) System knowledge.
(3:"What kind of system…")

Figure 15 b) Fee knowledge.
(4:"Are you aware of the fee?")

Figure 15 a) shows that many of the respondents are aware of how the system is working. 60.7% know that they pay a fixed fee plus a fee based on the weight of their household waste. 28.1% believe that the fee is based solely on weight, whereas 11.2% posits no knowledge about the system at all.

Figure 15 b) shows that 78.5% does not know how much they pay in fee a year, whereas 21.5% are aware of how much they pay. 60.7% states they have full system knowledge. Still, only 21.5% are aware of how much they pay. According to neoclassical economic theory, individuals will seek the option that gives them most gain/utility, which in this case should be increased sorting level to reduce the fee. And, especially those believing that the fee is based on weight only, should be sorting at a high level.

Considering the impact of the economic incentive, the respondents were asked to imagine hypothetical changes in the differentiated fee. When considering a hypothetical increase from 2,24 NOK/kg to 5,00 NOK/kg, Figure16 give a good indication of how people state this would affect their behavior.

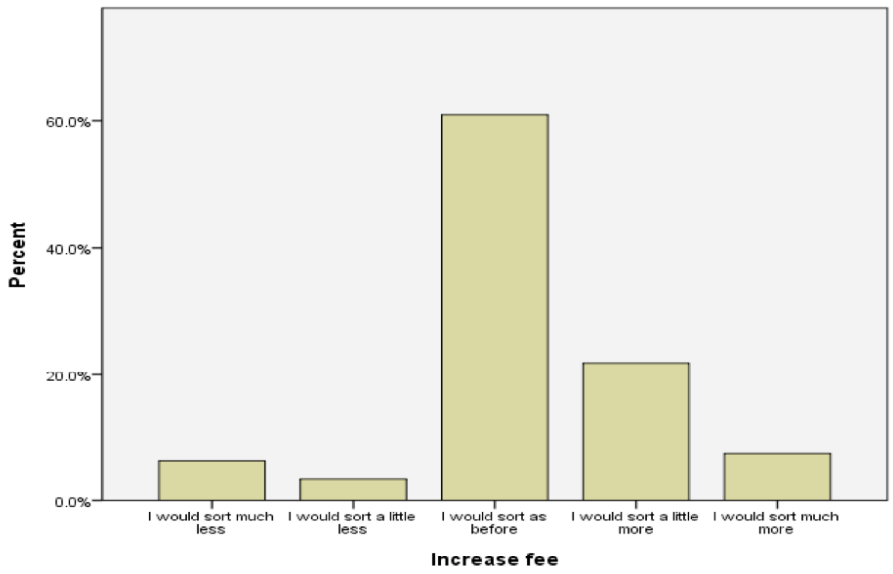


Figure 16. Sorting if fee is increased from 2,24 NOK to 5,00 NOK (26:"How would this affect your sorting?)

If the differentiated fee were increased from 2,24 NOK to 5,00 NOK, only 26% would increase their sorting to some extent, whereas 54.1% would sort as before. As seen in Table 11, 23.2% claimed an increased differentiated fee would motivate them, and as seen here, 26% state they would act in response to the incentive. If the fee were decreased to 0,50 NOK, on the other hand, as showed in Figure 17, 10.2% would increase their sorting. 76.5% would be sorting, as before, which is 22.4% more than if the fee was increased, and 7.7% would sort less. Clearly, the 10.2% who would increase are not satisfied with the fee system, whereas those who would decrease are acting according to the price mechanism.

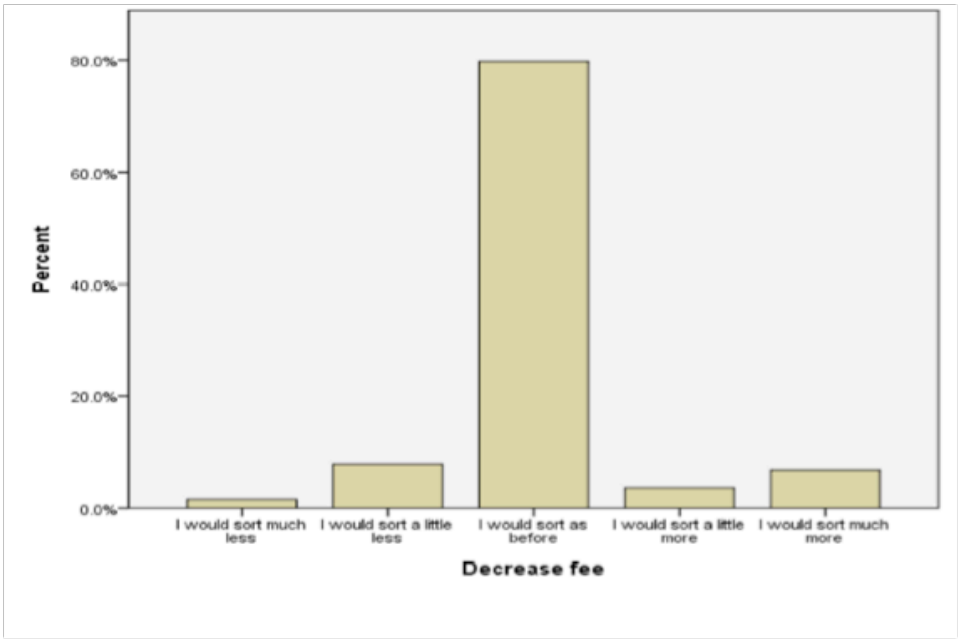


Figure 17. Sorting if fee is decreased from 2,24 NOK to 0,50 NOK (27:"How would this affect your sorting?)

5.5.3 Institutions.

The most important institution in this study is the waste regime. I have no data on the regime except for self-reported data on changed behavior. In the analysis, therefore, institutions are not fully covered, as it is mainly constant. Other institutions are present, however, and social processes in the local community or neighborhood can affect people's behavior. For example, if there exists strong norms in the neighborhood regarding how to behave in relation to sorting of waste, or other matters, this may influence the respondents' behavior. When asked to consider statements about how perceived social norms in the neighborhood are affecting them, the respondents gave answers represented in the following figure.

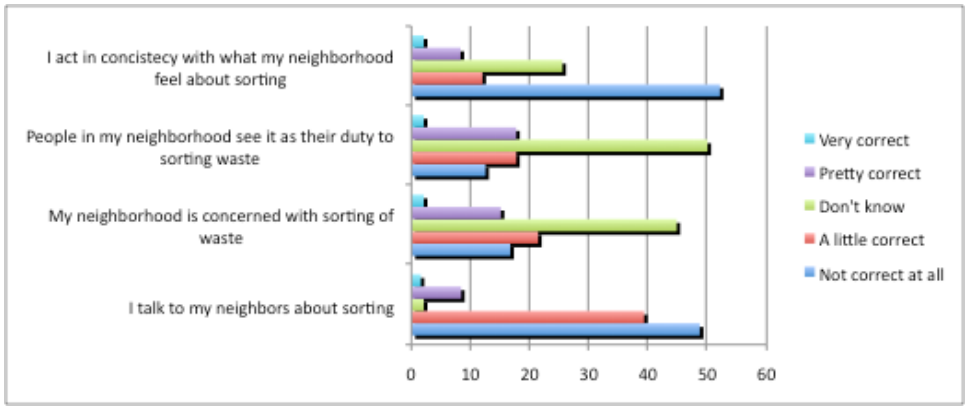


Figure 18. Perceived social norms in the neighborhood (15:"Consider following statements")

From Figure 18, households in Ulstein do not seem to be interacting much regarding the issue of waste sorting. Only the variable '*I talk to my neighbors*….' has got a fairly high response on the alternative 'a little correct'. A factor analysis gave only one factor, which is included as neighborhood institutions in later analyses.

5.5.4 Habits

Although there may be many factors contributing to motivating people to act in certain ways, behavior may be based on routine, which leads us to take into consideration the effects of habits. Habits are, like presented in earlier chapters, routinized behavior based on automacy, and which are not demanding thoughtful consideration. Since sorting of waste is a type of behavior that is carried out at least on a weekly basis in a household, it may have become routinized behavior carried out without consideration of the actual or original reasons for performing. When asking the respondents whether they are sorting their waste automatically,

by having them to consider whether they are sorting their waste without reflecting over the act, we got answers represented in Figure 19.

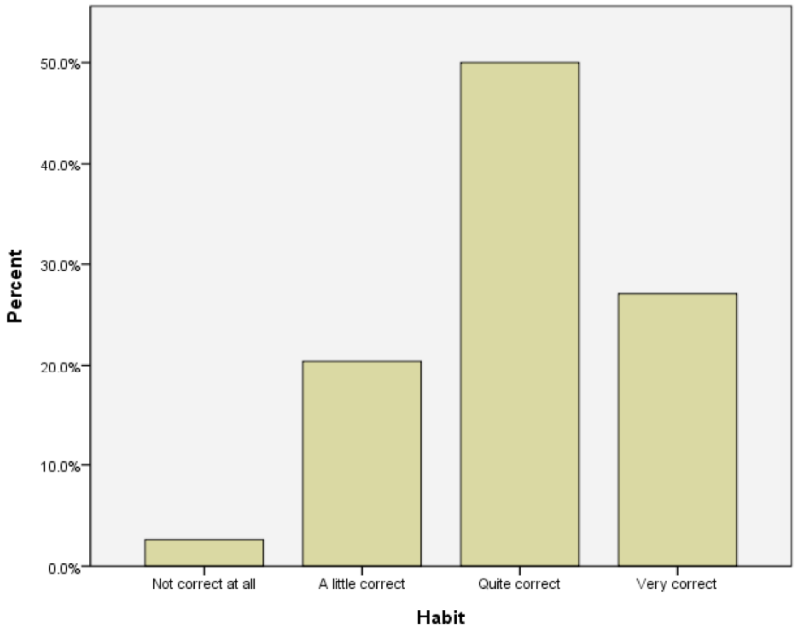


Figure 19. Habits (11:" I sort my waste without reflecting over the act")

27% of those responding sort their waste automatically (very correct) and 50% states it is quite correct that sorting is carried out automatically. This gives 77%, who routineously and not consciously are sorting their waste. 20.4% finds it a little correct that sorting of waste is a habit, whereas 2.6% do not agree, and hence, must find sorting to be an action requiring reflection.

5.5.5 Cognitive dissonance

Cognitive dissonance represents a state where one knows what is the right thing to do, but if not doing the right thing and instead is working with the other cognition to make the act less ridiculous, the dissonance related to not performing the act is reduced. Figure 20 shows some factors that may contribute to dissonance and, hence, also may affect sorting.

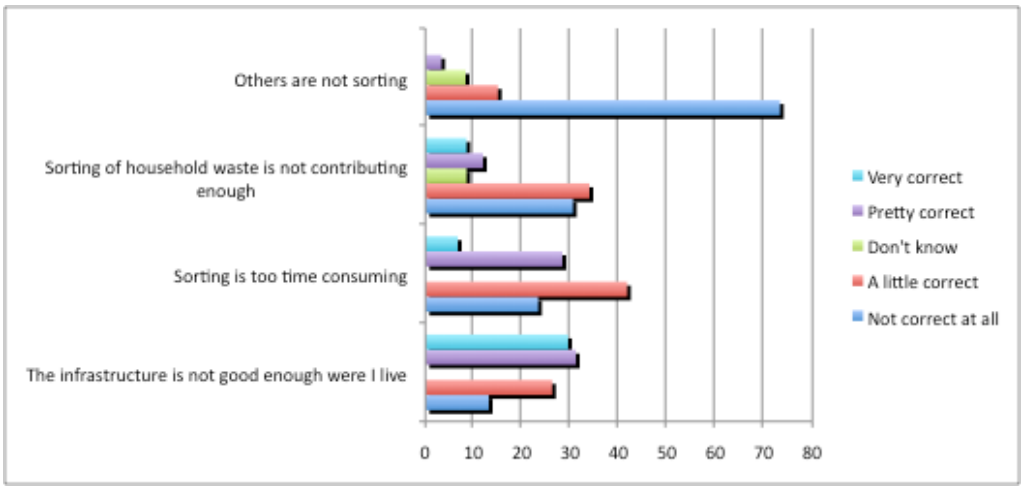


Figure 20. Cognitive dissonance (13:"I do not sort my waste because…")

30% of the respondents have replied they do not sort all they potentially can, and some of the reasons they do not do this are showed in Figure 20. 86.8% finds that the infrastructure is not good enough. 76.7% think sorting is too time consuming. 61.1% do not think that sorting of household waste contributes enough to solving the environmental problems, and lastly, 18.3% are not sorting all that they can because they believe that others are not sorting.

In addition to the above-mentioned variables that may work as to explain behavior, various socioeconomic factors, like presented in the first part of this chapter, may also influence behavior, and are included in further analyses.

5.6 Explaining variation in behavior

Now I will be looking at what factors may explain behavior. The framework represented in section 3.5.1 is representing the variables that I have assumed to influence on behavior, and will be used to explain this.

5.6.1 What explain variation in behavior?

To investigate what explains behavior, I did an ordinal logistic regression. This kind of regression is used when the dependent variable is ordinal and one assumes that the effect of all the independent variables is the same for each level of the dependent. The purpose of the analysis is to study what explains behavior by looking at the impact of the independent variables on the dependent one (Garson, 2009).

Procedure for ordinal logistic regression analysis

To control for multicollinearity, I did a bivariate correlation to see whether some of the independent variables were highly correlated. As a rule of thumb, values above 0.8 are worth investigating closer. I had values above 0.7 but below 0.8, however, this too suggested a rather high correlation. Two of the factors I got from the factor analysis were highly correlated (above 0.7), and to control for this in the regression, I removed the variables loading on more than one factor to avoid high correlations. Running a new correlation showed decreased values of correlation between these factors after this operation. Also, because there is not the same possibility of evaluating multicollinearity in ordinal regression, I did stepwise linear regressions to take a look at the multicollinearity statistics. This will, according to Eikemo and Clausen (2007:127), "work because the dependent variable is not included in the multicollinearity". The consequence of multicollinearity is that the estimated impact of a variable on the dependent variable tends to be less precise than would have been the case if there were no correlation.

To improve model fit I ran the ordinal logistic regression several times, dropping an insignificant variable at each step. By removing insignificant variables, the relationship between those left in the model may alter (Garson, 2009). I dropped the least significant variable at each step, and stopped when there was no reason to remove another variable as the significance level of those left did not improve.

N increased by 25 (from step one to step eleven) when removing insignificant variables, indicating that all respondents had not replied completely on all the questions. Because of this, the regression models may not be compared directly. The least significant variables may in fact have been correlated with some of the other independent variables, and therefore, when removing one, the other may improve as the covariance has been removed. They may, in addition, be insignificant because low or no explanatory power on the variance of the dependent variable.

Table 12. Ordinal logistic regression with stated behavior as dependent variable[*].

		Ordinal logistic regression with **stated behavior** as dependent variable, 1st step N = 153 LR chi² (16) = 80.377 Pseudo R^2 = .432 TPL = .079		Ordinal logistic regression with **stated behavior** as dependent variable, 11th step N = 178 LR chi² (6) = 84449 Psaudo R^2 = .399 TPL = .370	
	Independent variables	**Parameter estimates (coeffisients)**	**P value**	**Parameter estimates (coeffisients)**	**P value**
Motivation	Economic incentives	.355	**.002**	.390	**.000**
	Encouragesment from the authorities	.073	.562		
	Social norms	-.075	.638		
	Personal norms	.499	**.013**	.522	**.002**
Individuals' characteristics	Gender	.099	.778		
	Age level	.216	.464	.438	**.060**
	Income	-.396	.154		
	Education	-.170	.518		
	No in household	.506	**.084**	.391	**.092**
Attributes /control	Housing type (1)	1.107	.122	1.171	**.057**
Knowledge	System knowledge	.068	.770		
	Environmental concern	-.049	.819		
	Fee knowledge	.072	.849		
	Attitude towards regime	.155	.428		
Habits	Habits	.836	**.000**	.767	**.000**
Institutions	Institutions in the neighborhood	.322	.175		

The hypotheses that were presented in chapter 3.5 regarding stated behavior, related to sorting of waste, are presented again in the following section and answered basing the results on the ordinal logistic regression analysis. The significant findings are presented followed by the hypotheses that have been refuted.

Hypothesis 1: *Respondents living in houses sort more than respondents living in apartments.*

For a dichotomous variable like housing type where level 1, representing respondents living in house, is estimated and level 2 (apartment) is the reference category in the analysis, a positive coefficient means that the category coded 1 (house) is more likely to have higher scores on the ordinal dependent (than the category coded 2, if significant). The coefficient of 1.171 indicates that respondents living in houses are associated with higher values on level of

- Interpretation of reported abbreviations. N = the number of valid observations. LR Chi^2 =the likelihood ratio that at least one of the predictors' regression coefficient is not = 0 in the model. Pseudo R^2 =measure of model effect size, the higher the better. TPL = test of parallel lines. This should be non significant, and the categories in the model can be combined until parallelism is achieved.

sorting (behavior) than those living in apartments. The hypothesis is significant on a 10% level with p= .057.

Hypothesis 3: *Respondents who are sorting their waste habitually have a high level of sorting.*

There is clearly a significant relationship between habits and behavior. From the model we see that both in the first, as well as in the eleventh step, the variable habits is significant, and hence, for one unit's increase in habit, we would expect a 0.8 (.836) increase in the log ordered odds of being in a higher level of stated level of sorting (behavior) in the first step of the regression and a similar increase in the eleventh step (.767), given that all other variables are held constant. Exponentiation of the log ordered odds (e^{exp}) gives the odds ratio (2.3 first step and 2.2 eleventh step), which may be easier to interpret. Hence, for one unit's change in the variable habit, the odds ratio for respondents being in a higher level of the dependent variable, stated level of sorting, are 2.2. The hypothesis stating that respondents who sort habitually have a higher level of sorting is accepted at a 1% level, with p =. 000.

Hypothesis 6a: *Holding a personal norm concerning sorting of waste results in increased sorting.*

Personal norms have positive coefficients and is just not significant at a 1% level in the first model (p=. 013), but becomes significant at the 1% level in the second model with p=. 002. We can see that for a unit increase in personal norms would give a 0.5 (.499 in 1st step and .522 in 11th step) increase in the log ordered odds (or 1.7 in odds ratio) of being in a higher level of stated behavior, sorting level, given that other variables were held constant. The hypothesis is confirmed/accepted.

Hypothesis 6b: *The economic incentive motivates to increased sorting.*

Economic incentives are in both models significant at the 5% level, and in the last model at 1% level with p=. 002 (first step) and p=. 000 (eleventh step), and the hypothesis stating that the economic incentive is affecting behavior is accepted. For one unit increase in economic incentive, there would be a 0.4 increase in the ordered log odds or 1.5 in odds ratio of being in a higher level of sorting behavior if other variables were constant.

Hypothesis 2: *Neighborhood institutions in the form of perceived neighborhood norms influence on behavior.*

From the model there is no significant relationship between neighborhood institutions and behavior. Hence, I cannot say that neighborhood institutions influence on behavior in my study.

Hypothesis 4a: *System knowledge increases the level of sorting.*

There is no significant value for system knowledge in the model, and the variable system knowledge cannot be used to explain behavior.

Hypothesis 4b: *Attitude to the system is related to sorting*

There is no significant value for attitude to the system, and hence, the hypothesis has been refuted.

Hypothesis 5: *Environmental concern has a positive effect on sorting.*

Environmental concern has a positive coefficient but is not significant. The hypothesis is not accepted in this study.

Hypothesis 6c: *Acknowledging a social norm concerning sorting of waste results in increased sorting.*

The model does not give any significant values for this hypothesis in the first step and it is not accepted. The coefficient is negative, indicating that a unit increase in social norms we would expect a -0.1 (-.075) decrease in the ordered log odds, or 0.9 in odds ratio, of being in a higher level of stated behavior, given all other variables were held constant. Looking at the correlation between stated behavior and social norms, on the other hand, it is .230**, and hence, there is a relationship between the variables. The correlation matrix is presented in appendix II.

Hypothesis 6d: *Encouragement from the authorities increases the sorting level.*

Encouragement from the authorities is not significant in the model and cannot explain sorting level. It has positive coefficient in the first step, which indicates an increase in the likelihood (ordered log odds) of being in a higher level if it had been significant.

5.7 Can any of the variables explaining behavior also explain the differences in the level sorted of various waste categories?

To assess this question, I ran separate ordinal logistic regressions for the sorting of each of the different waste categories. I used a model with the same independent variables as used in the previous regression. For each model, I ran several steps to find the best model fit. Hence, all variables have a 1st step but different last steps. Therefore, comparison is difficult. Table 13 on next page presents the last step-models. The complete model with both steps is included in appendix II.

For this analysis it is important to keep in mind that the questions are asked on a general basis, and hence, when trying to get more specific results by holding each of the different waste categories as the variable to be explained (dependent) by the independent variables, the results may differ from the analysis trying to explain behavior on a general basis since the questions are formed to be answered on this basis.

		Ordinal logistic regression with **paper** as dependent variable, 15th step		Ordinal logistic regression with **plastic** as dependent variable, 8th step		Ordinal logistic regression with **organic waste** as dependent variable, 13th step		Ordinal logistic regression with **glass** as dependent variable, 10th step	
		N = 180 LR chi² (2) = 15.58 Pseudo R^2 =.100 TPL = .065		N = 165 LR chi² (9) = 38.58 Pseudo R^2 =.228 TPL = 1.000		N = 161 LR chi² (4) = 20.32 Pseudo R^2 = .133 TPL = .610		N = 177 LR chi² (5) = 38.50 Pseudo R^2 = .216 TPL = .151	
	Independent variables	**Parameter estimates (coefficients)**	**P value**	**Parameter estimates (coefficients)**	**P value**	**Parameter estimates (coefficients)**	**P value**	**Parameter estimates (coefficients)**	**P value**
Motivation	Economic incentives			.078	.278	.140	**.000**		
	Encouragesment from the authorities								
	Social norms			-.181	**.082**				
	Personal norms	.332	**.005**	.224	**.069**	.213	**.046**	.375	**.001**
Individuals' characteristics	Gender (1 = male)			.265	.242			-.675	**.013**
	Age level								
	Income			-.230	.167				
	Education								
	No in household			.442	**.011**			.405	**.013**
Attributes/ control	Housing type (1= house)			.374	.339	1.219	**.073**		
Knowledge	System knowledge								
	Environmental concern								
	Fee knowledge							.618	**.057**
	Attitude towards regime					.377	**.007**		
Habits	Habits			.251	**.012**				
Institutions	Institutions in the neighborhood	.423	**.011**	.512	**.002**			.521	**.002**

		Ordinal logistic regression with **metal** as dependent variable, 6th step		Ordinal logistic regression with **clothing** as dependent variable, 12th step		Ordinal logistic regression with **special waste** as dependent variable, 12th step		Ordinal logistic regression with **electronic waste** as dependent variable, 11th step	
		N = 161 LR chi² (4) = 20.32 Pseudo R^2 = .133 TPL = .610		N = 177 LR chi² (5) = 38.50 Pseudo R^2 = .216 TPL = .151		N = 160 LR chi² (11) = 55.65 Pseudo R^2 = .315 TPL = .855		N = 174 LR chi² (5) = 33.13 Pseudo R^2 = .185 TPL = .681	
	Independent variables	**Parameter estimates (coefficients)**	**P value**	**Parameter estimates (coefficients)**	**P value**	**Parameter estimates (coefficients)**	**P value**	**Parameter estimates (coefficients)**	**P value**
Motivation	Economic incentives	.196	**.076**			.248	**.010**		
	Encouragesment from the authorities	-.353	**.004**	-.175	**.094**			-.211	**.015**
	Social norms	-.403	**.010**	.321	**.011**				
	Personal norms	.463	**.016**			.313	**.049**	.336	**.005**
Individuals' characteristics	Gender (1 = male)	-.890	**.013**						
	Age level	.791	**.005**	-.776	**.011**	.419	**.072**	.638	**.001**
	Income	-.585	**.024**					-.460	**.014**
	Education								
	No in household	1.034	**.000**	.784	**.000**			.444	**.014**
Attributes/ control	Housing type (1= house)	1.948	**.007**			1.014	**.072**		
Knowledge	System knowledge								
	Environmental concern								
	Fee knowledge	.949	**.016**	.937	**.007**				
	Attitude towards regime					.592	**.092**		
Habits	Habits							.172	**.089**
Institutions	Institutions in the neighborhood	.461	**.041**						

Holding sorting of *paper* as the dependent variable to be explained by the independent variables, step 1 gives 4 significant variables: social norms, personal norms, system knowledge and, neighborhood institutions. Improving the model fit, only 2 explanatory variables were left: personal norms, significant at a 1% level (p =. 005) and neighborhood institutions at a 5% level (p = .011). Hence, there is a 99% probability that there is a connection between personal norms and sorting of paper. Institutions in the neighborhood have less explanatory effect as it is only significant on a 5% level, and thus, there is a 5% probability of not existing a relationship.

For sorting of *plastic,* the best model gave 5 significant variables: social norms, personal norms, number of people in the household, habits and lastly, institutions. The variable institutions is significant on a 1% level (p =. 002), habits and number of people in the household at 5% level (p =. 012 and p =. 011), and social norms and personal norms at a 10% level (p =. 082 and p =. 069). Hence, there is 99% chance for institutions, 95% for habits and number of people in household, and 90% for social and personal norms to have a connection with level of plastic sorting.

For sorting of *glass without refund,* the best model gave the variables personal norms and neighborhood institutions at respectively 1% (p =. 001, p=. 002) and gender and fee knowledge at 5% level (p = .013, p = .057). Gender 1 (male) has a positive coefficient, .405, which indicates that males are more likely to have higher scores on glass than females (odd ratio = 1.5).

For sorting of *organic waste,* the best model gave economic incentives and attitudes to the regime as significant explanatory variables at 1% level (p = .000, p = .007), and personal norms at 5% level (p = .046), and at 10% level housing type 1, house, (p = .073).

For *metal*, almost all the independent variables are significant at some level, except habits, attitude towards the regime, system knowledge, environmental concern and education. At 1% level, encouragement from the authorities (p = .004), social norms (p = .010), age level (p = .005), number of people in the household (p = .000), and housing type (p = .007). At a 5% level: personal norms (p = .016) and gender (p = .013). Lastly, at 10% level: economic incentives (p = .076).

For *clothing,* at 1% level, social norms (p = .001), fee knowledge (p = .007), number of people in the household (p = .000) and age level (p = .011) is significant. At a 10% level: encouragement from the authorities is significant (p = .094).

For the category *special waste,* economic incentives is significant at 1% level (p = .010). Personal norms at 5% level (p = .049) and at 10% level: age level (p = .072), housing type (p = .072) and attitude towards the regime (p = .092).

Lastly, for sorting of *special waste:* at 1% level personal norms (p = .005) together with age level (p = .001), followed by 5% level: economic incentives (p =. 015), income (p =. 014), and number of people in the household (p = .014). The variable habit is significant at 10% level (p = .089).

We see that 'personal norms' is present as an explaining variable in nearly all categories, followed by institutions in the neighborhood, which, on the other hand, did not come out as a significant variable for explaining behavior on a general level. The other variables are, as we can see from Table 13, scattered around as explaining variables for the various waste categories. Also worth noticing is that 'habits', which is a significant variable explaining behavior at the general level, is not significant as an explaining variable for any of the categories except for plastic and electronic waste, at a 5% and 10% level.

6. Discussion

I will now discuss to what extent the findings from the analyses in chapter 5 answers the research questions proposed for this study. I will, moreover, discuss the findings by using the theoretical perspectives presented in the theory part.

In this study I have addressed households and asked individuals to give answers based on the household as a unit, not distinguishing between single and multiple persons units. A household, as defined by Hook and Paolucci (1970, in Åberg, 2000:3), is "a corporate unit of interacting and interdependent personalities who have common themes and goals, have commitment over time and shares resources and living space". This definition, however, do not include single-person households, and Åberg (2000:3) states that single-person households have an increased resource use as they do not share the resource within the household. Further, she argues "single-person households may represent differences in life-styles with consequences for resource use and waste production". In my study, I do not differentiate between various types of households, since I have a random sample.

6.1 Level of waste sorting in Ulstein.

6.1.1 The level of waste sorting under a regime using monetary incentives.

The level of waste sorting was presented in chapter 5.3. I will now discuss the differences in the level sorted of the various waste categories. Due to limitations in data, this section will contain interpretation of reasons behind why the levels are as they are.

Keeping Figure 6 in mind will help underline the differences between the categories. There were three categories that had very high levels of sorting: paper, glass without refund and electronic waste. One category had a substantial level of no sorting: organic waste, whereas the other categories did not point out any extremes in the various sorting levels.

The waste system in Ulstein has arrangements for picking up paper, which has its own bin that the households can place beside the bin for household waste. Hence, the availability for sorting of paper is well organized and it does not require much extra effort from the respondents. Paper is, additionally, the largest waste category for sorting, which may have led to the establishing of a routine for sorting this waste category.

Glass without refund also has a high sorting level; 'everything', with only 1.7% less than paper, however, lower values in the other sorting levels. This kind of waste has to be washed before dropped off at return points placed around in the local area, and hence require some extra effort. Electronic waste also has a high level for 'everything'. A reason for this may be that since electronic waste is not something one gets rid of every week, one undertakes the extra effort and brings it to a store for drop off.

Organic waste is the category where most respondents have stated they sort nothing. There is no organized system for sorting of organic waste, even if it is a well-known resource for recycling. Because my sample is drawn from a village, a few of the respondents have stated they feed their farm animals. Beside that, there is not much sorting of organic waste although above 90% of the respondents are living in houses, and to increase the sorting level, organization of composting facilities or the like is necessary to arrange for by the municipality.

Sorting of plastic is 15.5% lower than for paper when adding the 'everything and mostly' category. This may have something to do with the effort the respondents have to undertake when sorting plastic, as there is no additional bin for this category. Instead the respondents have to use clear plastic bags, which are placed on the curbside, beside the bin for household waste, for collection. In addition, the plastic has to be clean, and there are rules for what can and cannot be categorized as plastic waste for recycling. Hence, there is some extra effort required to sorting plastic, which may be an explanation of why the sorting level for plastic is not as high as the level for paper. Another explanatory factor worth mentioning is that there has been some uncertainty regarding the usefulness of sorting plastic. In the questionnaire there were left some space open for 'other comments'. Many of those utilizing this opportunity for adding their views on the system, expressed uncertainty regarding if there was any point sorting plastic as this had been transported and processed together with the household waste; burned. Some also expressed anger with the regime due to this, and saw no point in putting effort into sorting their plastic when it was burned after all.

Sorting of metal is not high either, and beside organic waste and clothing/fabric, metal has most replies in the 'nothing' category with above 9%. A reason for this may clearly be that the respondents need to bring the waste to a return point, as there are usually containers both for glass and metal waste in the same area. On the waste company's web pages, however,

there is no information about how or where to sort metal waste, and thus it might be thrown into the household waste due to lack of information.

Clothes and fabric is a type of waste collected through special containers, mainly organized through some kind of aid organization. These are placed around the municipality, however not so plentiful as the containers for glass and metal. According to my sample, this category has not a high level of sorting. This may be due to the fact that people does not that often throw away old clothes, maybe they are given to relatives of friends, or like a respondent stated per telephone: *"We are 'sunnmøringer', we don't get rid of anything of value!"* (A respondent who had not received the invitation letter, but who agreed on answering the questions via telephone).

The last waste category is represented by special waste. This is a category including hazardous components like oil, paint, old batteries and so on. There have the last decade been launched information campaigns of the environmentally damaging effects of throwing components from this category into nature, and the waste company is obliged to establish a system for collection of special waste. In Ulstein the households are equipped with a box for special waste, which they can place at the curbside, but larger quantities need to be brought to the local waste deposit by the households themselves. In addition, containers made for receiving special waste are placed at certain areas. Hence, sorting of special waste requires some effort.

6.1.2 The level of sorting after the introduction of today's regime in Ulstein.

By introducing the regime, which was done in January 2009, households were given an economic incentive to increase their level of sorting and, thereby acting in a socially desirable way, contributing to a cleaner environment. From the self-reporting questionnaire, and as shown in Figure 7, nearly half of the respondents states they have increased their sorting level due to the implementation of the new regime. When using a bivariate correlation, we got a significant positive correlation between economic incentives and today's system (.286**), so clearly there is a relationship. Accordingly, there is a positive association, and there has been an increase, however, due to what reason, whether the economic incentive or the underlining of the importance behind sorting through using an incentive, is uncertain. Unfortunately I have no data on sorting levels in 2008, so comparison of levels is not possible.

According to Thøgersen (2003:197), "the rationale of regulation by means of economic incentives is to change the relative costs and benefits of environmentally desirable behavior in order to make it more profitable for the individual to behave in accordance with the collective interest". From my sample, I see that by introducing the regime, there has been an increase in the sorting level of the respondents, and hence one may say that it has served some of its purpose; increasing sorting levels.

Nevertheless, introducing a system utilizing market instruments to promoting a norm based behavior can be perceived negatively, and the largest share of my respondents states they are negative to the system. When or if the users of a system disagree with it due to various reasons, they may choose to deviate from it. This could for example be opposition through illegal dumping. Research has shown that resentment is an outcome when individuals feel constrained in relation to their behavioral freedom, and Berkowitz (1970:146) argues, "whenever we are confronted with a call for help or only a felt obligation to aid someone, we are faced with a bothersome loss of our freedom". Brehm (1966, in Berkowitz, 1970:146) agrees to this finding and adds; "psychological reactance arises when the individual faces a possible restriction on his or her behavioral freedom […], which further leads to hostility as well as an increased desire to do whatever the individual believes he or she may not be able to do".

When people feel constrained because the intervening force is perceived as too controlling and perhaps depressing self-determination, an opposite effect of what was intended may prevail. Pricing may reduce the effect of intrinsic motivation because morals and ethics are depressed by the intervention, thus replacing intrinsic motivation with a more rationalistic and economic point of departure (Frey, 1997). In addition to this, "the application of external interventions does not only crowd out intrinsic motivation in the specific area, but spreads beyond" (Frey, 1997:35). In many situations, "payment is not found to be adequate because supply is considered a moral obligation, and problems appear when the incentive mechanism used does not conform well to the logic of the concrete situation as perceived by the respondents" (Vatn, 2005:156).

Ackerman (1997:31) claims;" people do not respond very much to moderate prices for garbage collection. The initial introduction of unit pricing causes a modest reduction in waste disposal; small price changes thereafter have almost no additional effect, while big price

incentives might lead to unacceptable levels of illegal dumping". Illegal dumping, burning of waste or other kinds of deviation from the system, nevertheless, does not appear to be a problem according to my survey. Totally 42 respondents stated deviations from the regime and mostly explains this with feeding of farm animals or absent-mindedness in relation to throwing household waste into other waste categories. Of those 42 respondents, 21.4% states they are deviating from the system because this decreases their payments. Nevertheless, because this was a question most respondents were routed around, I do not have enough data to include this into any statistical analysis, and I cannot generalize from the findings. It on the other hand, something that should be kept in mind when designing policies of this kind.

6.2 What motivates sorting of household waste?

In the theory part of this paper, I presented different perspectives for explaining behavior. Behavior can be regarded as a result of action based on motivation, motivation as the means and, socially desirable behavior as the end for the 'we-oriented' individual and personally desirable behavior for the individual pursuing his or her own interests, the 'I-rational'. Like shown in chapter 5.4, by using a factor analysis to see where factors are loading in addition to reducing the amount of factors for explaining motivation, I found four factors working as motivations for sorting of waste. However, because there are positive correlations between the different factors, there is covariance and, I cannot claim that the same persons are not influenced by different factors.

Evidently, from Figure 10 presented in chapter 5.4, the motivating factors are: personal norms, social norms, economic incentives and, encouragement from the authorities. The first two variables are representing internal motivation like shown in Figure 3, and the latter two are representing external motivation. There are, however other variables that are influencing motivation and hence, behavior, and which will be added. Now I will discuss what motivates sorting of household waste according to my sample.

Internal motivation: personal norms and social norms

Personal norms is an internal motivational factor. According to Thøgersen (2003), personal norms represent behavior guided by what is internally interpreted as 'the right thing to do' and which then represents the individual's values. Internal motivation can be defined as motivation mainly coming from within, and in Figure 3, which is an overview of how

different motivations are defined, we see that internal motivation is constituted by personal norms, un-internalized social norms and expansion of utility in the form of good feelings.

In this study, personal norms is held to be a moral obligation or duty to act in accordance with what is interpreted to be socially optimal. This can be said to be an orientation in line with the institutional explanation provided in the theory part, holding prevalent institutions in society responsible for human action. Through an institutionalization process, individuals are regarded as holding values supportive of and accepted by society as a whole. Vatn (2005:7) finds that internalized norms mainly are "concerned with how we treat our fellows", and hence becomes behavior supporting what is morally right or proper behavior from a 'we perspective'. There are, however, other dynamics working and affecting the variable personal norms that I am using, and which became clear through the factor analysis. The other factors loading on personal norms, and which adds other aspects of motivation to the factor, are warm glow and self-image. These are factors that can be explained through the perspective expansion of the utility function in other ways than in economic terms.

The pursuit of the warm glow feeling is according to Andreoni (1990) a rather selfish or egoistic act because it represents a maximization of individual utility in the form of wellbeing. As a contrast to egoism, which can be seen as a monistic theory, we find altruism as a pluralistic theory of motivation. Egoism is associated with selfishness and unwillingness to act if there are no benefits involved, self-regarded behavior or 'I' rationality, whereas the latter implies an other-directed, or pluralistic motivated behavior, a 'we' rationality (Berkowitz, 1970). It has been argued that behavior, which may seem to be morally anchored and driven by altruistic motives, is driven by individuals' urge to enhance self-image (Andreoni, 1990). According to theory, warm glow and self-image are factors representing an expansion of the individual's utility function, and, hence, should be interpreted as 'opposites'/competitors to a 'we-perspective'.

However, since both factors are loading on personal norms, and in addition are correlated, it is possible to hypothesize that norms are actually strengthened as a 'rule of action' by enhanced self-image and warm glow. Taking information about effects into consideration as well, one may argue that there is a similar effect. Acting according to a norm may pay off in good feelings, also when the individual gets information about positive effects of sorting. Hence, there can be said to be a synergy between personal norms and expanding individual utility,

and Vatn (2005:151) holds, "much behavior cannot be explained by simply invoking the assumption of self-regarding behavior".

Different rationalities are present in different settings, and contrary to the neoclassical position, which holds that rational choice is driven by one logic only; maximization of individual utility, and is independent of social context; rationality can be driven by other reasons; "behavior is motivated both by individual utility and, there is behavior founded on norms, on moral reasoning about what is the right thing to do" (Vatn, 2005:122). This is, moreover, supported by Etzioni (1988), who underlines the presence of involvement based upon moral reasoning of what is the right behavior as well as on commitments to others, which is behavior based on norms from an institutional perspective.

There is, however, held to be tension between the two different rationalities, the 'I' rationality and the 'we' rationality, and according to Vatn (2005:122), "which rationality applies, depends on the institutional context in which one finds oneself ". However, the variable personal norms, as a factor motivating sorting of household waste, can be argued to consist of a normative anchoring in the institutional perspective but also of an individual anchoring in the theory of rational choice.

Social norms fall within the same category, internal motivation, as personal norms, although they are not fully internalized. In the excerpt of the factor analysis presented in chapter 5.4, we see that two of the factors loading on 'personal norms' also are loading, however weaker, on 'social norms': warm glow and self-image. If we are interpreting social norms as the right way of doing things from a society perspective, and remember that they are not internalized, there exist either imagined or real threats of sanctions, which acts as factors motivating the individual to behave in a certain way. When the respondents are behaving in response to '*I should do what I want others to do'* and '*others see me as responsible',* it is evident that norms about how to act as well as the view of others' matters. Deviations from social norms does not bolster individuals' self image or give warm glow, which can be defined as a loss, and in addition, deviation may result in fear of sanctions. Therefore, one can argue that normative behavior is chosen due to individuals' reasoning of what is best to do given the situation in which they find themselves.

External motivation: economic incentives and encouragement from the authorities

Both economic incentives and encouragement from the authorities are external motivations working as outside motivational factors for influencing individuals' decisions of how to act. Frey (1997:1) finds "the price system to be completely devoid of morale", however, solutions to social dilemmas can be found when taking the price mechanism into use because rational individuals adjust to reap the benefits, represented by the question asking the respondents how the new system has influenced their level of sorting, and where nearly half had increased.

According to the neoclassical position, individuals' preferences are independent of the institutional setting, and do not recognize collectives. Hence, individuals should act in ways that benefits them the most. Accordingly, sorting represents a cost in time and effort and therefore sorting is not rational for the individual although it is regarded as rational from a society-perspective. However, recognizing that individual welfare actually is depending on others' actions, has led to recognizing interdependency. Game theory gives a good illustration of how "rational individuals make decisions when they are mutually interdependent" (Romp, 1997:1), but the outcomes of such games rarely represents a socially optimum because individuals act rational, and do not cooperate due to perceived individual costs. By imposing an economic incentive on sorting of waste in Ulstein, however, this cost is flipped around; the inclusion of the incentive has turned the rationale, from being individually rational not to sort waste due to costs in form of time and effort, it has become individually rational to sort to avoid a large fee. The incentive may, in addition, work to underline the importance of sorting waste to contribute to a healthier environment, but it may also contribute to reducing the internal motivation in individuals, as it has the potential of crowding it out. The latter may happen if individuals sorting of moral reasons change their reason for sorting to be depending on external rewards and base their action on the price incentive only.

Encouragement from the authorities, on the other hand, is a motivational factor based on a perceived regulation or command. Deviation from this regulation has no or little possibility of being sanctioned, as there exists no control mechanism. Hence, encouragement from authorities can be said to motivate parallel to social norms as it represents socially desirable action. In addition, information about effect also bolsters this motivational factor. According to Frey (1997:30), "in standard economics, rewards and command are not differentiated. In both cases, deviating from the principal's desires entails a cost". The cost in the first is

associated with reward, however, this situation is perceived as voluntary in the way that the agent chooses his performance and hence his reward, whereas in the latter the cost is associated with punishment if deviated from and hence perceived as more restrictive (Frey, 1997).

6.3 Explaining behavior

Sorting of waste can be said to represent socially desirable behavior, and it has been regarded as a voluntary contribution to the welfare of society at large. However, since the dynamics in society are continuously altering, different perspectives develop regarding how to explain the various ways in which individuals choose to behave. Taking sorting of waste and the factors motivating this behavior into consideration, Frey (1997:57) holds that "individuals are prepared to apply much environmental morale in their behavior when it costs them little. The more costly it gets, the lower the weight on moral concerns". Hence, we see that understanding what factors are influencing on individuals' choices of how to behave is important for understanding how to promote desirable behavior.

Personal norms

Personal norms came out as a significant predictor for explaining behavior in this study. Personal norms are explained both by an institutional and an individual perspective; however, it represents morally right behavior from the society's perspective. Increased self-image, as well as feeling good about one self, are incentives working to promote intrinsic motivation, which is an internal motivation found to be a factor of motivation in the long run (DeYoung, 1986). According to Thøgersen (1996), sorting of waste is perceived as a moral activity and attitude towards the activity is not based on calculating costs and benefits, but rather an assessment of right and wrong. At the same time, however, moral activities are not undertaken if the individual cost is too high (Frey, 1997).

Intention behind sorting is related to a person's attitude towards the activity and how the activity is perceived to have an effect on the environment, while social norms do not have influence on the intention to act. Stern (2000:10787) claims that "it is possible to influence individual behavior […] by making people aware of the consequences, particularly adverse ones, for things they value, and by showing them that their personal behavior is important enough to make a difference". At the same time he argues that those who do not see

connections between their actions and the environmental consequences will not be motivated to take action and act by "an internalized sense of obligation" (p.10788).

Social norms

Social norms did not come out as a significant predictor for explaining general level of waste sorting, but proved to be significant predictors for sorting of plastic, clothes and metal waste. Since social norms are norms that are not fully internalized, they are adhered to due to fear of sanctions. However, since social norms did not prove to be significant for explaining the general level, there may be a reason to believe that norms have become internalized in the individuals, and fear of sanctions is not what decides action. The role of social norms for explaining sorting of the three waste categories, on the other hand, may be that there is no internalized norm for sorting these categories, and hence, sorting is guided by fear of sanctions.

Economic incentives

From the ordinal logistic regression, Table 12, we see that an economic incentive clearly is motivating behavior. According to my analysis, the economic incentive is one of the main motivating factors for sorting, and when asking the respondents about economic gain from sorting, over 55% stated sorting of household waste is economically beneficial. This is also evident when remembering that 48% have increased their efforts due to the new regime.

To see how price changes could affect behavior, we proposed hypothetical changes in the fee. When considering a hypothetical opportunity of a decrease in the differentiated fee, from 2,24 NOK to 0,50 NOK per kilo of waste, this is not contributing to changes for the largest part of my sample who would keep sorting as before. According to Figure 17, a small share of respondents would both increase and decrease their levels and, evidently, those who would increase their effort are not motivated by the fee system, as they clearly have an opportunity to increase their sorting level beyond today's level with today' price. Those who would lower their effort (nearly 8%), on the other hand, are responding to the price incentive; the cheaper it gets, the less one will sort. This is in accordance with neoclassical economic theory, which assumes that behavior is guided by external rewards and therefore that economic incentives may lead individuals to act so as to reap the benefits of these incentives, one way or another. If a reduction in the fee would lead many to lower their efforts, a crowding out effect could be the case. If the fee was very low it would have been a small incentive, but those solely

motivated by it, would lower their efforts, and an opposite effect than intended would have been experienced.

When looking at the opposite, a hypothetical increase in the differentiated fee, Figure 16, from today's 2,24 to 5,00 NOK per kilo household waste, almost 26% of the respondents would increase their efforts. This is also in accordance with the price incentive, and in addition, considering the amount of respondents believing that the system is based only on weight, this increase should be expected. On the other hand, if considering such an increase in the fee, there would be some respondents who would act in the opposite direction and lower their efforts. When considering the opportunity of increasing the fee, something that is considered by the waste company continuously, to covering the expenses with drifting the system, this may lead to respondents deviating from the regime by lowering their efforts as a negative response to the system.

Thøgersen (2003) has found that households under a pay-by-weight scheme sorted more of their waste for recycling, which is consistent with economic theory. However, when controlling the other variables, he doubts that the behavior can be attributed only to the price effect, but also has to do with the fact that the price mechanism has enhanced norms as well as perceived self-efficacy which are factors affecting motivation.

When looking at how economic incentives may explain the different waste categories, as shown in Table 13, it is only significant as a predictor regarding sorting of organic waste, metal and special waste. Obviously, organic waste has the potential to increase the weight of the waste substantially.

Encouragement from the authorities

As a motivational factor, the variable did not prove to be significant for explaining behavior in this study. Theoretically, nevertheless, it has the opportunity of influencing and bolstering peoples' self-determination and self-image if perceived as acknowledging. And, hence, encouragement from the authorities may enhance individuals' effort. For some of the waste categories, however, encouragement from the authorities was a significant predictor, which may be due to resent information campaigns.

Habits

We see that habits have a high explanatory power on behavior, in both models and in both steps. As was discussed in the theory part, habits can have its origin in both conventions and norms, and hence be "automatic responses to specific cues" (Verplanken and Orbell, 2003:1314), that are developed over time. However, habits may also develop due to bounded rationality, which implies that behavior is carried out simply because it solves a coordination problem in the easiest way, and not necessarily is based on moral assumptions.

From the neoclassical point of view, habits are only actions that are repeated because it is too costly changing them and thus not appreciated as a function enabling individuals to learning (Hodgson, 1988; Vatn, 2005). According to Thøgersen (1994:416) "behavior that is reinforced by an incentive will become habitualized", however, other studies have shown that this complying effect taper off in the long run because people adapt to changes in the beginning but fall back to old patterns of behavior after a while.

97.4% of the respondents agreed to some extent that they sorted their waste automatically, which shows the instrumental effect of habits. However, looking at the analysis holding the various waste categories as dependent, habits are only significant as explanatory variables for plastic and electronic waste.

Knowledge

Both knowledge about how a system works and how much one must eventually pay when utilizing services provided by a system, have the ability of motivating individuals regarding how they are performing. In addition is general knowledge about the environment and the detrimental effects of pollution a factor that may contribute to motivating individuals to act in a socially desirable way. In this study, however, knowledge about system and fee did not prove to be significant variables for explaining behavior, and there were no correlations between knowledge and economic incentives.

Other variables explaining stated behavior

There are in addition to the variables discussed above, other variables that may help explain behavior. From the analysis, housing type, number of people in household and the respondent's age level proved significant. The likelihood for those living in houses to be sorting at a high level is higher than for those living in apartments. Evidently, how many

people are living in the household also matters, as larger households generate more household waste. Lastly, being in a higher age level increase the likelihood for being in a higher category of sorting level.

Summing up explaining behavior

We have now seen that behavior may be explained by different motivational factors and by different theoretical positions. Economic incentives can be said to represent the neoclassical paradigm, which has been widely used to explain outcomes of behavior. This position has, however, to a large extent been criticized as "unrealistic, unproductive and amoral, further […] that the self-oriented, rational behavior modeled by neoclassicists is assumed to occur both within the context of personality structure and society" (Etzioni, 1988:2-3). Critics claims that "a move to an I-logic in case after case may ruin the social capital of society", like for example the use of economic instruments in cases where behavior is governed by social rationality. "The effect from this may be a crowding out effect and erosion of moral, thus resulting in increased demand for legal regulations" (Vatn, 2009:195). Ackerman (1997:4) finds that because many "goals and objectives are inherently priceless, they would be misrepresented or corrupted by the process of assigning them monetary values".

Contrary to the neoclassical view, the classical institutional position's perspective on choice reject the view on people as consumers only maximizing individual utility and has generalized that behavior is depending on institutions. Experiments have shown that the standard version of rational choice as found in economics, is not always suited to explain behavior. People are found to be cooperating in situations where the pursuit of individual rationality is expected, and at the same time, pay-offs in certain situations have led to a reduction in the willingness to cooperate (Vatn, 2009). It is found that people's moral regarding what is the right behavior is affecting behavior and, even though individuals are seen as rational and are labeled as selfish and only pursuing self-interest, voluntary contributions are often observed (Berglund, 2003). Even in situations where it would be rational according to economic theory not to participate or contribute, people are found to be contributing.

Following these findings, questions have arisen about the effects of implementing economic incentives into regulations because the incentives may "interact with the individuals' intrinsic or internalized reasons for performing the promoted behavior and hence produce unexpected outcomes" (Thøgersen, 2003:198). "With reference to cognitive dissonance theory it has

been shown that a positive attitude towards an environmentally beneficial activity can be undermined by an over-justification when people are given an extrinsic reason for doing something they would have done anyway" (Thøgersen, 1994:413-414).

Even though economic incentives seems to be a significant motivation factor in this study, it does not seem to have crowded out the moral reasoning as we can se that personal norms are present as a significant predictor for behavior. The large share of respondents reporting behavior based on routine, can be due to internalized norms that have developed into a habit, and not because of conscious evaluation of what to do to gain the most. Geller *et al.* (1982) has shown that attempts to improving environmental behavior by using monetary incentives and communicative strategies, only have been successful in a shorter time period. When incentives were removed, behavior returned to earlier levels. Thøgersen (1994:416), on the other hand has found that "behavior that is reinforced by an incentive will become habitualized". However, the fact that behavior is based on personal norms and automacy, further underlines that I cannot say that there has been a crowding out effect of moral behind sorting, which could have been the case if the norm behind the act continuously was reconsidered and behavior was undertaken only based on external incentives.

7. Conclusion

The goal with this thesis was to increase our understanding of what motivates sorting of household waste in a regime using an economic incentive, further what role these factors of motivation are playing when explaining behavior. We found that the respondents were motivated by internal and external factors and that both individual and institutional theory help explain behavior. The findings supported some of the hypotheses for this study. However, due to the low response rate, I cannot generalize from the findings and, therefore, further research is needed.

What is the level of sorting under a regime using an economic incentive to promote sorting? Has it changed with the introduction of this new regime?

We found that the sorting level score on average is 3.29 where 5 represents full sorting, and that 51% of the respondents are sorting mostly or everything followed by 20% who are sorting quite much. According to our findings, 48% have increased their efforts due to the implementation of the new regime, and we can argue that its implementation has had an effect on sorting level as it has changed in the desired direction.

What motivates sorting of household waste under this regime?

By making use of a factor analysis, for revealing rear warding factors of motivation, we found both internal and external motivational factors. In line with theory, factors representing personal norms and social norms together with economic incentives and encouragement from the authorities showed to be factors of motivation. Through the analysis for explaining behavior, however, we found that motivating factors for sorting of household waste under this regime are economic incentives and personal norms. In addition to these clear motivational factors, sorting was undertaken, to a great extent, based on routine. 77% are routineously sorting their waste without reflecting over the act. We have also found that housing facilities (attributes of the resource and possibility of action) have a positive influence on sorting. Evidently, houses have larger room sizes than apartments, and hence, sorting facilities are easier to install, which may motivate to increase sorting or even sort at all. Other significant findings that we did not hypothesize around are number of people in the household and age level. Both have a positive influence on sorting.

What role do motivational factors play when explaining actual waste sorting behavior?
Motivational factors play an important role because they are guiding behavior, either via internal or external motivation. Clearly, individuals are motivated differently, and the various motivational factors are contributing to promoting (desired) behavior, and hence, they play an important role in this regard.

The roles of the motivational factors are different; they are characterized as external and are affecting behavior through the use of incentives or rules, or they are internal. Internal motivation, like personal norms, which proved to be one of the significant explanation variables for behavior, is founded upon internalized norms and is rooted in the institutional perspective. Internal motivation guides behavior through a moral perspective, which further is regarding societal values as important, and hence, is an important factor behind behavior. Internal motivation also consists of elements that bolsters individuals' feelings, and hence motivates to continue the behavior. External motivation, on the other hand, guides behavior through the use of, for example economic incentives in this case, and may foster individualistic behavior. On the other hand, individuals not holding internal motivation for undertaking an activity may respond better to an external incentive, and thus, external motivation guides those who do not respond to internal motivational factors.

Accordingly, motivational factors play an important role when explaining behavior by working like determinants for behavior by being able to 'push' or guide behavior in certain directions. As we have seen in this study, the use of an economic incentive have led to increased sorting, which, from the municipality's point of view, as well as for society, is desirable. It is important to bear in mind, however, when trying to promote changes through implementing external motivational factors intended to guide behavior; they may work in the opposite direction and crowd out internal motivation.

What roles can a reduction or an increase in the differentiated fee play?
Changes in the differentiated fee have the potential to affect efforts according to the price incentive, and economically motivated respondents should respond to an increase by elevating their efforts and vice versa. Our findings imply that if the differentiated fee hypothetically were considered to being increased from 2,24 NOK/kg to 5,00 NOK/kg, 54% would continue sorting at present level whereas nearly 26% would increase. If the fee was decreased to 0,50

NOK/kg, on the other hand, 76% would continue at same level, and only 8% would decrease their efforts. 10% would actually increase.

Although external incentives has been largely criticized for the potential to crowding out internal motivation; personal norms, this cannot be said to be the case here as we see that personal norms are present to a large extent even if there is imposed an economic incentive. Hence, we can conclude with the findings in this study that sorting of household waste, in addition to being based on routine, is undertaken due to personal norms. The use of economic incentives at today's level, therefore, has not only increased sorting but it may additionally have underlined the presence of personal norms. However, we do not know for certain whether the economic incentive in reality has compensated for a crowding out effect that we cannot interpret from the sorting level.

There has in this study not been possible to draw conclusions about the effect of the regime due to lack of data on waste levels from last year. However, through self-reporting, respondents states they have elevated their efforts, and hence, based on their statements, the regime can be said to have had an effect on their sorting level without crowding out moral reasoning for contribution.

7.1 Where to go from here?

It is important to bear in mind that policy and regulation is formed so as to reflect the preferences and values of the people of a society. However, policy also has its point of departure in the preferences of these people, and according to Sagoff (1988), people possess preference orderings which can be said to be incompatible. "The economic man and the citizen are for all interests two different individuals", they hold different preference maps, which eventually have the ability to affect how policies are working (Sagoff, 1988:53). The economic man relates to the market and his individual preferences whereas the citizen relates to the political sphere regarding society and what concerns its members, and from this it is obvious that "social choices under one set of preferences will not be optimal under an other" (p.54). Hence, a divide is obvious, betweem the rational man, I-focused, taking the role as a consumer and pursuing maximization of own utility as seen in neoclassical economic theory, versus the citizen; conserned with what benefits the society as a whole, as seen in classical institutional explanations.

Continuing to study the effect of the price incentive for sorting household waste and whether it has the ability to affect behavior, without sacrificing the impotant precence of personal norms, is considerable for the designing of environmental policies and the implementation of systems in the future. Beside from developing new systems in response to increased waste production due to increased consumption, it is important to relate to this quotation of Ackerman as well; "to create a sustainable future it will be necessary to act on the understanding that there is such a thing as enough, and that many of our remaining needs must be addressed through social change rather than private spending" (Ackerman, 1997:185).

8. References

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Appendix I. The questionnaire.

The original questionnaire was published in Norwegian using Questback, and hence, the layout was different. Because question 1 and 2 was about anonymity consern and ID number, they are not included here. The questionnaire is translated and reproduced below.

Part A. About waste sorting

This section contains questions about the practicality of the waste system in your municipality. Please answer all the questions.

3) What kind of fee system is related to the waste system in your municipality?

Tick one of the following alternatives.

__ A fixed yearly fee

__ A fee based on the volume of the household waste

__ A fee based on the weight of the household waste

__A fee based on the frequency of the picking up of household waste

__ Split; a fixed fee + a differentiated fee based on weight

__ Split; a fixed fee + a differentiated fee based on volume

4) Do you know how much you pay per year for the waste services?

___ No ___Yes, ____Kr

5) How much of your waste is sorted?

Answers should be given on a scale where 1 = nothing and 5 = everything

1	2	3	4	5	Do not know

(if you answered 1 = nothing, proceed to question 7)

6) How much of the following waste categories do you sort?

Answers should be given on a scale where 1 = nothing and 6 = everything

	1	2	3	4	5	6	Do not know
Paper							
Plastic							
Organic waste							
Glass no refund							
Metal waste							
Clothes/Fabric							
Special waste							
Electronic waste							

7) What makes you sort your waste?

Answers should be given on a scale where 1 = not correct at all and 4 = Very correct

	1	2	3	4	Do not know
Encouragement from the authorities					
I want to see myself as a responsible person					
I want others to see me as a responsible person					
I should do what I want others to do					
Sorting makes me feel good					
Sorting is economically profitable for me					
I have a duty to sort my waste to help contributing to a healthier environment					
I think everyone should sort their waste even if they do not gain from it economically					
Information about positive effects make me sort my waste					

8) Other factors that would make you sort? Please specify:

_____

_____

9) What would make you sort even more, and if not sorting, what would make you start?

Answers should be given on a scale where 1 = not correct at all and 4 = very correct

	1	2	3	4	Do not know
Better infrastructure					
The differentiated fee is increased					
More information about the consequences of sorting					
Information about how much the household is sorting compared to other households					
The differentiated fee is replaced with a fixed yearly fee					

10) Other factors that will make you start or increase your sorting? Please specify:

_____

_____

11) Habits. Consider the statement below.

Answers should be given on a scale where 1 = not correct at all and 4 = very correct

	1	2	3	4	Do not know
I sort my waste automatically					

12) Do you sort all that you potentially can be sorting?

__ No __ Yes __ Do not know

(If yes, proceed to question 15)

13) I do not sort everything I potentially can, because…..

Answers should be given on a scale where 1 = not correct at all and 4 = very correct

	1	2	3	4	Do not know
The infrastructure is not good enough					
Sorting of waste is too time consuming					
Sorting does not contribute enough to a healthier environment					
Others are not sorting					

14) If you are not sorting all you potentially can, what are the reasons for this? Please specify:

_____

_____

15) Consider the following and pick the suitable alternative.

Answers should be given on a scale where 1 = not correct at all and 4 = very correct

	1	2	3	4	Do not know
I talk with my neighbors about sorting					
My neighborhood is engaged in the theme sorting of waste					
People in my neighborhood perceive sorting as a duty					
I act in accordance with the values held in my neighborhood					

Part B. Questions on attitude.

16) I see myself as more environmentally concerned than average.

__ No __Yes __ Do not know

17) Consider the following statements, and pick the suitable alternative:

Answers should be given on a scale where 1 = not correct at all and 4 = very correct

	1	2	3	4	Do not know
I have a personal responsibility to help solving the environmental problems					
I do what I can for the environment as long as it does not cost me too much					
Environmental issues are the responsibilities of the authorities					

Part C. The waste system.

18) In your municipality there is a split fee on household waste, one fixed yearly fee and a differentiated fee based on the weight of the household waste when it is picked up. The fixed fee is 1356NOK and the differentiated fee is 2,24NOK/kg. Consider the following statements:

I think the system is…….

Answers should be given on a scale where 1 = not correct at all and 4 = very correct

	1	2	3	4	Do not know
Good, because I can choose how much I like to sort and pay for the rest					
Bad, because I would like to decide how much I will sort without being punished economically					
Good, as such a system is punishing those who do not sort their waste					
Good, because such a system gives an economic incentive to sort					

19) Today's waste system was introduced in January 2009. How has the system affected your sorting activity?

__ I sort less

__ I sort as before

__ I sort more

__ Do not know

20) Does it happen that anyone in the household throw household waste into other waste categories, like household waste into the paper bin?

Answers should be given on a scale where 1 = never and 4 = often

1	2	3	4	Do not know

(If you answered never, proceed to question 23)

21) It happends that I or someone in my household throw household waste into other waste categories because:

Answers should be given on a scale where 1 = not correct at all and 4 = very correct

	1	2	3	4	Do not know
I am not interested in sorting					
Sometimes the household has more waste than the bin can take					
I do not have to pay so much for getting rid of the waste					
Good, because such a system gives an economic incentive to sort					
I forget					

22) Other reasons for throwing household waste into other waste categories. Please specify:

_____

_____

23) Do you get rid of household waste without using the waste services provided by the municipality, for example burning your waste?

___No ___Yes

24) If you get rid of waste without using the services provided, why do you do that? Please specify:

_____

_____

25) Imagine that the authorities on occasion would check your sorted waste, how would you perceive such a control?

Answers should be given on a scale where 1 = not correct at all and 4 = very correct

	1	2	3	4	Do not know
It is positive because I can get help to sort properly					
It would feel very controlling					
It would motivate me to sort even more					

Part D. Potential alternatives.

26) How would you adapt to potential changes in the differentiated waste fee?

A) Imagine the authorities decide to reduce the differentiated fee from 2,24 NOK/kg to 0,50 NOK/kg.

How would this affect your sorting?

__ I would sort much less

__ I would sort a little less

__ I would sort as before

__ I would sort a little more

__ I would sort much more

B) Imagine the authorities decide to increase the differentiated fee from 2,24 NOK/kg to 5,00 NOK/kg.

How would this affect your sorting?

__ I would sort much less

__ I would sort a little less

__ I would sort as before

__ I would sort a little more

__ I would sort much more

Part E. Background information.

27) Are you male or female?

___ Male ___ Female

28) What is your age? ___ Years

29) How many persons lived in your household last year? _____ Person(s)

30) What kind of education do you have?

___ Primary/secondary School

___ High School

___ Technical School

___ University or equivalent

___ Other

31) What kind of housing do you possess?

___ House ___ Apartment ___Other

32) What is the total yearly household income before tax?

___ Less than 150 000

___Between 150 001-400 000

___Between 400 001-650 000

___Between 650 001-800 000

___Between 800 001-1 000 000

___Above 1 000 000

Part F. Other comments.

In this section we invite you to share your opinion about the waste system in your municipality, this survey or other issues regarding sorting of household waste.

_____

_____

Thank you very much for participating. You now have the opportunity to win a gift-card (value: 1000kr) to be used at 'Blåhuset'.

Appendix II. Statistical analyses

Confidence intervals question 6, different waste categories.

Confidence intervals are used at a 95% level to estimate (the reliability for) a range of values likely to include an unknown parameter. The width of the intervals are studied to get an idea of how uncertain we are about the parameter, as the bigger the interval, the more uncertain we are.

One-Sample Statistics

	N	Mean	Std. Deviation	Std. Error Mean
Paper	195	5.48	.728	.052
Plastic	193	4.92	1.291	.093
Organic	191	2.49	1.841	.133
Glass without refund	194	4.95	1.521	.109
Metal	191	4.34	1.790	.130
Clothing	193	3.79	1.868	.134
Special waste	193	4.57	1.563	.113
Electronic waste	195	4.83	1.690	.121

One-Sample Test

	Test Value = 0					
					95% Confidence Interval of the Difference	
	t	df	Sig. (2-tailed)	Mean Difference	Lower	Upper
Paper	105.221	194	.000	5.482	**5.38**	**5.58**
Plastic	52.983	192	.000	4.922	**4.74**	**5.11**
Organic	18.712	190	.000	2.492	**2.23**	**2.75**
Glass without refund	45.358	193	.000	4.954	**4.74**	**5.17**
Metal	33.508	190	.000	4.340	**4.08**	**4.60**
Clothing	28.212	192	.000	3.793	**3.53**	**4.06**
Special waste	40.608	192	.000	4.570	**4.35**	**4.79**
Electronic waste	39.874	194	.000	4.826	**4.59**	**5.06**

Reliability analysis question 7.

Cronbach's Alpha was used to measure the internal consistency in question 7, which is the question representing motivation, by measuring the underlying construct. When the reliability coefficient is > 0.7, we have an acceptable level. By using this analysis, one may get an indication of the correlation between the items or how closely related they are as a group. For further study of the dimensionality of scale, a factor analysis is computed. See next page.

Case Processing Summary

		N	%
Cases	Valid	170	86.3
	Excluded[a]	27	13.7
	Total	197	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.789	.805	9

Inter-Item Correlation Matrix

	Encouragement from authorities	See myself as responsible	Other see me as responsible	I should do what I want others to do	Warm glow	Economic incentives	I have a duty to sort my waste	Everybody should sort their waste	Information about effects
Encouragement from authorities	1.000	.210	.263	.110	.089	.143	.109	.159	.281
See myself as responsible	.210	1.000	.519	.399	.567	.207	.487	.469	.431
Other see me as responsible	.263	.519	1.000	.496	.367	.241	.308	.381	.286
I should do what I want others to do	.110	.399	.496	1.000	.365	.140	.269	.247	.239
Warm glow	.089	.567	.367	.365	1.000	.234	.516	.480	.374
Economic incentives	.143	.207	.241	.140	.234	1.000	.197	.042	.182
I have a duty to sort my waste	.109	.487	.308	.269	.516	.197	1.000	.626	.475
Everybody should sort their waste	.159	.469	.381	.247	.480	.042	.626	1.000	.390
Information about effects	.281	.431	.286	.239	.374	.182	.475	.390	1.000

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.708	3.012	4.218	1.206	1.400	.204	9

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
33.37	46.862	6.846	9

Factor analysis question 7, Motivation.

Factor analysis was used to assess the underlying dimensions of the items in question 7, further to reducing the numbers of variables for more thorough analyses. By focusing on the rotated component matrix, an indication is given of the underlying dimension by how the items are loading on the factors.

Correlation Matrix

		Encouragement from authorities	See myself as responsible	Other see me as responsible
Correlation	Encouragement from authorities	1.000	.210	.263
	See myself as responsible	.210	1.000	.519
	Other see me as responsible	.263	.519	1.000
	I should do what I want others to do	.110	.399	.496
	Warm glow	.089	.567	.367
	Economic incentives	.143	.207	.241
	I have a duty to sort my waste	.109	.487	.308
	Everybody should sort their waste	.159	.469	.381
	Information about effects	.281	.431	.286

Correlation Matrix

		I should do what I want others to do	Warm glow	Economic incentives	I have a duty to sort my waste
Correlation	Encouragement from authorities	.110	.089	.143	.109
	See myself as responsible	.399	.567	.207	.487
	Other see me as responsible	.496	.367	.241	.308
	I should do what I want others to do	1.000	.365	.140	.269
	Warm glow	.365	1.000	.234	.516
	Economic incentives	.140	.234	1.000	.197
	I have a duty to sort my waste	.269	.516	.197	1.000
	Everybody should sort their waste	.247	.480	.042	.626
	Information about effects	.239	.374	.182	.475

Correlation Matrix

		Everybody should sort their waste	Information about effects
Correlation	Encouragement from authorities	.159	.281
	See myself as responsible	.469	.431
	Other see me as responsible	.381	.286
	I should do what I want others to do	.247	.239
	Warm glow	.480	.374
	Economic incentives	.042	.182
	I have a duty to sort my waste	.626	.475
	Everybody should sort their waste	1.000	.390
	Information about effects	.390	1.000

KMO and Bartlett's Test

	Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	**.822**
Bartlett's Test of Sphericity	Approx. Chi-Square	441.830
	df	36
	Sig.	**.000**

Communalities

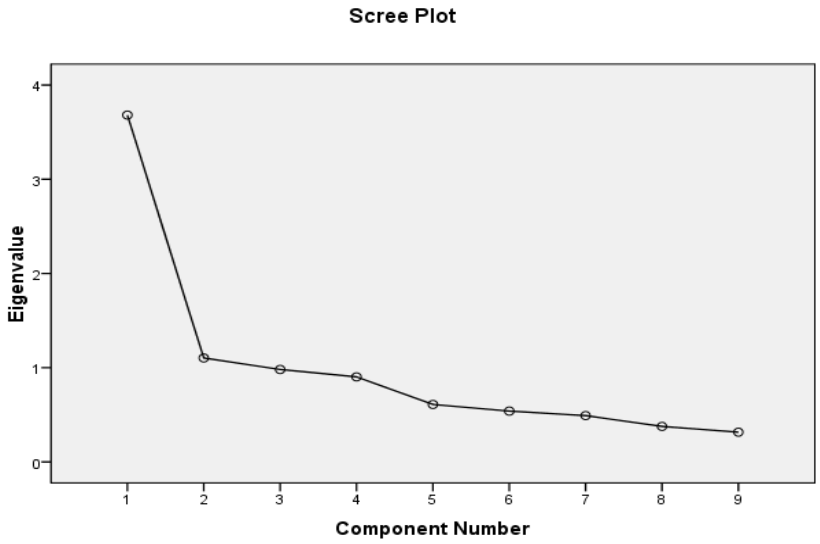
	Initial	Extraction
Encouragement from authorities	1.000	.903
See myself as responsible	1.000	.637
Other see me as responsible	1.000	.719
I should do what I want others to do	1.000	.751
Warm glow	1.000	.644
Economic incentives	1.000	.961
I have a duty to sort my waste	1.000	.749
Everybody should sort their waste	1.000	.711
Information about effects	1.000	.594

Extraction Method: Principal Component Analysis.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	**3.682**	**40.907**	**40.907**	**3.682**	**40.907**	**40.907**
2	**1.103**	**12.258**	**53.165**	**1.103**	**12.258**	**53.165**
3	**.981**	**10.900**	**64.065**	**.981**	**10.900**	**64.065**
4	**.902**	**10.027**	**74.092**	**.902**	**10.027**	**74.092**
5	.610	6.775	80.867			
6	.539	5.992	86.858			
7	.491	5.457	92.315			
8	.376	4.180	96.495			
9	.315	3.505	100.000			

Extraction Method: Principal Component Analysis.



Component Matrix[a]

	Component			
	1	2	3	4
See myself as responsible	.791			
I have a duty to sort my waste	.743	-.377		
Warm glow	.741			
Everybody should sort their waste	.714	-.407		
Other see me as responsible	.681	.347		
Information about effects	.648		.413	
I should do what I want others to do	.574		-.540	
Encouragement from authorities	.335	.560	.601	-.339
Economic incentives	.345	.517		.758

Extraction Method: Principal Component Analysis.

a. 4 components extracted.

Component Matrix[a]

a. 4 components extracted.

Rotated Component Matrix[a]

	Component			
	1	2	3	4
I have a duty to sort my waste	.852			
Everybody should sort their waste	.801			
Warm glow	.671	.367		
Information about effects	.637		.407	
See myself as responsible	.584	.515		
I should do what I want others to do		.856		
Other see me as responsible		.773		
Encouragement from authorities			.939	
Economic incentives				.967

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 5 iterations.

Total Variance Explained

Component	Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %
1	2.646	29.399	29.399
2	1.808	20.087	49.486
3	1.146	12.731	62.217
4	1.069	11.875	74.092

Extraction Method: Principal Component Analysis.

Component Transformation Matrix

Component	1	2	3	4
1	.777	.551	.226	.204
2	-.554	.367	.555	.501
3	.262	-.652	.711	-.021
4	.147	-.369	-.368	.841

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Factor analysis question 18.

Factor analysis was used on this question to reduce the amount of variables. Two factors were extracted and used in further analyses.

Correlation Matrix

		Good, because I can choose myself how much I want to sort and pay for the rest	Bad, because I want to have the opportunity to choose how much to sort without being punished by a fee	Good, as such a system punishes those who do not sort
Correlation	Good, because I can choose myself how much I want to sort and pay for the rest	1.000	-.180	.399
	Bad, because I want to have the opportunity to choose how much to sort without being punished by a fee	-.180	1.000	-.142
	Good, as such a system punishes those who do not sort	.399	-.142	1.000
	Good, as such a system clearly gives people economic incentives to sort their waste	.507	-.201	.672
	Bad, as my own motivation decrease	.055	.475	-.077
	Bad, sorting is a duty that should be promoted through other means than through economic incentives	-.160	.295	-.036
	Bad, as large households are punished	-.204	.454	-.117

Correlation Matrix

		Good, as such a system clearly gives people economic incentives to sort their waste	Bad, as my own motivation decrease	Bad, sorting is a duty that should be promoted through other means than through economic incentives	Bad, as large households are punished
Correlation	Good, because I can choose myself how much I want to sort and pay for the rest	.507	.055	-.160	-.204
	Bad, because I want to have the opportunity to choose how much to sort without being punished by a fee	-.201	.475	.295	.454
	Good, as such a system punishes those who do not sort	.672	-.077	-.036	-.117
	Good, as such a system clearly gives people economic incentives to sort their waste	1.000	-.074	-.077	-.101
	Bad, as my own motivation decrease	-.074	1.000	.438	.349
	Bad, sorting is a duty that should be promoted through other means than through economic incentives	-.077	.438	1.000	.474
	Bad, as large households are punished	-.101	.349	.474	1.000

KMO and Bartlett's Test

	Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	**.659**
Bartlett's Test of Sphericity	Approx. Chi-Square	341.358
	df	21
	Sig.	**.000**

Communalities

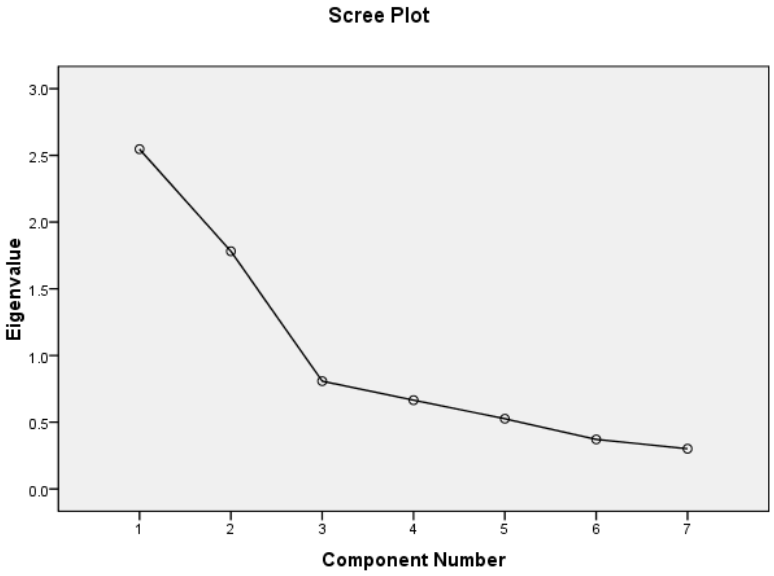
	Initial	Extraction
Good, because I can choose myself how much I want to sort and pay for the rest	1.000	.563
Bad, because I want to have the opportunity to choose how much to sort without being punished by a fee	1.000	.553
Good, as such a system punishes those who do not sort	1.000	.704
Good, as such a system clearly gives people economic incentives to sort their waste	1.000	.786
Bad, as my own motivation decrease	1.000	.591
Bad, sorting is a duty that should be promoted through other means than through economic incentives	1.000	.549
Bad, as large households are punished	1.000	.581

Extraction Method: Principal Component Analysis.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	**2.547**	**36.384**	**36.384**	**2.547**	**36.384**	**36.384**
2	**1.781**	**25.449**	**61.833**	**1.781**	**25.449**	**61.833**
3	.808	11.541	73.373			
4	.665	9.501	82.874			
5	.526	7.516	90.391			
6	.371	5.304	95.695			
7	.301	4.305	100.000			

Extraction Method: Principal Component Analysis.



Component Matrix[a]

	Component	
	1	2
Bad, because I want to have the opportunity to choose how much to sort without being punished by a fee	.674	.315
Bad, as large households are punished	.661	.381
Bad, sorting is a duty that should be promoted through other means than through economic incentives	.590	.448
Bad, as my own motivation decrease	.561	.526
Good, because I can choose myself how much I want to sort and pay for the rest	-.552	.508
Good, as such a system clearly gives people economic incentives to sort their waste	-.612	.642
Good, as such a system punishes those who do not sort	-.561	.624

Extraction Method: Principal Component Analysis.

a. 2 components extracted.

Rotated Component Matrix[a]

	Component	
	1	2
Bad, as my own motivation decrease	**.767**	
Bad, as large households are punished	**.752**	
Bad, sorting is a duty that should be promoted through other means than through economic incentives	**.741**	
Bad, because I want to have the opportunity to choose how much to sort without being punished by a fee	**.721**	
Good, as such a system clearly gives people economic incentives to sort their waste		**.884**
Good, as such a system punishes those who do not sort		**.838**
Good, because I can choose myself how much I want to sort and pay for the rest		**.743**

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

Total Variance Explained

Component	Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %
1	2.240	31.996	31.996
2	2.089	29.836	61.833

Extraction Method: Principal Component Analysis.

Component Transformation Matrix

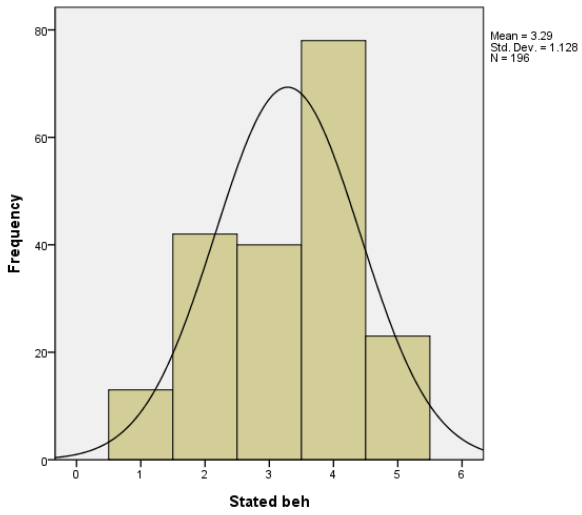
Component	1	2
1	.774	-.633
2	.633	.774

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Ordinal logistic regression, holding question 5, stated behaviour as the dependent variable to be explained. For statistical details, see next page.

		Ordinal logistic regression with **stated behavior** as dependent variable, 1st step		Ordinal logistic regression with **stated behavior** as dependent variable, 11th step	
		N = 153 LR chi² (16) = 80377 Pseudo R^2 (Nagelkerke)= .432 -2LL (sign.) = .079		N = 178 LR chi² (6) = 84449 Psaudo R^2 (Nagelkerke) = -2LL (sign.) = .370	
	Independent variables	**Parameter estimates (coeffisients)**	**P value**	**Parameter estimates (coeffisients)**	**P value**
Motivation	Economic incentives	.355	**.002**	.390	**.000**
	Encouragesment from the authorities	.073	.562		
	Social norms	-.075	.638		
	Personal norms	.499	**.013**	.522	**.002**
Individuals' characteristics	Gender	.099	.778		
	Age level	.216	.464	.438	**.060**
	Income	-.396	.154		
	Education	-.170	.518		
	No in household	.506	**.084**	.391	**.092**
Attributes /control	Housing type (1)	1.107	.122	1.171	**.057**
Knowledge	System knowledge	.068	.770		
	Environmental concern	-.049	.819		
	Fee knowledge	.072	.849		
	Attitude towards regime	.155	.428		
Habits	Habits	.836	**.000**	.767	**.000**
Institutions	Institutions in the neighborhood	.322	.175		



The distribution of the dependent ordinal variable was studied to determine what function to use in the ordinal logistic regression. Normal distribution assumes using the Logit function.

Ordinal Logistic Regression 1st step including all independent variables.

Case Processing Summary

		N	Marginal Percentage
Stated beh	A little	11	7.2%
	Some	34	22.2%
	Quite much	36	23.5%
	Mostly	56	36.6%
	Everything	16	10.5%
Housing	House	143	93.5%
	Apartment	10	6.5%
Gender	Male	108	70.6%
	Female	45	29.4%
Valid		153	100.0%
Missing		44	
Total		197	

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	449.192			
Final	368.815	80.377	16	.000

Link function: Logit.

Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	626.875	588	.129
Deviance	368.815	588	1.000

Link function: Logit.

Pseudo R-Square

Cox and Snell	.409
Nagelkerke	.432
McFadden	.179

Link function: Logit.

Parameter Estimates

		Estimate	Std. Error	Wald	df	Sig.
Threshold	[NYESTE = 1]	5.418	1.665	10.585	1	.001
	[NYESTE = 2]	7.732	1.734	19.884	1	.000
	[NYESTE = 3]	9.184	1.778	26.678	1	.000
	[NYESTE = 4]	11.927	1.859	41.169	1	.000
Location	ECON.INCENTIVES	.355	.117	9.204	1	.002
	SOS.NORMS.4	-.075	.159	.222	1	.638
	PERS.NORMS.4	.499	.202	6.113	1	.013
	ENCOURAGEMENT	.073	.126	.337	1	.562
	EDUCATION	-.170	.263	.417	1	.518
	AGELEVEL	.216	.295	.536	1	.464
	INCOME	-.396	.277	2.036	1	.154
	HABIT	.836	.170	24.107	1	.000
	KNOWLEDGESYST	.068	.233	.085	1	.770
	KNOWLEDGEFEE	.072	.380	.036	1	.849
	INHOUSEHOLD	.506	.293	2.989	1	.084
	ENVIRCONCERN	-.049	.216	.052	1	.819
	ATTSYST	.155	.196	.627	1	.428
	INSTITUTIONS	.322	.238	1.839	1	.175
	[HOUSINGTYPE=1]	1.107	.716	2.390	1	.122
	[HOUSINGTYPE=2]	0[a]	.	.	0	.
	[GENDER=1]	.099	.352	.080	1	.778
	[GENDER=2]	0[a]	.	.	0	.

Link function: Logit.

a. This parameter is set to zero because it is redundant.

Parameter Estimates

		95% Confidence Interval	
		Lower Bound	Upper Bound
Threshold	[NYESTE = 1]	2.154	8.683
	[NYESTE = 2]	4.334	11.131
	[NYESTE = 3]	5.699	12.669
	[NYESTE = 4]	8.283	15.570
Location	ECON.INCENTIVES	.126	.584
	SOS.NORMS.4	-.387	.237
	PERS.NORMS.4	.104	.895
	ENCOURAGEMENT	-.174	.320
	EDUCATION	-.684	.345
	AGELEVEL	-.362	.794
	INCOME	-.939	.148
	HABIT	.502	1.170
	KNOWLEDGESYST	-.388	.524
	KNOWLEDGEFEE	-.672	.816
	INHOUSEHOLD	-.068	1.079
	ENVIRCONCERN	-.473	.374
	ATTSYST	-.229	.539
	INSTITUTIONS	-.143	.788
	[HOUSINGTYPE=1]	-.296	2.511
	[HOUSINGTYPE=2]	.	.
	[GENDER=1]	-.591	.789
	[GENDER=2]	.	.

Link function: Logit.

Test of Parallel Lines[c]

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Null Hypothesis	368.815			
General	306.402[a]	62.413[b]	48	.079

The null hypothesis states that the location parameters (slope coefficients) are the same across response categories.

a. The log-likelihood value cannot be further increased after maximum number of step-halving.

b. The Chi-Square statistic is computed based on the log-likelihood value of the last iteration of the general model. Validity of the test is uncertain.

c. Link function: Logit.

Ordinal Logistic Regression 11th step.

Case Processing Summary

		N	Marginal Percentage
Stated behavior	A little	12	6.7%
	Some	40	22.5%
	Quite much	38	21.3%
	Mostly	68	38.2%
	Everything	20	11.2%
Housing	House	166	93.3%
	Apartment	12	6.7%
Valid		178	100.0%
Missing		19	
Total		197	

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	458.040			
Final	373.591	84.449	6	.000

Link function: Logit.

Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	543.136	470	.011
Deviance	328.956	470	1.000

Link function: Logit.

Pseudo R-Square

Cox and Snell	.378
Nagelkerke	.399
McFadden	.162

Link function: Logit.

Parameter Estimates

		Estimate	Std. Error	Wald	df	Sig.
Threshold	[NYESTESTATED = 1]	5.709	1.155	24.418	1	.000
	[NYESTESTATED = 2]	8.110	1.244	42.526	1	.000
	[NYESTESTATED = 3]	9.364	1.289	52.754	1	.000
	[NYESTESTATED = 4]	12.005	1.385	75.150	1	.000
Location	ECON.INCENTIVES	.390	.100	15.208	1	.000
	PERS.NORMS.4	.522	.171	9.373	1	.002
	HABIT	.767	.147	27.321	1	.000
	INHOUSEHOLD	.391	.232	2.845	1	.092
	AGELEVEL	.438	.232	3.546	1	.060
	[HOUSINGTYPE=1]	1.171	.616	3.609	1	.057
	[HOUSINGTYPE=2]	0[a]	.	.	0	.

Link function: Logit.

a. This parameter is set to zero because it is redundant.

Parameter Estimates

		95% Confidence Interval	
		Lower Bound	Upper Bound
Threshold	[NYESTESTATED = 1]	3.445	7.974
	[NYESTESTATED = 2]	5.672	10.547
	[NYESTESTATED = 3]	6.837	11.891
	[NYESTESTATED = 4]	9.291	14.719
Location	ECON.INCENTIVES	.194	.586
	PERS.NORMS.4	.188	.857
	HABIT	.479	1.055
	INHOUSEHOLD	-.063	.846
	AGELEVEL	-.018	.893
	[HOUSINGTYPE=1]	-.037	2.378
	[HOUSINGTYPE=2]	.	.

Link function: Logit.

Test of Parallel Lines[c]

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Null Hypothesis	373.591			
General	354.234[a]	19.357[b]	18	**.370**

The null hypothesis states that the location parameters (slope coefficients) are the same across response categories.

a. The log-likelihood value cannot be further increased after maximum number of step-halving.

b. The Chi-Square statistic is computed based on the log-likelihood value of the last iteration of the general model. Validity of the test is uncertain.

c. Link function: Logit.

Correlation matrix

A correlation matrix is computed to study the correlations between items.
Spearman's rho is used because of ordinal data.

Correlations

			Encouragement from authorities	Education	Housing	Age level	Gender	Income	Habit
Spearman's rho	Encouragement from authorities	Correlation Coefficient	1.000	-.035	-.152*	.270**	.019	-.101	-.036
		Sig. (2-tailed)	.	.636	.036	.000	.798	.165	.613
		N	195	187	191	193	193	190	195
	Education	Correlation Coefficient	-.035	1.000	-.030	-.138	.044	.388**	.010
		Sig. (2-tailed)	.636	.	.683	.060	.552	.000	.891
		N	187	188	185	187	186	184	188
	Housing	Correlation Coefficient	-.152*	-.030	1.000	-.181*	-.011	-.113	-.162*
		Sig. (2-tailed)	.036	.683	.	.013	.883	.123	.024
		N	191	185	192	190	190	187	192
	Age level	Correlation Coefficient	.270**	-.138	-.181*	1.000	.006	-.376**	.103
		Sig. (2-tailed)	.000	.060	.013	.	.936	.000	.151
		N	193	187	190	194	192	190	194
	Gender	Correlation Coefficient	.019	.044	-.011	.006	1.000	-.085	.192**
		Sig. (2-tailed)	.798	.552	.883	.936	.	.245	.007
		N	193	186	190	192	194	189	194
	Income	Correlation Coefficient	-.101	.388**	-.113	-.376**	-.085	1.000	-.018
		Sig. (2-tailed)	.165	.000	.123	.000	.245	.	.800
		N	190	184	187	190	189	191	191
	Habit	Correlation Coefficient	-.036	.010	-.162*	.103	.192**	-.018	1.000
		Sig. (2-tailed)	.613	.891	.024	.151	.007	.800	.
		N	195	188	192	194	194	191	196

System knowledge	Correlation Coefficient	.092	-.143	-.001	.059	-.011	.041	-.025
	Sig. (2-tailed)	.203	.050	.993	.415	.875	.577	.723
	N	195	188	192	194	194	191	196
Fee knowledge	Correlation Coefficient	.022	.060	-.093	.102	-.078	.019	.089
	Sig. (2-tailed)	.759	.413	.199	.160	.280	.795	.215
	N	194	187	191	193	193	190	195
Number in household	Correlation Coefficient	.001	.007	-.251**	-.376**	-.088	.453**	.071
	Sig. (2-tailed)	.994	.922	.000	.000	.222	.000	.324
	N	194	187	191	193	193	190	195
Envir. concern	Correlation Coefficient	.129	-.016	-.051	.079	.059	-.009	.319**
	Sig. (2-tailed)	.075	.833	.491	.279	.421	.901	.000
	N	191	184	188	190	190	187	192
Attitude toward the system	Correlation Coefficient	.100	-.060	.042	.200**	.020	-.122	-.007
	Sig. (2-tailed)	.183	.430	.580	.007	.789	.108	.922
	N	179	173	176	178	178	175	180
Neighborhood institutions	Correlation Coefficient	.074	.007	-.109	.193**	.096	-.157*	.259**
	Sig. (2-tailed)	.312	.928	.139	.008	.190	.032	.000
	N	189	183	186	188	188	185	190
Economic incentives	Correlation Coefficient	.130	-.131	.099	-.088	.088	-.109	.185**
	Sig. (2-tailed)	.071	.074	.174	.224	.222	.135	.010
	N	195	187	191	193	193	190	195
Stated behavior	Correlation Coefficient	.080	-.136	-.175*	.187**	.090	-.139	.498**
	Sig. (2-tailed)	.269	.062	.015	.009	.211	.056	.000
	N	195	188	192	194	194	191	196
PersNorms	Correlation Coefficient	.321**	.092	-.068	.010	.105	.014	.294**
	Sig. (2-tailed)	.000	.211	.353	.890	.147	.846	.000
	N	195	187	191	193	193	190	195
SosNorm	Correlation Coefficient	.738**	-.118	-.044	.132	.088	-.139	.089

	Sig. (2-tailed)	.000	.109	.548	.068	.224	.056	.214
	N	195	187	191	193	193	190	195

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Correlations

			System knowledge	Fee knowledge	Number in household	Envir. concern	Attitude toward the system	Neighborhood institutions
Spearman's rho	Encouragement from authorities	Correlation Coefficient	.092	.022	.001	.129	.100	.074
		Sig. (2-tailed)	.203	.759	.994	.075	.183	.312
		N	195	194	194	191	179	189
	Education	Correlation Coefficient	-.143	.060	.007	-.016	-.060	.007
		Sig. (2-tailed)	.050	.413	.922	.833	.430	.928
		N	188	187	187	184	173	183
	Housing	Correlation Coefficient	-.001	-.093	-.251**	-.051	.042	-.109
		Sig. (2-tailed)	.993	.199	.000	.491	.580	.139
		N	192	191	191	188	176	186
	Age level	Correlation Coefficient	.059	.102	-.376**	.079	.200**	.193**
		Sig. (2-tailed)	.415	.160	.000	.279	.007	.008
		N	194	193	193	190	178	188
	Gender	Correlation Coefficient	-.011	-.078	-.088	.059	.020	.096
		Sig. (2-tailed)	.875	.280	.222	.421	.789	.190
		N	194	193	193	190	178	188
	Income	Correlation Coefficient	.041	.019	.453**	-.009	-.122	-.157*
		Sig. (2-tailed)	.577	.795	.000	.901	.108	.032
		N	191	190	190	187	175	185
	Habit	Correlation Coefficient	-.025	.089	.071	.319**	-.007	.259**
		Sig. (2-tailed)	.723	.215	.324	.000	.922	.000
		N	196	195	195	192	180	190

System knowledge	Correlation Coefficient	1.000	.089	.067	-.072	-.136	.008
	Sig. (2-tailed)	.	.217	.353	.320	.068	.916
	N	196	195	195	192	180	190
Fee knowledge	Correlation Coefficient	.089	1.000	.038	.022	.016	.091
	Sig. (2-tailed)	.217	.	.601	.758	.836	.210
	N	195	195	194	191	180	190
Number in household	Correlation Coefficient	.067	.038	1.000	.089	-.078	-.171*
	Sig. (2-tailed)	.353	.601	.	.222	.298	.019
	N	195	194	195	191	180	189
Envir. concern	Correlation Coefficient	-.072	.022	.089	1.000	.028	.164*
	Sig. (2-tailed)	.320	.758	.222	.	.708	.025
	N	192	191	191	192	177	186
Attitude toward the system	Correlation Coefficient	-.136	.016	-.078	.028	1.000	.024
	Sig. (2-tailed)	.068	.836	.298	.708	.	.744
	N	180	180	180	177	180	180
Neighborhood institutions	Correlation Coefficient	.008	.091	-.171*	.164*	.024	1.000
	Sig. (2-tailed)	.916	.210	.019	.025	.744	.
	N	190	190	189	186	180	190
Economic incentives	Correlation Coefficient	.026	.018	.043	.120	.013	.088
	Sig. (2-tailed)	.716	.801	.549	.100	.865	.231
	N	195	194	194	191	179	189
Stated behavior	Correlation Coefficient	.031	.050	.112	.276**	.046	.233**
	Sig. (2-tailed)	.661	.484	.118	.000	.539	.001
	N	196	195	195	192	180	190
PersNorms	Correlation Coefficient	-.068	.054	.029	.415**	-.087	.236**
	Sig. (2-tailed)	.341	.451	.687	.000	.245	.001
	N	195	194	194	191	179	189
SosNorm	Correlation Coefficient	.082	.008	.034	.145*	.095	.101

	Sig. (2-tailed)	.253	.909	.635	.046	.204	.167
	N	195	194	194	191	179	189

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Correlations

			Economic incentives	Stated behavior	PersNorms	SosNorm
Spearman's rho	Encouragement from authorities	Correlation Coefficient	.130	.080	.321**	.738**
		Sig. (2-tailed)	.071	.269	.000	.000
		N	195	195	195	195
	Education	Correlation Coefficient	-.131	-.136	.092	-.118
		Sig. (2-tailed)	.074	.062	.211	.109
		N	187	188	187	187
	Housing	Correlation Coefficient	.099	-.175*	-.068	-.044
		Sig. (2-tailed)	.174	.015	.353	.548
		N	191	192	191	191
	Age level	Correlation Coefficient	-.088	.187**	.010	.132
		Sig. (2-tailed)	.224	.009	.890	.068
		N	193	194	193	193
	Gender	Correlation Coefficient	.088	.090	.105	.088
		Sig. (2-tailed)	.222	.211	.147	.224
		N	193	194	193	193
	Income	Correlation Coefficient	-.109	-.139	.014	-.139
		Sig. (2-tailed)	.135	.056	.846	.056
		N	190	191	190	190
	Habit	Correlation Coefficient	.185**	.498**	.294**	.089
		Sig. (2-tailed)	.010	.000	.000	.214
		N	195	196	195	195
	System knowledge	Correlation Coefficient	.026	.031	-.068	.082
		Sig. (2-tailed)	.716	.661	.341	.253
		N	195	196	195	195

	Fee knowledge	Correlation Coefficient	.018	.050	.054	.008
		Sig. (2-tailed)	.801	.484	.451	.909
		N	194	195	194	194
	Number in household	Correlation Coefficient	.043	.112	.029	.034
		Sig. (2-tailed)	.549	.118	.687	.635
		N	194	195	194	194
	Envir. concern	Correlation Coefficient	.120	.276**	.415**	.145*
		Sig. (2-tailed)	.100	.000	.000	.046
		N	191	192	191	191
	Attitude toward the system	Correlation Coefficient	.013	.046	-.087	.095
		Sig. (2-tailed)	.865	.539	.245	.204
		N	179	180	179	179
	Neighborhood institutions	Correlation Coefficient	.088	.233**	.236**	.101
		Sig. (2-tailed)	.231	.001	.001	.167
		N	189	190	189	189
	Economic incentives	Correlation Coefficient	1.000	.273**	.273**	.743**
		Sig. (2-tailed)	.	.000	.000	.000
		N	195	195	195	195
	Stated behavior	Correlation Coefficient	.273**	1.000	.206**	.230**
		Sig. (2-tailed)	.000	.	.004	.001
		N	195	196	195	195
	PersNorms	Correlation Coefficient	.273**	.206**	1.000	.366**
		Sig. (2-tailed)	.000	.004	.	.000
		N	195	195	195	195
	SosNorm	Correlation Coefficient	.743**	.230**	.366**	1.000
		Sig. (2-tailed)	.000	.001	.000	.
		N	195	195	195	195

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Correlation between today's system and economic incentives

A correlation was computed between the 2 variables to see whether they were correlated.

Correlations

			Economic incentives	Todays system
Spearman's rho	Economic incentives	Correlation Coefficient	1.000	.286**
		Sig. (2-tailed)	.	.000
		N	195	195
	Todays system	Correlation Coefficient	.286**	1.000
		Sig. (2-tailed)	.000	.
		N	195	196

**. Correlation is significant at the 0.01 level (2-tailed).

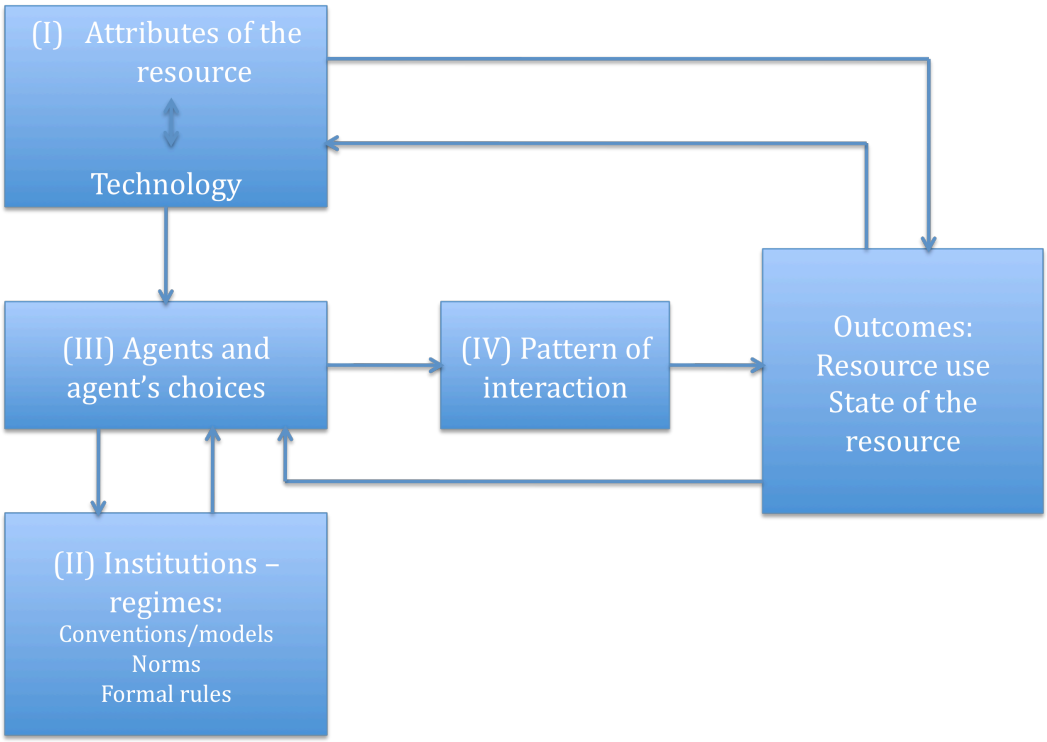
Results from ordinal logistic regression with waste categories as dependent.

		Ordinal logistic regression with **metal** as dependent variable, 1st step		Ordinal logistic regression with **metal** as dependent variable, 6th step		Ordinal logistic regression with **clothing** as dependent variable, 1st step		Ordinal logistic regression with **clothing** as dependent variable, 12th step	
		N = 151 LR chi² (16) = 26.38 Pseudo R^2 = .184 TPL =1.000		N = 161 LR chi² (4) = 20.32 Pseudo R^2 = .133 TPL = .610		N = 152 LR chi² (16) = 44.64 Pseudo R^2 = .281 TPL chi² = .014		N = 177 LR chi² (5) = 38.50 Pseudo R^2 = .216 TPL = .151	
	Independent variables	**Parameter estimates (coefficients)**	**P value**	**Parameter estimates (coefficients)**	**P value**	**Parameter estimates (coefficients)**	**P value**	**Parameter estimates (coefficients)**	**P value**
Motivation	Economic incentives	.147	**.065**	.196	**.076**	.082	.490		
	Encouragesment from the authorities	-.253	**.005**	-.353	**.004**	-.282	**.025**	-.175	**.094**
	Social norms	-.250	**.029**	-.403	**.010**	.255	.129	.321	**.011**
	Personal norms	.179	.182	.463	**.016**	.227	.260		
Individuals' characteristics	Gender (1 = male)	-.629	**.017**	-.890	**.013**	-.754	**.034**		
	Age level	.504	**.013**	.791	**.005**	-.025	.932	-.776	**.011**
	Income	-.520	**.008**	-.585	**.024**	-.443	.116		
	Education	.019	.917			.244	.358		
	No in household	.739	**.000**	1.034	**.000**	1.062	**.001**	.784	**.000**
Attributes/ control	Housing type (1= house)	1.761	**.000**	1.948	**.007**	-.122	.875		
Knowledge	System knowledge	-.109	.502			.044	.852		
	Environmental concern	.025	.867			-.100	.640		
	Fee knowledge	.847	**.004**	.949	**.016**	.819	**.029**	.937	**.007**
	Attitude towards regime	-.011	.937			.129	.507		
Habits	Habits	.157	.156			.088	.583		
Institutions	Institutions in the neighborhood	.212	.206	.461	**.041**	.058	.807		

		Ordinal logistic regression with **special waste** as dependent variable, 1st step		Ordinal logistic regression with **special waste** as dependent variable, 12th step		Ordinal logistic regression with **electronic waste** as dependent variable, 1st step		Ordinal logistic regression with **electronic waste** as dependent variable, 11th step	
		N = 153 LR chi² (16) = 20.813 Pseudo R^2 = . 152 TPL = .946		N = 176 LR chi² (5) = 24.47 Pseudo R^2 = . 139 TPL = .119		N = 152 LR chi² (16) = 35.09 Pseudo R^2 = .225 TPL = .001		N = 176 LR chi² (6) = 32.78 Pseudo R^2 = . 187 TPL = .700	
	Independent variables	**Parameter estimates (coefficients)**	**P value**	**Parameter estimates (coefficients)**	**P value**	**Parameter estimates (coefficients)**	**P value**	**Parameter estimates (coefficients)**	**P value**
Motivation	Economic incentives	.285	**.012**	.248	**.010**	.143	.102		
	Encouragesment from the authorities	-.203	.103			-.298	**.004**	-.211	**.015**
	Social norms	-.156	.318			.038	.748		
	Personal norms	.249	.204	.313	**.049**	.275	**.055**	.336	**.005**
Individuals' characteristics	Gender (1 = male)	.215	.534			-.106	.715		
	Age level	.657	**.025**	.419	**.072**	.650	**.004**	.638	**.001**
	Income	-.382	.163			-.519	**.022**	-.460	**.014**
	Education	.163	.528			-.085	.691		
	No in household	.219	.444			.384	**.084**	.444	**.014**
Attributes /control	Housing type (1= house)	1.151	**.099**	1.014	**.072**	.160	.753		
Knowledge	System knowledge	.129	.568			-.432	**.031**		
	Environmental concern	.271	.201			.068	.691		
	Fee knowledge	.759	.050			.097	.750		
	Attitude towards regime	-.225	.242	.592	**.092**	-.206	.174		
Habits	Habits	.064	.684			.175	.144	.172	**.089**
Institutions	Institutions in the neighborhood	-.071	.762			.152	.453		

Appendix III. Original frameworks.

Vatn's framework for analysing resource use problems (Vatn, 2005):



Ajzen's model from theory of planned behaviour (Ajzen, 1991):