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Economic incentives in household waste management: just a waste?

*A relational approach to agents and
structures in household waste sorting*

Økonomiske insentiver i forvaltningen av
husstanders avfallssortering: bare bortkastet?
*En relasjonell tilnærming til agenter og strukturer i
husstanders avfallssortering*

Marit H. Heller

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Sammendrag

I en verden der naturressursene forbrukes i et stadig raskere tempo og forringelsene av miljøet øker, er det stadig viktigere å fremme og legge til rette for adferd som er miljømessig bærekraftig. Ulike typer politikk er innført for å løse disse utfordringene, og bruken av økonomiske insentiver har blitt populært for å forsøke å oppnå miljømessig bærekraft. Derimot har forskning i de siste tiårene rapportert at å bruke et økonomisk insentiv ikke er like enkelt som man kanskje skulle tro. I noen tilfeller kan det til og med gi det motsatte resultatet av det som var ment da en innførte det økonomiske insentivet. Derfor krever det gjennomtenkte vurderinger, med tanke på hva som karakteriserer individers motivasjon og adferd, for å kunne fremme eller legge til rette for miljømessig bærekraftig adferd gjennom bruk av økonomiske insentiver.

Samfunnsvitenskapene tilbyr ulike teoretiske perspektiver og tilnærminger om dette emnet, og som resulterer i ulike politiske råd. En måte å skille mellom samfunnsvitenskapelige teorier er å forstå hvordan de forklarer sosiale fenomener, det vil si om de forklarer sosiale fenomener ved å fokusere på individet eller på sosiale strukturer.

Økonomifaget har av ulike grunner anvendt et perspektiv som i stor grad fokuserer på individet. Nærmere bestemt er det den subjektive teorien om Rasjonell Aktør (RA) som utgjør kjernen i det som ofte omtales som *neoklassisk* eller *mainstream økonomi*. Som følge av dette har studier om individuelle valg blitt gitt en sentral rolle. En alternativ tilnærming til dette er å forklare sosiale fenomener gjennom å forstå hvilken rolle sosiale strukturer spiller. Sistnevnte perspektiv antar at sosiale helheter eller samfunn er enheter i seg selv, og at disse enhetene ikke kan reduseres til egenskapene ved enkeltdelene som enhetene består av.

Noen forskere har imidlertid innført et tredje perspektiv som tar i betraktning både individer og sosiale strukturer når de forklarer sosiale fenomener. Denne tilnærmingen er referert til som relasjonell og hovedideen er å unngå et ensidig fokus på enten enkeltindivider eller sosiale strukturer, men heller studere hvordan de henger sammen og relaterer seg til hverandre. Denne avhandlingen er inspirert av denne relasjonelle tilnærmingen, og har forsøkt å operasjonalisere et slikt perspektiv gjennom å anvende og kombinere to teorier - dvs. Klassisk Institusjonell Økonomi (KIØ) og Selvbestemmelsesteori (SBT). Begge teoriene har en relasjonell tilnærming, men KIØ kan sies å understreke strukturer noe mer enn SBT, som på sin side legger noe større vekt på individet.

Mer spesifikt tilhører KIØ en teoretisk tradisjon som har utviklet seg parallelt med neoklassisk økonomi. Teorien fokuserer hovedsakelig på institusjoner, forstått her som konvensjoner, normer og formelle regler. I sin forklaring av sosiale fenomener legger KIØ vekt på utviklingen av institusjoner og hvordan disse påvirker og forholder seg til enkeltpersoner *in situ*. Et viktig trekk ved KIØ er at institusjonene uttrykker forventninger om hva som anses som riktig adferd i en gitt situasjon. For eksempel kan institusjoner uttrykke forventninger som favoriserer enkeltindividet - det vil si en "jeg logikk" - eller institusjoner kan uttrykke forventninger som favoriserer gruppen eller miljøet som individet er en del av - det vil si en "vi logikk".

SBT derimot er en teori som tilhører den humanistiske tradisjonen innenfor psykologi. SBT fokuserer hovedsakelig på individet og argumentere blant annet at *autonomi* og *eudaimonisk velvære eller trivsel (well-being)* er viktige begreper for å forstå menneskelig motivasjon og adferd. Autonomi forstås som individets ønske om å organisere sine egne erfaringer og adferd, og å kunne handle i samsvar med det som oppleves som det integrerte selvet. Eudaimonisk velvære, ofte sett på som en motsetning til *hedonisk*, forstås som velvære eller trivsel knyttet til oppfyllelsen av å kunne leve i samsvar med det integrerte selvet. Videre består SBT av flere mini-teorier og en av disse, Organismisk Integrasjonsteori (OI), utdyper autonomibegrepet videre. OI gir en forståelse av hvordan sosiale konstruksjoner, som for eksempel sosiale verdier og reguleringer, i varierende grad integreres og internaliseres i enkeltindividet, og derved utgjør hva individet opplever som sitt integrerte selv.

Forståelsen av hvordan de sosiale konstruksjonene utgjør selvet er viktig i denne sammenhengen, da det er denne forståelsen som gjør at teoriene KIØ og SBT kan kombineres. Videre er det kombinasjonen av KIØ og SBT som muliggjør en analyse av forholdet mellom enkeltpersoner og sosiale strukturer. Kombinasjonen gjør det også mulig å inkludere begrepet refleksivitet i analysen. Refleksivitetsbegrepet gir anledning til å forstå mennesker som evaluatorer i stedet for (bare) som maksimerere av nytte. Videre, siden både KIØ og SBT anvender et relasjonelt perspektiv, kan de potensielt gi andre typer svar på avvikene som er observert mellom faktisk adferd og forventet adferd slik den antas av RA. På et mer generelt nivå kan KIØ og SBT tilby andre innsikter om hva som karakteriserer enkeltpersoners motivasjon og atferd enn det neoklassisk økonomi foreslår.

Det empiriske fokuset i avhandlingen omhandler en miljørelevant praksis - dvs. avfallssortering i husholdningene. Det er uenighet i litteraturen om økonomiske insentiver er et effektivt virkemiddel for å øke den enkeltes sorteringsgrad. I den forbindelse er norsk avfallshåndtering et egnet laboratorium for å studere insentivsystemer. Systemer for avfallshåndtering som er innført i norske kommuner varierer nemlig både når det gjelder hvordan de praktisk har ordnet avfallssorteringen og med tanke på hvilke type insentiver de har innført for å øke sorteringsgraden.

Gitt det ovennevnte har målsettingen med avhandlingen vært å undersøke hvordan motivasjon og adferd i sortering av husholdningsavfall påvirkes av faktorer både på individnivå og på nivå med sosiale strukturer. Sosiale strukturer er begrenset til å inkludere *institusjonelle settinger*, som skissert av KIØ, og er her representert ved et avfallssystem med tre typer avfallsavgifter - se nedenfor. Det individuelle nivået er begrenset til det *integrerte selvet*, som skissert av SBT, og er her representert av to slags oppfatninger om menneske-natur relasjoner.

Følgende tre forskningsspørsmål (FS) er utviklet for å undersøke ulike aspekter av avhandlingens målsetting. FS 1 omhandler rollen som *institusjonelle settinger* spiller for motivasjon og adferd i sortering av husholdningsavfall. Institusjonelle settinger er representert ved et avfallssystem hvor enkelte avfallsfraksjoner hentes i husholdningene og med tre typer avfallsavgifter. FS 2 omhandler rollen som det integrerte selvet, slik dette er definert i SBT, spiller for motivasjon og atferd i sortering av husholdningsavfall. Det integrerte selvet er representert av to typer oppfatninger av menneske-natur relasjoner. Til sist ser FS 3 på

hvordan effekter av institusjonelle og individuelle faktorer kan tolkes basert på forståelser fra KIØ og SBT. Kan for eksempel effekten av den enkelte faktor avhenge av egenskapene til den andre?

Avhandlingen består av fire manuskripter som hver har ulikt fokus for hvordan de svarer på de ovenstående forskningsspørsmålene. Det første manuskriptet anvender KIØ og fokuserer hovedsakelig på rollen som institusjonelle settinger spiller for motivasjon og adferd i sortering av husholdningsavfall. Manuskript nummer to studerer SBT sine antagelser om hvordan det integrerte selvet er knyttet til autonom motivasjon og eudaimonisk velvære eller trivsel. I manuskriptene tre og fire er det forsøkt å kombinere de to teoriene, KIØ og SBT. I manuskript tre brukes det kombinerte teoretiske rammeverket for å studere hvordan en endring i institusjonelle settinger og ulike oppfatninger av hva som utgjør det integrerte selvet, kan påvirke hva som motiverer individet, oppfatninger av en vektbasert avfallsavgift og sorteringsgrader. I det siste og fjerde manuskriptet anvendes også elementer fra begge teorier i analysen som undersøker hvordan oppfatninger av en differensiert avfallsavgift dannes.

Avhandlingen tar utgangspunkt i to studiesettinger som inkluderer syv norske kommuner. Alle kommunene hadde på det tidspunktet da undersøkelsene ble gjennomført innført et system for avfallshåndtering der enkelte avfallsfraksjoner hentes i husholdningene. I den ene studiesettingen ble to typer avgifter - det vil si en fast avgiftsordning og en differensiert frekvensbasert avfallsavgiftsordning - sammenlignet. Ved å bruke tverrsnittsdata ble det undersøkt hvordan de to avgiftsordningene og to ulike oppfatninger av menneske-natur relasjoner påvirker menneskers motivasjon og adferd med hensyn til sortering av husholdningsavfall. Dataene ble samlet inn gjennom en undersøkelse som ble sendt til 1800 husholdninger fordelt jevnt mellom seks kommuner.

Den andre studiesettingen inkluderer Ulstein kommune, hvor det var en endring fra et vektbasert avfallssystem (kilo usortert avfall) til et avfallssystem med fast avgift. Ved hjelp av paneldata ble det undersøkt hvordan endringen i den institusjonelle settingen og to ulike oppfatninger av menneske-natur relasjoner påvirket folks motivasjon og adferd knyttet til sortering av husholdningsavfall. Datamaterialet fra denne studiesettingen inneholder også data fra samtaler i fokusgrupper.

Spørreundersøkelsene i begge studiesettinger ble utviklet for å studere ulike aspekter av motivasjon og adferd knyttet til avfallssortering. Med hensyn til motivasjon inkluderte undersøkelsene flere sett med spørsmål som dekker forhold knyttet til institusjoner, trivsel/velvære og følelser, oppfatninger av avgiftsgebyrordninger, oppfatninger av menneske-natur relasjoner (New Ecological Paradigm scale / "pro"- og "anti"-økologiske oppfatninger) og sosioøkonomiske variabler. Nivået av avfallssortering ble målt gjennom en selvrapportert variabel som spenner fra 1 som tilsvarer at ingenting er sortert, til 6 som tilsvarer at alt er sortert. I tillegg ble den faktiske avfallssorteringsgraden på husholdsnivå tatt med i tverrsnittstudien ved å bruke data rapportert av kommunene til SSB. Statistiske metoder som ble brukt til å analysere dataene samlet gjennom undersøkelsene, var hovedsakelig faktoranalyse og regresjonsanalyse som logit.

De fire manuskriptene avdekker flere funn som bidrar til å øke vår forståelse av institusjonelle og individuelle forhold knyttet til avfallssortering. For det første, når det gjelder hvordan institusjonelle settinger påvirker motivasjon knyttet til sortering av husholdningsavfall er et hovedfunn den sterke rollen som en "vi logikk" spiller i alle sammenhenger som studeres i denne avhandlingen. For det andre indikerer resultatene at en fast avfallsavgift, sammenlignet med en frekvensbasert avfallsavgift, fremmer høyere motivasjonsnivå knyttet til en "vi-logikk". For det tredje støtter dataene at tilstedeværelsen av et økonomisk insentiv skaper en tilleggslogikk, det vil si en "jeg logikk" som vektlegger kostnadsbesparelse. Til slutt, når det gjelder oppfatninger om avfallsavgiftene, er det indikasjoner på at den enkelte foretrekker den institusjonelle logikken som de befinner seg i.

Når det gjelder institusjoner og adferd, viser resultatene en signifikant høyere sorteringsgrad i kommuner med en fast avgift sammenlignet med en frekvensbasert eller en vektbasert avgift. I relasjon til den vektbaserte avfallsavgiften ble det også observert økte nivåer av ulovlig håndtert avfall.

Resultatene viser at det integrerte selvet tilknyttet ulike oppfatninger av menneske-natur relasjoner spiller en viktig rolle for å kunne erfare eudaimonisk velvære knyttet til sortering av husholdningsavfall. Dette er i tråd med SBT sitt autonomitetsperspektiv. Denne type oppfatninger har tilsynelatende også en rolle å spille i å bestemme hva som motiverer den enkelte til å sortere avfall - det vil si om motivasjonen er knyttet til det å gjøre det rette for miljøet eller å spare kostnader.

Til slutt er det en forskjell på hvordan de to avfallsavgiftene oppfattes av de som er identifisert med en integrert pro-økologisk oppfatning. Mens det i det frekvensbaserte avfallssystemet ble oppfattet som en støtte til en god vane, ble det vektbaserte systemet i Ulstein oppfattet som en dårlig ide. Hvorfor de to avfallsavgiftene ble oppfattet så forskjellige, kan det bare spekuleres om, men de foreslåtte forklaringene er knyttet til hvor påtrengende systemet oppfattes og graden av gjensidighet som ordningene involverer.

Gitt de empiriske funnene som er beskrevet ovenfor gir avhandlingen også noen teoretiske refleksjoner for å kunne utforske hva en relasjonell tilnærming kan bidra med i motsetning til perspektivet som neoklassisk økonomi og RA representerer. En av refleksjonene knytter seg forståelsen av individet – jeg'et som en del av en gruppe - et "vi" - som gjør det mulig å anta hvordan individet er knyttet til den sosiale verden, og hvilke mulige konsekvenser dette har for motivasjon og handling. En annen refleksjon omhandler de teoretiske sammenhengene mellom *relativ autonomi*, *velvære* og tilknytningen til et "vi", for eksempel om sortering av avfall oppfattes som et sosialt dilemma eller ikke avhenger av det integrerte selvet, og er derfor knyttet til både autonomi og velvære. Til slutt, ved å kombinere begrepene *locus of causality* og *refleksivitet*, argumenteres det for at refleksivitet kan observeres på to nivåer – både i relasjon til de ulike integrerte oppfatningene av menneske-natur relasjoner, og med den institusjonelle settingen.

Avhandlingens viktigste politikimplikasjon er at innføring av en differensiert avfallsavgift bør gjøres med stor forsiktighet i og med at økonomiske insentiver ikke synes å resultere i mer sortering av husholdningsavfall. Sannsynligvis er dette et resultat av at et økonomisk

insentiv har en tendens til å fremme mindre autonom motivasjon med fokus på individets egeninteresse. Å kombinere teoretiske perspektiver har vært nyttig i å forstå bedre hvordan slike "kontraintuitive" funn kan forklares. I den forbindelse kan avhandlingen forstås som et innlegg i debatten der det tas til orde for å åpne opp økonomifaget for ulike forståelser fra et bredere sett av fagområder - ikke minst for å kunne gjøre det mer progressivt i søken etter å kunne utvikle forsvarlige løsninger for de miljøutfordringene vi står ovenfor.

"It is the theory which decides what can be observed" – Albert Einstein

Part 1: Thesis introduction

Table of contents

Summary	8
1. Introduction	15
1.1. The Research Problem.....	15
1.2. Objective and research questions	18
1.3. Structure of the thesis	19
2. Theoretical framework	19
2.1. Neoclassical economics.....	20
2.1.1. Rational choice theory.....	20
2.1.2. Developments in behavioral economics	21
2.2. Classical Institutional Economics (CIE)	22
2.2.1. The core.....	23
2.2.2. The Institutions as Rationality Context model	25
2.3. Self-Determination Theory.....	25
2.4. Can you step into the same river twice?.....	29
3. Central theoretical concepts and their application.....	32
3.1. Motivation	32
3.2. Institutions and other social constructs such as values and beliefs	33
3.3. Well-being.....	35
3.4. Relational and reflexivity	36
3.5. The operationalization of combining SDT and CIE.....	39
4. Methods and data.....	41
4.1. About the choice of methods for collecting data	41
4.2. About the choice of study settings.....	42
4.2.1. Cross-sectional study: household waste sorting under two kinds of waste fee schemes.....	44
4.2.2. Panel study: introduction and termination of a weight-based waste fee.....	45
4.3. About the data	45
4.3.1. Motivational reasons for sorting household waste	46
4.3.2. Integrated sense of self.....	46
4.3.3. Well-being.....	47
4.3.4. Perceptions of a differentiated waste fee scheme	47
4.3.5. Behavior: stated and actual sorting degrees	48
4.3.6. Qualitative data.....	48

4.3.7. Considerations on the robustness of the data.....	49
5. Previous research regarding motivation and behavior related to household waste sorting under different waste fee schemes.....	50
6. Abstracts of papers.....	51
6.1. The false promise of a differentiated waste fee? (Paper 1).....	51
6.2. Sorting waste: exploring the integrated sense of self in self-determined environmental motivation (Paper 2).....	52
6.3. The divisive and disruptive effect of a weight-based waste fee (Paper 3).....	53
6.4. A relational approach: the case of a differentiated waste fee (Paper 4).....	54
6.5. Overview of main characteristics of the four papers.....	55
7. Synthesis of main findings.....	58
7.1. The impact of institutional settings for motivation related to household waste sorting.....	58
7.2. The impact of institutional settings for behavior related to household waste sorting.....	59
7.3. The impact of the integrated sense of self for motivation and behavior related to household waste sorting.....	60
8. Considerations regarding the applied relational approach.....	62
8.1. Me, myself and I, as in we.....	62
8.2. Relative autonomy, kinds of well-being and the link to institutions.....	63
8.3. Linking locus of causality and reflexivity.....	64
9. Policy implications.....	66
10. Final comments.....	67
11. References.....	68
Appendix 1: Survey questions and statements applied in the 4 papers.....	73
Appendix 2: Interview guide for the focus group conversations.....	79

List of figures and tables:

Figure 1: A taxonomy of human motivation. Source: Ryan and Deci (2000).....	28
Figure 2: Main theoretical concepts and connections applied from CIE and SDT.....	40
Table 1: Table 1 Overview of the four papers.....	56

Part 2: Compilation of papers

- Paper 1:** Authors: Heller, Marit H., Alfnes, Frode and Vatn, Arild.
Title: The false promise of a differentiated waste fee scheme?
Submitted to: Resources, Conservation and Recycling (15.05.17)
Status: Under review
- Paper 2:** Author: Heller, Marit H.
Title: Sorting waste: exploring the integrated sense of self in self-determined environmental motivation
Submitted to: International journal of well-being (31.08.17)
Status: Under review
- Paper 3:** Authors: Heller, Marit H. and Vatn, Arild
Title: The divisive and disruptive effect of a weight-based waste fee
Submitted to: Ecological Economics
Status: Published
- Paper 4:** Author: Heller, Marit H.
Title: A relational approach: the case of a differentiated waste fee
Submitted to: Institutional economics (31.08.17)
Status: Under review

Summary

In a world where natural resources are consumed at an ever-faster pace and environmental degradation escalates, it has become increasingly important to promote and facilitate for environmentally sustainable behavior. Different kinds of policies are implemented to address these challenges and the use of economic incentives has become popular to try to obtain environmental sustainability. However, research over the last decades report that to use economic incentive is not as straightforward as one might think. In some cases, to implement an economic incentive can even give the opposite result of what was intended. Hence, to promote or facilitate for environmentally sustainable behavior through the use of economic incentives calls for a thoughtful engagement with what characterizes individuals' motivation and behavior.

Social sciences offer different perspectives and approaches when theorizing about this topic resulting in different kinds of policy advice. One way to distinguish between theories in social sciences is to understand how they explain social phenomena, that is, whether they explain social phenomena through focusing on the *individual* or at *social structures*.

Economics has, for various reasons, applied a perspective that largely focuses on individuals. More specifically, it is the subjective rational choice theory (RCT) that constitutes the core of what is often referred to as *neoclassical* or *mainstream economics*. Consequently, investigating individual choices has been given a predominant role. An alternative approach is to explain social phenomena through understanding the role of social structures. This kind of perspective assumes that social wholes or societies are entities in themselves, and that these entities cannot be reduced to properties of the parts.

However, some scholars have introduced a third perspective that considers both individuals and social structures when explaining social phenomena. This approach has been referred to as *relational* and the main idea is not a unilateral focus on either individuals or social structures, but rather how they are interlinked and related. This thesis is inspired by this relational approach and has attempted to operationalize it through applying and combining two theories – i.e., Classical Institutional Economics (CIE) and Self-Determination Theory (SDT). Both theories are relational in their scope, although CIE might be said to emphasize structures more than SDT where emphasis is to a greater extent on the individual.

More specifically, CIE belongs to a theoretical tradition that has developed in parallel with neoclassical economics. It focuses mainly on *institutions*, understood as *conventions*, *norms* and *formal rules*. When explaining social phenomena, CIE emphasizes the development of institutions and how these affect and relate with individuals *in situ*. An important feature of CIE is that institutions express expectations about what is considered appropriate behavior in a certain situation. For example, institutions might express expectations that favor the individual alone – i.e., an '*I logic*' – or institutions might express expectations that favor the group or the environment that the individual is a part of – i.e., a '*we logic*.'

SDT, on the other hand, is a theory that belongs to the humanistic trend in psychology. SDT focuses mainly on the individual and advocates, among other things, *autonomy* and *eudai-*

monic well-being as important concepts for understanding human motivation and behavior. Autonomy is understood as the *desire* of an individual to self-organize experience and behavior, and to be able to act in concordance with one's integrated sense of self. Eudaimonic well-being, often contrasted to *hedonic*, is understood as well-being linked to the *fulfillment* of living in concordance with one's integrated sense of self. Further, SDT consists of several mini-theories and one of these, Organismic Integration Theory (OIT), elaborates on the concept of autonomy. OIT offers an understanding of how social constructs such as social values and regulations are integrated and internalized in varying degrees into the self of an individual, and thereby constitutes what the individual experience as the integrated sense of self.

The understanding of how these social constructs constitute the self of individuals should be stressed since it is this understanding that enables CIE and SDT to be combined. Further, it is the combination of CIE and SDT that enables an analysis of the relation between individuals and social structures. The combination also makes it possible to include the concept *reflexivity* in the analysis. Reflexivity enables an understanding of humans as evaluators rather than (only) as utility maximizers. Further, since CIE and SDT apply a relational perspective, they can potentially give other kinds of answers to the deviances observed between actual behavior and behavior as predicted by RCT. At a more general level, CIE and SDT might offer other kinds of insights about what characterizes individuals' motivation and behavior than what neoclassical economics proposes.

The empirical focus of this thesis regards an environmentally relevant practice – i.e., household waste sorting for recycling purposes. There is disagreement in the literature whether economic incentives are effective means to increase individuals' sorting degrees. In this respect, Norwegian waste management is interesting as a real-life laboratory for studying incentive systems. Waste management arrangements implemented by Norwegian municipalities are diverse in terms of both how they have practically arranged for waste sorting and what kinds of incentives they have implemented to increase sorting efforts.

Given the above, the objective of this thesis has been to investigate how motivation and behavior in household waste sorting are affected by factors both at the level of the individual and at the level of social structures. Social structures are restricted to institutional settings, as outlined by CIE, and are here represented by a curbside waste management system with three kinds of waste fee schemes – see below. The individual level is restricted to individuals' integrated sense of self and is here represented by two kinds of beliefs about human-nature relations.

The following three research questions (RQs) has been developed to investigate different aspects of the objective. RQ 1 concerns the role that institutional settings, as these are defined by CIE, play for motivation and behavior in household waste sorting. Institutional settings are represented by a curbside waste system with three kinds of waste fee schemes. RQ 2 concerns the role that the integrated sense of self, as this is defined by SDT, plays for motivation and behavior in household waste sorting. The integrated sense of self is represented by two kinds of beliefs about human–nature relations. Finally, RQ 3 regards how, based on insights from

CIE and SDT, the effect of institutional and individual factors can be interpreted. Does the effect of each type of factor depend on the characteristics of the other?

The thesis comprises four papers, which differs in their focus and how they cover the research questions. Paper 1 applies CIE and focuses mainly on the role of institutional settings for motivation and behavior in household waste sorting. Paper 2 investigates SDT's assumptions about how the integrated sense of self are related with autonomous motivation and eudaimonic well-being. CIE and SDT are attempted combined in papers 3 and 4. In paper 3 this combined theoretical framework is applied when studying how a change in institutional settings and different kinds of integrated sense of self, might influence motivational reasons, perceptions of a weight-based waste fee and sorting degrees. Elements from both theories are also applied in the analysis that investigates the formation of perceptions of a differentiated waste fee scheme as compared to a fixed waste fee scheme (paper 4).

The thesis focuses at two study settings that involve seven Norwegian municipalities. All municipalities had at the time of investigation implemented a curbside waste management system. In the first setting two kinds of waste fee schemes – i.e., a fixed waste fee scheme and a differentiated frequency-based waste fee scheme – were contrasted. Using cross-sectional data, I investigated how these waste fee schemes as well as two kinds of beliefs about human–nature relations influenced people's motivation and behavior regarding household waste sorting. The data used were collected through a survey that was sent to individuals in 1800 households distributed evenly between the six municipalities.

The other setting regards the municipality of Ulstein where there was a change from a weight-based waste fee scheme (kilograms of unsorted waste) to a waste system with a fixed waste fee. Using panel data, I investigated how a change in the institutional setting, and two kinds of beliefs about human–nature relations, affected people's motivation and behavior in relations to sorting household waste. The material for this study setting also includes data from focus-group conversations.

The surveys in both study settings were developed to cover different aspects of motivation and behavior related to waste sorting. Regarding motivation, the surveys included several sets of questions covering aspects related to institutions, well-being and emotions, perceptions of waste fee schemes, beliefs about human–nature relations (New Ecological Paradigm scale/'pro-' and 'anti-ecological' belief) and socioeconomic variables. The level of waste sorting was measured through a stated variable ranging from 1 that equals that nothing is sorted, to 6 that equals that everything is sorted. In addition, actual waste sorting degree at the household level was included in the cross-sectional study by using data reported by the municipalities to Statistics Norway. Statistical methods that were used to analyze the data collected through the surveys were mainly factor analysis and regression analysis such as logit.

The four papers reveal several findings that contribute to our understanding about the effects of institutional and individual factors regarding waste sorting. First, regarding the influence of *institutional settings* on the *motivation* for sorting household waste, a main finding is the strong role that a 'we logic' plays in all contexts that are studied. Second, the results indicate

that a fixed waste fee, as compared to a frequency-based waste fee, fosters higher levels of motivation related to a 'we logic'. Third, the data support that the presence of an economic incentive creates an additional logic, that is, an 'I logic' emphasizing cost saving. Finally, in terms of perceptions about the waste fee schemes, there are indications that individuals give preference to the institutional logic they currently experience.

Regarding institutions and *behavior*, the results report significantly higher sorting degree in municipalities with a fixed waste fee than in those with a frequency-based or weight-based waste fee. In the case of the weight-based waste fee, increased levels of displaced or illegal waste disposal were observed.

The results reveal that integrated beliefs about human-nature relations are important determinants of experiencing eudaimonic well-being linked to sorting household waste. This is in accordance with the *autonomy* perspective of SDT. These kinds of beliefs apparently also play a role in determining what motivates the individual to sort waste – i.e., about doing the right thing for the environment or saving costs.

Finally, there is a difference regarding how the two economic incentives are perceived by those who are identified with an integrated pro-ecological belief. While the frequency-based waste fee scheme was perceived as supportive of a good habit, the weight-based system in Ulstein was perceived as a bad idea. Why the two waste fee schemes were perceived so differently can only be speculated about, however, the different levels of intrusiveness and reciprocity that the schemes involve are suggested as explanations.

Further, in light of the empirical findings outlined above, the thesis offers some theoretical reflections to explore what a relational approach can contribute with as opposed to a perspective of neoclassical economics and RCT. One point regards the understanding of the individual – *the 'I'* – as being part of a group – *a 'we'* – that makes it possible to hypothesize how the individual relate to the social world, and the possible implications this has for motivation and action. Another reflection concerns the theoretical connections between *relative autonomy*, *well-being* and the linkage to a 'we' – e.g., if sorting waste is perceived as a social dilemma or not depends on your *integrated sense of self* and is hence linked to both *autonomy* and *well-being*. Finally, by linking the concepts *locus of causality* and *reflexivity* it is argued that reflexivity can be observed at two levels – i.e., with regard to the kind of integrated belief about human-nature relations and with regard to the institutional setting.

The main policy implication is that implementation of a differentiated waste fee should be considered with great caution. Economic incentives seem not to result in more sorting of household waste. Most probably, this is so as an economic incentive tends to foster less autonomous motivations with a focus at the individual interest. Combining theoretical perspectives has been helpful in understanding better how such 'counter-intuitive' findings can be explained. In that respect, the thesis is a plea for opening up the discipline of economics towards insights from a wider set of disciplines – not least to make it more progressive in its engagement to develop viable solutions for the environmental challenges we experience.

Part 1 Thesis Introduction

1. Introduction

1.1. The Research Problem

"We cut trees faster than they mature, harvest more fish than the ocean can replenish, and emit more carbon into the atmosphere than forests and the ocean can absorb. In 2014, we used more natural resources in eight months than the planet can produce in 12 months. For the remainder of the year, we borrowed resources from future generations" (WWF, 2015).

It is more important than ever to formulate policies that facilitate environmentally sustainable behavior. The awareness is growing though, and to promote such behavior has become an important policy imperative since the Rio Summit in 1992. Meanwhile, the concept of environmentally sustainable behavior has been widely adopted by national governments and other policy actors in an attempt to ensure desirable environmental policy objectives. To promote and facilitate for such behavior is, however, a complex undertaking that, among many other things, calls for a thoughtful engagement with what characterizes individuals' motivations and behavior.

Social science theories offer no simple or united answer to how human motivation and behavior can be characterized. In fact, theories tend to offer very different perspectives on these matters, and in turn these theories result in different kinds of policy advice. One such type of advice is that economic incentives (also known as market-based instruments) should be used (Andersen & Sprenger, 2000). This kind of advice is grounded in the theoretical framework of neoclassical economics where *rational choice theory* (RCT) constitutes an important part of the core. The basic premise of RCT is that individuals maximize utility. Hence, RCT accounts for and emphasizes the individual and her preferences in its explanation of human motivation and behavior.

For example, to act in a socially or environmentally friendly way might represent a cost to the individual. Policy advises based on RCT will in these kinds of situations look for an economic incentive that changes prices, so that what is considered socially or environmentally desirable becomes also individually beneficial. However, there is growing evidence that the relationship between prices and behavior is more complex than has been assumed (Bowles, 2008; Frey & Jegen, 2001; Frey & Oberholzer-Gee, 1997; Gintis, 2000; Gneezy, Meier, & Rey-Biel, 2011). Different explanations have been offered to address this insight. Although most studies that investigate the use of economic incentives apply RCT, there are alternatives that offer other kinds of perspectives.

One such approach addresses the need to consider how individuals and social structures are related. Hence, this approach includes an emphasis on both individuals and social structures when explaining human motivation and action, and not only the individual level as RCT does. This kind of theoretical perspective has by some scholars been referred to as *relational* (Archer, 1996; Donati, 2015; Elder-Vass, 2010; Emirbayer, 1997; Ritzer & Gindoff, 1992, 1994). Two theories with this kind of perspective are Classical Institutional Economics (CIE) and Self-Determination Theory (SDT). Although both belong to the literature in the social sciences that investigates relational aspects, they differ in their main focus. CIE focuses main-

ly on *social structures* such as institutions. SDT focuses mainly on *individuals*, and their basic psychological needs. However, both theories offer insights about underlying factors influencing human motivation and action, emphasizing interconnectedness, both between individuals and between individuals and social structures.

CIE assumes for example that *institutions* – here understood as *conventions, norms* and *formal rules* – form individuals (their perspectives and preferences) through being internalized. Further, CIE postulates that an institutional context conveys expectations about the appropriate focus of actions – e.g., on the individual or the group. Hence, if the institutional context emphasizes the interest of the group, it is assumed that people might be more willing to cooperate (Sen, 1979; Vatn, 2005: 3; Velez, Stranlund, & Murphy, 2009).

SDT, for its part, also places emphasis on social structures, but see it more from the individual's perspective. Among other things, SDT offers an analysis of the process of internalization of social values and regulations into the self of an individual (Ryan & Deci, 2000a). Further, SDT postulates that when these social values and regulations are integrated and internalized into the self, they are important for how *autonomy* is perceived and experienced by the individual. Autonomy is understood to be about "volition – the organismic desire to self-organize experience and behavior and to have activity be concordant with one's integrated sense of self" (Deci & Ryan, 2000: 231). Another central concept in SDT is *eudaimonic* well-being. A kind of well-being that is about the experience linked to the fulfillment of living in concordance with one's integrated sense of self (Deci & Ryan, 2008).

Since CIE and SDT applies a relational perspective – i.e., includes both individuals and social structures in their analysis of social phenomena – they can potentially give other kinds of insights and answers to what characterizes individual motivations and behavior, compared to RCT. Hence, this approach might also offer different answers for why the relationships between prices and behavior are more complex than earlier assumed.

An environmentally relevant practice, where the effectiveness of economic incentives has been questioned, is household waste sorting for recycling purposes. Sorting household waste is a widespread practice implemented to reduce household's environmental footprint. This is so also in Norway. Moreover, a diverse set of incentives have been implemented by Norwegian municipalities to increase sorting efforts. Hence, this waste management reality allows for studying how different kinds of incentive schemes – i.e., various institutional settings – influence individuals' motivation and behavior regarding household waste sorting.

In order to study potential relations between different kinds of institutional settings and individuals' motivation for sorting household waste, my analyses include both a structural part and an individual part. The structural part is represented by three kinds of waste fee schemes that have been implemented by Norwegian municipalities the last decades: a fixed fee, a frequency-based fee (the household pays for number of times the waste is picked up by the household) and a weight-based fee (the household pays for kilograms of unsorted waste). All three incentive schemes include a curbside waste management system, so that in principle it is only the fee payment system that varies between the incentive schemes. Each of the three

waste fee schemes represents an *institutional setting*. Notable is that an institutional setting is here assumed to include both formal and informal parts. The formal part regards the official regulations of implementing a curbside waste system and the specific waste fee scheme. The informal part includes norms and conventions that are assumed to accompany the formal part.

Regarding the individual aspect, I have included and investigated individuals' fundamental beliefs¹ "about the nature of the earth and humanity's relationship with it" (Dunlap, Van Liere, Mertig, & Jones, 2000a: 427) – i.e., human–nature relations – as they are mapped by the New Ecological Paradigm scale (NEP scale). This is a scale that measures both a pro-ecological belief and an antagonistic attitude toward a pro-ecological belief. Notably, the beliefs that are measured by the NEP scale are here understood as being part of what SDT defines as *the integrated sense of self*. These beliefs are thought relevant to an environmentally related practice since they describe individuals' fundamental view of human relationships with nature.

The thesis includes two study settings. In one setting, I compare municipalities with different kinds of waste fee schemes: one group of municipalities with a yearly fixed fee and one with a frequency-based fee. The latter is an economic incentive that was implemented to increase efforts to sort more household waste. The individual level is represented by two kinds of beliefs about human-nature relations ('pro'- and 'anti'-ecological paradigm). Using cross-sectional data, this context was set to investigate how the two kinds of waste fee schemes and the two kinds of beliefs about human–nature relations were related in forming people's motivation for sorting household waste.

The other study setting covers a case where an implemented weight-based waste fee was terminated and a fixed waste fee scheme was reintroduced. Hence, using panel data, it was possible to investigate how a change in the institutional setting – i.e., the implementation and termination of the weight-based waste fee – as well as two kinds of beliefs about human–nature relations influenced people's motivation and behavior in relation to sorting household waste.

¹ It should be noted that although I refer to the NEP scale as measuring fundamental *beliefs*, the scale also includes elements that are more appropriately called values or even attitudes (Dunlap et al., 2000a: 427). I will come back to these elements in Section 3.

1.2. Objective and research questions

Given the above, the objective of this thesis has been to investigate how *motivation* and *behavior* related to sorting household waste are affected by social structures and individual factors, represented here respectively by *institutional settings* and *the integrated sense of self*.

The following three research questions (RQs) address different aspects of the objective:

RQ 1: What impact does the institutional setting have on motivation and behavior regarding household waste sorting?

RQ 2: What impact does individuals' integrated sense of self play for motivation and behavior regarding household waste sorting?

RQ 3: Based on insights from CIE and SDT, individually or combined, how can the effect of the factors institutional settings and individuals' integrated sense of self be interpreted? Does the effect of each type of factor depend on the characteristics of the other?

Classical Institutional Economics and Self-Determination Theory, either alone or in a combination, constitutes the theoretical framework applied in this thesis. The *institutional settings*, as outlined by CIE, are in the analyses represented by a curbside waste system with different kinds of waste fee schemes – i.e., a fixed, a frequency-based and a weight-based. Furthermore, institutional settings are assumed to include both a formal part – i.e., the *official regulations* needed to implement both the curbside waste system and the waste fee scheme – and an informal part – i.e., *norms* and *conventions*, which are assumed to accompany the formal part. Regarding the individual level, emphasis is on the *integrated sense of self*, as outlined by SDT. The integrated sense of self is here represented by two kinds of beliefs about human-nature relations – i.e., a 'pro'- or an 'anti'-ecological belief. The integrated sense of self is, according to SDT, further linked to *autonomous motivation* and *eudaimonic well-being*. Individuals' motivation and eudaimonic well-being are here understood to be closely related with the social world – i.e., how social conditions, such as institutions and integrated beliefs, promote or thwart motivation and well-being regarding household waste sorting.

The four papers that constitute this thesis are set out to give answers to the three research questions. Each of the four papers addresses, however, the research questions in different ways. Paper 1 applies CIE and focuses mainly on the role of institutional settings on motivation and behavior in household waste sorting – RQ 1. Paper 2 applies SDT and focuses mainly on the role of the integrated sense of self for motivation in household waste sorting – RQ 2. Both paper 3 and 4 address RQ 3 since these papers, through the attempt of combining SDT and CIE, sets out to study and interpret how institutional settings and the integrated sense of self affect motivation and behavior in relation to waste sorting.

In addition, theoretical considerations that have been important and helpful to be able to combine CIE and SDT are presented in Section 2 and 3 in the introduction part of the thesis. Furthermore, considerations on the concepts that have been central for the combined theoretical approach, in the light of the empirical results, are presented in Section 8. This implies that the introduction to the thesis adds to the papers in two ways. First, it expands on the theoretical

and methodological considerations beyond what is possible in research papers. Second, it develops a discussion of the findings in the papers using this expanded theoretical basis. Hence, the introduction offers distinct inputs to answering RQ 3.

1.3. Structure of the thesis

The thesis consists of two parts where part one includes the introduction of the thesis and part two includes four research papers. The introduction on the thesis includes 11 sections. After the presentation of the research problem in Section 1, the theoretical framework for the thesis is presented in Section 2. In the first sub-section, I give a brief introduction to neoclassical economics and RCT to establish a contrast and a reference point to the theoretical framework used in this thesis. I present CIE in sub-section 2.2. and SDT in sub-section 2.3. Reflections regarding philosophy of science with emphasis on relevant methodological perspectives will be presented in sub-section 2.4. A discussion of central theoretical concepts: *motivation, well-being, social constructs, relational and reflexivity* and how they are applied in this thesis can be found in sub-sections of Section 3. Subsection 3.5 includes also comments that clarify the 'work division' between CIE and SDT, in addition to a figure – Figure 2 – that illustrates the connections between the theoretical concepts and also the 'meeting points' between the two theories as applied in this thesis. Material and methods applied are presented in Section 4. Section 5 gives an overview of previous research related to the use of economic incentives in the management of household waste sorting. Extended abstracts of the four papers can be found in Section 6, as well as Table 1 that offers an overview of e.g. main theoretical concepts and empirical results of the four papers. A synthesis of the main empirical findings is given in Section 7, while I offer some theoretical considerations regarding the possible added value of applying a relational approach in Section 8. Finally, in Section 9 some reflections are presented about policy implications, before final comments are given in Section 10. References are listed in Section 11.

2. Theoretical framework

In the following I will give a brief introduction to neoclassical economics and RCT before I continue with key aspects of CIE and SDT that are relevant for this thesis. In the final sub-section I present related methodological perspectives. I have included these meta-perspectives since I find them useful and necessary in order to understand the more fundamental differences between RCT as part of the broader neoclassical economics on one hand, and CIE and SDT on the other. It should also be mentioned that the theoretical foundation of the thesis has been developed over some time. The starting point was the perspective of CIE, but through literature-studies it became clear that SDT offers an opportunity to include aspects where CIE is weak – i.e., processes at the individual level. Since CIE and SDT have some important theoretical foundations in common, it became an interesting task to try to apply both of them, individually, but also in a combination. I found this especially interesting since the combination of the two enables an analytical framework that takes into account both structural and individual perspectives in a much more nuanced way, than they do separately. This combined theoretical framework has been applied in both paper 3 and 4.

Before I continue with the presentation of the theories, let me also emphasize that the aim of including the theoretical perspective of neoclassical economics and RCT is primarily to highlight some fundamental aspects of the mindset that this perspective represents, and use this as a contrast to SDT and CIE. Hence, it is over and beyond the scope of this thesis to give an overview of all relevant contemporary varieties found within neoclassical economics that is relevant for how RCT is applied today. It is also not the intention to give a full representation of how this strand of thinking originated and developed. The intention is rather to offer a brief presentation that will allow the reader to better understand what differentiates RCT, and also the broader field of neoclassical economics, from CIE and SDT. It is moreover a point in its own right to include RCT and neoclassical economics since this theoretical perspective is the main premise provider, and hence represents the dominating paradigm in economics of today.

2.1. Neoclassical economics

Neoclassical economics has a history back to the 19th century and is a collective term that covers a broad field of different strands of literature that is often referred to as mainstream economics. An underlying premise of neoclassical economics can be traced back to the desire to develop the discipline of economics in accordance with the lines of physics. For example, W. Stanley Jevons (1835-1882), wanted to design a 'mechanics of utility and self-interest' (Schabas, 2014). This scientific approach adopted from physics gave way to a growing use of mathematics in economics – a formalism that with time has escalated. Economics is today mainly a quantitative science, where RCT represents the core of the theoretical paradigm.

2.1.1. Rational choice theory

RCT rests basically on one idea, which is that individuals act rationally through maximizing individual utility. In order to make rational choices though, a set of assumptions must be met. In short, that is, if the preferences of an individual are taken to be complete, transitive and continuous in order (Hausman, 1992), they might form the basis for a continuous utility function. This utility function enables a universal application, but RCT starts and ends with the individual. In the words of Elster (2007: 191): "Rational choice theory is subjective through and through."

Although RCT is mostly nowadays not considered to be taken literally, majority of analyses in economics use the utility function as a point of departure when studying human behavior. For example, some applies RCT as a normative theory explaining how rational people *should* behave. Then, by using this 'ideal type' as a reference point, also referred to as *homo economicus*, alternative models are built to explain the deviances between what should have been if individuals had behaved 'rational' and the actual empirical findings (Samson, 2014). Hence, 'rational behavior' is assumed to be the norm and the burden of proof lies implicit on those behaviors that are not considered 'rational'.

Nevertheless, when developing policies, *homo economicus* is often used as a normative reference point for introducing economic incentives, such as a differentiated waste fee scheme (Norwegian Environment Agency, 2003). To motivate individuals to sort more waste, RCT suggests that the use of incentives will make the socially desirable behavior coincide with that of individual utility maximization. This can, for example, be obtained by using the pricing

mechanism – that is to differentiate the waste fee scheme – so that it is more costly not to sort than to sort waste.

Another relevant point for this thesis is that RCT principally is limited to include *hedonic well-being*. This follows from RCT being a fundamentally individual subjective theory, and that hedonic well-being is defined in terms of individuals' subjective experiences of pleasure attainment and pain avoidance. According to Huta (2015: 2), hedonic well-being includes "a focus on the self, the present moment, and the tangible, and a focus on taking and consuming what one needs and wants". Furthermore, hedonic well-being can be contrasted to *eudaimonic well-being*, a kind of well-being that rather emphasizes meaning and self-realization. I will return to the concept of eudaimonic well-being when I present SDT in Section 2.3., and in Section 3.3. I will discuss the concept of well-being as such.

2.1.2. Developments in behavioral economics

The realization of the shortcomings of RCT in explaining human action has grown as several researchers have observed behavior which deviates from expected behavior as assumed by RCT. For instance, Fehr and Simon (2000) and Ostrom (2000) found a much higher rate of cooperation than what a theory based on utility maximizing individuals predicts. Authors argue for example that people are willing to cooperate to create socially desirable outcomes, especially when for example given the option to punish free riders (Gintis, 2000; Ostrom, 2000).

Faced with such observations, scholars from different disciplines (mainly economics and psychology) have expressed dissatisfaction with the strict and fixed assumptions of RCT (Camerer, 2004; Fehr & Simon, 2000; Henrich et al., 2001). Other explanations have been suggested to explain these kinds of behaviors which deviate from expectations of RCT. Hence, economics as an academic field has in some ways moved beyond the strict interpretation of RCT. For example, many scholars that belong to the tradition that has been named 'behavioral economics' (BE) seemingly attempt to develop and formalizes mini-theories that investigate different phenomena that deviate from what RCT predicts.

To my knowledge though, BE carries the methodological heritage from RCT. This impression can be exemplified by the following quote from the "The Behavioral Economics Guide 2014" (Samson, 2014) that is authored by some of the most prominent researchers within this field at the moment: "According to BE, people are not always self-interested, benefits maximizing, and costs minimizing individuals with stable preferences - our thinking is subject to insufficient knowledge, feedback, and processing capability, which often involves uncertainty and is affected by the context in which we make decisions" (Samson, 2014: 9). Hence, BE still largely focus on the subjective individual, and do not challenge the perspective of RCT in any fundamental way.

For most of these ad hoc mini-theories that have been developed and applied within BE, the main development has been to expand the utility function to include new aspects – e.g., variables that account for cooperative behavior. Traditionally, the utility function has reflected a focus on variables such as monetary rewards or other tangibles, but has been expanded to also

include concepts that can be linked to individuals' 'inner life'. For example psychological variables such as the concept of 'the warm glow of giving', which describes how a person's own utility is enhanced by an increase in other people's utility (Andreoni, 1990; Besley & Ghatak, 2005; Glazer, 2004).

Another deviation that has caught a lot of attention the last decades is related to how an external incentive – e.g., a monetary reward or tax – cause individuals to reduce, rather than increase, efforts. The classic example is how less people donated blood when the organizers started to pay for the donation, as described by Titmuss (1970). A theory within the framework of neoclassical economics that tries to explain this kind of behavior is coined *motivation crowding theory* (MCT) and has become quite influential (Fehr & Simon, 2000; Frey, 1993, 1998, 2012; Frey & Jegen, 2001; Frey & Oberholzer-Gee, 1997; Gneezy & Rustichini, 2000b). To be able to explain the phenomenon, MCT assumes that individuals' utility can be split into 'intrinsic' and 'extrinsic' motivation². Intrinsic motivation refers to motivation that can be derived from undertaking an activity in itself – e.g. to sort household waste. Then, according to MCT, introducing external incentives might have the ability to 'crowd out' the already existing 'intrinsic motivation' – especially when the payment is not high enough (Frey & Oberholzer-Gee, 1997). In a review article, Frey and Jegen (2001) suggests that an external intervention might 'crowd out intrinsic motivation' if the affected individuals perceive it to be controlling. There is for example evidence which suggests that regulatory institutions might 'crowd out' public motivations in favor of greater self-interest (Gneezy & Rustichini, 2000a). Another conclusion from these studies is that extrinsic incentives can also 'crowd in intrinsic motivation'. This would be the case if the individuals concerned perceive the external intervention as being supportive of already existing 'intrinsic motivation' (Frey, 2012). I will return to MCT when I present different views on the concept of motivation in Section 3.1.

Furthermore, MCT is only one of several such mini-theories that attempt to address different kinds of behavior that deviate from the expectations of RCT. Noteworthy is the frustration that has recently been stated over these numerous ad hoc contributions: "One of the challenges practitioners face in incorporating behavioral insights is that there are myriad factors to consider, with little guidance about which factors are most important"(Chetty, 2015: 37), and "But given so many options, one finds it hard to decide which nonstandard preference model, if any, should replace rational choice theory as the predictive guide to welfare/BCA" (Shogren & Thunström, 2016: 1). However, to leave RCT as a normative guide in favor of other perspectives does not seem to be a real option for most economists.

2.2. Classical Institutional Economics (CIE)

CIE belongs to a different theoretical perspective than RCT, namely a *relational* one. CIE share this perspective with SDT. I will first go through what can be considered the core of CIE before I specify one direction – i.e., the Institutions as Rationality Context model (IRC). I will also shortly exemplify other strands of literature that gives emphasis to institutions, but where the frame of interpretation differs from CIE.

² RCT do not actually allow for this kind of differentiation of motivations. I will return to this point in Section 3.1.

2.2.1. The core

CIE can be dated back to the writings of Veblen ([1899] 1965) and (Commons, 1934), and is a tradition that is relational and contextual by nature and just as engaged with the stuff of social life as it is with the outcome of the behavior of individuals (Hodgson, 2012). A basic premise for CIE is that humans are social beings, and in order to relate with other human beings they internalize and apply socially constructed rules like norms and conventions. Through socialization processes individuals learn about what is expected behavior in various situations (Vatn, 2015).

Individuals' preferences, perceptions and ultimately behavior are assumed to be influenced by the institutional context in which individuals operate (Etzioni, 1988; Hodgson, 1988; Jordan & O'Riordan, 1995). Institutions are defined as common 'rules and practices' taking the form of conventions, norms and formal rules (Vatn, 2005). They determine what is appropriate and legitimate; define obligations as well as sanctions for unacceptable behavior. In this way, institutions offer meaning to, and structure human behavior, and govern relations between different actors. This way they help solve coordination problems between humans including those regarding use and protection of the environment, forming aggregate patterns of behavior with implications for sustainability. Institutions define what is considered to be the appropriate logic, and are therefore crucial for supporting individual human actions and choices by reducing complexity through explicit definitions of what is at stake and which actions are expected (Vatn, 2005, 2009).

In this thesis institutions have been operationalized as different kinds of waste fee schemes that all include a curbside waste management system. The fees and management systems have been implemented by law and represent institutions as formal rules. In addition, it is assumed that informal norms and conventions accompany the formal part – e.g., that practical facilitation like a curbside waste system conveys informal expectations about waste sorting. In all, the specific formal and associated informal institutions constitute an institutional setting.

In addition to institutions, CIE posits the importance of *values* and *beliefs* – as social constructs – for the social creation of the individual (Vatn, 2015: 261). While institutions, like norms, are action-oriented rules, beliefs represent more fundamental knowledge about what constitutes the world. Furthermore, values emphasize what is important in life such as ethical and moral considerations. Values are "held by individuals, but are typically culture specific" (Vatn, 2015: 261). Hence, as opposed to RCT, where also values are seen as subjective, CIE stresses that there are universal or 'objective' human values – e.g., good health or personal relations. However, the content of these objective values might differ depending on the culture. Furthermore, beliefs and values legitimize institutions (Vatn, 2015). Here, CIE is in line with Berger and Luckmann (1967), emphasizing that knowledge expressed through both beliefs about reality and values are needed to legitimize an institutional order. Furthermore, knowledge such as beliefs is needed to explain the order of things: "Legitimation not only tells the individual why he should perform one action and not another; it also tells why things are what they are. In other words, 'knowledge' precedes 'values' in the legitimation of institutions" (Berger and Luckmann, 1967: 111). Thus, both beliefs and values play important roles in the formation of perceptions. Finally, while values legitimize institutions, the latter protects

the former through the actions prescribed (Vatn, 2005a). Values and beliefs are operationalized in the thesis by mapping individuals' worldview regarding human-nature relations as this is stated by the NEP scale – i.e., a 'pro'-ecological and an 'anti'-ecological belief.

The ability to reflect and to attribute meaning into logics that institutions potentially express is dependent on these beliefs and values that form perceptions about the world. The personality – including genetics and the individual's social history formed as beliefs and values – influences both perception and the significance a person gives to a certain social context – be it individually or socially oriented. In this way, institutions become interpreted, and in turn these interpretations will cause variation in behavior. CIE emphasizes that the way institutions are perceived and interpreted by the individual is a dynamic issue that depends not only on situational factors, but also the history of the individual. Hence, we talk of potentials and propensities, which cause actions to vary both between and within contexts (Vatn, 2015:175).

Based on the above, to introduce a monetary incentive might change actor perceptions of what logic is considered appropriate. This might result in a shift from practices motivated by the need to fulfill social moral obligations to those driven by self-interests and guided by cost-benefit calculations. However, it is also expected that individuals with a 'pro'-ecological belief or worldview will relate and react differently with a differentiated waste fee as compared to those with an antagonistic attitude to such a worldview. One possible outcome might be that those with a 'pro'-ecological worldview can be provoked by the differentiated waste fee, as they are of the opinion that to sort waste is a citizen duty, a moral act, and not about saving costs.

CIE is not the only tradition within economics that study the role of institutions. There is also New Institutional Economics (NIE) originating in the work of Coase – e.g., Coase (1960) - and North – e.g., North (1990). Their understanding of institutions and their roles are, however, very different. CIE emphasizes that institutions both constrain and liberate (Bromley, 1989). They form the individual and offer meaning to human behavior (Hodgson, 1988; Vatn, 2005). NIE, on the other hand, defines "Institutions (as) the rules of the game in a society or, more formally, ... the humanly devised constraints that shape human interaction" (North, 1990: 3). This 'external constraint view' of institutions is logical as this school of thought is largely based on a neoclassical economics foundation and hence looks at the individuals as self-contained. This can be exemplified by the following quotation from North (1986): "the theoretical framework should be capable of integrating neoclassical theory with an analysis of the way institutions modify the choice set available to human beings." It should be noted that at present, NIE dominates the thinking in economics regarding institutions and their role in explaining human motivation and behavior.

The work of Elinor Ostrom also largely falls within the NIE tradition of understanding institutions as she used rational choice as her theoretical framework and saw institutions as affecting choice by influencing the utility of different actions. She did accept, though, that norms and individual preferences are formed by societal processes, and the following quote might exemplify how she in many ways took a middle position: "The proportion of individuals who fol-

low each type of norm will vary from one subpopulation to another and from one situation to another" (Ostrom, 1998: 11).

2.2.2. The Institutions as Rationality Context model

The IRC model goes one step further concerning the role of institutions for motivating action (Vatn, 2005, 2009). It is based on inputs from CIE, sociology and organization theory (Etzioni, 1988; Hodgson, 1988; Scott, 1995; Veblen, [1899] 1965). The IRC model emphasizes that institutions provide expectations and meanings to people in a complex environment. While institutions are formed by agents, they also influence behavior by forming interests and perceptions and supporting different values by defining what is considered 'the right thing to do' in a given situation. Thus, based on the IRC model, different institutions support different rationalities. The idea is that rationality is a plural concept spanning both individual and social rationality. This is opposed to how 'rationality' is explained in RCT, considering only one form or way of acting rationally, that is, maximizing individual utility.

Hence, IRC postulates the existence of plural rationality. In some contexts, thinking only about oneself is accepted or promoted, while in other situations it is expected that agents cooperate and take the interests of others into account. The role of institutions is to signal what type of rationality applies in which situation, helping people to sort out complex coordination problems. Institutions influence behavior not least by defining the specific logics as pertinent to a certain context. They define which rationality is anticipated and in this way they resolve a core problem for the individual. They inform her about whether the setting is one in which self-regarding acts are the proper type of act – i.e., they express an 'I logic' – or a setting in which the logic is that of cooperation – i.e., a 'we logic'. The former logic is parallel to the perspective of the rational choice theory where the individual's subjectivity, understood for example as hedonic well-being, dominates the concern of the individual. The latter logic concerns what is best for the group – i.e., social rationality – and would be expected to appear in situations where cooperation is considered the better solution (Vatn, 2009).

Regarding sorting household waste, a 'we logic' is present whenever the respondents report that they sort waste because they consider it as the right thing to do. That to sort waste is an appropriate action since it potentially can decrease the environmental footprint of consumption. Correspondingly, an 'I logic' will be present if respondents report that they are motivated by for example saving costs, and this is a likely outcome in an institutional setting that includes a differentiated waste fee. The logic is now not to do the appropriate thing in order to save the environment, but rather to look after your own wallet. The strength and extent of the logics, however, depend on several factors. In the case of this thesis, it is assumed that it will depend on how the differentiation is designed – i.e., a frequency-based or weight-based – and the values and beliefs the respondents hold – i.e., beliefs about human-nature relations.

2.3. Self-Determination Theory

The third theory I will present is SDT, a theory that belongs to a tradition in psychology that has been "devoted to the investigation and understanding of the conditions for people's happy and harmonious lives, including people's autonomy, agency, and freedom" (Ryan, Sheldon, & Chirkov, 2011: 14). Edward Deci and Richard Ryan are the main developers of SDT. Their

work originates in studies of learning, and is, first of all, oriented towards how teachers, parents, leaders, coaches, etc. can mobilize others to act. However, SDT has been applied in many fields (Ryan & Deci, 2017). This tradition includes different schools of thought, for example humanistic psychology and existential psychology, and can be contrasted to two other traditions within psychology.

First, there is a position inspired by Skinner (1971) that also includes modern cognitive psychologists. This is a tradition that seeks "to find the ultimate causes of human behavior by precluding consideration of subjective experience and the intentional nature of human reasoning as determinant of action" (Ryan et al., 2011: 14). With its emphasis on the subjective individual, this tradition can be seen as the psychological sister of RCT. The position has also been referred to as 'behaviorists' (Ryan & Deci, 2017: 30). The second tradition is represented by a variety of theories that could be linked to a postmodernist, social constructionist movement wherein people's psychological processes and states have been presented as social constructions, as texts, or sets of discourses" (Ryan et al., 2011: 14). Hence, the three traditions reflect positions in psychology that emphasizes individuals and social structures differently.

SDT, on its part, is occupied with "determinants of good lives for humans and their well-being in autonomous human consciousness, as well as in people's ability to reflect on their life-conditions, both internal and external" (ibid: 15). These determinants are by Deci and Ryan defined as three basic psychological needs: *autonomy*, *competence* and *relatedness*, and they are, according to Ryan and Deci (2000b: 68), been identified "inductively, using the empirical process." The psychological needs "appear to be essential for facilitating optimal functioning of the natural propensities for growth and integration, as well as for constructive social development and personal well-being" (ibid: 68).

Out of the three psychological needs, it is mainly the understanding of *autonomy*, which is applied in this thesis. According to SDT, autonomy is the desire of individuals to be self-organized or self-determined: "Autonomy refers to volition – the organismic desire to self-organize experience and behavior and to have activity be concordant with one's integrated sense of self" (Deci & Ryan, 2000: 231). Furthermore, the way autonomy is defined in SDT enables it to be combined with CIE. Both SDT and CIE assume that individuals are fundamentally social beings. Autonomy allows individuals not only to be "free in pursuing their potentialities and needs, but also to merge easily with a larger social whole"³ (Maslow 1971 in Ryan et al., 2011: 21). Hence, my interpretation is that the 'larger social whole' includes social constructs like institutions, values and beliefs as defined in CIE – see also Section 3.2. for reflections on the similarities between the two theories.

Autonomy is further elaborated on in one of the six mini-theories that SDT comprise of – i.e., the Organismic Integration Theory (OIT). Each of these mini-theories addresses different as-

³ As a consequence of the assumption that humans are fundamentally social beings, autonomy should not be linked to independence, or to be independent: "Independence means not relying on others, whereas autonomy as used in Self-Determination Theory means acting with the experience of choice. Thus, it is quite possible to be autonomous (volitional) while relying on others rather than acting independently of them" (Deci and Ryan, 2008: 8).

pects of motivation or personality functioning (selfdeterminationtheory.org., 2017), and OIT addresses the process of how individuals internalize and integrate various extrinsic motives – e.g., a belief or worldview about human-nature relations as these are mapped by the NEP scale. An important assumption for this understanding of how extrinsic motives can be internalized is the division between *intrinsic* and *extrinsic* motivation. Ryan and Deci (2000a: 56) define the former as "doing of an activity for its inherent satisfaction of the activity itself." The focus is here on "the prototypic manifestation of the human tendency toward learning and creativity" (ibid.: 56). The definition implies that humans "are active, inquisitive, curious, and playful creatures, displaying a ubiquitous readiness to learn and explore, and they do not require extraneous incentives to do so" (ibid: 56). Extrinsic motivation is, on the other hand, seen as "a construct that pertains whenever an activity is done in order to attain some separable outcome" (ibid.: 71). In turn, it is this inner drive to learn and to explore that enables extrinsic motives and social constructs to be internalized and regulated into the self of an individual. Hence, SDT gives emphasis to the relation between intrinsic and extrinsic motivation. That is, how motivation develops 'in the individual' – on self-motivation, and personality integration – on how external regulations like norms are integrated in the individual (Ryan & Deci, 2000a; Ryan et al., 2011).

In OIT, extrinsic motivation is divided into four sub-categories depending on how integrated and internalized the regulation or motive is into the self. Figure 1 describes how these sub-categories can be classified – i.e., a taxonomy of human motivation (Ryan & Deci, 2000a). The least integrated is an *external* regulation – referring to external rewards and punishments – and involves feelings of control. This category is operationalized in this thesis by the motive of saving costs, which is made possible by the differentiated waste fee. The second is an *introjected* regulation that is mostly about enhancing or maintaining self-esteem – ego-involvement, internal rewards and punishments like pride and guilt. If the motivation for sorting waste is reported to be about the concern for what others might think of you, this is categorized as an introjected regulation. The third is an *identified* regulation meaning that the person has identified herself with the personal importance of the behavior – personal importance and conscious valuing. Reasoning for sorting waste that address a wish for wanting to see yourself as a responsible person falls into this category. Finally, there is *integrated* regulation, the most autonomous form of extrinsic motivation, where the regulation has been fully assimilated into the self. To fully internalize a regulation, and thus to become autonomous with respect to it, people must inwardly grasp its meaning and worth. (Ryan & Deci, 2000a). Stated reasons that address sorting waste to be the right thing to do represent integrated motivation.

In addition, the four categories of extrinsic motivation are further divided into two classes – i.e., either an externally perceived locus of causality (ELOC) or an internally perceived locus of causality (ILOC). The former – ELOC – includes the categories external and introjected regulations, and the latter – ILOC – includes identified and integrated regulations. The two classes states from where the individual perceives that the justification of the regulation stems from – i.e., from outside or from within herself (ibid.).

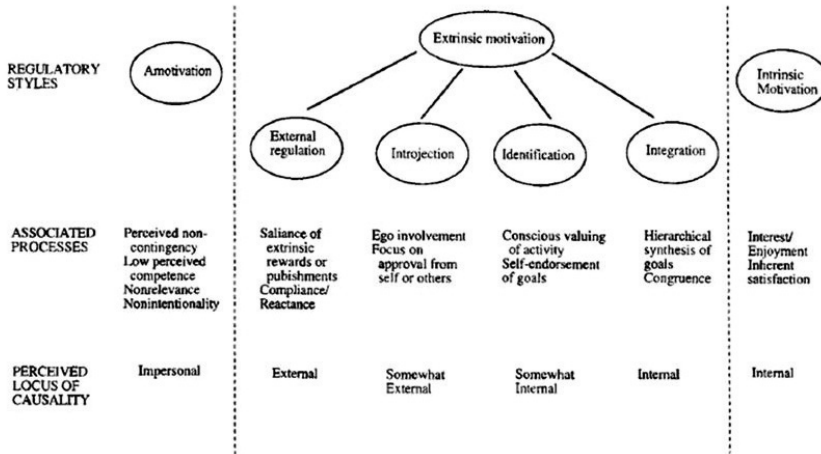


Figure 1. A taxonomy of human motivation. Source: Ryan and Deci (2000).

Furthermore, Deci and Ryan (2000) address the need of bringing new regulations into congruence with one's other values and needs. Hence, OIT stresses the importance of the constant dialog between the external motives already integrated and internalized into the individual (the integrated sense of self), and the social world that the individual is living in. The already integrated sense of self is operationalized in this thesis by mapping two kinds of beliefs about human-nature relations as these are stated in the NEP scale. Hence, this thesis operationalizes SDT in two ways. One is through identifying different levels of autonomous motivations regarding sorting waste – referring to the different categories of extrinsic motivation. The second is identifying relevant beliefs that constitute the integrated sense of self with regard to household waste sorting.

Ryan and Deci (2000a) argue that only autonomy-supportive contexts will yield integrated self-regulation. SDT postulates that regulations can either be autonomy-supportive or controlling. The former refers to a situation where the individual experience a regulation as flexible and the latter refers to a situation that is experienced as controlled (Deci & Ryan, 1987). For example, how a person perceives a specific regulation, like a fixed (less controlling) or a differentiated (more controlling) waste fee, will probably depend on her integrated sense of self – i.e., either of the two kinds of beliefs about human-nature relations.

Finally, a higher degree of perceived autonomy is also associated with greater engagement and greater psychological well-being. SDT emphasizes meaning and self-realization, and defines that "well-being is not so much an outcome or end state as it is a process of fulfilling or realizing one's daimon or true nature – that is, of fulfilling one's virtuous potentials and living

as one was inherently intended to live" (Deci & Ryan, 2008: 2). Hence, SDT belongs to the *eudaimonic* approach of well-being – i.e., a kind of well-being that is often contrasted to hedonic well-being as referred to in Section 2.1. (Deci & Ryan, 2008). Hence, according to SDT, individuals might perceive waste sorting as a meaningful practice that brings experiences of eudaimonic well-being with it. However, it is the integrated sense of self that determines to what degree waste sorting will be perceived as meaningful or not.

2.4. Can you step into the same river twice?

As mentioned in the introduction of Chapter 2, I have found it useful as part of the efforts to combine CIE and SDT as a contrast with RCT, to explore two methodological debates that form parts of the theoretical underpinning of the included theories. The methodological issues that I have considered relevant are *substantialism vs. relationism* and *agents vs. social structures*.

It must be stressed, though, that it is over and beyond the scope of this thesis to give a detailed representation of the above-mentioned debates. The idea of including some main points from these discussions is rather to achieve a minimum of understanding that might clarify why RCT on one hand, and CIE and SDT on the other, on a more fundamental level, gives different interpretations of what characterizes human motivation and behavior, and therefore explain social phenomena in different ways. It should also be mentioned that I have limited the issues in this section to methodological aspects. I am aware that it could be relevant to include linkages to for example ontological issues as these are closely related to the methodological ones. To include these kinds of themes would, however, extend the scope and length of this thesis introduction substantially, and I have considered it to be sufficient to include relevant methodological aspects to explore the outlined research questions of this thesis, especially RQ 3.

First, *substantialism vs. relationism*, as many philosophical issues, this methodological debate can be traced back to pre-Socratic times and concerns a fundamental dilemma, that is, if the world consists primarily in substances or in processes (Emirbayer, 1997: 281). Can the world be divided into elements, or is the world truly dynamic and must be viewed as unfolding relations? The former view represents the 'substantialist' view and "takes as its point of departure the notion that it is substances of various kinds (things, beings, essences) that constitute the fundamental units of all inquiry" (ibid: 282). In the latter view, the relational one, the "very terms or units involved in transaction derive their meaning, significance, and identity from the (changing) functional roles they play within that transaction. The latter, seen as a dynamic, unfolding process, becomes the primary unit of analysis rather than the constituent elements themselves" (ibid: 287).

One of the first traceable sources that reflect a relational view on the world can be found in the writings of Heraclitus (535–475 BCE). This Greek philosopher is famous for his doctrine of change being central to the universe and coined the saying: "You cannot step twice into the same river." A common interpretation of this metaphor has been that 'everything changes'. However, another and perhaps a more interesting interpretation is that there is an implicit antithesis in this saying (Graham, 2015). Even though the waters are in constant change, the

rivers stay the same. Actually, "it must be precisely because the waters are always changing that there are rivers at all, rather than lakes or ponds" (ibid). The point, then, is not that "everything is changing, but that the fact that some things change makes possible the continued existence of other things. Perhaps more generally, the change in elements or constituents supports the constancy of higher-level structures" (ibid).

Substantialism on the other side can be traced back to the thinking of Aristotle that was built around 'substances' and where it is claimed that there "exist things which completely, inherently, and hence necessarily, possess Being" (Emirbayer, 1997: 125). This perspective has been the dominant one in the Western world through history (ibid). Today it is *methodological individualism* (MI) that is the most vigorous representative of the substantialist view, and this brings me to the next methodological debate I will refer to, namely the one of 'agents vs. social structures'. This debate is often restricted to a substantialist view⁴ where the two main positions have been that social phenomena can be reduced to either agents or social structures. The former position is the one that is often referred to as MI and takes for granted that the elementary unit of social life is the agent – i.e., explanations about social phenomena can be reduced to the agent (Kjosavik, 2003). Ritzer and Gindoff (1992: 130) describes it this way: MI "involves the idea that all explanations of social phenomena must be rendered in terms of individuals and their thoughts and actions." The first theory presented, RCT, belongs to this methodological perspective, and hence, also most research and theoretical developments within the loosely defined behavioral economics as part of the neoclassical paradigm, belong here. To understand why MI has gained so much influence in today's society, it is important also to understand the period of time when these ideas gained acceptance in Europe. This is the time of social upheaval between the feudal systems and the emergence of individual entrepreneurs who were only responsible to themselves (Kjosavik, 2003).

Parallel to MI, you have *methodological holism* (MH). This perspective is also a representative of the substantialist view. MH reduces everything to structure – i.e., explaining social phenomena through various social structures in society. "Holism is based on the premise that the properties of wholes or systems cannot be *explained* in terms of the properties of their parts" (Ritzer & Gindoff, 1994: 12).

Hence, MI and MH represent a dualism that in the literature is often referred to as 'agents versus structure' or 'individuals versus society'. However, agents and structures can also be viewed as complementary rather than competitive entities in explaining social phenomena. Young (2002: 50) for example call for an "effort to synthesize the two sets of models, combining essential elements from each to build new models." Such a synthesis has been addressed by several scholars and some have also attempted to develop this perspective formally and coined it *methodological relationism* (MR). Vigor spokespersons of MR are for example Ritzer and Gindoff (1992) and Emirbayer (1997). Yet others talk of 'relational sociology' (Donati, 2015; Maton, 2003). This literature argues that it is equally necessary to include social structures and human agents when explaining social phenomena. Not only that, Ritzer and Gindoff (1994: 14) claim that individualistic and holistic concepts are useful in order to *de-*

⁴ This is also referred to as *atomism* (Kjosavik, 2003)

scribe and to gain some *understanding* of social phenomena, but if our goal is *explanation*, a relational approach, that includes relational concepts, is needed in order to give emphasis to the linkage and the relations between the two. Hence, a relational approach to study social phenomena, or also *methodological relationism* (MR), can be argued to represent what was initially referred to as a relationistic view of the world, as opposed to a substantialistic view.

Finally, and in addition to the attempts of for example Emirbayer (1997) and Ritzer and Gindoff (1992, 1994) of formalizing MR, others have discussed and developed concepts that enable a relational analysis. Examples of such concepts are *reflexivity* (Archer, 2007, 2009) and *emergence* (Elder-Vass, 2010). The significance of these concepts is that they allow for an investigation of the linkage and the relations between agents and structures. In turn and as already mentioned, it can be argued that to apply the relational approach enables us to explain, and not only to describe, a social phenomenon.

As already stated, RCT belongs to MI. In the following though, I will argue that CIE and SDT belong to MR as they give emphasis to both social structures and individuals. What part of the relation between agents and structures they give focus to, differ though between CIE and SDT. In the case of CIE, the main emphasis is on how social structures and especially institutions – i.e., the institutional settings – influence individuals' preferences, perceptions and ultimately behavior (Etzioni, 1988; Hodgson, 1988; Jordan & O'Riordan, 1995). Individuals are however not evaluated as passive recipients of the messages conveyed by the institutional context. CIE stresses that the way institutions are perceived and interpreted by the individual is a dynamic issue that depends not only on situational factors, but also on individuals' characteristics such as the values they hold (Vatn, 2015).

In the case of SDT, a relational view on the world can be exemplified through the organismic perspective on self. The individual is attributed a "natural tendency toward growth and development, which represents an ongoing tendency toward organismic integration". (Ryan & Deci, 2017: 8). However, this natural tendency toward growth and development is conditional: "Yet this integrative propensity, while natural, is also conditional; it requires social and environmental support for persons to satisfy basic psychological needs — the needs for autonomy, competence, and relatedness." (ibid: 8). Hence, also SDT, just as CIE, stresses the inherent mutual dependency between individuals and social structures, which characterizes a relational approach.

Based on this, my interpretation is that both CIE and SDT assume a theoretical understanding of social phenomena that belong to MR. In turn this enable an analysis of a social phenomenon where not "everything is changing, but that the fact that some things change makes possible the continued existence of other things" (Graham, 2015) – i.e., 'some things change' is portrayed here as *motivation and actions*, and 'the continued existence of other things' is portrayed here as *institutional settings* and *individuals' integrated sense of self*. For example, motivation for sorting household waste can be more or less autonomous depending on the kind of waste fee implemented in your municipality – i.e., institutional setting – and your views regarding the role humans have in relation to nature – i.e., individuals integrated sense of self.

3. Central theoretical concepts and their application

When applying different theories, you are typically confronted with different concepts that explain more or less the same things or phenomena. This has also been the case when developing this thesis. This is especially so regarding the attempt to combine CIE and SDT as a theoretical framework that considers both structural as well as individual characteristics in the analyses of a social phenomenon. Therefore, before I present and discuss my empirical findings, I will make comments and clarify the key concepts in the theoretical framework that have been essential in understanding and analyzing the results, as well as in the attempts of combining SDT and CIE. This includes also clarifications about which concepts that I will apply and their definitions.

3.1. Motivation

A central concept applied in this thesis is *motivation*. Etymologically, motivation concerns what 'moves' people to action (Harper, 2017). However, there is a difference in how theories view motivation as a phenomenon. For example, experimental psychology has historically treated motivation "as a unitary unit, which is to say that it has been studied in terms of amount or strength but has not typically been differentiated with respect to types, qualities or orientations" (Ryan & Deci, 2017: 13). Humanistic psychology on the other hand "is inevitably concerned with the social conditions that promote or thwart the development of humans' healthy motivation as well as their ultimate happiness, flourishing, and the good life" (Ryan et al., 2011: 21). This latter view, that individuals and social conditions are fundamentally related, is shared by SDT and CIE. RCT on the other hand, makes very different assumptions to what motivate the individual. In the following, I will go through some points on differences and similarities between the three theories regarding motivation. The intention is to clarify the common ground of SDT and CIE, but also to explore and clarify the borders between a relevant theoretical development in behavioral economics – i.e., MCT - and SDT.

To start with RCT, this theory assumes that individuals' motivation is to maximize utility, and it does not take a stand on the sources of that motivation (Frey, 2012). This means for example that RCT do not allow for a division between 'intrinsic' and 'extrinsic' motivation as is done in SDT. As stated in Section 2.1.2., only monetary rewards or other tangibles were originally included in the utility function. It is rather recently that models have been developed to include not only external incentives or interventions, but also motivation from the 'inner life' of individuals. One such attempt is MCT as referred to in Section 2.1. Bruno Frey has been a major contributor to the development of this mini-theory, and although RCT do not allow for a differentiation of different kinds of motivation, MCT includes a division between 'intrinsic' and 'extrinsic' motivation. The two kinds of motivations are defined in MCT in the following way: "People have intrinsic motivation when they just like to act in a certain way or because they have internalized social norms" and "...extrinsic motivation – i.e., on incentives coming from the outside the person in question" (Frey, 2012: 91).

SDT on the other hand, defines 'intrinsic motivation' as "the doing of an activity for its inherent satisfactions rather than from some separable consequence" (Ryan & Deci, 2000a) and "extrinsic motivation is a construct that pertains whenever an activity is done in order to attain

some separable outcome." Hence, SDT offers a definition of intrinsic motivation that is radically different than the one offered by MCT – i.e., MCT includes "internalised social norms" into intrinsic motivation, while SDT sees social norms as extrinsic – i.e., introjected motivation with a somewhat external locus of causality. Hence, the definitions that MCT offer of intrinsic and extrinsic motivation does not relate to the two categories that SDT refers to as *identification* and *integration* with an internally perceived locus of causality. See Figure 1 in Section 2.4.

Considering that Frey refers to the work of Deci and Ryan as a source of inspiration when he elaborates the concept of MCT, including the division between extrinsic and intrinsic motivation, it is a bit puzzling that he interprets the concept 'intrinsic motivation' the way he does. It may be seen as "careless usage" as expressed by Thøgersen (2006: 258). It is also somewhat puzzling that Frey (Frey, 2012; Frey & Jegen, 2001) refers to the work of Deci and Ryan to the degree that he does. As stated in Section 2.2, *autonomy* is the concept by which SDT brings together the different kinds of motivation and also defines human agency. Perceived autonomy is what connects the individual with the social world and is an expression for how society is imprinted upon the individual. Taking this into consideration, it might not be so surprising that Frey (2012) choose a definition of 'extrinsic' motivation that excludes the two categories of motivation in SDT with an 'internally perceived locus of causality'. This is so since it is actually an impossible task to include autonomy as defined by SDT into MCT. To include relative autonomy into the MCT would demand to step outside the perspective of methodological individualism altogether. A final point is that the founders of SDT, Deci and Ryan, quite harshly critique standard economic thinking and explicitly argue against rational choice theory as a good representation of human choice (Deci & Ryan, 1985: 155). The intention of this rather detailed presentation of the theoretical boundaries between SDT and MCT/RCT is to give a representation of how the two theories apparently explain a social phenomenon in the same way, and that it is only when one studies the theories more thoroughly that the fundamental differences between them appear.

Henceforward, I will make use of the division that SDT makes regarding intrinsic and extrinsic motivation, between the four types of extrinsic motivation (external, introjected, identified and integrated) and the division between external and internal locus of causality. As already mentioned, this understanding of human motivation permits to link SDT's understanding of human motivation with how CIE interprets and defines institutions. This brings me to the next concept – i.e., institutions or also the wider concept of social constructs.

3.2. Institutions and other social constructs such as values and beliefs

In RCT and contemporary developments, social constructs like institutions are often not included. If included, it is similar views as NIE (see Section 2.2.1) that is mostly applied – i.e., institutions defined as 'external constraints'. CIE on the other hand, emphasize how institutions convey logics and meanings, and how they guide individuals in their actions. Hence, there is a fundamental difference between how RCT and CIE interprets and applies institutions in analyzing a social phenomenon.

CIE also gives attention to the role of other social constructs such as values and beliefs, as well as the process where these social constructs are internalized into the self. SDT also address social structures or constructs and refers often to *behavioral regulation*, but other terms such as *rules*, *values*, *identities* and *norms* are also used – e.g. "social values and behavioral regulations" (Ryan & Deci, 2000a: 60). Hence, the concepts applied by SDT partly or completely overlap with concepts described and used by CIE. In Ryan et al. (2011: 51) it is also stated: "The importance of considering the degree of internalization and integration of identities, values and even self-concepts cannot be overstated."

Based on this, my interpretation is that CIE and SDT have similar understandings of institutions and other social constructs. Further, they share a common understanding of how important they are in the socialization process of individuals, and how they become part of what SDT refer to as the 'integrated sense of self'. However, in the following I will for the most part use the 'language' of CIE, as outlined in Section 2.2., that gives focus to social constructs such as *institutions*, *values* and also *beliefs*. It should also be stressed, that it is this shared understanding of the dynamic role of social constructs and how these relate with the individual, which enables a combination of CIE and SDT.

Noteworthy though, is that the literature that address the content of *values* (and that not necessarily link these to context, institutions etc.) is considerable, and seemingly all social disciplines engage in issues regarding different interpretations and aspects of it – see e.g., Brosch and Sander (2015) for an overview. Regarding environmental relevant values, it has for example been stated that "six values are theorized to influence environmental decision-making" (Dietz, 2015: 335): altruism, biospheric values, self-interest, traditional, openness to change and hedonism. Further, and since "environmental issues can be framed as the governance of common pool resources, an important form of the collective action problem" (ibid: 333), there has been much emphasis given to altruism, but also biospheric values and self-interest. A relevant case from this literature is, for example Stern (2000) that makes a division between egoistic, altruistic and biospheric values. The concept of 'biospheric value' has been further developed in De Groot and Steg (2007, 2008) and has also been linked to self-determined pro-environmental motivation (De Groot & Steg, 2010). Furthermore, it should be noted that even though a theoretical division between values and beliefs has been defined – see Section 2.2. – these concepts seem to be included in analytical frameworks in different and overlapping ways. For example, the NEP scale that I apply in this thesis, includes not only beliefs, but also values and attitudes (Dunlap et al., 2000), and these are partly overlapping with biospheric values. At the same time, Stern (2000) uses the NEP scale as distinct from such values. Henceforward, I will refer to the results from applying the NEP-scale as *beliefs*, although I acknowledge that values and especially biospheric values can be considered relevant in this context.

Finally, it should also be noted that the concepts 'rationality' and 'logic' has been used interchangeably in the above sections when explaining how institutions might guide individuals in their choices, and how a shift in institutional context might also imply a shift in rationality, or logic. Because the concept 'logic' reflects a more active or dynamic state capturing the relation between individuals and structures compared to the concept rationality, I have chosen to use

logic in the subsequent sections. This point is elaborated by Berger and Luckmann (1967: 82) that stress that concepts such as *logics* should be used with care as a logic does not "reside in the institutions and their external functionalities, but in the way these are treated in reflection⁵ about them." Consequently, logics do not manifest themselves until individuals, through their ability to *reflect*, ascribes institutions the quality of a specific logic. Relevant for this thesis would be that a differentiated waste fee do not occur and reside as an 'I logic' until the waste sorter with its integrated sense of self reflect upon the specific institutional setting as an 'I logic'.

3.3. Well-being

Both *hedonic* and *eudaimonic* well-being as part of the broader fields of hedonic and eudaimonic approaches have been recognized already by Aristotle. There have been long philosophical debates about these concepts (Chirkov, Ryan, Kim, & Kaplan, 2003: 46; Deci & Ryan, 2008; Huta, 2015; Ryff & Singer, 2008; Woolfolk & Wasserman, 2005)⁶. A common way of defining hedonic well-being is to primarily link it to a subjective experience of the presence or absence of positive or negative affect (Huta, 2015; Kahneman, Diener, & Schwarz, 1999). Eudaimonic well-being on the other hand is often more loosely defined, but relates to an experience of meaning, life-satisfaction and self-connectedness. Often eudaimonia is contrasted to hedonia by a time variable where eudaimonia is seen as a process and hedonia is linked to the momentary (Huta, 2015).

Even though the two forms of well-being often are contrasted, there are overlaps as well. For example, Deci and Ryan (1985) points out that this division is to a large degree a theoretical construct and less relevant in practical terms in people's lives, and they call for a more nuanced and less polarized debate. These overlaps are also stressed by Huta (2015) who points out that that both kinds of well-being seems to be needed in order to live balanced lives: "people who pursue both hedonia and eudaimonia have more well-rounded wellbeing than people who pursue only one or the other, because hedonia and eudaimonia fill somewhat different well-being niches" (ibid: 5).⁷

In terms of the theories included in this thesis, RCT or mainstream economics allows only hedonic well-being to be included. This is a logical result since RCT rests on the assumptions of the subjective agent. A relevant development in economics is the school of thought referred to as 'happiness economics', which is also part of the broader strand of behavioral economics (see Section 2.1.2.), where the term 'subjective well-being' is central (Ryan et al., 2011: 207). There is a similar strand of literature in psychology that also focuses primarily on hedonic

⁵ See also Section 3.4 for further comments on the term reflection

⁶ It is over and beyond the scope of this thesis to give a full representation of the literature that deals with the well-being concept. I have chosen to focus on the distinctions between eudaimonic and hedonic well-being, but even this literature is too broad for this thesis to capture in a complete way. I have for example left out discussions that the fields of literature positive psychology vs. humanistic psychology have had on this topic. Hence, I focus mainly on the interpretations made by SDT, and some related understandings that I have found relevant for this thesis.

⁷ Regarding the debates about the boundaries between eudaimonic and hedonic well-being, it is noteworthy to observe that a relatively new strand within gene studies, so-called human social genomics (Chirkov et al., 2003), have started to investigate if also our genes separate between the two kinds of well-being (Cole, 2014; Fredrickson et al., 2013).

well-being. An illustration is the book: "Well-being: The Foundation of Hedonic Psychology" (Kahneman et al., 1999). The authors have developed a happiness index that also includes the factor 'life satisfaction'. However, as Deci and Ryan (2008) points out, if hedonic well-being is the frame of the happiness index, it would be more precise not to include 'life satisfaction' as a parameter, as this is strictly speaking not a hedonic concept. Life satisfaction involves a cognitive evaluation of the conditions of one's life. Such an evaluation involves potentially cognitive processes such as reflection and reflexivity⁸. Consequently, other factors than pure subjective individual affections must be accounted for which is more in line with eudaimonic than hedonic well-being.

Regarding CIE and SDT, SDT positions itself within the eudaimonic tradition, and seeks to explore eudaimonic well-being in more depth. It should be noted though, that even if SDT link eudaimonic well-being to satisfaction of the basic psychological needs (autonomy, competence and social relations), SDT recognizes also that "being satisfied with one's life and feeling" also is related to "relatively more positive affect and less negative affect" – i.e., subjective well-being (Ryan & Deci, 2001: 147). CIE on the other hand, can be seen as a reaction to the hedonistic basis of neoclassical economics (e.g. Veblen 1899). Hodgson (2008: 238) states: "health is an objective, universal need, irrespective of whether or not it is also a want. The recognition of a distinction between wants and needs challenges the utilitarian foundations of neoclassical economics." Hodgson (2008: 240) continues with a differentiation: "a distinction must be made between wants and needs, where wants are culturally conditioned subjective desires and needs are objective conditions of autonomy, survival, well-being and social interaction." Hence, Hodgson links well-being to a universal human need in a much similar way to how SDT term basic psychological needs.

Regarding the broader framework of MR, I see, however, no theoretical reason for not including both kinds of well-being. Rather, I find that both concepts of well-being logically can, and should, be included. There is also a theoretical possibility of linking eudaimonic well-being to the institutional 'we logic', and hedonic well-being to the institutional 'I logic' – see Section 3.5 and Figure 2 for how this is attempted operationalized. Hence, both hedonic and eudaimonic well-being are potentially relevant for this thesis, and might be traced both at the individual and the structural level.⁹

3.4. Relational and reflexivity

In the following I will present some relevant views on the concepts 'relational' and 'reflexivity', but again, to give a full representation of the discussions that can be found in relevant literature on these concepts is over and beyond the scope of this thesis. The intention is rather to highlight some points that will give the reader some understanding of the choices I have made about the concepts that I have applied.

⁸ Reflection and reflexivity are concepts that will be dealt with in Section 3.4.

⁹ The approach outlined above regarding how to possibly link the two kinds of well-being to the institutional level, could also be one way forward to counter a criticism that has been presented about research on eudaimonic well-being, seeing it as too individualistically oriented as it does not take into consideration social or structural aspects beyond the immediate social relations (Health, 2015). This criticism is among others been emphasized by Becker and Marecek (2008).

Both 'relational' and 'reflexivity' address the link between agents and structures, or as in the case of this thesis: household waste sorters and waste fee schemes. The concept 'relational' address the theoretical approach that this thesis has been inspired by, and in Section 2.4, I presented the methodological debates linked to the approach. However, the field of literature that addresses the development of the relational approach includes several debates. One of these debates discusses which expression or term that best describe the linkage or process of a social relation.

Emirbayer (1997) for example, discuss different possible terms and their suitability, and argues that the concept 'interaction' "is frequently confused with more truly relational points of view" (ibid: 286) and compares the process of interaction with that of billiard balls or also how Newton describes particle mechanics: "... where entities no longer generate their own action, but rather, the relevant action takes place *among* the entities themselves. Entities remain fixed and unchanging throughout such interaction, each independent of the existence of the others" (ibid: 286). Emirbayer (ibid) then discuss the concept 'transaction' and argues that this concept should be favored. He argues that this term is appropriate since "the very terms or units involved in a transaction derive their meaning, significance, and identity from the (changing) functional roles their play within that transaction" (ibid: 287). Hence, the units – the household waste sorters – involved are active and changeable actors in the social process of sorting waste under different waste fee schemes

However, Donati and Archer (2015) are critical of Emirbayer (1997), and argue that a relational approach includes more than a transaction – i.e., a transaction do not necessarily entail social relations. They stress that it is necessary to give "more attention to the relationship itself rather than subsuming all relations under an abstract noun such as 'transaction'" (Donati and Archer, 2015: 21). They suggest to simply use 'relational'. To address this 'something more than just transactions' in a social relation they address among other things the concept reflexivity, a concept that is about how the individual relates to, interprets and act upon the social world¹⁰ (Archer, 2009). Reflexivity might be defined as "the regular exercise of the mental ability, shared by all normal people, to consider themselves in relation to their (social) contexts and vice versa. Hence, it is crucial in mediating between what actors themselves are most concerned to achieve in society and the social constraints and enablements that they confront as they try to realize their concerns" (Archer, 2009: 2).

Furthermore, it should be noted that reflexivity is tightly connected to the human ability to *reflect* that might be considered as the prior step to exercise reflexivity. According to Archer (ibid: 2): "Human reflection is the action of a subject towards an object." Hence, I interpret this as the mental action or process of *identifying* an object – e.g., a waste fee scheme or different kinds of waste fractions – that in many instances happens at an unconscious level – i.e., reflection do not necessarily include conscious evaluating. For example, when sorting household waste, reflection is exercised when an individual, while making dinner and talking on the

¹⁰ The role and status of reflexivity as an analytical concept has varied a lot through history, but in general reflexivity has not had any prominent place in social science. The literature covers other understandings of reflexivity than is outlined here, but my understanding of reflexivity is mainly influenced by the work of Archer (2007, 2008).

phone, considers if the paper diaper should be thrown into the paper fraction or the residual waste. In many cases, this practice is 'automatized' and the individual only need to *reflect*. Then, in order to exercise reflexivity, another step must be involved: "The distinguishing feature of reflexivity is that it has the self-referential characteristic of 'bending-back' some thought upon the self, such that it takes the form of *subject-object-subject*" (ibid: 2). With reference to waste sorting again, a reflexive consideration would be if an environmentally concerned individual (subject) that lives in a municipality that has not implemented waste sorting (object), started to sort waste anyway, because she finds it problematic not to live in accordance to her pro-environmental beliefs (subject). This needs not only the action of identifying, as in reflect upon, institutions or other social construct, but also conscious evaluation – i.e., reflexive consideration.

Another point that is stressed by Archer is the "heterogeneity of reflexivity" (Archer, 2009: 10). "To stress the importance of reflexive deliberation is to allow that personal subjectivity filters how agents respond to the same objective circumstances" (ibid: 10). Consequently and relevant for this thesis, this understanding of reflexivity emphasizes that individuals might perceive the practice/-norm of waste sorting and economic incentives differently, depending on their subjectivity. In turn, it is stressed that "if the initial premise is that modes through which reflexivity is practiced are heterogeneous rather than homogenous, then immediately a whole new research agenda opens up in relation to social institutions and institutionalized practices" (ibid: 11). A final point I want to highlight from the work of Archer (ibid) is that a reflexive agent assumes that "the agent is always active (or potentially so) rather than passive (...). These agents are not rational maximizers, but strong evaluators and, as such, they are emotionally involved, if emotions are taken as commentaries upon our concerns" (ibid: 12).

Regarding the relevance of reflexivity for the applied theories in this thesis, it must be stressed that an important prerequisite that is derived from the above, is that in order to deal with reflexivity, a theory must acknowledge the interrelated connection between agents and social structures. Hence, theories that can be identified as holding a *substantialist view*, either MI as represented by RCT, or also theories within MH, exclude themselves from discussions dealing with reflexivity all together.

An example of a theory that tries to define what constitutes a reflexive agent is Bourdieu's theory of practice that includes the concept of *habitus* – i.e., "the conditionings associated with a particular class of conditions of existence produce the habitus, systems of durable, transposable dispositions, structured structures predisposed to function as structuring structures, that is, as principles which generate and organize practices and representation" (Bourdieu, 1977: 53). Bourdieu is often referred to as a truly relational thinker. There is however wide disagreements as if the concept of *habitus* is truly reflexive or not (King, 2000). Without going into depths about the debates on how *habitus* might or might not include a reflexive agent, it is worthwhile to mention that one of the main arguments, among others set out by Archer (2009: 8), is that the agent in habitus is described to be too little conscious in her choices in life, that she is too much led by the social structures that surrounds her from birth and childhood. Hence, the agent as outlined by *habitus* is not recognized as being reflexive enough to constitute a realistic theory on human motivation and behavior.

The discussions referred to above about the concepts *relational* and *reflexivity* are relevant as this thesis aspires to apply a relational approach. In terms of choice of concepts that I will apply for the analyses of the results I find the clarifications that Emirbayer makes between interaction and transaction helpful, but I sympathize with the view of Donati and Archer, that it is a better idea to attempt to describe the social relation itself, than trying to find 'the one' concept. Hence, I will use different terms when I address the various theoretical connections – e.g., 'affect' or 'influence', or also 'relation'. Furthermore, I will make use of the term reflexivity when I discuss the results from the four papers in Section 9.

3.5. The operationalization of combining SDT and CIE

As part of the attempt to combine CIE and SDT, I will here pursue to clarify the 'work division' between CIE and SDT, and how this has been attempted operationalized in the analyses of this thesis. I have also included a figure – Figure 2 – that illustrates the connections between the theoretical concepts, in addition to the 'meeting points' between the two theories.

As stated above, CIE focuses on the content of institutions, and how these might hold the power to form and possibly determine different kinds of motivation and behavior – e.g., individual rationality ('I logic') or social rationality ('we logic'). SDT on the other hand, addresses how present institutions relate with individuals' integrated sense of self, and depending on the features of these two – i.e., the institutions and the integrated sense of self – this will cause more or less autonomous motivation in a specific situation. Consequently, when society changes a formal institution such as a waste fee scheme – e.g., from a fixed waste fee to a differentiated – this will according to CIE and SDT relate and engage with the motivation of an individual depending on both the social constructs that are more or less internalized and integrated into the individual (operationalized here as beliefs about human-nature relations and based on the NEP scale) and the institutional setting *in situ* (the waste fee schemes). From the perspective of SDT, the relative autonomy – i.e., which belief she experiences as part of her integrated sense of self – can be argued to be a determinant for which institutional logic – i.e., 'we logic' or 'I logic' – the individual will be directed by.

More specifically, the four categories of extrinsic motivation in SDT correspond with the two kinds of logics that CIE/IRC operates with – for an overview see Figure 2 under the heading "Reasons for sorting household waste." Reasons that address appropriateness correspond with a 'we logic' (CIE) and an integrated or identified motivation (SDT) that will be experienced as an internal justification/ILOC. Reasons that address concern for what others might think correspond with an 'I logic' (CIE) and introjected motivation (SDT). Finally, if economic concern is addressed as a reason to sort waste, this corresponds with an 'I logic' (CIE) and external motivation (SDT). The latter two categories will be experienced as an external justification – i.e., ELOC. Noteworthy is that this presupposes that the integrated sense of self coincides with the intention of the behavior – i.e., in this case sorting household waste. If the integrated sense of self does not correspond with the intention of the required behavior, the individual will, according to SDT, experience less autonomous motivation. By the differentiation of e.g. ILOC and ELOC, SDT brings in an aspect not observed by CIE and reflects a more detailed understanding of what happens at the level of the individual.

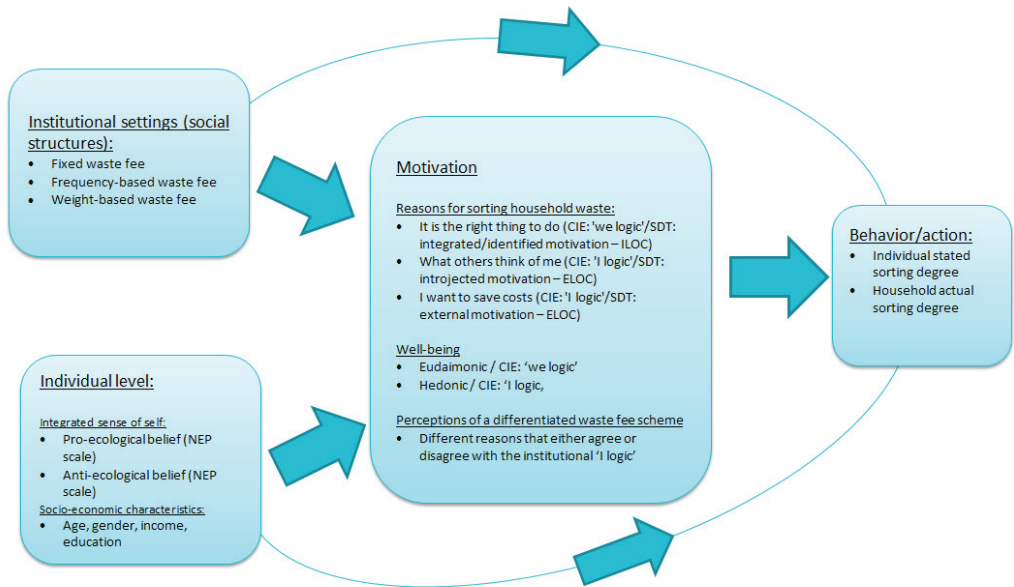


Figure 2 Main theoretical concepts and connections applied from CIE and SDT

Regarding the two kinds of well-being that has been addressed earlier – i.e., eudaimonic and hedonic well-being – these are most commonly addressed at the individual level, but will be attempted linked also to the structural level in this thesis. For example, in the case of waste sorting it is assumed that eudaimonic well-being can be linked to both internal justifications (ILOC) in line with concerns for the environment – i.e., a pro-ecological belief – but also to an institutional setting that favors a 'we logic'. Correspondingly, external justifications (ELOC) – e.g., sorting waste from the wish of saving costs – as well as an institutional 'I logic' can be linked to hedonic well-being. This approach is supported by SDT which states that motivations that are experienced as external justifications fosters little or no autonomous motivation and will in turn not contribute to eudaimonic well-being. Furthermore, a wish for saving costs falls under the definition of hedonic well-being offered by Huta (2015:2) "a focus on the self, the present moment, and the tangible, and a focus on taking and consuming what one needs and wants" (Huta, 2015: 2).

4. Methods and data

In this section, I will present the methods employed for collecting data, the two study settings and describe the data that has been collected to form the empirical basis of this thesis. However, before I present the study settings, I will give some reflections about the choice of methods and data.

4.1. About the choice of methods for collecting data

The choice of methods for the collection of data depended on several factors.¹¹ Since the objective of this thesis has been to study motivation and behavior in relation to waste sorting depending on both institutional settings and individuals' integrated sense of self it was evaluated as adequate to collect quantitative survey data at the individual level. Quantitative survey data was favored since this enables the analysis to link individuals' beliefs and motivations to their stated behavior. Furthermore, quantitative data gives the possibility to statistically test differences between samples – i.e., institutional settings. Hence, surveys measuring self-reported motivation and behavior linked to household waste sorting in different institutional settings, has been the main source of data for the analysis of this thesis (all four papers). Noteworthy is that I am aware that actual data in some circumstances are preferred over self-reported data. In relation to this, it should be mentioned that actual sorting data at the individual level were not available. Stated or reported data from surveys were also evaluated as adequate since the main concern has been to reveal motivational intentions across institutional settings, and the relative strength of these intentions. If the purpose of the study had been for example to study exact sorting degrees, this would have been different.

However, in order to strengthen the data basis, I have supplemented the stated household survey data with actual data, whenever relevant and possible (paper 1). Furthermore, to improve the in depth understanding of the motivational intentions and social processes I collected some qualitative data such as the focus group conversations (paper 3). In addition, I have studied official documents, formal regulations and had conversations with people working with waste management, both locally at the municipality level, in the Ministry of Environment and the Norwegian Environment Agency. All of this has improved my understanding and given important background information.

In addition to these considerations about data collection related to the objective of the thesis, there are other aspects that played a role as well. All disciplines exercise some kind of norms for what is considered 'correct research'. While I have a background in economics, this thesis has been written at the Department of International Environment and Development Studies (Noragric) – a department that address interdisciplinary research within the social sciences. This opened up for discussions regarding methods for data collection somewhat more compared to study environments favoring only one discipline. For example, I found it to be very

¹¹ In the original study plan of this thesis it was scheduled an additional study, which was designed as a choice experiment with students as respondents. The data collection was carried out, but due to some unfortunate set up of the experiment, the results were not possible to analyze in any meaningful way. I mention the study here as it is relevant given available resources, financially and temporally, for the data collection as such. However, since the results have not been applied in any way, I have chosen not to include the data collection linked to this study in this section. Nor have I mentioned this study elsewhere in the thesis.

instructive to discuss the different perspectives on what is regarded as high quality data – i.e., economists favoring quantitative actual data and anthropologists favoring qualitative data such as participant observation. Based on the experiences from the work with this thesis, and from discussions with colleagues from other disciplines, I recognize that the start phase of collecting data could have been somewhat more explorative. Ideally, focus group conversations and/or interviews could have been conducted before sending the surveys. However, the available resources, both financially and temporally, set limits to what were manageable options.

4.2. About the choice of study settings

Regarding empirical data, household waste sorting is an environmentally relevant practice, and topical to investigate since the effect of implementing a differentiated waste fee scheme has been questioned. In addition, since the waste systems are rather diverse in terms of how the municipalities have organized them, the Norwegian waste management reality has turned into a real life observatory for studying incentive systems. This includes both how they have arranged for waste sorting in practical terms, and what kind of incentives they have implemented in order to increase sorting efforts.

The former, the practical arrangements, includes among other things decisions about implementing a curbside waste collecting system, or having centrally located collection points. In addition, decisions must be made regarding what kind of waste fractions should be picked up – e.g., paper, glass, bio-material etc. In terms of incentives, there are also several decisions to be made – e.g., whether to use a fixed or a differentiated waste fee scheme, set up information campaigns etc.

More specifically, there is a requirement for Norwegian municipalities that the waste fee scheme shall cover the costs of the management of the household waste without generating a profit. Originally, a fixed waste fee was instituted to cover costs of the management of household waste. This implies that the household pays a fixed annual fee as part of the local government taxes. This reality has changed somewhat as there are encouragements from the authorities to differentiate the waste fee. Despite the encouragements, differentiation of the waste fee scheme has not been particularly prevalent in Norway, at least not with a very refined paying structure such as by weight of unsorted waste¹².

To my knowledge there are at least three ways that municipalities have differentiated the waste fee in Norway; by volume, by frequency and by weight. It can however be questioned whether the most common type, the volume based, can be categorized as an economic incentive. The reason for this is that the differentiation is linked to subscriptions where the household only chooses the size of the waste containers. This choice is typically only made once, for example when you move to a new house, if at all, and the alternatives are normally predefined as a standard, a small and a big subscription. The focus is also more towards 'what the household needs' than emphasizing the importance of sorting waste. Hence, this type of waste fee does not interfere with the daily routines linked to sorting household waste, and can there-

¹² In other countries, such as the Netherlands and USA, to pay by weight or by bag is a common practice.

fore hardly be viewed as an economic incentive the way the authorities have defined it. I have therefore not included municipalities with this type of waste fee in my study.

A second type of differentiated waste fee is based on a differentiation by the number of times that the unsorted waste is picked up by the curb for collection, a so-called frequency-based waste fee. This waste fee scheme is split in two parts. One part is fixed and equal for all households. The other part is differentiated with regard to number of times the unsorted waste is picked up. This implies that the household every week must decide if the waste container should be emptied and correspondingly face an increase in the waste fee. A third type is to differentiate by weight and this has, to my knowledge, only been introduced once in Norway and was soon withdrawn. The weight-based waste fee implies that the household has to pay for each kg of unsorted waste that is delivered to the waste company.

From this range of alternatives, I ended up with two study settings. One is a cross-sectional study including six municipalities of which three had a fixed yearly waste fee and the other three had implemented a frequency-based waste fee. The other study setting constitutes a study in one municipality, Ulstein, which introduced and later terminated a weight-based waste fee.

It should be noted though, that the choice of study settings were done over some years. I initially planned for two studies; one pilot and a main study. The intention for the main study was to set it up as a cross-sectional study with two institutional settings that each included three municipalities. Hence, I needed a type of differentiated waste fee that was implemented in more than one municipality. In my studies of the Norwegian waste reality I found out that my only option was to include a frequency-based waste fee representing the institutional setting with an economic incentive. Hence, for the main study I decided to include three municipalities with a frequency-based and then three municipalities with a yearly fixed waste fee. When searching for suitable study settings, I came across the situation in Ulstein where a weight-based waste fee just had been introduced. This was then considered to be an interesting case for a pilot study, and based on this, the first survey was sent to respondents in Ulstein in 2009. The weight-based waste fee was also considered as an interesting case since a differentiation based on kilograms is a relatively refined waste fee, and therefore interesting to compare with the frequency-based waste fee scheme that was included in the main study.

The first collection of survey data in Ulstein was done in cooperation with a master student. Based on the experiences that were made from the pilot, I conducted the cross-sectional study in 2010/11. Then, after the collection of data from the cross-sectional study was completed, I became aware of that the weight-based waste fee in Ulstein had been terminated, and hence, I decided to conduct a second survey in Ulstein. The collection of the second survey and the focus group conversations were done in cooperation with another master student. The data from both the first and the second survey, in addition to the data from the focus group conversations, constitute the panel study in Ulstein.

4.2.1. Cross-sectional study: household waste sorting under two kinds of waste fee schemes

Data for the cross-sectional study were collected from six Norwegian municipalities. Three of the municipalities – Askim, Eidsberg and Kragerø – had a yearly fixed waste fee. At the time of data collection, in 2010¹³, the fixed waste fees amounted to 2249 NOK in Askim, 2543 NOK in Eidsberg and 3353 NOK in Kragerø. The three other municipalities – Os, Askøy and Kristiansand – had implemented a frequency-based waste fee. At the time of data collection, the fixed part of the waste fee amounted to 1893 NOK per year for households in Os and 1918 NOK Askøy. The fixed part included 12 pick-ups per year due to prevention of health hazards and smell in the summer. The marginal cost for any additional pickups of unsorted waste amounted to 33 NOK in both Os and Askøy¹⁴. As indicated, the household may choose to have the unsorted waste being picked up every week. This gives a maximum yearly waste fee of 3193 NOK in Os and 3218 NOK in Askøy.

The design of the frequency-based waste fee in Kristiansand is slightly different. This fee is also split in two parts and the fixed part amounted to 1754 NOK. The difference from the waste fee in Os and Askøy is that there was a marginal price on two waste fractions – i.e., unsorted waste and organic waste. The latter included 13 compulsory pick-ups of the organic waste and was also due to prevention of health hazards and smell in the summer. The marginal cost for any additional pick up of organic waste amounted to 28 NOK and the marginal cost of a pickup of unsorted waste amounted to 34 NOK¹⁵. The household had the possibility to have both fractions picked up every week.

All six municipalities have similar socio demographic characteristics and are middle-sized municipalities with a town center. All municipalities had at the time of investigation implemented curbside collection for households waste for three or more waste fractions¹⁶ – i.e., unsorted or residual waste (all), paper/cardboard (all), plastic (all except Kristiansand) and organic waste (all except Os and Askøy). Other waste fractions such as glass and metal, hazardous waste, electronic waste, textiles etc. had to be brought to collection units spread out in the municipalities or to larger waste dumps or recycling stations.

A survey was conducted in the six municipalities and three hundred households were randomly chosen in each of the six municipalities, 1800 in total. Each household received a letter sent by postal service, where they were asked to visit a website with a link to a questionnaire. The letters were addressed to the household as a unit. To ensure a random and representative selection of respondents within the household, we asked that the questionnaire was answered by

¹³ All prices on waste fees include VAT.

¹⁴ This fee refers to what the waste company defines as a 'standard subscription' for households that includes a 140 l container for unsorted waste. It is possible to subscribe for a larger container which will give a higher marginal cost for each pick up of unsorted waste.

¹⁵ This fee refers to a subscription that includes a 120 l container for unsorted waste. It is possible to subscribe for a larger container which will give a higher marginal cost for each pick up of unsorted waste.

¹⁶ In this regard it should be mentioned that studies have shown that the most important determinant for the sorting degree is the practical arrangements – i.e., if there is arranged for a curb-side management for the household waste. However, as all of the municipalities have implemented curb-side management for the household waste,

the adult (18 years or older) that most recently had his or her birthday. After two rounds of telephone reminders, we received 556 responses – a response rate equaling 31 %.

4.2.2. Panel study: introduction and termination of a weight-based waste fee

The study was conducted in Ulstein municipality, Norway with approximately 8,000 inhabitants (StatisticsNorway, 2015). The inter-municipal waste management company Søre Sunnmøre Reinhaldsverk (SSR), established in 1980, manages the renovation services in Ulstein and nearby municipalities (Almedal, 2005). When the study was conducted, Ulstein had a curbside waste collection system that included the waste fractions residual waste, paper and plastic. Other waste fractions such as electronic waste and waste categorized as environmentally dangerous had to be taken to central collection points.

Until 1 January 2009, when the weight-based waste fee was introduced, all households in Ulstein faced a fixed yearly waste fee. The new weight-based fee was split in two. One part was fixed and equal for all households (1356 NOK). The other was differentiated depending on how many kilograms of unsorted household waste households delivered. The price per kg of residual waste was 2.24 NOK.

Two years later, 1 January 2011, the weight-based fee was terminated and a fixed waste fee was reintroduced. The formal decision to terminate the weight-based fee was undertaken by SSR's supervisory board in September 2010. The decision was, among other things, based on evaluating the effects of the weight-based waste system.

Data were collected from 2009 until 2013 and include both quantitative and qualitative information. The quantitative data include two surveys. The first was conducted in late 2009 (2009 survey), almost a year after the weight-based was introduced and was sent to a random sample of 500 households in Ulstein municipality.¹⁷ After two rounds of telephone reminders, a total of 198 households responded. The second survey, in 2012, was conducted about one year after the weight-based fee was terminated. To secure a panel data set, the second survey was sent to the same individuals that responded in 2009. After two rounds of telephone reminders, 86 of 198 respondents from the 2009 survey responded. The 86 responses constitute the 2012 survey. The low number of respondents in the 2012 survey represents a weakness, since small samples are always problematic

4.3. About the data

This section informs about the operationalization of the key theoretical concepts applied in this thesis. The surveys that were developed to collect the data comprised several questions which included sets of statements in order to capture different aspects of motivation and behavior related to household waste sorting across institutional settings. Appendix 1 offers an overview of survey questions and statements applied in the thesis. Table 2 presents an overview of the four papers and where the operationalized key concepts are included in each of these. Due to experiences gained from the first survey, it is notable that there are some differences between the surveys applied in the two study settings. For example, both the NEP scale and the statements addressing emotions were added after the pilot study in Ulstein. In addi-

¹⁷ For budgetary reasons, the 2009 survey consisted of 500 questionnaires.

tion, as the theoretical understanding of CIE and SDT evolved over some time, the surveys carry some evidence that they do not always include customized elements for the theoretical analyses that I apply.

4.3.1. Motivational reasons for sorting household waste

To capture different reasons or motivations for sorting household waste, a set of statements were developed. They were constructed to capture reasons related both to the institutional settings – i.e., the postulated 'we' and 'I logic' – and relative autonomy that is further related to eudaimonic well-being (as addressed in Section 3.3.) – i.e., the four categories of extrinsic motivation as postulated by SDT. The statements were also developed on the basis of Berglund (2005) and Berglund and Matti (2006).

Statements addressing cooperative motivations (a 'we logic'/CIE), or also integrated motivation/SDT (given a pro-ecological belief) are for example "I sort waste because I want to do the right thing for the environment" or "It is my duty to sort waste to contribute to a better environment". Statements included to cover an institutional setting that emphasizes self-interested behavior ('I logic'/CIE) or external motivation/SDT were for example "It is economically profitable for me to sort waste." In addition, statements were included that address reasons related to what significant others might think of you – e.g., "I want others to see me as a responsible person." These statements are theoretically related to an 'I logic' as understood by the perspective of CIE and introjected motivation as understood by SDT.

4.3.2. Integrated sense of self

Both CIE and SDT postulate that other social constructs than institutions, such as values, beliefs or worldviews, might influence and guide motivation and behavior of individuals. Therefore, a set of questions was included that intended to measure people's more fundamental environmental concern. Different kinds of scales were evaluated and I decided to use the revised form of the New Environmental Paradigm developed by Dunlap and Van Liere named New Ecological Paradigm Scale (Dunlap & Van Liere, 1978; Dunlap, Van Liere, Mertig, & Jones, 2000b). An important part of the decision was that this is the most frequently used scale to measure environmental concern (Dunlap, 2008; Fransson & Garling, 1999). Another scale that I considered was the Motivation Toward the Environment Scale (MTES) (Fransson & Garling, 1999; Pelletier & Sharp, 2007), but I found that the MTES involves aspects that I had already included in the set of questions covering different reasons for sorting household waste. Hence, by applying the NEP scale, I would uphold a distinction between a fundamental belief "about the nature of the earth and humanity's relationship with it" (Dunlap et al., 2000a: 427) (human-nature relations) as covered by the NEP scale, and the kind of motivation that was expected to be related to the institutional settings *in situ*, and that SDT addresses as more or less autonomous motivation. A related circumstance is that I realized first after some time – i.e., after I started to combine CIE and SDT – that the MTES is a scale used by those that apply SDT when analyzing environmental related motivation. Hence, it could be argued that this would have been a better choice – not as a substitute for the NEP scale - but for the statements addressing motivation for waste sorting. However, since my intention was to address motivation related to waste sorting, and not environmental motivation in general, the statements in the MTES would have had to be changed anyhow. In addition and as already mentioned, the

statements in the MTES are in some respects similar to the one I applied. Hence, I consider the statements that I have applied as suitable for the purpose intended.

The NEP scale consists of 15 items. Eight items represent a positive attitude towards an ecological worldview, and seven items measure an antagonistic attitude towards an ecological worldview. In applying the scale, I followed the recommendations from the literature (Dunlap & Van Liere, 2008; Hawcroft & Milfont, 2010). It should be noted that the NEP scale was included in the cross-sectional study, but only in the second of the two surveys collected in Ulstein. Ideally, it should have been included in both surveys in the study setting of Ulstein, but since the scale maps fundamental beliefs, the results will likely not change much over time, at least not in the actual three years period.

4.3.3. Well-being

SDT relates emotions or affections to eudaimonic well-being, and sees these not as an end in itself, but rather as outcome of eudaimonic processes. Hence, it is expected that affect, under many circumstances, can be a byproduct of eudaimonic living. A set of questions was developed to explore different kinds of emotions related to waste sorting, both positive and negative. Positive emotions that were addressed were a sense of satisfaction, good conscience, independence and to be proud. Negative emotions were a sense of being controlled or forced. The negative emotions address the point made by SDT that more controlling environments might foster less autonomous motivation and in turn less eudaimonic well-being. The perspective of reflexivity as mentioned in Section 3.4. is also relevant since Archer (2009: 2) links emotions to individuals' concerns.

Furthermore, CIE stresses that institutions offer meaning to human behavior, and SDT on its part, relates meaning to autonomous motivation and eudaimonic well-being. Hence, the surveys in the cross-sectional study setting included a question that addresses this aspect of well-being – i.e., if the respondents find waste sorting to be meaningful. In the extension of this, and as outlined in Section 3.3., the distinction between hedonic and eudaimonic well-being might possibly be traced both at the individual level (relative autonomy with related presence or absence of eudaimonic well-being vs hedonic affections) as well as the structural level ('we logic' vs 'I logic'). Hence, the questions addressed under reasons for sorting waste are closely associated with the data that address well-being more directly.

4.3.4. Perceptions of a differentiated waste fee scheme

A set of statements were developed to capture different perceptions of a differentiated waste fee scheme. This set of statements is the most explorative of the ones included in the surveys, and they are not developed on the basis of previous research. From the experiences that were made from the first survey in Ulstein, some wording was changed before a revised set of statements were included in the surveys used in the cross-sectional study setting.

The theoretical basis for including this set, was the CIE postulate that an economic incentive will carry expectations about self-interested behavior, an 'I logic', that individuals might or might not be influenced by. The intention was therefore to develop a set of statements that would capture reasons why people might agree respectively disagree with this 'I logic'. This

latter aspect is also the background for why the statements include claims that a differentiated waste fee is either a good or bad idea – e.g., 'I find a differentiated waste fee to be a bad idea because to sort waste is something you should do regardless of saving money'. Notable, the changes made in the wording from one study setting to another, although many of the same formulations are included in both, requires some caution when comparing the results across the settings.

4.3.5. Behavior: stated and actual sorting degrees

To measure the individual degree of household waste sorting, all surveys included the question: "How much do you normally sort of the waste fractions that are picked up at your home?" The responses were given on a scale from 1 to 6, where 1 equals 'nothing', 2 equals 'a little bit', 3 equals 'some', 4 equals 'pretty much', 5 equals 'most' and 6 equals 'everything'. Hence, the degree of household waste sorting is measured as a stated variable and at an individual level.

An alternative to the scale where the amount is indicated with text could have been to ask for the percentage that the respondents sorted. This alternative would have strengthened the statistical analyses regarding means statistics and linear regressions. However, I evaluated it to be easier for people to relate to wording like 'I sort most' or 'I sort everything' than percentages. Percentages is an abstract term, and since I wanted to include a representative sample from the age of 18 and up, I considered it would be better to use wording that is closer to what can be expected as part of people's 'normal' or 'everyday' speech, and link these to a scale from 1 to 6.

Regarding actual sorting degrees, it can be argued that to measure the individual degree of waste sorting actual terms would be favorable compared to self-reported data, but as explained in Section 4.1., such data were not available at individual level and stated data were evaluated as adequate since the intention has been to investigate behavior across institutional settings, and not exact sorting degrees. However, aggregated numbers at municipality level was retrieved from the data-base of Statistics Norway and household averages could therefore be calculated. In addition, I had hoped that individual household data could be retrieved in Ulstein, but the renovation company, SSR, unfortunately lost their data on weights as a result of a computer accident.

4.3.6. Qualitative data

To complement the quantitative data collected through the surveys, I retrieved some qualitative data through conducting focus group conversations. Due to time and financial constraints I chose to collect the qualitative data in relation to the study setting in Ulstein. I evaluated it as more efficient to collect these data in relation to a study setting that included only one location that I had already followed through some years, than to do qualitative studies in connection to the study setting that includes two kinds of waste fee schemes in six municipalities.

The focus group conversations were conducted in April 2013 in cooperation with a master student. Participants in two of the groups, in total six people, were recruited from respondents in the 2012 survey. Since few of the respondents in the survey had said yes to participate in a

focus group conversation, we encountered some difficulties in finding participants. We contacted therefore the local newspaper to recruit additional participants, but unfortunately with no result. Therefore, we also made contact with SSR directly and recruited participants that constitute the third focus group. Due to these difficulties, the study ended up with fewer participants than what is recommended and also planned for, which might cause some biases in the captured responses.

The focus group conversations were set up in an office in the center of Ulstein that one of the participants owned and offered us to use. Both the master student and I participated at the three focus group meetings. We had prepared a presentation of some of the results from the two surveys that we presented for the participants in the start of the conversations. We had also developed an interview guide for the conversations where we addressed possible issues that we wanted to discuss - see Appendix 2 for details. The discussions were recorded for further analyzing afterwards. Each focus group conversation lasted between two and three hours.

In addition, I made a few, short interviews with people on the streets of Ulstein while I was there. I have also used some written sources such as newspaper articles, official documents and made many informal conversations with the manager of SSR that have all contributed to my understanding of the processes of and responses to introducing and terminating the weight-based waste fee in Ulstein. An alternative approach could have been to conduct individual interviews, either instead or in addition to the focus group conversations. Unfortunately, due to financial and time constraints, this was not possible.

4.3.7. Considerations on the robustness of the data

Although the respondents to the surveys were reminded two times, the response rate remained somewhat low. In turn, these relatively low response rates might cause a risk that the sample is not representative. However, since the focus of this thesis has been to investigate the existence of different kinds of motivations, the exact ratio between different categories is subordinate. One possible and relevant bias in the sample might be a bias towards a sample of more dutiful people than the average population. This might be so since giving answers to a survey based on voluntarism is an act of duty in itself.

This is less of a problem in the cross-sectional analysis as we would expect that the bias would be somewhat similar in both types of communities. In the Ulstein study, it could be a problem as there could be a bias regarding who were willing to participate in the second round. Since the number of respondents in the 2012 survey constituted a limited sample of the 2009 survey, a duty based bias might have been encountered in the second survey as well. We therefore checked for this kind of bias using t-tests. No indications were found that the sample in 2012 was more dutiful than the sample in 2009, or that the structure of sub-groups changed from 2009 to 2012. In addition, there were no indications from the t-tests that the samples changed from 2009 to 2012 regarding socioeconomic variables (age, gender or level of education).

Another possible bias is linked to the reporting of illegal behavior. Since people might hesitate to report illegal actions, there is a risk that people did not answer questions related to im-

proper or illegal disposal of waste truthfully. Hence, due to this consideration and also because of few responses linked to these kinds of questions, I chose not to include statistical data related to this issue. However, since other kinds of data-sources like papers from the board of the renovation company in Ulstein, SSR, clearly stated this was a significant problem in the period where a differentiated fee was used, I could nevertheless document and include this as part of the analysis.

5. Previous research regarding motivation and behavior related to household waste sorting under different waste fee schemes

The literature studying the use of economic incentives to increase household waste sorting degrees demonstrate varying results in terms of the effectiveness of such incentives (Kinnaman, 2006; Linderhof, Kooreman, Allers, & Wiersma, 2001; Miranda, Everett, Blume, & Roy, 1994). It has been argued by some that waste fee schemes that are more refined in terms of marginal pricing of waste are more effective in increasing recycling rates – e.g., volume-based and frequency-based waste fees are claimed to be inferior to weight-based and bag-based waste fees (Kinnaman, 2006). Other parts of the literature express a more moderate view regarding the capacity of the economic incentive in increasing recycling rates (Ackerman, 1996; Berglund, 2006; Berglund & Matti, 2006; Ferrara & Missios, 2012; Hage, Söderholm, & Berglund, 2009; Kinnaman, 2006; Reschovsky & Stone, 1994; Thøgersen, 1994). Some stress that there are other factors that are more important than economic incentives when the aim is to increase individuals' sorting degree (Ferrara & Missios, 2012; Mueller, 2013).

Regarding motivation, some studies have concluded that sorting household waste is mainly motivated by norms and moral considerations (Berglund, 2005, 2006; Hage et al., 2009) – i.e., the 'domain of morality' as Thøgersen (1996) states it – or the domain of being a 'good citizen' as expressed by Berglund and Matti (2006). Others have found that individuals relate positive emotions with sorting household waste (Berglund & Matti, 2006), and that it is considered as a pleasant activity in itself (Bruvoll, Halvorsen, & Nyborg, 2002). Another study demonstrated that most households prefer to sort the household waste themselves, rather than having the waste sorted for them (Czajkowski, Kądziela, & Hanley, 2014). Others have hypothesized that waste sorting might be perceived as a burden when someone feels that their efforts cannot meet the expectations from the society (Bruvoll & Nyborg, 2004).

A few studies investigate in more detail motivation and perceptions related to economic incentive and the intention to increase efforts to sort more household waste. For example, Thøgersen (1994) uses the concept 're-framing' when analyzing how the use of a differentiated waste fee might 're-frame' the recycling activity from an act of moral into the sphere of private cost-benefit calculations – i.e., recycling is seen as a moral act where an economic incentive might reframe the recycling behavior to another 'schema of interpretation' from the domain of morality to the domain of economy (ibid: 551). Hence, it parallels with what in this thesis is termed 'change in logic' due to a shift in the institutional context. Thøgersen (ibid.) concludes that there is empirical support for this hypothesis, but is a topic that requires further

investigation. In another study, Thøgersen (2003) looks at behavioral and psychological reactions to a weight-based waste fee and finds that the economic incentive seems to enhance internalized motivation – i.e., the economic incentive may "strengthen internalized norms for the promoted behavior" (ibid: 220). Since the weight-based waste fee seems to have a supporting effect on the internalized motivation for sorting waste it is concluded that the economic incentive "boosts its effect on behavior over and above that of the direct price effect" (ibid.: 220). However, the paper also stresses that the introduction of this type of economic incentive – i.e., a weight-based waste fee – is associated with risk because internalized motivation plays a key role which in turn makes it hard to foresee the behavioral outcome.

Given the above, one might argue that a kind of duality seems to influence people's motivation and behavior in municipalities where an economic incentive is introduced to increase waste sorting. This means that whenever a differentiated waste fee is implemented, there is both a moral and an economic motivation that must be taken into consideration when analyzing the effect of an economic incentive on the sorting degree (Berglund, 2005; Hage et al., 2009; Thøgersen, 1994, 1996).

6. Abstracts of papers

In the following I will present an extended abstract of each of the four papers that constitute this thesis. As outlined in Section 1.2., the papers vary in their focus regarding which research question they relate to. Paper 1 applies CIE and has a main focus on institutional settings represented by a curbside waste management system with two kinds of waste fee schemes – RQ 1. The second paper applies SDT, and explores how the integrated sense of self – i.e., beliefs about human-nature relations – is related with reasons for sorting household waste and eudaimonic well-being – RQ 2. Paper 3 applies a combination of SDT and CIE when analyzing how a change in the institutional setting – i.e., the introduction and the termination of a weight-based waste fee – impacts on motivation and behavior in relation to sorting household waste – mainly RQ 3. The fourth paper also applies a combination of CIE and SDT and investigates how the integrated sense of self and institutional settings influence perceptions of a differentiated waste fee scheme – mainly RQ 3.

6.1. The false promise of a differentiated waste fee? (Paper 1)

Norwegian municipalities are advised by the environmental authorities to implement economic incentives in order to increase individuals' efforts to sort more household waste. At the same time, evidence has grown stronger that the relationship between prices and behavior is more complex than earlier assumed. Against this background, paper 1 sets out to compare two different waste fee schemes implemented in six Norwegian municipalities to investigate if the two schemes caused differences in motivation and behavior related to sorting household waste. Three of the municipalities have a yearly fixed waste fee, and three have adopted a differentiated frequency-based waste fee scheme. Classical Institutional Economics (CIE), that emphasizes the role that institutions play in influencing individual motivation and behavior, is applied when developing the research instrument and analyzing the results. Institutions are here defined as conventions, norms and formally sanctioned rules. According to CIE, in-

stitutions guide individuals about when to act for the benefit of themselves, and when to act for the benefit of the community. The former represents an individual rationality or an 'I logic', and the latter represents a social rationality or a 'we logic'.

There are two main findings from this study. First, according to the standard version of RCT, a differentiated fee should induce households to sort more waste. Actually, it is difficult to explain any sorting without such an incentive. However, both stated (individual) and actual (aggregated) sorting degrees were somewhat higher in the municipalities with a fixed yearly waste fee compared to the municipalities with a differentiated waste fee. The stated sorting degree was measured on a scale ranging from 1 to 6 where one indicates that nothing was sorted and six indicates that everything was sorted. According to statistical tests, respondents living in municipalities that practice a zero marginal cost on unsorted household waste sort more than the respondents living in municipalities practicing a positive marginal cost on unsorted household waste. Second, although the most important motivation for sorting household waste is related to doing the right thing for the environment – i.e., a 'we logic' – there is a dualism regarding motivation in both waste fee schemes – i.e., both an 'I logic' and a 'we logic'. The dualism is seemingly linked to institutional settings – i.e., the kind of waste fee scheme that is implemented.

Consequently, the results presented in this study indicate that implementing a weak economic incentive such as a frequency-based waste fee scheme might be a false promise in terms of increasing efforts for sorting household waste, at least over and above municipalities with a fixed yearly waste fee scheme. In addition, the indication that although the main motivation for sorting household waste is related 'to doing the right thing' for the environment' – i.e., a 'we logic', this motivation seems to be somewhat lower under a differentiated waste fee. This gives conformation to earlier studies that address the need for a more in depth studies on motivations and behavior related to economic incentives.

6.2. Sorting waste: exploring the integrated sense of self in self-determined environmental motivation (Paper 2)

While Paper 1 applies CIE, this paper applies SDT, and the intention was to investigate in more detail the individual level in relation to motivation for waste sorting. Noteworthy though, is that although most studies that apply SDT when analyzing motivation in relation to a practice measure the degree of self-determined motivation, this study sets out to investigate the theoretical assumptions of SDT as these are stated in the mini-theory Organismic Integration Theory (OIT) in relation to sorting household waste.

The analysis that studies the theoretical underpinnings of OIT was conducted using household survey data from a cross-sectional study setting that included six Norwegian municipalities. Three of the municipalities had a fixed waste fee, and three had adopted a differentiated frequency-based waste fee scheme. The surveys included data that mapped beliefs about human-nature relations representing the integrated sense of self, degrees of self-determined motivation and eudaimonic well-being in relation to sorting household waste. The two beliefs, a pro- and an anti-ecological paradigm belief, were mapped using the New Environmental Paradigm

scale (NEP scale). The postulated theoretical relations were also studied under two kinds of incentive schemes – i.e., a fixed waste fee and a frequency-based waste fee scheme.

More specifically, there were three aspects of SDT/OIT that was analyzed. First, the postulation that SDT makes about how the perceived integrated sense of self impacts on perceived autonomy and eudaimonic well-being. Second, I explored how the integrated sense of self influenced the reasons that individuals have for sorting household waste – i.e., more or less autonomous motivation. Third, I analyzed how a more or less controlling context, represented here by two kinds of waste fee schemes, impacted on perceived autonomy, eudaimonic well-being and motivation for sorting waste.

In general, the results offer support to SDT/OIT. First, a positive relation was found between a pro-ecological belief and variables measuring eudaimonic well-being related to household waste sorting. Second, the results display that individuals with an anti-ecological belief tend to relate negative emotions to household waste sorting, and find motivation in other sources than to do the right thing for the environment. Third, the results indicate that a fixed fee can give rise to a higher degree of autonomous motivation linked to household waste sorting, as compared to an incentive scheme with a frequency-based waste fee.

Seen in relation to previous findings on pro-environmental motivation, this paper offers both confirmations and new insights. For example, the results give support to earlier studies that have highlighted the role of values and beliefs in relation to eudaimonic well-being. Also, the included anti-ecological belief about human-nature relations might supplement earlier research that have identified that not everyone evaluate pro-environmental behavior as an act of doing morally good. Finally, the study contributes to the clarification of an ambiguity identified in the literature about a possible overlap between 'biospherical values' and the NEP scale.

6.3. The divisive and disruptive effect of a weight-based waste fee (Paper 3)

The two former papers have contributed with some insights, both at the structural level (paper 1) and the individual level (paper 2), about what characterizes individuals' motivations and behavior in relation to waste sorting in the cross-sectional study setting. This paper however, attempts to combine CIE and SDT in order to further investigate the ability of economic incentives to promote environmentally friendly behavior, and in a different study setting – i.e., the panel study in Ulstein. More specifically, this paper sets out to study how the introduction and termination of a weight-based waste fee scheme and two kinds of beliefs about human-nature relations influence individuals' motivations for sorting waste, their perceptions of a differentiated waste fee and their sorting degree.

There are three main findings from this paper. First, the findings by earlier studies that moral considerations are important in relation to motivation for waste sorting, was confirmed. Normative motivations linked to doing the right thing for the sake of the environment and being a responsible person seemingly play an important role in explaining why people sort household waste. This result was proven to be stable over time and might serve as an additional example (paper 1 also found this) of how important moral-based motivations are in people's lives.

Concerning effectiveness of the economic incentive to increase efforts to sort household waste, a divided response to the introduction of the weight-based waste fee scheme was observed. Half the sample ('the more group') stated they were motivated to sort more household waste, and the other half ('the same group') reported they continued as before. A possible explanation for this divided response is proposed through the combined theoretical approach of CIE and SDT. For example, it is proposed that the economic incentive brings an 'I logic' forward that motivates some to sort more household waste. However, not everyone is guided and directed by the 'I logic' of the economic incentive. Those with an internal locus of causality for why they sort waste – i.e., they hold high levels of relative autonomy – questions instead the economic incentive and continues to sort waste as before. Hence, we find support for institutions holding the power to define which logic is pertinent to specific contexts and thereby which logic is anticipated. However, this is true only to a certain degree, depending on how autonomous people are with respect to the reasons for why they sort household waste – i.e., how strongly internalized the norm of sorting is.

In addition, a disruptive effect of the weight-based waste fee scheme was observed – i.e., an increased practice of misplaced and illegal waste disposal. This effect was not completely unexpected since earlier research has made evident that this is a possible result from introducing an economic incentive. Still, the extent of this illegal practice, being one of the main reasons for why a weight-based waste fee was terminated, was somewhat surprising.

6.4. A relational approach: the case of a differentiated waste fee (Paper 4)

Finally, the last paper also attempts to combine CIE and SDT, and the study setting is once more the cross-sectional one. The combined theoretical framework was applied when studying how perceptions about an economic incentive is influenced by a) the institutional setting – defined as a curbside waste management system with two kinds of waste fee schemes; and b) the integrated sense of self – represented also here by beliefs about human-nature relations based on the NEP scale.

The combination of the two theories is here operationalized through a shared understanding of how reasons for actions are categorized. For example, an institutional setting (as outlined by CIE) that promotes a 'we logic' corresponds with what SDT refers to as integrated motivation, and an institutional setting that promote an 'I logic' corresponds with external motivation as outlined by SDT.

The most consistent finding is how the two institutional settings were decisive in forming individuals' perceptions about a differentiated waste fee. This gave confirmation to CIE's postulations about how an institutional setting conveys expectations about what the appropriate logic is and hence influences individuals' perceptions. The results provided by using the perspective of SDT – i.e., how the integrated sense of self influence perceptions – add nuances to the picture. For example, how the two kinds of ecological beliefs determine individuals' perceptions about whether a differentiated waste fee is perceived as supportive of a good habit, or not, address the point that individuals, in their meeting with institutions, interpret them. This latter point was further strengthened by comparing the results from this study with those by paper 3, where the logic of a differentiated waste fee was rather questioned by those that

belong to the group identified with an integrated pro-ecological belief. Notably however, the two beliefs play a less predominant role than the institutional settings in forming perceptions about a differentiated waste fee. Combining the two approaches was proved to be productive, but leave also some unanswered questions that call for further investigations.

6.5. Overview of main characteristics of the four papers

In the following I have included a table - Table 1 - that summarizes the main characteristics of each paper. The table includes among other things information regarding which theoretical framework that has been applied in each paper, the main theoretical concepts and how these have been operationalized, the main empirical results and also the statistical methods used. Although I have not mentioned the variable names in the above abstracts I have included these in the table. The variable names were included to make a comparison across the papers more accessible – both on how the concepts have been operationalized, but also the results.

Table 1 Overview of the four papers

		Paper 1	Paper 2
Title		The false promise of a differentiated waste fee?	Sorting waste: exploring the integrated sense of self in self-determined environmental motivation
Study setting		Cross-sectional	Cross-sectional
Main research question (RQ)		RQ 1	RQ 2
Theories applied		Classical Institutional Economics	Self-Determination Theory
Aim of the study		How two different institutional settings (waste fee schemes) , beliefs about human-nature relations and different kinds of motivational reasons influence behavior - i.e., household waste sorting degrees	Study SDT's assumptions about how the integrated sense of self (beliefs about human-nature relations) are related with autonomous motivation and eudaimonic well-being , investigated under two different waste fee schemes
Theoretical concepts and how they are operationalized	Institutional settings	FIXED ; fixed waste fee scheme FREQUENCY ; frequency-based waste fee scheme.	FIXED ; fixed waste fee scheme FREQUENCY ; frequency-based waste fee scheme.
	Integrated sense of self	Beliefs about human-nature relations: PRO_ECO_PARAD ; pro-'ecological paradigm' belief/NEP scale ANTI_ECO_PARAD ; anti-'ecological paradigm' belief/NEP scale	Beliefs about human-nature relations PRO_ECO_PARAD ; pro-'ecological paradigm' belief/NEP scale ANTI_ECO_PARAD ; anti-'ecological paradigm' belief/NEP scale
	Motivation	Factors that address different kinds of reasoning or logics for sorting waste: RIGHT_THING ; it is the right thing to do; 'we logic' OTHERS ; significant others; 'I logic' ECON_GAIN ; saving costs; 'I logic'	Factors that address different kinds of reasoning or logics for sorting waste: RIGHT_THING ; it is the right thing to do; integrated OTHERS ; significant others; introjective ECON_GAIN ; saving costs; external
	Perceptions of a differentiated waste fee scheme	Not included	Not included
	Well-being	Not included	MEANING ; the experience of how meaningful waste sorting is EMO_POS ; positive emotions related to sorting waste EMO_NEG ; negative emotions related to sorting waste
	Behavior	Individual stated household sorting degree Actual sorting degree at the household level	Not included
Main empirical findings	Behavior: Both stated and actual sorting degrees are higher in FIXED compared to FREQUENCY Both FIXED and FREQUENCY: RIGHT_THING /'we-logic' and OTHERS /'I logic' explain sorting degree FIXED: RIGHT_THING /'we-logic' explains sorting degree FREQUENCY: RIGHT_THING /'we-logic' and ECON_GAIN /'I logic' explains sorting degree Beliefs about human-nature relations: No relations between these factors and the sorting degree	Eudaimonic well-being: Positive relations between PRO_NEP and MEANING , and PRO_NEP and POS_EMO Negative relation between PRO_NEP and EMO_NEG Positive relations between ANTI_NEP and EMO_NEG Integrated motivation: Higher levels of RIGHT_THING in FIXED as compared to FREQUENCY Positive relation between PRO_NEP and RIGHT_THING Introjected motivation: Higher levels of OTHERS in FREQUENCY as compared to FIXED Positive relation between PRO_NEP and OTHERS Positive relation between ANTI_NEP and OTHERS External motivation: Positive relations between ANTI_NEP and ECON_GAIN	
Statistical methods	Factor analysis, Kruskal-Wallis test and Wilcoxon (Mann-Whitney) test, correlation matrix, logit regressions	Factor analysis and logit regressions	

Table 1 Overview of the four papers – cont.

		Paper 3	Paper 4
Title		The divisive and disruptive effect of a weight-based waste fee	A relational approach: the case of household waste sorting
Study setting		Panel - two surveys: 2009 and 2012	Cross-sectional
Main research question (RQ)		RQ 1,2 and 3	RQ 3
Theories applied		Classical Institutional Economics and Self-Determination Theory	Classical Institutional Economics and Self-Determination Theory
Aim of the study		Study how a change in institutional settings and the integrated sense of self (beliefs about human-nature relations) , influence motivational reasons, perceptions of a differentiated waste fee and behavior	Investigate how the integrated sense of self (beliefs about human-nature relations) and institutional settings (waste fee schemes) influence perceptions of a differentiated waste fee scheme
Theoretical concepts and how they are operationalized	Institutional settings	WEIGHT ; weight-based waste fee scheme FIXED ; fixed waste fee scheme	FIXED ; fixed waste fee scheme FREQUENCY ; frequency-based waste fee scheme.
	Integrated sense of self	Beliefs about human-nature relations ProNEP ; pro-'ecological paradigm' belief/NEP scale AntiNEP ; anti-'ecological paradigm' belief/NEP scale	Beliefs about human-nature relations PRO_ECO_PARAD ; pro-'ecological paradigm' belief/NEP scale ANTI_ECO_PARAD ; anti-'ecological paradigm' belief/NEP scale
	Motivation	Factors and single variables that address different reasons for sorting household waste: RIGHT_THING ; CIE : 'we logic'/ SDT : integrated motivation RESPONSIBLE ; CIE : 'I logic'/ SDT : introjected regulation PROFIT ; CIE : 'I logic'/ SDT : external motivation ENCOURAGEMENT INFORMATION GOOD_FEELING	Not included
	Perceptions of a differentiated waste fee scheme	Perceive the weight-based waste de as bad idea: WEIGHT_GOODIDEA ; Perceive the weight-based waste de as good idea: WEIGHT_BADIDEA ;	NOT_TO_SAVE : bad idea - to sort waste is something you should do regardless of saving money BIG_HOUSEHOLDS : bad idea - households with many people is punished economically GOOD_TO_SAVE : good idea - a waste fee that I can influence gives me the opportunity to save costs GOOD_HABIT : good idea - it supports a good habit GOOD_PUNISH : good idea - those who sort little waste is punished economically CARROT : good idea - it works as an economic carrot
	Well-being	Not included	Not included
	Behavior	Individual stated household sorting degree	Not included
Main empirical findings		Institutional settings in relation to motivation and behavior: Both WEIGHT (2009) and FIXED (2012): RIGHT_THING , RESPONSIBLE and INFORMATION explains sorting degree WEIGHT (2009): RIGHT_THING , RESPONSIBLE , INFORMATION and PROFIT explains sorting degree, in addition to Increase in illegal disposal of waste FIXED (2012): RESPONSIBLE explains sorting degree Emotions: Mainly positive emotions and few negative emotions are reported in relation to sorting household waste Results regarding SAME (half of the respondents sort the SAME after WEIGHT was introduced): Perceptions of a differentiated waste fee scheme: Positive relation between WEIGHT_BADIDEA and SAME Motivation: Positive relations between RIGHT_THING and SAME , and between RESPONSIBLE and SAME Integrated sense of self: Positive relation between PRO_NEP and SAME Results regarding MORE (half of the respondents sort MORE after WEIGHT was introduced): Perceptions of a differentiated waste fee scheme: Positive relation between WEIGHT_GOODIDEA and MORE Motivation: Positive relation between PROFIT and MORE Integrated sense of self: no relations were found between this and MORE	Perceptions of a differentiated waste fee scheme: Fixed: a differentiated waste fee seen as a bad idea: NOT_TO_SAVE and BIG_HOUSEHOLDS Frequency: a differentiated waste fee seen as a good idea: GOOD_TO_SAVE , GOOD_PUNISH , CARROT Integrated sense of self: Positive relation between PRO_NEP and GOOD_HABIT Positive relation between PRO_NEP and GOOD_PUNISH Positive relation between ANTI_NEP and GOOD_PUNISH
Statistical methods		Factor analysis, random-effects GLS regression, OLS and logit regressions	Factor analysis and logit regressions

7. Synthesis of main findings

Based on the above described findings from the different papers, I will now return to the research questions as defined in Section 1.2 and discuss what responses the various findings can offer to each of these. In doing so, I will combine insights across the studies. I start off with evaluating the results relevant for RQ1 that gives emphasis to the structural level and where the postulations of CIE have played the main theoretical role. An investigation on what role an *institutional setting*, represented by different kinds of waste fee schemes, plays for *motivation* related to household waste sorting. The second sub-section investigates in a similar way the relations between institutional settings and *behavior* related to household waste sorting, for which is also relevant for RQ 1.

The third sub-section presents results relevant for RQ 2 that address the individual level, and where SDT has played the main theoretical role – i.e., how beliefs about human-nature relations affect individuals' *motivation* and *behavior* related to sorting household waste. Research question 3, which addresses, based on insights from SDT and CIE, how the effect of institutional and individual factors can be interpreted, is touched upon through all three sub-sections.

7.1. The impact of institutional settings for motivation related to household waste sorting

Evaluating the structural level first – i.e., the role that different kinds of waste fee schemes play for motivation in relation to sorting household waste – there are several interesting results. For example, in all three papers that investigated motivation for sorting household waste, a strong positive relationship between the sorting degree and motivation related to doing the right thing for the environment, was reported. This finding recurs in both study settings and hence independent of the waste fee scheme implemented in the municipalities that have been investigated (paper 1 and 3). Hence, motivation linked to doing the right thing for the environment seems to be the primary reason for why people sort waste. In addition, the results from the cross-sectional study reveals higher levels of motivation linked to doing the right thing for the environment in municipalities with a fixed waste fee scheme compared to municipalities with a frequency-based waste fee scheme (paper 2). This gives support to the predictions of CIE, that a fixed waste fee scheme to a greater extent communicate expectations about a 'we logic' compared to a differentiated waste fee that potentially express an 'I logic'.

Regarding a possible 'I logic', the results display that implementing an economic incentive does create this kind of logic. The respondents report that when an economic incentive is present they find some motivation to sort waste through saving costs – i.e., self-regarding motivation (paper 1, 2 and 3).

Another relevant finding regarding the structural level is how institutional settings influence perceptions about a differentiated waste fee scheme (paper 4). Without exception, the present institutional setting influences the expressed perspectives and values concerning perceptions about a differentiated waste fee scheme. More specifically, individuals give preference to statements that favor the logic they currently experience. These results follow expectations

derived from CIE about how institutions convey expectations about logics through influencing which perspectives that are considered as correct and which values are appropriate.

Finally, regarding the relation between waste fee schemes and motivation derived from a concern about what significant others might think of you – i.e., an 'I logic' – the results show that in municipalities with a fixed waste fee scheme (paper 1) and also in Ulstein (paper 3) – i.e., both under and after the weight-based waste fee scheme was implemented – respondents found 'significant others' motivating for sorting waste. In municipalities with a frequency-based waste fee scheme, however, respondents did not find significant others being important for motivating waste sorting (paper 1). One interpretation, although not possible to test, is that under a fixed waste fee, those that are not environmentally concerned will find motivation in what significant others might think of you. This is a possible outcome since motivation linked to significant others is also related to an 'I logic' in the same way that saving costs is – i.e., the concern in focus is yourself, and not the environment surrounding you.

All in all, the results described above give support to the predictions by CIE that waste fee schemes, understood as institutional settings, influence the logics – e.g., a 'we logic' or an 'I logic' – underlying waste sorting.

7.2. The impact of institutional settings for behavior related to household waste sorting

Regarding waste fee schemes and behavior, there are two main results that I want to highlight. The first is related to stated and actual waste sorting degrees. The results show a significantly higher sorting degree in municipalities with a fixed waste fee compared to those with a frequency-based. This is surprising if we apply RCT. It is noteworthy that the findings regarding stated sorting degrees were supported by data on actual sorting degrees when this was investigated in the municipalities with either a fixed or a frequency-based waste fee scheme (paper 1).

According to RCT, using the price mechanism should result in higher levels of sorting. Although the Norwegian regulations do not allow the waste fee scheme to be differentiated to a large degree, even a small economic incentive compared to no economic incentive, should make it more favorable to sort more. In case of the fixed vs. frequency based systems (paper 1), the finding holds for all sub-groups/municipalities involved. In Ulstein where the weight-based waste fee scheme was implemented, half of the respondents reported that they sorted more household waste due to the introduction of the differentiated waste fee scheme (paper 3). Hence, the weight-based waste fee had at least a partial positive effect on the waste sorting degree, although the means for the two groups after the weight-based waste fee was implemented show that they sort about the same amount of household waste.

The second finding related to behavior was the undesirable side effect of increased illegal waste disposal that became evident in the study setting in Ulstein (paper 3). The results reveal that the implementation of the weight-based waste fee scheme increased the illegal waste fee disposal considerably. This was related both to throwing things into the wrong waste categories (displaced waste), such as baby diapers into the paper fraction, but also dumping or burn-

ing waste illegally. Hence, the study setting in Ulstein illustrate that the risk of increased illegal waste disposal is a realistic effect from introducing a differentiated waste fee scheme. A related issue is also the increased costs that the renovation company reported from the displacing of waste and the illegal disposals. I will come back to this in Section 9 about policy implications. It should be noted that since this aspect was not studied in the cross-sectional study it is not possible to draw any conclusions across types of incentive based systems. I note, however, that I did not come across the issue of illegal disposal etc. in the cross-sectional study.

7.3. The impact of the integrated sense of self for motivation and behavior related to household waste sorting

In this section I highlight some of the empirical findings regarding individuals' beliefs about human-nature relations for motivation and behavior related to sorting waste. First, the integrated sense of self in relation to self-determined motivation was explored in paper 2. As part of this, it was asked if the practice of sorting waste feels forced upon individuals and complicates everyday routines, or do people find it meaningful? The results indicate that it depends.

There was a positive relation between holding pro-ecological beliefs and to find sorting household waste to be a meaningful practice and to relate positive emotions to this practice. This indicates an internally perceived locus of causality and that these individuals experience waste sorting as autonomy supportive. The results similarly display a positive relation between an anti-ecological belief and attaching negative emotions to sorting waste. This indicates an externally perceived locus of causality and gives reason to believe that individuals with such beliefs do not experience waste sorting as autonomy supportive. These results indicate that there are different propensities among people regarding how sorting waste is perceived. If it is 'a joy or an annoyance' depends on their beliefs about human-nature relations.

Second, the analysis of the relation between the two kinds of beliefs about human-nature relations and the three kinds of institutionally relevant motivations (doing the right thing for the environment, significant others and saving costs) gave further insights about how beliefs about human-nature relations influence motivations (paper 2 and 4). Most of these results correspond well with the predictions of SDT; what you find motivating coincides with your integrated sense of self. A pro-ecological belief will for example make you motivated to do the right thing for the environment (paper 2 and 4), or in the words of Deci and Ryan; it lets you "merge with a social whole." However, an anti-ecological worldview (paper 2), or also the absence of any such beliefs (paper 3), indicate that one will more easily be motivated by opportunities to save costs. Regarding the motivational factor 'significant others', a positive relation was identified with both kinds of beliefs. A possible interpretation of this result could be that the motivation derived from what others might think – i.e., introjection in SDT terms – plays a somewhat different role depending on differences in integrated beliefs. For those with an anti-ecological belief, significant others might motivate *despite* their own inner convictions, and hence functions as a social pressure. For those with a pro-ecological belief, however, it is possible that this category of motivation rather motivates *because of* their belief and functions more as a social confirmation.

Finally, there is a difference in how the two economic incentives are perceived by those that are identified as having pro-ecological beliefs. The frequency-based waste fee scheme was perceived as supportive of a good habit, while the weight-based system in Ulstein was perceived as a bad idea. Hence, there is no automatic relation between internalized pro-ecological beliefs – i.e., an internally perceived locus of causality for why you should sort waste – and how you perceive a differentiated waste fee scheme. So, how is it that these individuals identified with a pro-ecological belief perceive the two waste fee schemes so differently? Unfortunately, there is little information in the data that can offer a clear answer to this, but there are some inherent differences to the two waste fee schemes that might help to at least speculate.

For example, the weight-based waste fee scheme is more intrusive into people's lives compared to the frequency-based. The latter might possibly also induce an element of reciprocity. For example, the kilogram based system potentially forces you to think through how much each of the items that you want to throw actually weighs, and whether you want to pay for the extra weight or not. Hence, the weight-based waste fee scheme might be viewed as a punishment by those already strongly motivated. It might also be that the weight-based system is more clearly signaling the economic incentive that the environmentally motivated find unnecessary, or maybe even provocative.

Regarding the frequency-based waste fee scheme, the decision that will affect your waste fee is linked to a decision regarding when/how often the waste is going to be picked up or not. It is the volume of the whole container that sets limits (and not every kilogram). Hence, the frequency-based waste fee gives a larger degree of freedom and implicitly also a greater degree of responsibility and trust – i.e., reciprocity. The frequency-based waste fee scheme might therefore give a feeling of paying for a service and the differentiation might be perceived as an encouragement, and not a punishment.

These suggestions are in line with the emphasis that SDT puts on the link between having the freedom to choose to live in accordance with your inner self and well-being. It is also in line with the emphasis that CIE puts on the relations between institutions and individuals when understanding how institutions are interpreted.

Henceforth, these results points in the direction that an internally or externally perceived locus of causality – i.e., how integrated and internalized the two kinds of beliefs about human-nature relations are – impact both your perceptions of the waste fee schemes implemented and the motivation related to sorting household waste. Furthermore, the results that have been displayed above are both interesting and useful when investigating the relation between structures and individuals. It becomes clear that how we perceive the physical and the social world that we are constantly surrounded by influences how we are motivated, and thereby the choices we make.

8. Considerations regarding the applied relational approach

As outlined in the theoretical framework, the theories applied in this thesis interpret and define human motivation and behavior differently. As with all theories, the ones included have their strengths and weaknesses. Therefore, in the light of the empirical findings presented above, I will provide some considerations on the contribution that the theories used offers to the understanding of human motivation and behavior.

In the subsequent sections, I will first look into the implications of linking the individual, the 'I', to a group, a 'we'. Next, I comment on the implications of linking the 'I' and the 'we' for the two kinds of *well-being*, *autonomy* and the link to *institutions*, before I finally discuss the potentials for linking the concept of *locus of causality* with the concept of *reflexivity*.

8.1. Me, myself and I, as in we

As Section 2.1 outlines, economics as an academic field has in some ways moved beyond the strict assumptions of RCT. However, it is evident that for example the literature that belongs to behavioral economics is still well placed within the perspective of methodological individualism. As long as this one-way impact process is adhered to, assumptions about reflexivity and interdependencies between individuals and social structures are left outside the scope of analysis. Since theory is what decides what is observed, I will try to point at what has been the added value for this thesis of including the perspective of a 'we' in a principal way.

As stated on several occasions through this thesis, an important common denominator of CIE and SDT is the fundamental understanding about the individual as being part of a group, or 'I' as part of a 'we'. Both SDT and CIE emphasize that the individual can only be understood as shaped by social constructs that are integrated and internalized in a never-ending process when relating with the social world. This enables for other kinds of interpretations and understanding compared to RCT-like theories. From the perspective of CIE, this understanding is reflected among other things through the theoretical predictions about the existence of different kinds of institutional logics. Institutional logics that has been observed in the findings of this thesis – e.g., a fixed waste fee scheme with an associated 'we logic', and a differentiated waste fee scheme with an additional associated 'I logic'. From the perspective of SDT, a 'we' has been observed among individuals where a pro-ecological belief is part of the integrated sense of self. In addition, this pro-ecological belief is observed to have connections with what is considered to be meaningful in life – i.e., eudaimonic well-being. A pro-ecological belief has also been observed to have a link to motivation as expressed through the institutional 'we logic'.

CIE and SDT take both an 'I' and a 'we', and the relation between the two, into account. More precisely, they hypothesize how individuals relate to the social world surrounding them, and through connecting the 'I' with the 'we', the individual is no longer seen in isolation as in RCT. In turn the combination of the 'I' and 'we' enable the analysis to include motivational reasons (framed as extrinsic motivation in SDT) that regards both hedonic aspects ('I', materialistic and instant considerations) and eudaimonic aspects ('we', moral and volitional considerations). I will come back to this and other 'we' dependent concepts in the subsequent sections.

8.2. Relative autonomy, kinds of well-being and the link to institutions

To see the individual as being created through social processes/being formed as part of groups enables a different understanding of what characterizes the individual and also its well-being. This is contrasted to RCT where the individual is subjective all through (Elster, 2007: 191). SDT postulates that the individual inherits a psychological autonomy that is a "real psychological phenomena that exist independently of our own and other people's beliefs or opinions about them, and, thus, they can be the objects of an empirical scientific analysis" (Ryan et al., 2011). Logically, RCT does not relate to this kind of understanding of autonomy. According to Deci and Ryan (1985: 155) "Homo economicus does not know autonomy, because he cannot feel concordance with the self, he cannot experience well-being and the process of the growing self. He is a sophisticated goal achiever, but without really choosing, because he does not experience the sense of freedom in his behavior." From the perspective of RCT, autonomy must therefore rather be understood as independence and individualism.

Further, relative autonomy allows for a more in-depth understanding of the linkage and the relations between individuals and the social world. This linkage, and the process of integration and internalization described by OIT, is essential in order to understand how an individual develops an understanding of both being an 'I' as well as being part of a 'we'. Further, relative autonomy is according to SDT the key to determine the level of eudaimonic well-being, related to behavior. This is in contrast to RCT, since subjectivity can only include hedonic well-being.

So, how does this relate to the results of this thesis? First, it should be noted that since the concept of well-being and the important distinction between hedonic and eudaimonic well-being was not fully accounted for when the surveys were developed, it could have been possible to ensure a higher level of accuracy both in and between the two study settings with regard to these concepts. This limits somewhat the opportunity to investigate the distinction between hedonic and eudaimonic well-being and how this could be linked to different institutional logics as expressed through e.g., an economic incentive or ecological beliefs.

Still, both relative autonomy and well-being can be observed in the results between ecological beliefs and how much meaning and positive emotions an individual relate to sorting waste. The more strongly the 'I' believe that it is part of a 'we' that it heavily depends on, the more meaning the 'I' find in waste sorting and relate well-being to the practice. In contrast, individuals with an anti-ecological belief relate negative emotions to sorting waste. This is an additional example that reflects how autonomy and well-being of a person is interrelated with how the 'I' is manifested in the 'we', or as in this latter case, the 'I' is *not* reflected in a 'we'.

Another example of how relative autonomy is reflected in the results is the difference in how the weight-based and the frequency-based waste fees are interpreted by those that are defined as being environmentally concerned. An interpretation in line with the above reflections is that while these individuals perceived and interpreted the frequency-based to be a supporter of the 'we', the weight-based was perceived and interpreted, by half the sample, as not supporting a 'we', but rather an 'I'. I will come back to this example in the next section.

Hence, despite the shortcomings in the data outlined, I will argue that the results do provide some cues for what role eudaimonic well-being plays for how the respondents perceive waste sorting. Most importantly, it gives support to the predictions of SDT that the level of integration and internalization of relevant beliefs into the self – relative autonomy – is relevant for determining the degree of meaning and well-being related to performing a practice.

Moreover, the recognition that most of the respondents seem to perceive waste sorting as a meaningful practice, goes against the assumption that forms the basis for introducing an economic incentive, namely that sorting waste is perceived as a dilemma for the individual. It also shows that to act on behalf of the community can be experienced as meaningful, and that the institutional context can strengthen the motivation that rests on this recognition. However, it is important to emphasize that this perception of meaningfulness related to waste sorting is not perceived by all. For those who hold an anti-ecological belief, sorting household waste is seemingly perceived as an individual dilemma and provokes even negative affections. Hence, what is recognized as an environmental or social dilemma is related to your integrated sense of self such as beliefs, and consequently also to autonomy and eudaimonic well-being.

This identifies a possible dilemma from the society's point of view, though, as the same policy will create different responses in different parts of the population. While SDT emphasizes the possibility to make choices that cohere with your inner convictions and therefore realize individual eudaimonic well-being, the desired practice of sorting waste will nonetheless come with a cost for some – i.e., those with an anti-ecological belief.

Finally, the understanding of relative autonomy is also the key link between CIE and SDT as the level of integration and internalization of a social construct will determine how an individual respond to, or more precisely, how an individual will act and execute *reflexivity* with respect to a social construct that is introduced – e.g., a differentiated waste fee scheme.

8.3. Linking locus of causality and reflexivity

In the following, I will link two concepts that both have been presented in the above sections – i.e., locus of causality and reflexivity – to explore if this can contribute to a more in-depth understanding of the relations between individuals and social structures.

According to SDT, integrated and internalized values, beliefs and institutions contribute to define what the individual perceive as her integrated sense of self. Further, a distinction that SDT postulates is between *externally* and *internally perceived locus of causality*. This is an important distinction as it places from where – i.e., either from inside or outside – one experiences that the justification for the action stems from. This may be whether it is because one has an inner conviction for the action, or because it is to avoid or achieve some external factor. Hence, the perceived locus of causality direct and guide the person in its meeting with institutional settings.

At the same time, the concept of reflexivity is important as it captures key aspects of how individuals relate to these inner convictions and act upon them. As outlined in Section 2, reflection is an ongoing activity that humans do in their everyday life, and what separates reflection from reflexivity is that the latter has "the self-referential characteristic of 'bending-

back' some thought upon the self, such that it takes the form of subject-object-subject" (Archer, 2009: 2). Let me also repeat the definition of reflexivity offered in Section 2.1 since this will be applied in the subsequent sections:

"the regular exercise of the mental ability, shared by all normal people, to consider themselves in relation to their (social) contexts and vice versa. Hence it is crucial in mediating between what actors themselves are most concerned to achieve in society and the social constraints and enablements that they confront as they try to realize their concerns" (ibid: 2).

In order to be reflexive, you must, however, face at least two alternatives. Berger and Luckmann (1967) states that you must have the knowledge about both what is right and wrong. As long as there is a 'full match' between integrated beliefs and the institutional setting, it is hard to have knowledge about what could have been. Hence, in the case of the fixed waste fee scheme, that has been the original way of collecting the waste management fee, this institutional setting can be interpreted to represent the 'state of order' – i.e., the state of mind that has always been. However, both the frequency-based and the weight-based represent possible breaks with this 'state of order'. The results indicate that the two differentiated waste fee schemes are interpreted differently by the respondents in terms of representing possible breaks with this 'state of order'.

First, in the institutional setting of the weight-based waste fee scheme (paper 3), there seems to be a break with the 'state of order', at least for half the sample. Hence, it can be argued that the two groups, defined as the 'more group' and the 'same group', executes *reflexivity* although with different results. With a reference to the definition of reflexivity above, a possible interpretation is that a 'social constraint' – i.e., the weight-based waste fee scheme – has been forced upon them, as they try to 'realize their concerns', which is to act in congruence with the experienced integrated sense of self. In the study setting of Ulstein, the 'same group' was identified with an integrated pro-ecological belief. They problematized the use of an economic incentive and were not motivated to sort more household waste as a response to the implementation of the weight-based waste fee. Hence, it can be argued that they saw the weight-based waste fee as a break with the 'state of order'. The 'more group' on the other hand, was not identified with any of the ecological beliefs. They did not problematize the economic incentive and reported that they found motivation to sort more waste as a response to the economic incentive. Hence, the two groups have interpreted the 'social constraint' forced upon them differently depending on their experienced integrated sense of self.

Regarding the cross-sectional study that included a fixed and a frequency-based waste fee scheme (paper 4), reflexivity can, however, be observed as executed the other way around. Here, those identified with a pro-ecological belief – i.e., those with an internally perceived locus of causality for why they sort waste – interpret a differentiated waste fee to be supporting a good habit (supporting the 'state of order'). Those that in this case are identified with an anti-ecological belief do not see a differentiated waste fee to be supporting a good habit.

Hence, reflexivity can be observed at two levels. First, those with an internally perceived locus of causality (pro-ecological belief) execute reflexivity differently compared to those iden-

tified with an externally perceived locus of causality (either those with an anti-ecological belief as in the cross-sectional study (paper 4) or the 'more group' in the case with weight-based waste fee (paper 3). In addition, it can be observed that those with an internally perceived locus of causality (pro-ecological belief) execute reflexivity differently depending on the current experience of a frequency-based or a weight-based waste fee scheme.

Hence, reflexivity has been performed in both study settings, although with different results, depending on both the institutional setting – i.e., the waste fee schemes – and the belief that is part of the integrated sense of self – i.e., beliefs about human-nature relations.

9. Policy implications

This thesis offers also some insights for policymaking. Given that Norwegian authorities strongly recommend that municipalities implement a differentiated waste fee scheme, it has been timely to ask if economic incentives actually have the power to raise efforts to sort more household waste. In addition to the recommendation of implementing an economic incentive, Norwegian municipalities are limited by law to cover only their cost of the renovation services without profits. Hence, it is difficult for municipalities to implement strong economic incentives.

According to the insights from this thesis, implementing a differentiated waste fee scheme might be a false promise. At least it does not increase efforts over and above those of municipalities with a fixed waste fee scheme. On the contrary, to introduce a monetary incentive such as a weight-based waste fee scheme runs the risk of creating resistance that in turn creates no additional motivation to increase efforts to sort more waste. There is also a risk of changing actor perceptions for those that are not environmentally concerned, to an 'I' logic – i.e., to save costs – that in this case seems to be less effective in boosting efforts for sorting household waste, than is an institutional setting that calls for a joint effort. In addition, the increased amounts of displaced and illegal disposal of waste in the Ulstein case indicate that great care should be exercised in implementing an economic incentive in household waste management.

An additional policy-relevant aspect that should be considered regards the costs related to implementing and running the different kinds of waste fee schemes. Even though this was not a main aspect to be considered in this thesis, the Ulstein setting made it clear that implementing a weight-based waste fee scheme was costly. There were, for example, increased costs related to the practical arrangements that the system demands, such as the weighing equipment of the trucks picking up the waste, and also the change from sacks to plastic containers. There were also increased costs related to the need for re-sorting waste fractions and for collecting illegally disposed waste. In this case, the economic incentive in household waste management turned out to be ineffective.

Finally, this thesis offers some more general insights regarding the use of economic incentives as a policy measure in different situations. While rational choice predicts that economic incentives will be effective and efficient due to the way it understands human motivation, alter-

native theories like SDT clarifies that this conclusion cannot be generalized across issues. It problematizes the use of such incentives as this type of extrinsic motivation might be harming human well-being – i.e., at least for those with an internally perceived locus of causality for why they are acting. It should be stressed, however, that SDT does not exclude or question that economic incentives work in the sense that they influence people's motivation and behavior, but it questions the quality of the motivation that comes along with the economic incentive. These reflections call for a more fundamental understanding of these kinds of processes and mechanisms, especially in a period of time where shifting to incentive-based systems is the dominant trend.

10. Final comments

To continue where this thesis started; we are facing serious environmental problems and they are escalating. Economics and other social sciences are, both in theory and in practice, important in finding solutions to these challenges. However, since it is theory that decides what can be observed, I will argue that it is essential to apply theories that use different perspectives when investigating human motivation and behavior, especially in order to develop viable and well-thought solutions to the environmental problems we are facing. The findings of this thesis supports such a view.

RCT is seductively plausible in its simplicity, and adds in principle no restrictions for what might be included in the utility function. The inherent subjectivity accompanied by hedonic well-being of RCT gives, of course, insights into what characterizes human motivation and behavior. Still, it is not going to take us beyond the individual being and hence, RCT tells us only parts of the story about what characterizes people's motivation and behavior.

The findings presented within humanistic psychology though, represented here by SDT, gives way to other kinds of perspectives about what contributes to people's well-being in their everyday lives. Further, and especially important for the development of the theoretical framework of this thesis, is the greater recognition of the importance of eudaimonic well-being. Not least that both hedonic and eudaimonic well-being are vital to be able to live good lives. Hence, a more comprehensive approach to what characterizes human motivation and behavior is possible, and possibly both at the individual level and the structural level.

An extension of this recognition about eudaimonic well-being is that it is this kind of well-being that represents the link between the individual and the social world, a link that in turn enabled the combination of CIE and SDT as outlined in this thesis. Hence, I will argue, using the empirical results presented in this thesis, that it could be constructive to combine theories from psychology, focusing on both eudaimonic and hedonic well-being, with theories from social disciplines that have developed a more thorough understanding of social constructs such as institutions. This seems to be an approach that is not often undertaken, but could potentially boost discussions and give new insights into old discussions.

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Appendix 1: Survey questions and statements applied in the 4 papers

Data collected from the cross-sectional study setting (paper 1, 2 and 4)

Individuals' sorting degrees: paper 1

How much do you normally sort of the waste fractions that are picked up at your home?

1. Nothing
2. A little bit
3. Some
4. Pretty much
5. Most
6. Everything

Motivation for sorting household waste: paper 1 and 2

What motivates you to sort household waste?¹⁸ Evaluate the following statements and tick one alternative per statement:

- I sort waste because I want to see myself as a responsible person
- I sort waste because I see it as my duty
- I sort waste because I should do what I expect of others
- I sort waste because I want to contribute to a better environment
- I sort waste because I want others to see me as a responsible person
- I sort waste because I am familiar with the positive environmental consequences
- I sort waste because it is economic profitable¹⁹
- I sort waste because I want to reduce numbers of pick ups²⁰

Scale: 1=completely disagree to 5= completely agree

Emotions related to sorting household waste: paper 2

Do you associate any of the following emotions with the practice of sorting household waste? Evaluate the following statements and tick one alternative per statement:

- A sense of satisfaction
- A sense of independence
- A sense of being forced
- A sense of good conscience
- A sense of being controlled
- A sense of being proud

¹⁸ The respondents that ticked 'nothing' regarding how much waste they sorted were not given the chance to answer this question

^{19,2} Only asked in the municipalities with a frequency-based waste fee scheme

Scale: 1=completely disagree to 5= completely agree

Evaluating how meaningful sorting of household waste is experienced: paper 2

Evaluate the following statement and tick one alternative:

- I find sorting household waste to be a meaningful practice

Scale: 1=completely disagree to 5= completely agree

Perceptions about a differentiated waste fee: paper 4

I find a differentiated waste fee to be...

- ...a bad idea because to sort waste is something you should do regardless of saving money
- ...a bad idea because households with many people is punished economically
- ...a good idea because a waste fee that I can influence gives me the opportunity to save costs
- ...a good idea because it supports a good habit²¹
- ...a good idea because those who sort little waste is punished economically
- ...a good idea because it works as an economic carrot

Scale: 1=completely disagree to 5= completely agree

The New Ecological Paradigm scale: paper 1, 2 and 4

Evaluate the following statements and tick one alternative per statement:

- We are approaching the limit of the number of people the earth can support
- Humans have the right to modify the natural environment to suit their needs
- When humans interfere with nature it often produces disastrous consequences
- Human ingenuity will insure that we do NOT make the earth unlivable
- Humans are severely abusing the environment
- The earth has plenty of natural resources if we just learn how to develop them
- Plants and animals have as much right as humans to exist
- The balance of nature is strong enough to cope with the impacts of modern industrial nations
- Despite our special abilities humans are still subject to the laws of nature
- The so-called "ecological crisis" facing humankind has been greatly exaggerated
- The earth is like a spaceship with very limited room and resources
- Humans were meant to rule over the rest of nature
- The balance of nature is very delicate and easily upset
- Humans will eventually learn enough about how nature works to be able to control it
- If things continue on their present course, we will soon experience a major ecological catastrophe

Scale: 1=completely disagree to 5= completely agree

²¹ Only asked in the municipalities with a frequency-based waste fee

Socio-economic questions: paper, 1, 2 and 4

What year are you born?

- Write the year here: ...

Are you woman or man?

Tick the correct alternative:

- Female
- male

How long education do you have?

- Tick the correct alternative:
- Elementary school
- High school
- Higher education like university or college

What is your personal yearly income before tax

- Less than NOK 50 000
- Between NOK 50 001 and 100 000
- Between NOK 100 001 and 300 000
- Between NOK 300 001 and 500 000
- Between NOK 501 000 and 700 000
- Above NOK 700 000

Data collected from the study setting in Ulstein: the introduction and termination of a weight-based waste fee (paper 3)

Individuals' sorting degrees:

How much do you normally sort of the waste fractions that are picked up at your home?

1. Nothing
2. A little bit
3. Some
4. Pretty much
5. Most
6. Everything

Has the change from a fixed yearly waste fee to a weight-based waste fee changed how much you sort household waste?

Tick one of the following statements:

- I sort the same as before the weight-based waste fee was implemented
 - I sort more household waste after the weight-based waste fee was implemented
 - I sort less after the weight-based waste fee was implemented
-

Motivation for sorting household waste:

What makes you sort household waste? Evaluate the following statements and tick one alternative per statement:

- I want to see myself as a responsible person
- I want others to see me as a responsible person
- I should do what I expect of others
- It is my duty to sort waste to contribute to a better environment
- I think that to sort household waste is something one should do even though it does not pay off individually
- It is economically profitable for me to sort waste
- I get a good feeling from sorting waste
- Encouragements from municipality about sorting waste
- Information about positive consequences from waste sorting motivates me
- being a responsible person

Scale from 1 to 4: 1=this does not match at all with my view, 2=this match a bit with my view, 3=this match partly with my view, 4=this match completely with my view.

Perceptions linked to the weight-based waste fee:

I find the weight-based waste fee to be:

- ... a good idea because I can choose for myself how much to sort and pay for the rest
- ... a good idea because it punishes those that are sloppy with waste sorting
- ... a good idea because it gives a clear economic reason to sort waste
- ... a bad idea because I want to choose for myself how much waste to sort without being punished economically
- ... a bad idea because to sort waste is a citizen duty and should be promoted by other means than economic incentives
- ... a bad idea because it punishes big households

Scale: from 1 to 4: 1=this does not match at all with my view, 2=this match a bit with my view, 3=this match partly with my view, 4=this match completely with my view.

Emotions linked to sorting household waste (only in the 2012 survey):

Do you associate any of the following emotions with the practice of sorting household waste?

Evaluate the following statements and tick one alternative per statement:

- A sense of satisfaction
- A sense of independence
- A sense of being forced
- A sense of good conscience
- A sense of being controlled
- A sense of being proud

Scale: 1=completely disagree to 5= completely agree

The New Ecological Paradigm scale (only in the 2012 survey):

- Evaluate the following statements and tick one alternative per statement:
- We are approaching the limit of the number of people the earth can support
- Humans have the right to modify the natural environment to suit their needs
- When humans interfere with nature it often produces disastrous consequences
- Human ingenuity will insure that we do NOT make the earth unlivable
- Humans are severely abusing the environment
- The earth has plenty of natural resources if we just learn how to develop them
- Plants and animals have as much right as humans to exist
- The balance of nature is strong enough to cope with the impacts of modern industrial nations
- Despite our special abilities humans are still subject to the laws of nature
- The so-called "ecological crisis" facing humankind has been greatly exaggerated
- The earth is like a spaceship with very limited room and resources
- Humans were meant to rule over the rest of nature
- The balance of nature is very delicate and easily upset
- Humans will eventually learn enough about how nature works to be able to control it
- If things continue on their present course, we will soon experience a major ecological catastrophe

Scale: 1=completely disagree to 5= completely agree

Socio-economic questions:

What year are you born?

- Write the year here:

Are you woman or man?

Tick the correct alternative:

- female: ...
- male: ...

What education do you have?

Tick the correct alternative:

- Elementary school: ...
- High school: ...
- Technical school: ...
- Higher education like university or college: ...

Appendix 2: Interview guide for the focus group conversations

Interview guide for the focus groups:

Participants: Volunteers from the collection of panel data

Number of participants: 3 - 6

Time frame: 2 hours

Aim: to explore how the inhabitants in Ulstein perceive the use of an economic incentive such as the weight-based waste fee to promote sorting of household waste

Equipment: sound recording equipment

The intention of the focus groups:

We want to conduct focus group conversations in order to better understand how the implementation of a weight-based waste fee, used as an economic incentive, was perceived by the inhabitants in Ulstein. The idea of a weight-based waste fee is to give the households an economic benefit if sorting more. The economic incentive was implemented in spring 2008 and terminated in 2010/2011. We want to take a closer look on how this worked out, why the incentive was terminated and how the incentive has influenced the motivation of the inhabitants for sorting/their sorting habits.

Introduction:

- Welcome to this focus group conversations
- My name is Marit Heller and I work as a research fellow at the Norwegian university of Life Sciences with a doctoral degree in environmental economics. My position is financed by a bigger project that is led by Professor Arild Vatn at the same university. The project is financed by the Norwegian Research Council and will be run for 4 years. The aim of the study is to investigate more closely if economic incentives has the intended effect – i.e., if they promote pro-environmental behavior as for example waste sorting. In addition to what we do here in Ulstein, the project also conduct surveys in 6 municipalities. However, Ulstein is the only municipality where we collect so called panel data; that we collect the same survey data from the same person twice. The first time was under the weight-based waste fee and now afterwards when it has been terminated. Panel data is valued data in research because you can measure changes over time with the same people.
- Irene Tollefsen is a master student at the same university and has participated in the project as part of her master thesis and her plan is to deliver this summer.
- It will be me that will lead and 'modify' these conversations here today and Irene will be an observer.
- The purpose of these conversations, or focus groups as it is called technically, is to give us some in depth information and knowledge about some of the issues that we asked about in the surveys. In that way our understanding of the surveys will increase. And maybe it will come up some new aspects that will give us a new understanding of the relations that we see in the survey results? Statistics that we have got from the surveys are helpful, but it does not in any way give us the whole picture. The idea is that these conversations will help us with that.
- Of the same reasons, it is important for us that you tell us things the way you experience it. And I want to stress that there are really no correct or wrong answers here. We want to be, and really is only curious about how you perceive things and about your thoughts on these issues. So the aim here now is that you keep a 'low threshold' on what to say, and try to have as a little as possible of self-censorship. So: do not think so much of what you might think that we would like to hear, but rather talk about the things that you find of importance and also comment on what the others are saying.
- If I ask a question that you do not understand, please ask back.

- The best thing for us is that when you exit from here you have a feeling that you have said everything you mean and think about the topic. If you afterwards find out that there is something that you did not mention, please just call us. Nothing is too little or too big to give us a better understanding of how you experience things.
- We guarantee full anonymity.
- As you see, there is a smart phone in front of you and it is this that we use a sound recorder. In order to make the sound quality as good as possible, I ask you to speak one and one, and not everyone at the same time.
- Depending on how the conversations proceed I might interrupt underway to make sure that we cover all issues that we want to discuss with you.
- Are there any questions before we start?

Issues:

General about sorting waste (20 min)

- To warm up we start off with a small round. I thought we could start with some practicalities about how you have arranged for the recycling in your home? (bring up how it is done in Oslo to exemplify what you think of) And if you have changed some of these arrangements over time? For example how you arranged it when you started with plastic
- 'Name': Can you start?
- Follow up question: what do we think of sorting household waste?
- Does it happen that sorting is commented on by yourself or others? If so, on which occasions?
- If you are a place (visiting someone or travelling to other places) where they do not sort do you reflect on that? How do you experience to throw 'all in one basket'?
- What are the most important reasons for sorting waste? (40 min)
- Cue: Comment on the results regarding motivation
- Cue: emotions linked to sorting

Changes in the fee? (40 min)

- The weight-based waste fee was implemented in 2008. Can you remember what your first reaction or thought when you heard about it? (a round)
- Can you remember that it was presented some kind of reasoning for the weight-based waste fee?
- What did you think of these reasons that were presented?
- Can you identify if your own main motivation or thoughts has changed throughout the changes in fees? From fixed to weight-based and back to fixed?
- Cue: comment on the results about that perceptions of a differentiated waste fee has changed over time.
- How do you consider that the differentiated waste fee relate to your (inner) motivation?.
- Cue: "stick" or "carrot"? Comment...

Waste astray

- It has been said that people became 'creative' in order to decrease the kg of unsorted waste. Could you comment on this statement? To throw waste in the nature/into the wrong container/or to get rid of it in some other way. How common is it to burn waste – and also what is 'normal' to burn? Paper, or also other things? "Who" was creative and what were the reasons?
- Ending and summing up (20 min)

Thanks so much for taking time to participate!

Part 2: Compilation of papers

Paper 1: The false promise of a differentiated waste fee?

Authors: Marit H. Heller, Frode Alfnes and Arild Vatn

Abstract: Norwegian environmental authorities advise municipalities to implement economic incentives to increase households sorting of waste. However, recent research has shown that the relationship between economic incentives and environmental behavior can be more complex than standard economic theory predicts. With this background, our study compares two different waste fee schemes implemented in six Norwegian municipalities. Three of the municipalities have a yearly fixed waste fee and three have adopted a frequency-based waste fee. In analyzing the results we apply Classical Institutional Economics. In both settings, people state that the most important motivation for sorting household waste is that they want to save the environment. The institutional setting including a frequency-based waste fee promotes additional motivation linked to saving costs. Contrary to standard economic theory, we find that both stated and actual sorting degrees were somewhat higher in a setting with a fixed yearly waste fee compared to the setting with a frequency-based waste fee. The results indicate that the promotion of economic incentives to increase sorting of household waste might be based on a false argument, and that the economic incentives do not deliver as promised.

1. Introduction

Most industrialized countries including Norway have developed policy goals and measures to decrease the negative impact of human activities on the environment (Norwegian Ministry of Environment, 1999). Norway has – as an example – introduced a differentiated household waste fee schemes to motivate households to increase waste sorting. This encouragement is formalized in a guideline by The Norwegian Climate and Pollution Agency (Norwegian Environment Agency, 2003) that states that municipalities are "strongly advised" to use differentiated household waste fee schemes to "motivate for reductions of waste and increased recycling" (ibid.: 26) (authors translation). Such a scheme works as an economic incentive by setting a price on the amount of waste that a household do not sort. Hence, the more a household sort their waste, the lower will the household's waste fee be. According to standard economic theory this will lead to increased efforts by households to sort their waste.

Norwegian municipalities are, however, obliged to set the size of the waste fee at a level that just covers the costs of collecting and managing the waste (Norwegian Ministry of Environment, 1981: §34). This requirement sets a clear limit to what extent the waste fee can be differentiated. Consequently, the economic incentive that Norwegian municipalities can introduce to increase sorting of household waste is relatively weak.

Using economic incentives to promote environmental friendly behavior is now a widespread practice in most developed countries. However, there is a growing literature showing that the relationship between economic incentives and pro-social and/or environmentally friendly behavior is more complex than standard economic theory assumes – see e.g., Bowles (2008); Gneezy and Rustichini (2000); Frey and Oberholzer-Gee (1997); Gneezy, Meier, and Rey-Biel (2011). Also in the area of waste sorting, there is a debate about the efficiency of economic incentives (Berglund, 2005; Thøgersen, 2003). Some has found that an economic incentive can increase sorting levels (Linderhof, Kooreman, Allers, & Wiersma, 2001) while others have found the opposite (Miranda, Everett, Blume, & Roy, 1994).

With this as a background, the present study aims at investigating the ability of a differentiated waste fee scheme to raise people's efforts in sorting household waste, as compared to a fixed waste fee scheme. Hence, we examine if the recommendation from Norwegian authorities to implement a differentiated waste fee scheme has led to the desired effect regarding increased sorting degrees. In addition, we study whether there are differences in people's motivation for sorting waste that can be linked to, and hence explained by, the present waste fee scheme. For example, it is assumed that wanting to do the right thing for the environment is a motivation that is present given both kinds of waste fee schemes. In the municipalities with a differentiated waste fee, the motive to reduce costs is added. The relative strength of the two kinds of motivations is, however, uncertain and has to be established empirically.

We find that Classical Institutional Economics (CIE) is a good basis for analyzing situations with mixed motivations. CIE emphasizes that social structures, or more specifically *institutions*, have the ability to influence individual motivation and behavior. Institutions are here

defined as conventions, norms and formally sanctioned rules (Scott, 1995; Vatn, 2005). While most analyses of economic phenomena are based on rational choice theory – the utility maximizing individual – CIE puts emphasis also on the structural level. Our expectation is that to include social structures such as institutions into the analysis can provide new insights when investigating the ability of economic incentives to promote environmentally friendly behavior.

In order to study how the *institutional setting* – i.e., the set of institutions framing waste sorting – might influence sorting degrees as well as motivation for sorting, a survey was conducted in six municipalities in Norway. All six had a curbside waste management system. Three of the municipalities had a fixed waste fee scheme and three had a differentiated frequency-based waste fee scheme. Hence, the two waste fee schemes – i.e., either a fixed or a differentiated waste fee – represent here two different institutional settings. In addition, data from Statistics Norway were collected on actual sorting degrees at the household level from the same six municipalities, and also from some additional municipalities with similar waste fee regimes.

The remaining of this paper proceeds as follows. Section two describes the classical institutional economics (CIE) framework that is applied in this study. Section three summarize findings from the literature that examine different types of waste fee schemes, their ability to raise efforts to sort waste and motivational aspects related to this. Material and methods used are presented in section four. Section five presents the results, followed by a discussion of the results in light of the CIE theory. Finally, we give some concluding remarks and policy recommendations.

2. CIE and its implications for studying incentives intended to increase household waste sorting

The arguments for introducing a differentiated waste fee draw on neo-classical economic theory. By differentiating the waste fee, households can reduce their fee by increasing their sorting. This gives the household an economic incentive to sort more of their waste. A fixed yearly waste fee on the other hand, gives no economic incentive to sort waste. Everything else kept constant, the differentiated waste fee will therefore likely result in a higher sorting degree. However, research has shown that the *ceteris paribus* condition does often not hold when introducing economic incentive in situations that is not typically associated with a market. In these situations, introduction of economic incentives might give results that are inconsistent with the predictions of standard economic theory (Bowles, 2008; Gneezy et al., 2011).

The literature emphasizes appropriateness as an alternative form of motivation. According to CIE, what kind of motivation that emerges is partly institution specific. March and Olsen (2006: 8) highlight that "institutions provide codes of appropriate behavior, affective ties, and a belief in a legitimate order". This perspective sees individuals as part of a community with institutions, for example a norm that to sort waste is your civic duty. The norm provides

expectations and meaning to people when acting. Consequently, the focus of attention is moved from the individual alone to the interrelated dynamics between individuals' motivations and behavior, and institutional settings.

According to CIE, institutions guide individuals about when to act for the benefit of themselves, and when to act for the benefit of the community. The former represents an individual rationality or an 'I logic', and the latter represents a social rationality or a 'we logic'. Consequently, institutional theory opens up for plural rationalities or logics, where institutions define which logic are pertinent to specific contexts and thereby which rationality that is anticipated. Thus, rationality can take other forms than individual utility maximization - i.e., a rationality that express an 'I logic'. It may also be about what is considered better for the group as defined by socially defined conventions and norms – i.e., a rationality that expresses a 'we logic'. What rationality applies in a certain situation depends on the present institutional setting (Vatn, 2005).

CIE posits that values, beliefs and institutions are all social constructs. While values and beliefs define fundamentally what is important in life, norms and other institutions are action-oriented rules defining how such values and beliefs can be supported or protected when acting in social contexts (Vatn, 2015). Implicit in this, is the view that a value, belief or institution can be more or less integrated and internalized into the self of an individual. Furthermore, the degree that social constructs or structures have been internalized influences in turn individual motivations for action. Typically, the literature emphasizes the degree of internalization and integration of social constructs – such as norms or beliefs – as important (Ryan & Deci, 2000; Thøgersen, 2006).

To apply CIE to the practice of sorting household waste under different institutional settings – such as a curbside waste management system with two kinds of waste fee schemes – implies that the institutional setting, under which one acts, will operate as a carrier of a set of expectations about what logic to follow. Regarding the institutional setting with a fixed yearly waste fee, each household pays a yearly fixed fee independent of the sorting degree – i.e., no marginal price on unsorted waste. Knowing that the rationale for sorting waste is to take care of the environment, the obvious reasons for sorting waste is that it is something you do for the sake of the common interest. It is your duty as a fellow citizen – i.e., implicit a rationality expressing a 'we logic'. It is expected that this is the prevalent logic in municipalities with a curbside waste management with a fixed waste fee scheme.

Regarding the institutional setting that includes a differentiated waste fee, there are two possibly competing logics. In addition to the 'we logic' as explained above, the differentiated waste fee scheme emphasizes also another logic as it gives an opportunity for the individual to save costs through increased sorting of waste. Hence, the differentiated waste fee scheme indicates that one is in a setting where self-regarding acts – 'I rationality' – is a possible logic.

The effect of different kinds of institutional settings such as a differentiated waste fee as compared to a fixed fee, depends on both the institutions and beliefs that are at play; both at

the individual and societal level. We emphasize that the relation between different logics is an emergent property – i.e., it is difficult to hypothesize the outcome. Based on the theory, we may argue that if the ‘we logic’ is strongly integrated into the self of the individuals, and a weak economic incentive is introduced, one may expect that the individuals involved do not respond to the ‘I logic’ as it is expressed by the differentiated waste fee. However, if the ‘we logic’ for why people sort their waste is only weakly integrated, and strong economic incentives are introduced, the outcome is more likely to be in accordance with the expectations of the ‘I logic’ – i.e., people find motivation in saving costs.¹

3. Empirical data on waste fee schemes and different kinds of motivation for sorting household waste

Most studies investigating the ability of economic incentives to increase sorting of household waste use the standard economic theory as basis for their analyses (Abbott, Nandeibam, & O’Shea, 2013; Ackerman, 1996; Bruvoll, Halvorsen, & Nyborg, 2002; Bruvoll & Nyborg, 2004; Dijkgraaf & Gradus, 2004; Fullerton & Kinnaman, 2002). The main findings from these studies are, however, that economic incentives vary in their ability to rise sorting (Kinnaman, 2006; Linderhof et al., 2001; Miranda et al., 1994). Some authors argue that waste fee schemes that are more refined in terms of marginal pricing of waste, are more effective in increasing sorting rates. Volume-based and frequency-based waste fees are for example claimed to be inferior to weight-based and bag-based waste fees (Kinnaman, 2006). Other parts of the literature express a more differentiated view regarding the capacity of the economic incentive in increasing sorting rates (Ackerman, 1996; Berglund, 2006; Berglund & Matti, 2006; Ferrara & Missios, 2012; Hage, Söderholm, & Berglund, 2009; Kinnaman, 2006; Reschovsky & Stone, 1994; Thøgersen, 1994). For example, a few studies go beyond the standard economic models and argue that waste sorting is mainly motivated by norms and moral considerations (Berglund, 2005, 2006; Hage et al., 2009) – i.e., the ‘domain of morality’ as Thøgersen (1996) states, or the domain of being a ‘good citizen’ as expressed by Berglund and Matti (2006). Other studies have found that to sort household waste is associated with a positive emotion (Berglund & Matti, 2006) and that it is considered as a pleasant activity in itself (Bruvoll et al., 2002). Czajkowski, Kądziela, and Hanley (2014) concludes that most households prefer to sort waste themselves compared to a situation where the waste is sorted for them. Others have hypothesized that to sort waste may be perceived as a burden when the sorter feels that her efforts cannot meet the expectations from the society (Bruvoll & Nyborg, 2004).

Only a few studies investigate motivations and perceptions related to the introduction of an economic incentive to increase the sorting effort more in depth. One example is Thøgersen (1994) that uses the concept of ‘re-framing’ when he hypothesize that the use of a differenti-

¹ The reader may question why these kinds of situations are not referred to as ‘crowding out’ or ‘crowding in’ of norms or intrinsic motivation (Bowles, 2008; Cardenas et.al., 2000; Gneezy and Rustichini, 2000; Frey and Oberholzer-Gee, 1997). We avoid these kinds of expressions because they have been so strongly linked to parameters of a utility function, while CIE rather emphasizes the shift in logic – e.g., between appropriateness and utility maximization.

ated waste fee might ‘re-frame’ the recycling activity into the sphere of private cost-benefit calculations. ‘Re-framing’ means the change to another ‘schema of interpretation’, which may imply a change in goals as well as in decision heuristics, including the set of action alternatives considered. Hence, it parallels with what we above term ‘change in logic’ due to a shift in the institutional context. Thøgersen (ibid.) concludes that there is empirical support for this hypothesis, but that this is a topic requiring further investigation. Thøgersen (2003) also studies behavioral and psychological reactions to a weight-based waste fee, and reports that the economic incentive seems to enhance internalized motivation. At the same time, the paper stress that the introduction of this kind of incentive should be implemented with carefulness since internalized motivation plays a key role, which in turn makes it hard to envision the behavioral outcome.

4. Material and methods

4.1. The setting

Norwegian municipalities are required to balance the income from the waste fee scheme with the management costs of the household renovation services. Historically, the waste fee scheme has been organized as a fixed yearly waste fee, hereafter referred to as FIXED. After the municipalities were strongly advised to differentiate the waste fee, some have acted upon the encouragement and implemented a differentiated waste fee scheme. Although, despite this call, it has not been particularly prevalent to differentiate the waste fee scheme at the household level.

So far, there are at least three ways that Norwegian municipalities have differentiated the waste fee scheme – i.e., by volume, by frequency, or by weight. It can be questioned however, whether the volume-based, which is the most common type, can be categorized as an economic incentive. The reason for this is that the differentiation is linked to subscriptions where the household only chooses the size of the waste containers. This choice is typically only made once, for example when you move to a new house. The subscription alternatives are also predefined – e.g., ‘small’, ‘standard’ and ‘large. Hence, this type of waste fee scheme does not interfere with the daily routines linked to sorting household waste and can hardly be viewed as an economic incentive the way the authorities have defined it – i.e., it should work as an encouragement to sort more household waste. Consequently, the volume-based waste fee scheme is not included in this paper.

The second type is to differentiate the waste fee by weight. The waste fee is split and one part is fixed and equal for all households. The other part is differentiated with regard to how many kg of unsorted waste that the renovation service collects from the household. However, to the knowledge of the authors this has only been introduced once in Norway and was soon terminated (Heller & Vatn, 2017).

The third type of differentiated waste fee is frequency-based, hereafter referred to as FREQUENCY. FREQUENCY is also split in two parts. One fraction is fixed and equal for all

households. The other part is differentiated with regards to the number of times the unsorted waste is picked up at the curbside of the household. This implies that the household must decide if the waste container should be emptied or not on a specific day every week, and correspondingly if the household's waste fee should increase or not. This kind of differentiated waste fee had been implemented in a few municipalities in Norway at the time when this study was carried out.

Data were collected from six Norwegian municipalities; three with FIXED: Askim, Eidsberg, Kragerø, and three with FREQUENCY: Os, Askøy and Kristiansand. Askim and Eidsberg belong to the same inter-municipal waste management company 'IØR'. Os and Askøy belong to the inter-municipal company 'BIR', and Kristiansand belong to the inter-municipal company 'SØR'. Kragerø is not part of an inter-municipal waste company. The municipalities were carefully chosen in order to be as identical as possible except for the waste fee scheme. Hence, all six municipalities have similar socio-demographic characteristics and are middle-sized municipalities with a town center. At the time of investigation, all municipalities also had implemented a curbside management system for three or more waste fractions – that is unsorted waste (all), paper/cardboard (all), plastic (all, but Kristiansand) and organic waste (all, but Os and Askøy). Other waste fractions such as glass, metal, hazardous waste, electronic waste, textiles etc. had to be brought to central collection points or to larger waste dumps.

At the time of data collection, the fixed fees² amounted to 2249 NOK per year in Askim, 2543 NOK in Eidsberg and 3353 NOK in Kragerø. For the municipalities with FREQUENCY, the fixed part of the waste fee amounted to 1893 NOK per year for households in Os and 1918 NOK in Askøy. The fixed part of the frequency fee in Os and Askøy included 12 compulsory pick-ups per year due to prevention of health hazards and smell, especially in the summer. The marginal cost for any additional pick-ups of unsorted waste amounted to 33 NOK in both Os and Askøy³. Each household had at the time of investigation the possibility to have the unsorted waste picked up every week. To use this service every week amounts to a maximum yearly waste fee of 3193 NOK in Os and 3218 NOK in Askøy.

The frequency-based fee scheme in Kristiansand was somewhat differently designed compared to the schemes in Os and Askøy. The waste fee scheme in Kristiansand was also split in two parts (the fixed part amounted to 1754 NOK), but there was a marginal price on two waste fractions – i.e., unsorted waste and organic waste. The fixed part of the waste fee scheme included 13 compulsory pick-ups of the organic waste and this were also due to prevention of health hazards and smell. The marginal cost for any additional pick-up of organic waste amounted to 28 NOK and the marginal cost of a pick-up of unsorted waste

² All prices on waste fees includes VAT

³ This fee refers to what the waste company defines as a "standard subscription" for households that includes a 140 l container for unsorted waste. It is possible to subscribe for a larger container which will give a higher marginal cost for each pick up of unsorted waste.

amounted to 34 NOK⁴. The households had the possibility to have both fractions picked-up every week.

4.2. Sample and household survey

To investigate how the institutional setting possibly affects the motivation and behavior related to sort household waste, a survey was conducted in the six municipalities in 2010. Three hundred households were randomly chosen in each of the six municipalities, 1800 in total. The households received a letter sent by postal service where they were asked to visit a website with a link to a questionnaire. The letters were addressed to the household as a unity. To ensure a random and representative selection of respondents, we asked that the questionnaire was answered by the adult, 18 years or older, that most recently had his or her birthday. After two rounds of telephone reminders, we received 556 responses giving a response rate at 31%.

Individual measures for the degree of waste sorting were not available from the municipalities. Therefore, we measure the individual degree of sorting household waste using stated responses to the question "How much of the household waste that is picked up at your home do you sort?" The question was asked using a six point scale from one equal 'nothing', to six equal 'everything'.

The survey included questions that were developed to capture different kinds of motivation related to sorting household waste and that can be linked to the two kinds of institutional settings. It included statements addressing different aspects assumed relevant to investigate the social or 'we logic' at a normative level: "I see it as my duty to sort waste" and "I sort waste because I want to see myself as a responsible person" are example of statements that were included. For the surveys distributed in the municipalities with FREQUENCY, questions that covered the individual or 'I logic' were also included - i.e., "I sort waste because it makes sense economically" and "I sort waste to save costs by reducing number of times the unsorted waste is picked up". This set of statements was partly based on a survey by Berglund (2006) – see Table 1 for an overview of questions, statements and scales.

A potential weakness of the statements described above is that they contains two parts; both a claim that the respondent do sort waste and the reason why. The two parts were combined in order to secure the link between the behavior – sorting – and the reason why the individual sort waste. It can be argued that the inclusion of both parts can make it unclear what the respondents are answering – i.e., if they answer if they sort waste or the rationale for why they sort waste. Our post-testing of the question in unstructured consumer interviews indicates that consumers see it as a question about the reasons why they sort waste. Moreover, only

respondents that reported to sort household waste to some degree were asked to answer the statements that addressed motivation for sorting waste.

⁴ This fee refers to a subscription that includes a 120 l container for unsorted waste. It is possible to subscribe for a larger container which will give a higher marginal cost for each pick up of unsorted waste.

Table 1. Overview of survey questions, statements and scales

"How much of the household waste that is picked up at your home do you normally sort?"

Scale: 1 to 6: 1 if 'nothing', 2 if 'a little bit', 3 if 'some', 4 if 'pretty much', 5 if 'most' and 6 if 'everything'

"What motivates you to sort household waste?"

Consider the following statements and tick one alternative per statement:"

1. I sort waste because I want to see myself as a responsible person
2. I sort waste because I see it as my duty
3. I sort waste because I am familiar with the positive environmental consequences
4. I sort waste because I want to contribute to a better environment
5. I sort waste because I should do what I expect of others
6. I sort waste because I want others to see me as a responsible person
7. I sort waste because it is economic profitable
8. I sort waste because I want to reduce numbers of pick ups

Scale: 1 to 5 where 1=completely disagree to 5= completely agree:

The New Ecological Paradigm Scale

"Evaluate the following statement and tick one alternative:

- a) We are approaching the limit of the number of people the earth can support
- b) Humans have the right to modify the natural environment to suit their needs
- c) When humans interfere with nature it often produces disastrous consequences
- d) Human ingenuity will insure that we do NOT make the earth unlivable
- e) Humans are severely abusing the environment
- f) The earth has plenty of natural resources if we just learn how to develop them
- g) Plants and animals have as much right as humans to exist
- h) The balance of nature is strong enough to cope with the impacts of modern industrial nations
- i) Despite our special abilities humans are still subject to the laws of nature
- j) The so-called "ecological crisis" facing humankind has been greatly exaggerated
- k) The earth is like a spaceship with very limited room and resources
- l) Humans were meant to rule over the rest of nature
- m) The balance of nature is very delicate and easily upset
- n) Humans will eventually learn enough about how nature works to be able to control it
- o) If things continue on their present course, we will soon experience a major ecological catastrophe"

Scale: 1 to 5 where 1=completely disagree to 5= completely agree

In order to capture information about more fundamental values and beliefs that can be determinants of environmentally related behavior (Dunlap, Van Liere, Mertig, & Jones, 2000b; Fransson & Garling, 1999), we included the New Ecological Paradigm scale (NEP-

scale) (Dunlap & Van Liere, 1978; Dunlap, Van Liere, Mertig, & Jones, 2000a); (Dunlap, 2008; Fransson & Garling, 1999). The NEP-scale consists of 15 items that address two kinds of worldviews or beliefs linked to human-nature relations. More specifically, the NEP-scale includes eight statements or items that represent a positive attitude towards an ecological worldview or paradigm, and seven statements or items that measure an antagonistic attitude towards an ecological worldview or paradigm. We have followed recommendations from the literature when applying the scale (Dunlap & Van Liere, 2008; Hawcroft & Milfont, 2010). It should be mentioned though, that although we treat the NEP-scale as measuring fundamental *beliefs* about human-nature relations, the literature that address this scale has pointed out that it is not unambiguous in what it captures. That is, the scale also includes elements of social *values* and *attitudes* (Dunlap et al., 2000a).

Finally, the socio-economic variables age, gender, level of education and income were included. Descriptive statistics for the respondents faced with the two types of waste fee schemes are presented in Table 2.

Table 2. Socio-economic statistics for individuals in the two sub-samples.

Variables	Description	FIXED		FREQUENCY	
		%	N	%	N
GENDER	0 = Female,	49.1	140	52.7	138
	1 = Male	50.9	145	47.3	125
EDUCATION	1 = Elementary school	9.9	28	9.2	24
	2 = High school	50.9	145	38.5	101
	3 = University	39.3	112	52.3	137
INCOME	1= less than NOK 50 000	2.9	8	1.5	4
	2 = between NOK 50 001 and 100 000	2.5	7	1.1	3
	3 = between NOK 100 001 and 300 000	31.1	86	28.1	73
	4 = between NOK 300 001 and 500 000	42.8	118	43.1	112
	5 = Between NOK 501 000 and 700 000	14.9	41	13.8	36
	6 = Above NOK 700 000	5.8	16	12.3	32
		Mean	St.dev	Mean	St.dev
AGE	In years	34.12	14.33	31.33	13.89

To use survey and stated responses implies a possible pitfall related to that people tend to be over optimistic in evaluating their own efforts (Chao & Lam, 2011). Another possible pitfall is related to the relatively low response rate. This might imply a bias in the sample towards being more dutiful compared to the average population. However, there are to our knowledge no reasons why these two tendencies should differ across the two institutional settings. Hence, as long as we investigate the relative difference in motivation and behavior, we expect these two potential biases to have little impact on the results.

To supplement the survey data, we used municipality level data from Statistics Norway on the actual amounts of ‘paper/cardboard’ and ‘plastic’ waste for the years 2009 until 2014. The household sorting degrees were estimated by dividing the municipality amount by the number

of renovation subscriptions in the municipality. The two categories ‘paper/cardboard’ and ‘plastic’ were chosen as these were the only two that all or most municipalities reported on during the time interval, and also because these two categories are close to equally defined in the municipalities. However, the estimates for plastic for the municipalities with FREQUENCY do not include Kristiansand as collection of plastic is not part of their curbside collection system. For the Statistic Norway data, we included all municipalities that were part of the inter-municipal waste companies BIR and IØR. As a result, eight municipalities are included in the measuring of actual sorting degrees with a fixed waste fee (ADD_FIXED) and nine with a frequency-based waste fee (ADD_FREQUENCY).

4.3. Statistical analysis

The survey includes several statements that the respondents were asked to consider and these statements measure potentially the same motivational aspect. These are often referred to as latent variables (Bartholomew et al., 2008). A factor analysis investigates concepts that are not easily measured directly by collapsing a number of variables into a few interpretable underlying latent variables also called factors. The loadings offer an evaluation of the relationships – i.e., correlations – between observed variables and the latent factor. We ran the factor analyses using the software STATA.

We started with an exploratory factor analysis (EFA) on the six statements related to motivational aspects that were sent to all municipalities (statements 1 to 6 under the question "What motivates you to sort household waste" in Table 1). With a factor loading cut-off at 0.5, the six statements formed two factors – i.e., RIGHT_THING and OTHERS – see Table 3. Notable is that the eigenvalue of the second factor is low (0.38), but since it is theoretically interesting we chose to include the factor in the further statistical analysis.

The second factor analysis was run as a Confirmatory Factor Analysis (CFA) and included two statements that were included in the survey sent to the institutional setting FREQUENCY – statements 7 and 8 in Table 1. The factor is referred to as ECON_GAIN – see Table 3. An alternative could be to run only one factor analysis that included all eight statements. This would imply that only half the sample could be included in the analysis since questions 7 and 8 were only asked in municipalities with FREQUENCY, and was therefore evaluated to be an inferior solution.

Finally, we ran factor analysis that included all 15 statements from the NEP-scale. Since the literature is not clear on how many dimensions the NEP-scale includes (Dunlap et al., 2000a) this was a subject that we needed to explore. Hence, we ran an EFA. Using a factor loading cut-off at 0.5, two distinct factors were formed that includes eight of the original 15 statements. To run both EFA and CFA is often the case when factor analysis are applied (Bartholomew, Steele, Galbraith, & Moustaki, 2008: 290). The results of the factor analysis can be found in Table 3.

Table 3. Factor analysis

Factor analysis:	Mean	SD	Loadings	Cronbach's alpha
<i>RIGHT THING</i>	4.18	0.78		0.794
I sort waste because I want to see myself as a responsible person	4.16	1.00	0.54	
I sort waste because I see it as my duty	4.28	0.96	0.76	
I sort waste because I am familiar with the positive environmental consequences	4.11	1.15	0.60	
I sort waste because I want to contribute to a better environment	4.47	0.85	0.77	
<i>OTHERS</i>	3.62	1.08		0.579
I sort waste because I should do what I expect of others	3.14	1.42	0.51	
I sort waste because I want others to see me as a responsible person	4.11	1.15	0.55	
<i>ECON_GAIN</i>	3.40	1.21		0.821
I sort waste because it is economically profitable	3.14	1.27	0.77	
I sort waste because I want to reduce numbers of pick ups	3.63	1.27	0.77	
<i>PRO_ECO_PARAD; pro 'ecological paradigm' beliefs from NEP-scale</i>	3.35	0.75		0.688
When humans interfere with nature it often causes catastrophic consequences	3.29	1.19	0.55	
Humans are severely abusing the environment	3.74	1.02	0.62	
The nature's balance is fragile and easy to interrupt	2.99	1.08	0.51	
If things continue on their present course, we will soon experience a major ecological catastrophe	3.37	1.02	0.60	
<i>ANTI_ECO_PARAD; anti 'ecological paradigm' beliefs from NEP-scale</i>	2.60	0.70		0.621
Humans have the right to modify the natural environment to suit their needs	2.88	1.16	0.54	
Human ingenuity will insure that we do NOT make the earth unlivable	3.10	1.03	0.52	
The balance of nature is strong enough to cope with the impacts of modern industrial nations	2.18	1.02	0.53	
Humans will eventually learn enough about how nature works to be able to control it	2.64	1.04	0.53	

Note:

^a See Table 1 for details about the statements and scales included in the factor analysis.

The Cronbach's alpha is an estimate for internal consistency of the various factors and measures whether several items that propose to measure the same general construct produce similar scores. Values under 0.5 are in general evaluated as unacceptable. Hence, none of the factors are unacceptable, but the factor named OTHERS is poor.

To investigate if there are differences in the sorting degrees between the two institutional settings, we report descriptive statistics for the sorting degrees in the six municipalities. In addition we have run statistical tests that address if there are differences in sorting degree between these settings.

To investigate the relationship between the sorting degree – measured on a scale from 1 = nothing to 6 = everything – and the five motivation factors in Table 2, we run three ordered logistic regression (ordered logit). Model 1 investigates the assumed relationships between sorting degree and five motivations factors using pooled data from all six municipalities. Model 2 includes only FIXED municipalities, while model 3 included only the FREQUENCY municipalities. Hence, we could study, among other things, if there is a difference in sorting degree caused by the difference in institutional setting. In addition to the five motivation factors, we have included the socio-economic variables age, gender, education and income. The factor measuring the stated importance of saving costs – ECON_GAIN – is only included in model 3.⁵ Before estimating the ordered logit models, we estimated a correlation matrix between the independent variables.

5. Results

5.1. Stated sorting degree at the individual level

Table 4 presents descriptive statistics for the stated sorting degree in the six municipalities. We note three things: (1) almost everyone say they sort at least some of the waste; (2) there is a higher proportion of the respondents that say they sort everything in the FIXED than in the FREQUENCY municipalities; and (3) this results also holds if we combine the categories ‘most’ and ‘everything’, with 77.4% in FIXED and 66.9% in FREQUENCY.

Table 4. Descriptive statistics for stated sorting degree^a at municipality level within FIXED or FREQUENCY.

Institutional setting	FIXED							FREQUENCY						
	Askim		Kragere		Eidsberg		All three	Os	Askøy		Kristiansand		All three	
Municipality	%	n	%	n	%	n	%	%	n	%	n	%	n	
1 Nothing	0.9	1	-	-	2.6	2	1.0	-	-	-	-	-	-	
2 A little bit	0.9	1	1.8	2	2.6	2	1.0	1.3	1	4.3	4	3.1	3	
3 Some	2.9	3	2.6	3	2.6	2	2.8	8.0	6	6.4	6	5.2	5	
4 Pretty much	20.6	21	17.4	19	13.0	10	17.4	26.7	20	24.4	23	20.6	20	
5 Most	45.1	46	51.6	56	45.5	35	47.7	42.7	32	43.6	41	55.7	54	
6 Everything	29.4	30	26.6	29	33.7	26	29.6	21.3	16	21.3	20	15.4	15	
Total	100	102	100	109	100	77	100	100	75	100	94	100	97	

Note:

^a Responses to the question "How much of the household waste that is picked up at your home do you normally sort?" were given on a scale from 1 to 6: 1 if ‘nothing’, 2 if ‘a little bit’, 3 if ‘some’, 4 if ‘pretty much’, 5 if ‘most’ and 6 if ‘everything’.

⁵ The ECON_GAIN statements were, for logical reasons, not included in the survey sent to respondents in the municipalities with a fixed waste fee.

To test if there is a significant difference in the reported sorting degrees between the two waste-fee schemes, we conducted two types of tests: a Kruskal-Wallis test and a Wilcoxon (Mann-Whitney) test. The two tests are non-parametric tests without assumptions about the distribution. Both tests supported that there is a significant difference ($p < 0.00$) between the two waste fee schemes (Kruskal-Wallis test: $\chi^2 = 10.21$ and Wilcoxon (Mann-Whitney): $z=3.43$). The respondents in our study living in municipalities that practice a zero marginal cost on unsorted household waste sort more than the respondents living in municipalities practicing a positive marginal cost on unsorted household waste.

5.2. Actual sorting degree at the household level

In addition to the individual stated sorting degrees, we obtained data regarding actual amounts in kilograms for two waste fractions, plastic and paper/cardboard from Statistics Norway. As described in the method section, we here also included the five additional municipalities with fixed waste fees, ADD_FIXED, and six additional municipalities with frequency based waste fees, ADD_FREQUENCY.

Figure 1 presents data regarding kilograms of plastic and Figure 2 presents data regarding kilograms of paper/cardboard. As can be seen from Figure 1, the actual amount of sorted plastic is greater in municipalities with a fixed waste fee compared to those with a frequency-based waste fee. In Figure 2 with paper/cardboard, the relationship is not as clear, but also here the actual amounts of sorted waste is greater in the fixed rate municipalities. The Wilcoxon rank-sum (Mann-Whitney) test that was run to test the difference for ADD_FIXED and ADD_FREQUENCY also indicates that there are significant differences for actual amounts of both paper/cardboard ($p=0.01$, $z=2.72$) and plastic ($p=0.00$, $z=2.88$).

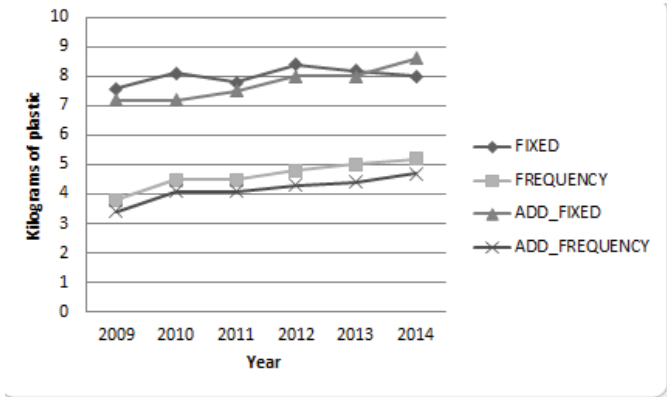


Figure 1. Actual amounts of ‘plastic’

Note:

The variable ‘plastic’ is measured in kilograms and as an average of the municipalities that constitute the sub-samples in the years 2009 to 2014, and divided by numbers of renovation subscriptions in the municipalities. The municipality Kristiansand is not included in FREQUENCY or ADD_FREQUENCY because their collection of plastic is not part of the curbside collection system. Source: Statistics Norway.

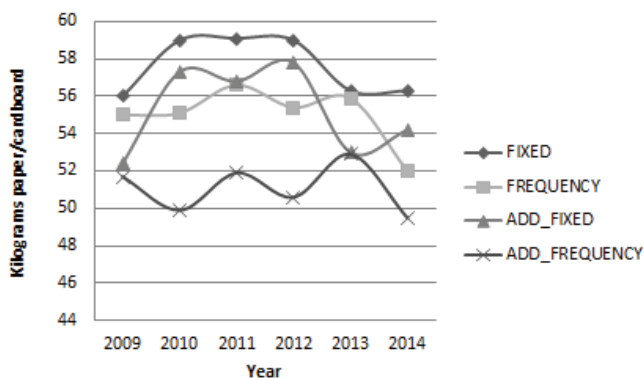


Figure 2. Actual amounts of ‘paper/cardboard’^a

Note:

The variable ‘paper/cardboard’ is measured in kilograms and as an average of the municipalities that constitute the sub-samples in the years 2009 to 2014, and divided by numbers of renovation subscriptions in the municipalities. Source: Statistics Norway.

5.3. Results on the relationship between motivations and waste fee schemes

To check for correlations between the independent variables to be included in the ordered logit, we have run a correlation matrix – see Table 5 for details. The highest correlation is found between OTHERS and RIGHT_THING (0.61). We also observe that the factor ANTI_ECO_PARAD has a negative correlation with both RIGHT_THING and OTHERS, and a positive correlation with ECON_GAIN. The opposite is the case for PRO_ECO_PARAD that has a positive correlation between RIGHT_THING and OTHERS, and a negative correlation with ECON_GAIN. All these correlations are very low though.

Table 5. Correlation matrix for independent variables^a

	RIGHT_THING	OTHERS	ECON_GAIN	PRO_ECO_PARAD	ANTI_ECO_PARAD	Age	Education	Income	Gender
RIGHT_THING	1								
OTHERS	0.61	1							
ECON_GAIN	0.21	0.16	1						
PRO_ECO_PARAD	0.26	0.15	-0.02	1					
ANTI_ECO_PARAD	-0.06	-0.02	0.14	-0.24	1				
Age	0.15	0.12	0.12	0.06	0.00	1			
Education	0.06	-0.09	-0.05	-0.06	-0.05	-0.15	1		
Income	-0.09	-0.03	-0.01	-0.12	-0.00	-0.01	0.28	1	
Gender	-0.29	-0.16	-0.09	-0.20	0.03	0.05	-0.03	0.36	1

Note:

^a See Table 1 and Table 2 for definitions of the factors and variables included in the correlation matrix.

Table 6 presents the results of the three ordered logit estimations. Model 1, where data from both institutional settings were included, confirms that there is a significant relationship between sorting degree and the waste fee scheme – i.e., there is a higher sorting degree in municipalities with FIXED than in municipalities with FREQUENCY. In addition, there is a positive relationship between the sorting degree and the normative motivations RIGHT_THING and OTHERS, and older respondents sort more.

Table 6. Motivational factors^a and stated household waste sorting degree^b in FIXED and FREQUENCY.

Dependent variable: Stated sorting degree ^b									
Independent variables ^a	Model 1 Both FIXED and FREQUENCY			Model 2 FIXED			Model 3 FREQUENCY		
	Coef	St.err	<i>p</i>	Coef	St.err	<i>p</i>	Coef	St.err	<i>p</i>
Institutional setting ^c	-.37	.20	0.05						
Factors:									
RIGHT_THING	1.09	0.15	0.00	1.08	0.20	0.00	1.15	0.26	0.00
OTHERS	0.17	0.10	0.10	0.13	0.13	0.33	0.14	0.19	0.45
PRO_ECO_PARAD	-0.12	0.12	0.32	-0.00	0.17	0.98	-0.18	-0.19	0.33
ANTI_ECO_PARAD	0.09	0.13	0.48	-0.04	0.17	0.82	0.18	0.18	0.38
ECON_GAIN ^d							0.37	0.12	0.00
Control variables:									
AGE	0.03	0.01	0.00	0.03	0.00	0.00	0.01	0.01	0.34
GENDER	0.19	0.20	0.32	0.10	0.28	0.71	0.43	0.30	0.15
EDUCATION	0.00	0.15	0.99	-0.07	0.21	0.74	0.04	0.25	0.85
INCOME	-0.04	0.09	0.67	0.15	0.15	0.29	-0.17	0.14	0.22
R ² _{pseudo}		0.11			0.13			0.10	
LR chi ²		137.2			74.77			57.79	
N		489 ^e			252			204	

Notes:

^a See Table 1 and Table 2 for details about the independent variables.

^b Stated sorting degree was measures asking the question "How much do you normally sort of the waste fractions that are picked up at your home?", and responses were given on a scale from 1 to 6: 1 if 'nothing', 2 if 'a little bit', 3 if 'some', 4 if 'pretty much', 5 if 'most' and 6 if 'everything'.

^c The variable "institutional setting" is defined as 0 if FIXED and 1 if FREQUENCY.

^d The variable ECON_GAIN is only relevant for the municipalities with FREQUENCY.

^e Since the variable ECON_GAIN is not included in Model 1, a greater number of respondents are included from the municipalities with FREQUENCY compared to model 3. Hence the number of respondents from Model 2 and 3 does not add up with the number of respondents in Model 1.

^f Statistically significant relationships are denoted in bold and italic.

In Model 2, that only includes data from FIXED, we again find a significant positive relationship between sorting degree and the independent variables RIGHT_THING and AGE. The results from model 3 indicate that in the municipalities with FREQUENCY, there is a positive relationship between sorting degree and the independent variables RIGHT_THING and ECON_GAIN. Regarding the two factors measuring two kinds of beliefs about human-nature relations – PRO_ECO_PARAD and ANTI_ECO_PARAD – we find no significant relationship in any of the three models with the stated sorting degree.

We find that the goodness-of-fit indicator reported for the three ordered logit models report similar values across the three models (Pseudo R^2 values: Model 1: 0.11; Model 2: 0.13; Model 3: 0.10). The Pseudo R^2 values reported here can be interpreted as acceptable, although not excellent (values from 0.2 to 0.4 are considered an excellent fit – e.g., McFadden (1977)).

Finally, since the factor RIGHT_THING appears in both FIXED and FREQUENCY as a significant explanatory variable for sorting waste, we ran a test to check if there was a significant difference in the strengths of RIGHT_THING in Models 2 and 3. The test reported no significant difference in the explanatory strength of RIGHT_THING in these models.

6. Discussion

6.1. The false promise of a differentiated waste fee scheme?

Considering that sorting household waste demands both energy and time, it is hard to explain using standard economic reasoning why individuals sort household waste when there is zero marginal cost on unsorted waste. Still, earlier studies have found that people sort waste under fixed waste fee schemes and mixed results with respect to the ability of economic incentives to increase the sorting of household waste.

This study finds that individuals in an institutional setting with no marginal price on unsorted waste (FIXED) have higher sorting degrees than the individuals in an institutional setting with such a price (FREQUENCY). This is so whether we base the analysis on survey data or the official waste amount data reported by the municipalities to Statistics Norway. While the difference is not large in practical terms, our finding indicates that a weak economic incentive could be contra-productive and give the opposite results of what standard economic theory predicts. These results are consistent with several previous studies investigating the efficiency of economic incentives in promoting environmentally friendly behavior in situations where (strong) norms for environmental behavior exist (Heller & Vatn, 2017; Kinnaman, 2006).

Based on the sorting results alone, one can question the recommendation of implementing a differentiated waste fee scheme in order increase the households sorting of waste. Also taking into consideration that the more complex frequency based waste scheme likely is more costly to administrate than the fixed waste scheme, one could wonder why any municipalities would follow the advice.

6.2. Moral and money in household waste sorting

According to CIE, institutions hold the power to guide and direct people through expressing expectations about what is appropriate behavior in specific situations. The results report that RIGHT_THING is the most important factor explaining people's sorting degree, which indicates that the 'we logic' is integrated into the self of the respondents. Hence, our results indicate that motivation linked to wanting to do the right thing for the environment plays an important role when sorting household waste. In other words, norms that express a 'we logic' guide and direct people in their motivation for why they should sort household waste. Hence, our results give support to earlier research that indicate that sorting waste is a practice that can be defined within the domain of moral behavior (Berglund, 2006; Hage et al., 2009). However, the importance of the factor OTHERS (in Model 1) shows that avoiding social discomfort also motivates sorting of household waste. This indicates that the 'we logic', to some degree is only superficially internalized.

Consistently, the results we observe in Model 3 regarding a strong positive relationship between the sorting degree and ECON_GAIN, gives support to the prediction that an economic incentive holds the power to express and direct peoples motivation towards an 'I logic'. However, waste sorting in municipalities with FREQUENCY is also motivated by doing the right thing for the environment. Hence, a motivational dualism is present in municipalities with a frequency-based waste fee. At the same time, the stated sorting degrees are also reported to be lower in FREQUENCY. The observation that economic incentives accommodate a duality in the motivation related to the action of sorting household waste has also been made in earlier studies (Berglund, 2005; Hage et al., 2009; Thøgersen, 1994, 1996).

So, how is it that the stated sorting degrees are lower in FREQUENCY as compared to FIXED? One possibility could be that the strength of RIGHT_THING was weaker in FREQUENCY as compared to FIXED. However, the statistical test that was run to test such a difference did not support this interpretation. What we do know, though, is that the motivation that can be derived from the institutional setting including a frequency-based waste fee – to save costs - is not enough to increase the sorting degrees over and above what an institutional setting that includes a fixed waste fee and where the motivation linked to doing the right thing for the environment is the predominant one.

6.3. Beliefs expressing environmental concern

A somewhat surprising result was the lack of relationships between the sorting degree and the two beliefs about human-nature relations: PRO_ECO_PARAD and ANTI_ECO_PARAD. Taking into consideration the parts of the literature that advocate a link between inner beliefs and values and people's actions, these results questions the importance of these relationships. A possible explanation is that to sort waste is a practice so firmly grounded and anchored in the population that 'everyone' does it. The strong association between normative motivations that includes norms such as being a 'responsible person' or 'it is my duty' may point in this direction. These types of norms are more related to being a responsible person in general, or to be a good citizen, than caring especially for the environment. The fact that the correlation

matrix in Table 5 shows low correlation values between these variables and the factor RIGHT_THING gives support to this hypothesis.

7. Conclusions

Norwegian municipalities are advised by the environmental authorities to implement economic incentives in order to increase efforts to sort household waste. However, the municipalities are limited by law to only cover their cost of the renovation services without profits. Hence, it is difficult for municipalities to implement strong economic incentives, and most of them are left with relatively small fee components that depend on household sorting behavior. In addition, there are now ample evidence that the relationship between prices and behavior is more complex than standard economic theory predicts, and that introducing an economic incentive in situations that are not typically associated with a market might get the opposite result of what economic theory predicts.

With this as a background, this study set out to compare two waste fee schemes implemented in Norwegian municipalities to investigate if the two schemes caused differences in motivation and behavior related to sorting household waste. We found that both stated and actual sorting degrees were slightly higher in municipalities with a fixed yearly waste fee compared to municipalities with a differentiated waste fee. This questions the wisdom of the recommendation to implement economic incentives through differentiated frequency-based waste fee scheme to motivate households to sort more of their waste.

Second, when investigating the different kinds of motivational factors related to either a ‘we logic’ or an ‘I logic’, a rather complex picture emerges. The most important motivation for sorting household waste is with no doubt ‘to do the right thing’ for the environment, or also what is referred to by institutional theory as motivation related to a ‘we logic’. However, in the municipalities with a frequency-based waste fee scheme we find different types of motivation for sorting household waste. Both a motivation linked to the ‘we logic’ – i.e., wanting to do the right thing for the environment – and to an ‘I logic’ – i.e., a more individualistic motivation, which is to save costs – was observed.

Consequently, the results presented in this study indicate that implementing a weak economic incentive, such as the frequency-based waste fee, might be a false promise in terms of increasing efforts for sorting household waste, at least over and above municipalities with a fixed yearly waste fee. Hence, one should be careful with implementing economic incentives, at least as long as there is an option to create norms as an alternative to using external incentives. Actually, this was historically what happened in Norway, as norm building was the strategy emphasized from the very beginning of building municipal waste sorting systems.

From the above, we suggest that more research is needed to further enhance our understanding of how people’s motivation and behavior possibly change through shifts between ‘economic’ and ‘moral’ policy schemes. Studies should focus more systematically and in depth on how people perceive the policy measures and what kind of logic or rationality they

seem to evoke. A more fundamental understanding of this is of utmost importance in a situation where shifting to incentive based systems is the dominating trend.

8. References

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Paper 2: Sorting waste: exploring the integrated sense of self in self-determined environmental motivation

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Abstract: Self-Determination Theory (SDT) assumes that individuals' perceived autonomy and eudaimonic well-being are linked to individuals' integrated sense of self. The aim of this study is to investigate these theoretical assumptions put forward by SDT on an environmental relevant practice: household waste sorting. The analysis was conducted as a field study using household survey data (n=554) from six Norwegian municipalities, which mapped individuals' degrees of self-determined motivation and eudaimonic well-being in relation to sorting household waste, as well as their integrated sense of self. The latter was mapped by the New Ecological Paradigm (NEP-scale). The hypothesized theoretical relations were also studied under two kinds of incentive schemes; a fixed waste fee and a frequency-based waste fee. In general the results offer support to SDT's theoretical postulations. First, a positive relation is identified between a pro-ecological belief and factors measuring eudaimonic well-being in household waste sorting. Second, the results display that individuals with an anti-ecological belief relate negative emotions to household waste sorting, and find motivation in other sources than to do the right thing for the environment. Third, the results indicate that the frequency-based waste fee, as compared to the fixed waste fee, can give rise to less autonomous motivation regarding sorting household waste. The results are discussed in relation to previous findings on pro-environmental motivation and offer both confirmation and new insights. The study might also contribute to clarify an ambiguity identified in the literature about a possible overlap between 'biospherical values' and the NEP-scale.

1. Introduction

In order to facilitate for environmentally friendly behavior, there is a need to better understand human motivation. There are several theories that explore motivation and behavior based on different kinds of assumptions, and one such theory is Self-Determination Theory (SDT) (Deci & Ryan, 1985; Ryan & Deci, 2017). SDT has been applied in many different life areas including environmental issues – see e.g., De Groot and Steg (2010), Webb, Soutar, Mazzarol, and Saldaris (2013) and Heller and Vatn (2017).

SDT offers a coherent framework for motivational studies and holds a positive and dynamic view of what constitutes human motivation. More specifically, SDT assumes three basic psychological needs to be vital to human mental health and flourishing – i.e., *autonomy*, *competence* and *relatedness* (Ryan & Deci, 2000; Ryan, Sheldon, & Chirkov, 2011). This study investigates *autonomy* in relation to pro-environmental motivation. SDT postulates that individuals have a desire to self-organize experience and behavior, and this desire to be self-determined is what SDT characterize as autonomy. Further, SDT talks of *relative autonomy*, and links this to the degree that social constructs such as values, worldviews, beliefs and rules of behavior are integrated and internalized into what an individual experience as the integrated sense of self (Ryan & Deci, 2000; Ryan et al., 2011). As an extension of this understanding of autonomy, an individual that are able to live in concordance with one's integrated sense of self will experience *eudaimonic well-being*. It is notable that SDT belongs to a tradition within the well-being literature suggesting "that virtue, which is central to eudaimonia, involves making the right *choices*" (Deci & Ryan, 2008: 7). When you make the right choices – i.e., choices that are consistent with your integrated sense of self – you will experience contentment and your actions are experienced as meaningful – i.e., eudaimonic well-being.

Based on this, the aim of this study is to contribute to an improved understanding of what characterizes pro-environmental motivation through studying the theoretical postulations made by SDT about how perceived autonomy and eudaimonic well-being are linked to individuals' integrated sense of self. The theoretical assumptions are studied in an environmentally relevant area – i.e., how integrated beliefs or worldviews about human-nature relations influence motivation and well-being related to sorting household waste for recycling purposes. Waste sorting is relevant since this is a widespread practice adopted in order to reduce individuals' environmental footprint. The relevant beliefs – i.e., a pro- and anti-ecological belief about human-nature relations – were mapped by applying the New Ecological Paradigm Scale (NEP-scale) (Dunlap, Van Liere, Mertig, & Jones, 2000). Household waste sorting is also interesting to investigate since different incentive systems have been implemented to increase sorting efforts. Hence, this study also investigates how two kinds of fee schemes relate to autonomy, well-being and motivation in relation to waste sorting.

Quite a few studies have studied the link between attitudes, values, beliefs, norms, emotions etc., related to pro-environmental motivation (see Section 3 for a review of relevant literature). What distinguishes this study from others is that it investigates how two relevant

beliefs, which stand in contradiction to one another – i.e., pro- and anti-ecological beliefs – relate to human autonomy and eudaimonic well-being when contexts differ. By applying SDT, this paper will more specifically investigate the following three aspects: First, I will test the postulation that the degree that social constructs – represented here by the two beliefs – are integrated and internalized into the self, impacts on perceived autonomy and eudaimonic well-being. Second, I will explore how the two beliefs impact on the reasons that individuals have for sorting household waste – i.e., more or less autonomous motivation. Third, I will explore how two kinds of waste fee schemes influence perceived autonomy, eudaimonic well-being and motivation for sorting waste.

The analysis is based on survey data from a cross-sectional study that includes six Norwegian municipalities. All municipalities have implemented household waste sorting with a curbside waste system. Three of the municipalities have a fixed waste fee, while the other three have implemented a frequency-based waste fee scheme.

The remainder of the paper is organized as follows: the theoretical framework is presented in Section 2. Section 3 gives an overview of the most relevant existing empirical studies. The case and methods are presented in Section 4. Section 6 reports the results and also a discussion of these. Section 7 offers concluding comments.

2. Self-Determination Theory and Organismic Integration Theory

SDT has developed to become a comprehensive theory of human motivation (Deci & Ryan, 1985; Ryan & Deci, 2017; Ryan et al., 2011). A fundamental characteristic of SDT is the positive and dynamic view of what constitutes human motivation, and the assumption that humans are connected and interlinked with a socially constructed world – i.e., humans are "inclined to learn, to grow, to assimilate cultural values, and to connect and contribute to others" (Ryan et al., 2011: 35).

As mentioned in the introduction, SDT assumes that *autonomy* is a key concept for understanding human motivation and behavior: "Autonomy refers to volition – the organismic desire to self-organize experience and behavior and to have activity be concordant with one's integrated sense of self" (Deci & Ryan, 2000: 231). Autonomy is understood as a psychological need that allows individuals to merge with a social whole, a point that according to Ryan et al. (2011: 21) is based on what among others Maslow have stated: "Psychological autonomy, which he equates with the motivation of the 'being-needs,' allows fully functioning individuals not only to be free in pursuing their potentialities and needs, but also to merge easily with a larger social whole" (Maslow 1971 in Ryan et al., 2011: 21). This way of understanding autonomy – i.e., that the individual is linked to the social world – enables SDT to talk of *relative* autonomy. Relative autonomy is a concept about the extent that social values, beliefs and regulations are integrated and internalized into the self. How this process of integration and internalization takes place is more closely described in a mini-theory of SDT – i.e., Organismic Integration Theory (OIT).

However, before turning to OIT, it is necessary to bring in the concept of *eudaimonic well-being* and how this is linked to autonomy. SDT postulates that a higher degree of perceived autonomy is associated with greater engagement and greater psychological well-being. The eudaimonic tradition of understanding well-being claims that "well-being is fostered by reflective, purposive living in accord with deeply held social values"(Ryan et al., 2011: 46)¹. This implies for example that autonomous motivation for sorting waste must cohere with an individual's beliefs about how humans are related to nature or the environment. Conversely, if an individual think that humans do not have any responsibility for protecting the environment, it is, according to SDT, unlikely that she will find sorting waste to be "living in accordance with deeply held social values". Hence, it is questionable that she will also experience eudaimonic well-being from sorting waste. These social values or regulations are characterized as extrinsic motivation in the framework of SDT, and is elaborated on in OIT.

OIT, as outlined in Ryan and Deci (2000), is based on a classification scheme that distinguishes between extrinsic and intrinsic motivation. *Extrinsic motivation* is defined as "a construct that pertains whenever an activity is done in order to attain some separable outcome" (Ryan & Deci, 2000: 60) – and *intrinsic motivation* is defined as "the doing of an activity for its inherent satisfactions rather than for some separable consequence" (Ryan and Deci (2000: 56). Extrinsic motivation is further divided into four sub-categories depending on how *integrated* and *internalized* for example a regulation is into the self. The processes of internalization and integration are described as "taking in a value or regulation" and "integration is the process by which individuals more fully transform the regulation into their own so that it will emanate from their sense of self" (ibid: 60). It is these psychological processes of internalization and integration that form the basis for how individuals can perceive social constructs as part of their sense of self – e.g., beliefs about how humans are related to nature.

The least integrated category is an *external* regulation. This kind of regulation is referred to as external rewards and punishments, and they also involve feelings of external control. The second category is an *introjected* regulation that is mostly about enhancing or maintaining self-esteem that includes internal rewards and punishments like pride and guilt. To sort waste because you want to please someone that are close to you would fall into this category. A more autonomous form of extrinsic motivation is an *identified* regulation. This means that the person has identified herself with the personal importance of the behavior. Finally, there is *integrated* regulation, the most autonomous form of extrinsic motivation, where the value or regulation has been fully assimilated into the self, bringing new regulations into congruence with one's other values and needs (Ryan & Deci, 2000). This regulation implies "To fully internalize a regulation or other social constructs, and thus to become autonomous with respect to it, people must inwardly grasp its meaning and worth" (ibid: 64). Hence, a person that finds waste sorting to be a meaningful practice falls into this category of an integrated

¹ Eudaimonic well-being can be contrasted to hedonic well-being where focus is rather on the presence or absence of subjective affections (Huta, 2015).

regulation. Furthermore, OIT operates with amotivation that is characterized by a "state of lacking an intention to act" (Ryan and Deci, 2000: 61). A person that is amotivated would lack an intention to sort waste, and find no meaning in it. Finally, it should be noted that SDT stresses that it "is also important to see internalization in its complexity. Within the SDT model, underlying most behaviors are multiple forms of regulation (Ryan et al., 2011: 52). Hence, a person can be motivated by both integrated and introjected regulations.

In addition, the categories of extrinsic motivation are divided into two classes – i.e., *externally perceived locus of causality* and *internally perceived locus of causality*. The former includes external and introjected regulation and the latter includes identified or integrated regulation (ibid: 61). These classes state from where the individual perceives that the justification of the regulation stems from – i.e., from outside or within herself.

Regarding different contexts and the various kinds of extrinsic motivation presented above, OIT postulates that more "controlling contexts may yield introjected regulation if they support competence and relatedness, but only autonomy supportive contexts will yield integrated self-regulation" (Ryan & Deci, 2000: 64). Hence, different incentive systems such as the two waste fee schemes included in this study have the potential to give rise to motivation that is more or less autonomous.

3. Previous research regarding values and beliefs, autonomy and well-being related to pro-environmental motivation

As stated in the introduction, there are quite a few studies that have examined how values, beliefs, norms, well-being etc. relate to pro-environmental motivation and behavior. Of those that apply SDT, several have found that self-determined individuals are more likely to engage in pro-environmental behavior – see e.g., Pelletier, Baxter, and Huta (2011) for an overview – and that the more self-determined you are, the more likely it is that you will conduct pro-environmental behaviors that are perceived to be difficult (Green-Demers, Pelletier, & Ménard, 1997; Pelletier & Sharp, 2007). Self-determined or autonomous motivation has also been found to be a better predictor of pro-environmental behavior compared to other more established predictors such as intentions, subjective norms, perceived behavioral control and past behavior (Webb et al., 2013).

The literature includes also other approaches than SDT that set out to explain pro-environmental motivation and behavior. The value-belief-norm theory (VBN) presented by Stern (2000) is one such approach that "links value theory, norm-activation theory, and the New Environmental Paradigm (NEP) perspective through a causal chain of five variables leading to behavior" (ibid: 412). The first variable is *values* that are divided into either 'biospheric', 'altruistic' or 'egoistic' that are further linked to *beliefs* that are represented by an 'ecological worldview' as expressed by the NEP-scale. This is further linked to pro-environmental personal norms that again will determine behaviors. It should, however, be noted that even though VBN categorize the NEP-scale as representing a *belief*, others have

pointed at the fact that the NEP-scale also includes elements of *values* and *attitudes* (Dunlap et al., 2000).

The role that values, as outlined by the VBN-theory, play in explaining pro-environmental motivation has been further developed and studied by others. De Groot and Steg (2007, 2008) have developed a survey instrument that sets out to measure *egoistic*, *altruistic* and *biospheric* value orientations. The value orientation that is most relevant for this study, is the biospheric that includes ‘preventing pollution’, ‘respecting the earth’, ‘unity with nature and protecting the environment’ (De Groot & Steg, 2010).

Further, Steg (2016) has reviewed literatures that have investigated “factors influencing and encouraging pro-environmental actions by individuals and households”. The review offers relevant insights for this study: pro-environmental action has the potential to make individuals feel good about themselves; people tend to act in a less pro-environmental way if their biospheric values are not supported by the context, or also when competing values are activated by factors in a choice context. Other studies have identified relations between holding biospheric values, but also altruistic values, and self-determined pro-environmental motivation (De Groot & Steg, 2010), and a relation has also been identified between a pro-ecological belief – measured by applying the NEP-scale – and self-determined motivation (Heller & Vatn, 2017).

Regarding the concept of *well-being* related to pro-environmental behavior, Venhoeven, Bolderdijk, and Steg (2013) have presented a review of the literature. This study concludes that increased eudaimonic well-being depends on “that people see pro-environmental behaviour as the right thing to do, and have the feeling they want and freely choose to perform this behaviour” (ibid: 1381). The review also states that what is considered as “good behaviour may depend on the norms and values upheld by the social groups one belongs to” (ibid: 1379). Added to this, a study by (Feinberg & Willer, 2013) have found that not everyone evaluate pro-environmental behavior as an act of doing morally good.

Other relevant studies that have investigated motivations in relation to waste sorting, without applying SDT or referring to eudaimonic well-being explicitly, have found that sorting household waste is mainly motivated by norms and moral considerations (Berglund, 2005; Berglund & Matti, 2006; Hage, Söderholm, & Berglund, 2009). Thøgersen (1996) states, for example, that to sort waste is part of the ‘domain of morality’, and Berglund and Matti (2006) find this practice to be part of being a ‘good citizen’.

4. Material and methods

4.1. The selected study settings

To sort waste for recycling purposes decreases the negative impact of human activities on the environment. Taking this into consideration, most industrialized countries including Norway have developed policy goals and measures to increase the recycling rates of household waste (Norwegian Environment Agency, 2003; Norwegian Ministry of Environment, 1981). One

such measure is to implement curbside waste management where the households are expected to sort waste into different waste fractions – e.g., paper and plastic – which are picked up at the curbside of the household.

Historically, the Norwegian waste fee scheme for households has been organized as a yearly fixed waste fee (FIXED). However, municipalities have been advised to differentiate the waste fee to increase the public's effort in sorting household waste. One way to differentiate regards the number of times the container with unsorted, or residual, waste is collected at the curbside of each household by the municipal waste collection service. This is a frequency-based waste fee scheme (FREQUENCY). The fee under FREQUENCY is split in two parts. One part is fixed and equal for all households. The other part is differentiated with regard to number of times the unsorted waste is picked up at the household. This implies that the household every week must decide if the waste container should be emptied or not, and correspondingly if the household's waste fee should increase or not.

The survey was sent to six municipalities. Three had FIXED (Askim, Eidsberg and Kragerø), and three had FREQUENCY (Os, Askøy and Kristiansand). The municipalities have similar socio-demographic characteristics and are middle-sized municipalities with a town center. At the time of investigation, all municipalities had implemented curbside collection for three or more waste fractions: paper/cardboard (all), plastic (all, but Kristiansand) and organic waste (all, but Os and Askøy), and residual/unsorted waste (all). Other waste fractions such as glass, metal, hazardous waste, textiles etc. had to be brought to collection points in town and near landfills. Electronic waste could be handed in at any store selling electronic equipment.

At the time of data collection (2010), the fixed yearly waste fees² amounted to 2249 NOK in Askim, 2543 NOK in Eidsberg and 3353 NOK in Kragerø. For the municipalities with FREQUENCY, the fixed part of the waste fee amounted to 1893 NOK per year for households in Os and 1918 NOK in Askøy. The fixed part of the frequency-based waste fee scheme in Os and Askøy included 12 compulsory pick-ups per year due to prevention of health hazards and smell, especially in the summer. The marginal cost for any additional pick-ups of unsorted waste amounted to 33 NOK in both Os and Askøy³. Each household had at the time of investigation the possibility to have the unsorted waste picked up every week. To use this service every week amounts to a maximum yearly waste fee of 3193 NOK in Os and 3218 NOK in Askøy.

The frequency-based waste fee scheme in Kristiansand was somewhat differently designed compared to the waste fee schemes in Os and Askøy. The waste fee scheme in Kristiansand was also split in two parts (the fixed part amounted to 1754 NOK), but there was a marginal price on two waste fractions – i.e., unsorted waste and organic waste. The fixed part of the

² All prices on waste fees includes VAT

³ This fee refers to what the waste company defines as a 'standard subscription' for households that includes a 140 l container for unsorted waste. It is possible to subscribe for a larger container which will give a higher marginal cost for each pick up of unsorted waste.

waste fee scheme included 13 compulsory pick-ups of the organic waste. The marginal cost for any additional pick-up of organic waste amounted to 28 NOK, and the marginal cost of a pick-up of unsorted waste amounted to 34 NOK⁴. The households had the possibility to have both fractions picked-up every week.

4.2. Sample and household survey

A survey was conducted in six municipalities in 2010. 1800 households were chosen randomly – i.e., 300 in each municipality. Each household received a letter sent by postal service where they were asked to visit a website with a link to a questionnaire. The letters were addressed to the household as a unity. To ensure a random and representative selection of respondents, the questionnaire asked that an adult, 18 years or older, that most recently had his or her birthday, responded. After two rounds of telephone reminders, the response rate was 31 %. The survey included different sets of questions that were developed to capture the different aspects of motivation related to household waste sorting – see Tables 1, 2 and 3 for an overview of variables and factors included.

The NEP-scale was included in the survey to map fundamental beliefs related to environmental concern that represented the integrated sense of self. The NEP-scale consists of 15 items that include two kinds of belief systems linked to nature and the environment. Eight statements represent a positive attitude towards an ecological worldview. They emphasize that there are limits regarding how much natural resources humans can extract and use, as well as the possibility of a human made ecological crisis. I will refer to this as a pro-ecological belief (PRO_ECO_PARAD). Seven items measure an antagonistic attitude towards an ecological worldview, and I will refer to it as an anti-ecological belief (ANTI_ECO_PARAD). This latter worldview express an ecological view of human domination where humans are at the center of the universe – i.e., anthropocentrism – and postulates that "humans are exempt from the constraints of nature" (Dunlap et al., 2000: 431). The two beliefs about human-nature relations are assumed relevant since sorting household waste is a practice introduced to save the environment. Recommendations from the literature have been followed when applying the scale (Dunlap & Van Liere, 2008; Hawcroft & Milfont, 2010).

⁴ This fee refers to a subscription that includes a 120 l container for unsorted waste. It is possible to subscribe for a larger container which will give a higher marginal cost for each pick up of unsorted waste.

Table 1. Overview of survey questions, statements and scales included in the statistical analysis

What motivates you to sort household waste? Consider the following statements and tick one alternative per statement:

1. I sort waste because I want to see myself as a responsible person
2. I sort waste because I see it as my duty
3. I sort waste because I am familiar with the positive environmental consequences
4. I sort waste because I want to contribute to a better environment
5. I sort waste because I should do what I expect of others
6. I sort waste because I want others to see me as a responsible person
7. I sort waste because it is economic profitable
8. I sort waste because I want to reduce numbers of pick ups

Scale: 1 to 5 where 1=completely disagree to 5= completely agree:

Do you associate any of the following emotions with the practice of sorting household waste?

Evaluate the following statements and tick one alternative per statement:

- I. A sense of satisfaction
- II. A sense of independence
- III. A sense of being proud
- IV. A sense of good conscience
- V. A sense of being controlled
- VI. A sense of being forced

Scale: 1 to 5 where 1=completely disagree to 5= completely agree:

Evaluate the following statement and tick one alternative:

- I find sorting household waste to be a meaningful practice (MEANING)

Scale: 1 to 5 where 1=completely disagree to 5= completely agree

The New Ecological Paradigm Scale.

Evaluate the following statement and tick one alternative:

- a) We are approaching the limit of the number of people the earth can support
- b) Humans have the right to modify the natural environment to suit their needs
- c) When humans interfere with nature it often produces disastrous consequences
- d) Human ingenuity will insure that we do NOT make the earth unlivable
- e) Humans are severely abusing the environment
- f) The earth has plenty of natural resources if we just learn how to develop them
- g) Plants and animals have as much right as humans to exist
- h) The balance of nature is strong enough to cope with the impacts of modern industrial nations
- i) Despite our special abilities humans are still subject to the laws of nature
- j) The so-called "ecological crisis" facing humankind has been greatly exaggerated
- k) The earth is like a spaceship with very limited room and resources
- l) Humans were meant to rule over the rest of nature
- m) The balance of nature is very delicate and easily upset
- n) Humans will eventually learn enough about how nature works to be able to control it
- o) If things continue on their present course, we will soon experience a major ecological catastrophe

Scale: 1 to 5 where 1=completely disagree to 5= completely agree

Further, SDT assumes that when the reasoning behind a practice, such as waste sorting is in congruence with generally held values and beliefs, this will lead to higher levels of perceived autonomy and eudaimonic well-being – i.e., the practice is experienced as meaningful. To test this, the survey included a variable that measured how meaningful the respondents perceived waste sorting to be (MEANING), and variables measuring both positive (EMO_POS) and negative emotions (EMO_NEG) related to waste sorting. A positive relationship between

PRO_ECO_PARAD and both EMO_POS and MEANING will offer a confirmation of SDT. Similarly, a positive relation between ANTI_ECO_PARAD and EMO_NEG is expected since lower levels of integration and internalization of relevant beliefs will, according to SDT, have the potential to foster negative emotions like feeling forced or controlled.

In addition, another set of statements was included to investigate how different kinds of motivation for sorting household waste might reflect to what degree a pro-ecological belief is internalized and integrated into the self of an individual. First, statements reflecting reasoned motivation for sorting waste such as "I sort waste because I see it as my duty" were included and represent motivation characterized as *identified* or *integrated* with an internal locus of causality. These statements formed the factor RIGHT_THING. It was assumed that PRO_ECO_PARAD would correspond with this factor since SDT postulates that to "fully internalize a regulation, and thus to become autonomous with respect to it, people must inwardly grasp its meaning and worth" (Ryan & Deci, 2000: 64). Second, two statements were included to capture extrinsic motivation characterized as *introjective*. This is motivation related to what you hope or think that significant others might think of you in relation to waste sorting, and these statements formed the factor OTHERS. Finally, for the surveys distributed to the municipalities with FREQUENCY, two additional statements were included that covered motivation related to saving costs – an opportunity that was part of this system. These two formed the factor ECON_GAIN.

The two kinds of waste fee schemes were included as a binary variable named 'waste fee scheme' where 0 denote a fixed waste fee scheme (FIXED) and 1 denote a frequency-based waste fee scheme (FREQUENCY). Finally, socio-economic variables – age (AGE), gender (GENDER), level of education (EDUCATION) and personal income (INCOME) – were included. See Table 2 for details.

Table 2. Socio-economic statistics for individuals in the two sub-samples.

Variables	Description	FIXED		FREQUENCY	
		%	N	%	N
GENDER	0 = Female,	49.1	140	52.7	138
	1 = Male	50.9	145	47.3	125
EDUCATION	1 = Elementary school	9.9	28	9.2	24
	2 = High school	50.9	145	38.5	101
	3 = University	39.3	112	52.3	137
INCOME	1= less than NOK 50 000	2.9	8	1.5	4
	2 = between NOK 50 001 and 100 000	2.5	7	1.1	3
	3 = between NOK 100 001 and 300 000	31.1	86	28.1	73
	4 = between NOK 300 001 and 500 000	42.8	118	43.1	112
	5 = Between NOK 501 000 and 700 000	14.9	41	13.8	36
	6 = Above NOK 700 000	5.8	16	12.3	32
AGE	In years	Mean	St.dev	Mean	St.dev
		34.12	14.33	31.33	13.89

A possible pitfall is the relatively low response rate (31%) that in this case might imply a bias in the sample towards respondents being more dutiful compared to the average population. However, as long as it is the relative difference in motivation that is investigated, this is considered to be a manageable bias.

Another noteworthy circumstance is that the statements addressing motivation for sorting waste contains two parts. Each statement contains a claim that the respondent does sort waste, and also the reason why. The two parts were combined in each statement in order to secure that the link between the behavior – i.e., sorting – and the reason why the individual sort waste, was captured. It can be argued that the inclusion of both parts in the statements can make it unclear what the respondents are answering – i.e., if they answer if they sort waste, or the rationale for why they sort waste. However, as long as there are only respondents who actually sort waste that are given the opportunity to answer this question, this circumstance is not evaluated as a serious objection to how the statements are constructed.

4.3. Statistical analysis

The surveys include several questions measuring the same motivational aspect, so-called latent variables or factors (Bartholomew, Steele, Galbraith, & Moustaki, 2008). To reduce the number of variables factor analyses were run for each of the sets of questions included in the survey – see Table 3 for details. The loadings offer an evaluation of the relationships – i.e., correlations – between observed variables and the latent factor. The factor analyses were ran using the software STATA.

The first factor analysis was ran as an exploratory factor analysis (EFA) on the six statements related to motivational aspects that were sent to all municipalities (statements 1 to 6 under the question "What motivates you to sort household waste" in Table 1). With a factor loading cut-off at 0.5, the six statements formed two factors – i.e., RIGHT_THING and OTHERS – see Table 3. Notable is that the eigenvalue of the second factor was low (0.38), but since it is theoretically interesting I chose to include the factor in the further statistical analysis. The second factor analysis was run as a Confirmatory Factor Analysis (CFA) and included two statements that were included in the survey sent to the institutional setting FREQUENCY – statements 7 and 8 in Table 1. The factor is referred to as ECON_GAIN – see Table 3. To run only one factor analysis that included all eight statements could have been an alternative. However, since questions 7 and 8 were only asked in municipalities with FREQUENCY this latter solution would imply that only half the sample could be included in the analysis, and was therefore evaluated to be an inferior solution. Further, a CFA was run for the statements that address emotions linked to sorting household waste, and two factors were formed: EMO_POS and EMO_NEG – see Table 3. Finally, an EFA was run including all 15 statements from the NEP-scale. Since the literature is not clear on how many dimensions the NEP-scale includes (R. Dunlap et al., 2000) this was a subject that I needed to explore. Using a factor loading cut-off at 0.5, two distinct factors were formed that includes eight of the original 15 statements. To run both EFA and CFA is often the case when factor analysis is applied (Bartholomew, Steele, Galbraith, & Moustaki, 2008: 290). The results of the factor analysis can be found in Table 3.

The Cronbach's alpha is an estimate for internal consistency of the various factors and measures whether several items that propose to measure the same general construct produce similar scores. Values under 0.5 are in general evaluated as unacceptable. Hence, none of the factors are unacceptable, but the factor named OTHERS is evaluated as poor.

Table 3. Factor Analysis¹.

	Mean	SD	Loadings	Cronbach's alpha
<i>RIGHT_THING - integrated</i>	4.18	0.78		0.794
I sort waste because I want to see myself as a responsible person	4.16	1.00	0.54	
I sort waste because I see it as my duty	4.28	0.96	0.76	
I sort waste because I am familiar with the positive environmental consequences	4.11	1.15	0.60	
I sort waste because I want to contribute to a better environment	4.47	0.85	0.77	
<i>OTHERS - introjected</i>	3.62	1.08		0.579
I sort waste because I should do what I expect of others	3.14	1.42	0.51	
I sort waste because I want others to see me as a responsible person	4.11	1.15	0.55	
<i>ECON_GAIN - external</i>	3.40	1.21		0.821
I sort waste because it is economic profitable	3.14	1.27	0.77	
I sort waste because I want to reduce numbers of pick ups	3.63	1.27	0.77	
<i>PRO_ECO_PARAD; pro 'ecological paradigm' beliefs from NEP-scale</i>	3.35	0.75		0.688
When humans interfere with nature it often causes catastrophic consequences	3.29	1.19	0.55	
Humans are severely abusing the environment	3.74	1.02	0.62	
The natures balance is fragile and easy to interrupt	2.99	1.08	0.51	
If things continue on their present course, we will soon experience a major ecological catastrophe	3.37	1.02	0.60	
<i>ANTI_ECO_PARAD; anti 'ecological paradigm' beliefs from NEP-scale</i>	2.60	0.70		0.621
Humans have the right to modify the natural environment to suit their needs	2.88	1.16	0.54	
Human ingenuity will insure that we do NOT make the earth unlivable	3.10	1.03	0.52	
The balance of nature is strong enough to cope with the impacts of modern industrial nations	2.18	1.02	0.53	
Humans will eventually learn enough about how nature works to be able to control it	2.64	1.04	0.53	
<i>EMO_POS; positive emotions</i>	3.37	0.99		0.828
A sense of satisfaction	3.66	1.23	0.75	
A sense of independence	2.88	1.27	0.71	
A sense of being proud	2.96	1.28	0.73	
A sense of good conscience	4.03	1.11	0.64	
<i>EMO_NEG; negative emotions</i>	1.78	0.99		0.804
A sense of being controlled	1.77	1.10	0.74	
A sense of being forced	1.80	1.07	0.75	

Note:

¹ See Table 1 for details about the statements included.

The statistical analyses are based on non-continuous ordered variables, and the appropriate regression analysis to run is therefore ordered logistic regression (logit). Logit regression were run to estimate different models that investigated the assumed relationships between the independent variables: beliefs regarding human-nature relations (PRO_ECO_PARAD and ANTI_ECO_PARAD), waste fee schemes (a dummy where 0 indicate FIXED and 1 indicate FREQUENCY) and socio-demographic variables (AGE, GENDER and EDUCATION) and the dependent variables: perceived meaning and emotions related to waste sorting (MEANING, EMO_POS and EMO_NEG), as well as the motivational factors for sorting waste (RIGHT_THING, OTHERS and ECON_GAIN).

Regarding ‘goodness-of-fit indicator’ this is referred to as Pseudo R-squared as the analysis is based on logit regression. The indicator reports rather low values across the different models, ranging from .01 to .05. Values from 0.2 to 0.4 are considered an excellent fit – see e.g., McFadden (1977). It should be noted though that these values are not comparable to R-squared values that are obtained running OLS regression, and where the values can be interpreted as percentage explained variance.

5. Results and discussion

The aim of this study has been to contribute to the literature that investigates what characterizes pro-environmental motivation by studying the theoretical assumptions put forward by SDT about how perceived autonomy and eudaimonic well-being are linked to the individual’s integrated sense of self. In the following, I will first discuss the findings in relation to the theoretical postulations of SDT/OIT – i.e., a pro-ecological belief in Section 6.1, an anti-ecological belief in Section 6.2, and the two waste fee schemes in Section 6.3. In Section 6.4 I comment on the results regarding socio-economic data. Finally, the relevance of the results from this study will be discussed in relation to previous research in Section 6.4.

5.1. Pro-ecological beliefs and household waste sorting

According to SDT/OIT, it is the individual’s integrated sense of self that constitutes the basis for how the individual relates to the social world surrounding her, as well as being a key determinant for what she will experience eudaimonic well-being (Ryan & Deci, 2000). The results in Table 4 display a positive relation between a pro-ecological belief and the variables representing eudaimonic well-being (MEANING and EMO_POS). Hence, these results offer support to the postulations of SDT/OIT about how the integrated sense of self is linked to eudaimonic well-being.

Table 4. Ecological beliefs and waste fee schemes in relation to eudaimonic well-being and autonomy in household waste sorting.¹

Independent variables ^a	Dependent variables:								
	MEANING			EMO_POS			EMO_NEG		
	Coef	St.err	p	Coef	St.err	p	Coef	St.err	p
Waste fee scheme ²	.02	.17	.89	.23	.16	.15	.27	.17	.12
PRO_ECO_PARAD	.45	.12	.00	.52	.11	.00	-.21	.12	.08
ANTI_ECO_PARAD	-.01	.12	.96	.14	.12	.12	.27	.12	.03
Control variables:									
AGE	.04	.15	.00	.02	.01	.00	-.03	.01	.00
GENDER	-.30	.18	.11	-.65	.17	.00	.55	.19	.00
EDUCATION	.00	.15	.98	-.02	.13	.83	-.25	.14	.08
INCOME	.13	.09	.17	-.06	.08	.51	-.06	.09	.51
R ² _{pseudo}	0.05			0.02			0.03		
LR chi ²	50.01			56.28			42.59		
N	502			493			500		

Notes:

¹ See Tables 1 and 2 for explanations of variables and factors

² 'Waste fee scheme' is a binary variable where 0 denote a fixed waste fee scheme (FIXED) and 1 denote a frequency-based waste fee scheme (FREQUENCY).

It was also expected that those identifying with a pro-ecological worldview (PRO_ECO_PARAD) would find motivation for sorting household waste through wanting to do the right thing for the environment – i.e., integrated motivation (RIGHT_THING). This is observed in Table 5, and can serve as an example of how integrated beliefs (PRO_ECO_PARAD) legitimize behavioral regulations if these regulations are experienced as authentic to the individual. The regulations, represented here by the practice of sorting waste, 'express' a view about human-nature relations that correspond well with the person's beliefs. Further, these individuals will experience an internally perceived locus of causality for why they sort waste, since beliefs and the regulations that guide action reflects the same kind of logic. Accordingly, the lack of relationship between those with a pro-ecological belief and external motivation (ECON_GAIN) – see Table 5 – is plausible. This is so, since a wish to save costs reflects reasoning in line with an externally perceived locus of causality for why you should sort waste.

Table 5. Ecological beliefs and waste fee schemes in relation to motivation for sorting household waste.¹

Independent variables	Dependent variable:								
	RIGHT_THING integrated			OTHERS introjective			ECON_GAIN ³ external		
	Coef	St.err	p	Coef	St.err	p	Coef	St.err	p
Waste fee scheme ²	-.54	.17	.00	1.26	.17	.00			
PRO_ECO_PARAD	.62	.11	.00	.49	.11	.00	-.05	.18	.76
ANTI_ECO_PARAD	.03	.12	.68	.48	.12	.00	.43	.19	.03
Control variables:									
AGE	.03	.01	.00	.01	.01	.10	.02	.01	.06
GENDER	-.87	.18	.00	-.47	.18	.01	-.49	.28	.08
EDUCATION	.15	.14	.26	-.06	.14	.67	-.12	.22	.58
INCOME	.02	.08	.86	.12	.09	.18	.09	.14	.55
R ² _{pseudo}	.05			.04			.01		
LR chi ²	107.24			82.84			11.19		
N	494			496			206		

Notes:

¹ See Tables 1 and 2 for explanations of variables and factors

² ‘Waste fee scheme’ is a binary variable where 0 denote a fixed waste fee scheme (FIXED) and 1 denote a frequency-based waste fee scheme (FREQUENCY).

³ The factor ECON_GAIN is only relevant for FREQUENCY, and was therefore not included in the surveys sent to respondents in municipalities with FIXED.

In addition, a positive relation between holding pro-ecological beliefs and emphasizing the role of others – OTHERS – for why you are motivated to sort waste (Table 5). This kind of motivation is characterized by OIT as an introjected regulation – i.e., less autonomous motivation compared to an identified or integrated regulation, but more integrated as compared to an external regulation. This implies that to gain acceptance from significant others is an important motivational factor for people holding pro-ecological beliefs, and also that motivation related to self-esteem can be just as important despite deeply integrated beliefs.

5.2. Anti-ecological beliefs and household waste sorting

Turning to those that identify with an anti-ecological worldview (ANTI_ECO_PARAD), it was assumed that they would find no meaning in sorting waste since they are of the opinion that "humans are exempt from the constraints of nature" (Dunlap et al., 2000: 431). The results in Table 4 support this assumption. The relation between ANTI_ECO_PARAD and MEANING is highly insignificant, which gives support to the postulation by SDT/OIT that what you experience as a meaningful activity is linked to what you perceive as your integrated sense of self. Similarly, the results indicating that individuals with an anti-ecological worldview experience negative emotions (EMO_NEG) while sorting waste were also expected. Consistently, they do not associate positive emotions to sorting waste.

Further, as observed in Table 5, those with an anti-ecological worldview are motivated through other sources – i.e., to save costs (ECON_GAIN) and/or to sort waste due to opinions

of significant others (OTHERS). Both of these sources of motivation are linked to other logics than to the save the environment, and it is therefore expected that they will perceive an externally locus of causality for why they sort waste.

5.3. Incentive schemes and motivation for sorting household waste

Regarding the effect of the two waste fee schemes, it can be observed in Table 5 that FIXED is associated with higher levels of motivation linked to wanting to do the right thing for the environment (RIGHT_THING) – i.e., autonomous motivation – compared to FREQUENCY. Also, a positive relationship can be observed between the type of waste fee and OTHERS. This implies that FREQUENCY, compared to FIXED, is associated with more *introjective* motivations – i.e., a less autonomous form of extrinsic motivation compared to motivation represented by RIGHT_THING. In turn, these results support the predictions by SDT/OIT about how more controlling context has the potential to create less autonomous motivations. The results also support that an autonomy supportive context (FIXED), holds the potential to yield more integrated self-regulation – here represented by RIGHT_THING.

Further, considering that SDT/OIT postulates that only autonomy supportive contexts will yield integrated self-regulation, it could be expected that FREQUENCY would yield more negative emotions (EMO_NEG) and less positive (EMO_POS) in relation to sorting waste, as compared to FIXED. The results in Table 4 indicate positive relations to both positive and negative emotions, but neither is significant. Hence, the two kinds of waste fee schemes seem to have very little influence on well-being as measured in this analysis. It should be noted though that the kind of waste fee scheme that FREQUENCY represents, can be considered to be less controlling as compared to for example a fee that is weight-based. Hence, it could be speculated that the controlling aspect of FREQUENCY is too weak to have a significant impact on perceived well-being in relation to sorting waste.

5.4. Results regarding socio-economic data

The results regarding socio-economic data indicate that older people find it more meaningful to sort household waste – see Table 4. Further, age and/or to be a woman increases the chances of relating positive emotions to household waste sorting. There is also an increased chance to relate negative emotions sorting waste if you are younger and/or a man and/or have little education. Further, the results in Table 5 show a relationship between being older and/or a woman and to be motivated by doing the right thing for the environment. There is also identified a relationship between women and to be motivated by the factor OTHERS. Finally, the results in Table 5 indicate that men are more likely to be motivated by ECON_GAIN compared to women. Similarly, elder people find also more motivation in this factor.

5.5. The results in relation to findings from previous research

The results reported from this study offer both confirmation and new insights to what earlier studies have indicated, and in the following I will discuss the most important ones. First, the identified relation between a pro-ecological belief and autonomous motivation for sorting waste resulting in eudaimonic well-being gives support to earlier studies that have highlighted

the role of values and beliefs in relation to eudaimonic well-being (De Groot & Steg, 2010; Heller & Vatn, 2017; Steg, 2016; Stern, 2000; Venhoeven et al., 2013).

Second, earlier studies have identified that not everyone evaluate pro-environmental behavior as an act of doing morally good (Feinberg & Willer, 2013). Some scholars have introduced concepts and studied underlying motives for this kind of perception – e.g., egoistic values as outlined in the VBN-theory (De Groot & Steg, 2007, 2008; Stern, 2000) and/or hedonic values (Steg, Perlaviciute, Van der Werff, & Lurvink, 2014). The term used in this study - an anti-ecological belief - represents a different approach. The results show that individuals with an ecological view that places people in the center of the universe (ANTI_ECO_PARAD) is not motivated by doing what is (morally) right for the environment, but is rather motivated by motives with an external locus of causality – i.e., either saving costs or through what others think. Thus, such a belief might also contribute to the understanding for why someone views pro-environmental behavior as *not* an act of doing morally good.

Third, although some studies have been published in later years that studies structural or context dependent variables, this is in general an under investigated issue in relation to pro-environmental behavior (Steg, Bolderdijk, Keizer, & Perlaviciute, 2014; Steg & Vlek, 2009). The present study contribute to our understanding about contextual factors, and indicates that more controlling contexts, here represented by a frequency-based as compared to a fixed waste fee, yield less autonomous motivation. This result adds insights to previous research about what might be the underlying factors for why individuals are motivated to act in an pro-environmental way. This insight can also be explored further in future research. For example, it is likely that a more refined fee – e.g., a weight- or bag-based waste fee - will be perceived as more controlling than the frequency-based studied here. Hence, it would be interesting to do comparative studies to study if the same relationships can be identified, and perhaps even more distinct relationships - e.g., between the type of waste fee scheme and negative emotions.

Finally, I want to point at some possible ambiguities in the literature presented in Section 3 about two survey-instruments that are used when investigating pro-environmental motivation and behavior – i.e., biospheric values and the NEP-scale. As mentioned above, the VBN-theory outlines a five-variable model that seeks to explain pro-environmental motivation and behavior. The first variable consists of three kinds of values – i.e., egoistic, altruistic and biospheric values. The second variable regards beliefs represented by the NEP-scale. At the same time and noted earlier, the founders of the NEP-scale emphasizes that the NEP-scale includes different kinds of social constructs such as *values*, but also *beliefs* and *attitudes* (Dunlap et al., 2000). Hence, it is a possible overlap between what the literature refers to as biospheric values and the NEP-scale since both seemingly address values related to environmental concern. In relation to this, it is noteworthy that a link between self-determined pro-environmental motivation and biospheric values has been identified (De Groot & Steg, 2010), but also with the pro-ecological worldview as represented by the NEP-scale (Heller & Vatn, 2017). Hence, a task for future investigation should be to try to clarify the potential overlap and appropriate role division between the concept of biospheric values as outlined by

Stern (2000) and (De Groot & Steg, 2007, 2008), and a pro-ecological belief about human-nature relations as expressed by the NEP-scale (Dunlap et al., 2000), in explaining pro-environmental motivation and behavior.

6. Conclusion

The aim of this paper has been to study, in an environmentally relevant context, the theoretical assumptions put forward by SDT/OIT about how individuals' perceived autonomy and eudaimonic well-being are linked to individuals' integrated sense of self. The integrated sense of self has been operationalized through mapping individuals' beliefs regarding human-nature relations – i.e., either a pro- or an anti-ecological belief based on the NEP scale. All in all the results provide support to SDT. First, an integrated pro-ecological belief is associated with greater engagement and psychological well-being in relation to sorting household waste. Second, the opposite was found regarding an integrated anti-ecological belief. These individuals relate negative emotions with sorting household waste and they find motivation in motives with an external locus of causality - i.e., introjective or external motives. Finally, the least-controlling context – i.e., a fixed waste fee – fosters higher levels of autonomous motivation compared to a more controlling context – i.e., a frequency-based waste fee.

Previous research has been less focused on the role of the already integrated sense of self, such as beliefs or values, plays for self-determined motivation and well-being. The same also applies, as previously mentioned, the role of contextual factors for individuals' motivation. The results from this study can hopefully provide some new insights regarding these under-investigated issues.

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The divisive and disruptive effect of a weight-based waste fee



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ABSTRACT

The ability of economic incentives to promote environmentally friendly behavior has been questioned in the literature. Most studies investigating this issue are grounded in the agent-based rational choice model. The aim of this study is to expand our insights by applying an alternative theoretical framework combining elements from classical institutional economics and self-determination theory to study incentives for waste sorting. The analysis is based on data from a Norwegian municipality, Ulstein, which introduced and later terminated a differentiated waste fee. There are three main findings. First, the important role of normative motivation for sorting household waste is confirmed. Second, the economic incentive had a divisive effect on the motivation to sort household waste. Perceived autonomy linked to fundamental values about environmental concern seems to play an important role in explaining why half the sample reports no extra efforts in sorting waste as a response to the economic incentive. The other half was influenced by the external logic given to them (i.e., to save costs and hence report increased motivation to sort household waste). Finally, an increased practice of illegal waste disposal was observed as a response to the differentiated waste fee.

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1. Introduction

There is a debate in the literature regarding if, respectively under what conditions economic incentives are effective in promoting pro-social and/or environmentally friendly behavior – e.g., Bowles (2008), Frey and Oberholzer-Gee (1997), Gneezy and Rustichini (2000), Scott (1995). This debate extends even to sorting household waste (e.g., Berglund (2005); Thøgersen (2003)) – where observed results of introducing incentives vary quite substantially from success e.g., Linderhof et al. (2001) to failure e.g., Miranda et al. (1994).

Most studies that have investigated this issue use some extended form of the agent-based rational choice model such as “motivation crowding theory”, where the utility function has been expanded to include various “intrinsic motivations”. However, less emphasis has been placed on social structures such as institutions and the interaction between these and the individual. The aim of this study is therefore to expand our insights concerning the interactions between institutional and individual factors. We thereby contribute to the understanding of the conditions under which economic incentives work as intended, and when they might not promote environmentally friendly behavior.

The analysis is based on a case study from a Norwegian municipality, Ulstein, which introduced and later terminated a differentiated household waste fee. The differentiation was based on the amount of residual waste each household produced – a so-called weight-based waste fee (WEIGHT). The differentiated fee was introduced to increase efforts

for sorting waste for recycling purposes, but after only two years, WEIGHT was terminated and a fixed yearly waste fee (FIXED) was reintroduced. In analyzing the case, we combine two strands of theory: classical institutional economics and self-determination theory. The purpose is to see to what extent a combination of a structure based and an agency-based explanation can help in extending our insights into why effects of economic instruments vary so much.

The remainder of the paper is organized as follows: Section 2: theoretical framework; Section 3: the most relevant existing empirical studies; Section 4: case and methods; Section 5: results; Section 6: discussion; Section 7: conclusion.

2. Theoretical Framework

The most commonly used model to study economic incentives is rational choice: rationality understood as maximizing individual utility. This is the core of neoclassical (mainstream) economics. The use of a differentiated waste fee is grounded in this theoretical perspective. With a fixed yearly waste fee, there is no economic incentive to sort waste, and according to this model, the degree of sorting will be low.¹ Setting a price on the amount of waste that a household does not sort will however, motivate individuals to sort waste because it offers an economic gain from doing so.

One problem with this understanding is that it cannot explain the rather high levels of sorting observed with a fixed fee (Berglund and

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¹ Actually, it should be zero if there is no individual net gain from sorting.

Matti, 2006; Czajkowski et al., 2014; Thøgersen, 1994). There must be some other motivations involved than external rewards. Several theories exist that try to explain limitations of external rewards – including attempts to expand the standard rational choice model to include “internal rewards” and/or “intrinsic motivations”, (e.g., Andreoni (1990); Frey and Oberholzer-Gee (1997)), self-determination theory, e.g., Ryan and Deci (2000b) and classical institutional economics (e.g., Hodgson, 2007; Schuman and Johnson, 1976; Vatn, 2005). In our analysis, we combine the latter two theories because they both hold a pluralistic view on what motivates human action and focus explicitly on the dynamics between institutions and actors, while doing so from different angles. In the following we briefly describe the two theories and discuss how they can supplement each other to offer new insights to understand the effect of economic incentives on human motivation and action.

2.1. Classical Institutional Economics (CIE)

CIE is part of a broader field of institutional theory drawing on insights from, for example, sociology and political science. It emphasizes the interdependency between institutions and individuals when analyzing social phenomena and human action. Institutions are defined as conventions, norms and formally sanctioned rules (Scott, 1995; Vatn, 2005). Further, March and Olsen (2006: 8) highlight that institutions “provide codes of appropriate behavior, affective ties, and a belief in a legitimate order”. Thus, the focus of attention is moved from the individual, as in standard rational choice, to the interdependent dynamics between institutions and individuals’ motivations and actions.

As institutions have the power to influence behavior by forming individuals’ interests and perceptions, CIE understands rationality as plural (Hodgson, 2007). Institutions create a basis for human interaction defining which logic is pertinent to specific contexts and thereby the rationality that is anticipated (Paavola and Adger, 2005). In some institutional contexts, the emphasis is on individual interests – as in markets – and the individual-utility-maximization model is one possible representation of what “drives” choice. In other contexts, the issue is about what is better for a group or the society. Hence, we can talk of individual and social rationality. The appropriate logic is defined by present conventions and norms. While Etzioni (1988) emphasizes that even individual rationality demands socialization to function well, the collective logic behind norms is important because it solves coordination problems for which the individual alone can find no resolution.²

CIE posits that values and norms are social constructs. While values represent views that are more fundamental about what is important in life, institutions, like norms, are action-oriented rules defining how such values can be supported or protected when acting in social contexts. With reference to our case, institutional theory suggests that a norm exists that guides people to sort household waste – a norm that solves the evident collective decision problem. The introduction of a WEIGHT holds the potential to change the type of motivation for why people sort household waste. That is, the logic could change from a rationality that considers what is the right thing to do to a rationality that focuses on individual utility. This could result in increased sorting. However, it could also imply a reduction if the incentive is too weak to compensate for the shift in logic or a shift to an instrumental logic that has no meaning for actors.³

² One of the reviewers note that Goal Framing theory (GFT) Lindenberg and Steg, 2007. Normative, gain and hedonic goal frames guiding environmental behavior. *Journal of Social Issues* 63, 117–137. is another attempt to systematically include multidimensionality in human motivation. We acknowledge this, while we also note that there is a difference in that CIE includes institutions as key social constructs to explain the creation of different motivational structures and which dominates in certain contexts.

³ The reader may ask why we do not call this “crowding out” of norms or intrinsic motivation (e.g., Bowles, 2008; Cardenas et al., 2000; Frey and Oberholzer-Gee, 1997). We avoid that language because “crowding out” has been so strongly linked to changes in parameters of a utility function, while CIE emphasizes the change in logic (e.g., between utility maximization and appropriateness).

Finally, CIE emphasizes the importance of perceptions. Institutions are interpreted and in turn these interpretations will cause variation in behavior. The personality – including genetics and the individual’s social history – influences both perception and the significance a person gives to a certain context – be it individually or socially oriented. Hence, we talk of propensities, which cause actions to vary both between and within contexts.

2.2. Self-determination Theory (SDT)

While CIE focuses mainly on the role institutions play for perception and motivation, SDT begins from the level of the individual and relates to the tradition that emphasizes *eudaimonic* well-being. “Well-being is fostered by reflective, purposive living in accord with deeply held social values” (Ryan et al., 2011: 47). Eudaimonic well-being stands in contrast to hedonic well-being that involves a focus on the self, the present moment and the tangible. Accordingly hedonic well-being is about a momentary presence or absence of affections (Huta, 2015).⁴ Further, SDT assumes *autonomy*, *competence* and *relatedness* as basic psychological needs to human flourishing and mental health. The emphasis is on how motivation develops “in the individual” – on self-motivation (Ryan and Deci, 2000a; Ryan et al., 2011).

SDT advocates an understanding of *autonomy*⁵ as a key concept for understanding human motivation and behavior. Autonomy as postulated by SDT is rooted in eudaimonic well-being – i.e., “autonomy refers to volition – the organismic desire to self-organize experience and behavior and to have activity be concordant with one’s integrated sense of self” (Deci and Ryan, 2000: 231). Ryan and Deci (2000a) argue that only autonomy-supportive contexts will yield integrated self-regulation. Autonomy understood as a basic psychological need allows individuals not only to be “free in pursuing their potentialities and needs, but also to merge easily with a larger social whole” (Maslow 1971 in Ryan et al., 2011: 21). A higher degree of perceived autonomy (i.e., relative autonomy) is also associated with greater engagement and greater psychological well-being.

Formally, SDT comprises six mini-theories. Each of these addresses one facet of motivation or personality functioning (selfdeterminationtheory.org, 2015). In this paper we draw on the mini-theory Organismic Integration Theory (OIT) that addresses the process of internalization of various extrinsic motives (Ryan, 2009). OIT distinguishes between intrinsic and extrinsic motivation where Ryan and Deci (2000a: 56) define the former as “doing of an activity for its inherent satisfaction of the activity itself”. The focus is here on “the prototypic manifestation of the human tendency toward learning and creativity” (Ryan and Deci, 2000a).⁶ Extrinsic motivation is, on the other hand, seen as “a construct that pertains whenever an activity is done in order to attain some separable outcome” (Ryan and Deci, 2000a: 71) and is divided into four sub-categories depending on how integrated and internalized the institution is into the self.

The least integrated is an *external* regulation. This category refers to behavior that is “performed to satisfy an external demand or obtain an externally imposed reward contingency” (Ryan and Deci, 2000a: 61), and involves feelings of control. The second is an *introjected* regulation that is mostly about enhancing or maintaining self-esteem – ego-involvement, internal rewards and punishments like pride and guilt. The third is an *identified* regulation meaning that the person has

⁴ Rational choice theory is a fundamentally subjective theory and can therefore only relate to hedonic well-being.

⁵ This study is limited to studying different kinds of motivation related to sorting household waste. Hence, *autonomy* is a relevant concept that will be discussed. The concepts *relatedness* and *competence* are however not emphasized in this paper.

⁶ Notable is that Deci and Ryan’s work originates in studies of learning and first of all is oriented towards how teachers, parents, leaders, coaches, etc. can mobilize others to act. We note that this focus represents a potential challenge when applying their insights in the field of environmental action.

identified him-/herself with the personal importance of the behavior – personal importance and conscious valuing. Finally, there is *integrated* regulation, the most autonomous form of extrinsic motivation. To fully internalize a regulation, and thus to become autonomous with respect to it, people must inwardly grasp its meaning and worth. An *integrated* regulation has been fully assimilated into the self, bringing new regulations into congruence with one's other values and needs (Ryan and Deci, 2000a).⁷

The four categories outlined above that define to what extent a regulation is internalized and integrated is further divided into two sub-categories. First, *external locus of causality* that includes external and introjected regulations. Second, *internal locus of causality* that includes identified or integrated regulations. These two sub-categories states from where the individual perceives that the justification of the regulation stems from – i.e., from outside or from within herself (Ryan and Deci, 2000a).

2.3. Implications for Studying Waste Sorting

Where CIE focuses on the content of institutions and how these may hold the power to determine different kinds of motivation and behavior (e.g., individual and social rationality), SDT addresses the process of internalization of various extrinsic motives and how institutions activate certain orientations in people, affecting subsequent motivation (Ryan, 2009).

In our case, sorting household waste is potentially linked to different motivations. In the case of WEIGHT it may be motivated by saving costs. In the case of FIXED there may be more emphasis on values, norms and integrated regulation. Both theories posit that a shift from FIXED to WEIGHT might affect the motivation to sort waste. Following CIE, situations exist where a shift to individual rationality might create confusion or even hostility. This may occur when “doing the right thing” is what makes the action meaningful. “Doing the right thing” becomes an expression of who one is. Hence, if the value and its adherent norm(s) are strongly integrated across the whole society, one might expect that a shift to an economic incentive could reduce effort consistently across that society. If the values and norms are less strong/less integrated, shifting to an economic incentive might have the capacity to increase effort. Integration may typically vary across individuals, hypothesizing also a varied response to the economic incentive across individuals. The shift from WEIGHT to FIXED implies more uncertainty, though. According to mainstream economics it is plausible that the sorting degree will decrease when the economic incentive is removed. According to CIE the response to a reintroduction of a FIXED depends on the initial response to WEIGHT. If WEIGHT has been met with harsh hostility, one could expect some kind of relief or even gratitude when FIXED is reintroduced.

SDT adds to this understanding with its emphasis on relative *autonomy* as an important condition for the integration of institutions into the self. Further, to investigate individual's internal and external locus of causality have the potential to shed light on the determinants of which institutional logic that directs and guide people.

The combination of the two theories holds the potential to enable an analysis of the interactions between individuals with different beliefs or values regarding environmental concern and institutions here in the form of different kinds of waste fee schemes.

3. Empirical Findings Regarding Effects of Economic Incentives on Motivation and Efforts to Sort Household Waste

Studies investigating the ability of economic incentives to raise efforts to sort more household waste show quite varied results (Kinnaman, 2006; Linderhof et al., 2001). Most such studies base their analysis on standard rational choice (Abbott et al., 2013; Ackerman, 1996; Bruvoll et al., 2002; Bruvoll and Nyborg, 2004; Dijkgraaf and Gradus, 2004; Fullerton and Kinnaman, 2002). However, few such studies limit their understanding to external rewards. Many expand the utility function to include what this strand of the literature terms “intrinsic reward” (as developed in e.g., Andreoni, 1990; Frey and Oberholzer-Gee, 1997). These studies are inspired by the hedonic definition of well-being as the “presence of positive affect and the absence of negative affect” (Kahneman et al., 1999).

For example, studies have found that sorting household waste is associated with a positive emotion (Berglund and Matti, 2006) and that it is considered as a pleasant activity in itself (Bruvoll et al., 2002). Czajkowski et al. (2014) conclude that most households even prefer to sort waste themselves rather than to have waste sorted for them.

Others look beyond the rational choice model and address the social context of human motivation and action. A key finding is that sorting household waste is mainly motivated by norms and moral considerations (Berglund, 2005; Berglund and Matti, 2006; Hage et al., 2009). Thøgersen (1996) states that to sort waste falls under the “domain of morality” and Berglund and Matti (2006) find this practice to be part of being a “good citizen”.

Yet others, though few, scrutinize motivations and perceptions linked to introducing an economic incentive to sort household waste. Thøgersen (1994) studies the potential of economic incentives to boost efforts to sort household waste and uses the concept of “re-framing” when he hypothesize that the use of a differentiated waste fee might “re-frame” the recycling activity into the sphere of private cost-benefit calculations. It parallels with what we above term “change in logic” due to a shift in the institutional context.⁸ The article concludes that there is empirical support for this hypothesis, but that this is a topic requiring further investigation. In another study, Thøgersen (2003) studies behavioral and psychological reactions to a weight-based waste fee. Although the economic incentive seems to increase efforts to sort household waste, Thøgersen concludes that to introduce such an incentive is associated with risk because “intrinsic motivation” plays a key role and it is therefore hard to envision the behavioral outcome.

Finally, the literature raises the concern that an economic incentive might increase illicit burning or dumping of waste (Dijkgraaf and Gradus, 2004; Fullerton and Kinnaman, 1995; Kinnaman, 2006). The logic of utility maximization implies that this is a probable outcome because illicit disposal of waste will reduce the level of fees paid. Such actions are, however, not desirable from society's viewpoint. Nevertheless, studies have shown that this is a likely, but not predictable outcome from introducing unit pricing on waste (OECD, 2004). Some find evidence of increased dumping (Fullerton and Kinnaman, 1996; Hong and Adams, 1999; Jenkins, 1993; Reschovsky and Stone, 1994); others find minimal changes in illicit dumping (Miranda et al., 1994; Nestor and Podolsky, 1998; Podolsky and Spiegel, 1998).

4. Material and Methods

4.1. The Setting in Ulstein

The study was conducted in Ulstein municipality, Norway (approximately 6.200 inhabitants Norway, 2015). The inter-municipal

⁷ It should be noted that the division between intrinsic and extrinsic motivation described above parts from how the strands of the literature stemming from the rational choice theory defines intrinsic motivation (e.g., “motivation crowding theory”). This latter kind of approach includes also “internalized social norms” into the concept of “intrinsic motivation” (Frey, 1997; Frey, 2012; Frey and Oberholzer-Gee, 1997).

⁸ We prefer using the concept “logic” to emphasize the interactive relation between individuals and social constructs such as institutions found in both CIE and SDT. The concept of “frames” seems typically used to describe something that is external to the individual.

waste management company Søre Sunnmøre Reinhaldsverk (SSR), established in 1980, manages the renovation services in Ulstein and nearby municipalities (Almedal, 2005). When the study was conducted, Ulstein had a curbside waste collection system whereby unsorted waste, paper and plastic were picked up at households. Other waste fractions such as electronic waste and waste categorized as environmentally dangerous had to be taken to central collection points.

Until 1 January 2009, when the weight-based waste fee (WEIGHT) was introduced, all Ulstein's households had a fixed yearly waste fee (FIXED). The given reason for introducing the differentiated waste fee scheme was that it "should pay to sort households waste" (author's translation) Vestfossen, 2007). The new WEIGHT scheme was split in two. One part was fixed and equal for all households (1356 NOK). The other was differentiated depending on how many kilograms of unsorted household waste households delivered. The price per kg of residual waste was 2.24 NOK. Noteworthy is that according to Norwegian regulations, total income from the waste-fee scheme can never exceed a municipality's costs related to renovation services (Norwegian Ministry of Environment, 1981). Hence, the range of the differentiation was relatively small. Two years later, 1 January 2011, WEIGHT was terminated and FIXED was reintroduced. The decision to terminate WEIGHT was, among other things, based on evaluating the effects of the system. It stressed that the introduction of WEIGHT had triggered "illegally dumped waste at sea and on shore, burying of waste, burning, using the neighbor's waste container etc." (author's translation) (Reinhaldsverk, 2010: 2). Additional costs related to administration and running of WEIGHT was also highlighted (Reinhaldsverk, 2010).

4.2. Data Collection

Data were collected from 2009 until 2013. It includes two surveys and some focus group interviews. The first survey was conducted late 2009, almost a year after WEIGHT was introduced, and was sent to a random sample of 500 households in Ulstein municipality.⁹ A total of 198 households responded. The second survey, in 2012, was conducted about one year after WEIGHT was terminated. To secure a panel data set, the second questionnaire was sent to the same individuals that responded in 2009. Eighty-six of 198 respondents to the 2009 survey responded; their responses constitute the 2012 survey.¹⁰

The somewhat low response rates might cause a risk that the sample is not representative. However, since the focus of this study is to investigate the existence of different kinds of motivations, the exact ratio between different categories is subordinate. One possible and relevant bias in the sample might be a bias towards a more dutiful sample than the average population. This is because giving answers to a survey is an act of duty in itself. In addition, since the number of respondents in the 2012 survey constitutes a limited sample of the 2009 survey, we might have encountered this bias in the second survey as well. To try to control for this we ran t-tests, but found no indications that the total sample in 2012 were more dutiful than the total sample in 2009 or that the structure of sub-groups changed from 2009 to 2012. In addition, there were no indications from t-tests that the samples changed from 2009 to 2012 regarding socioeconomic variables (i.e., age, gender or level of education).¹¹

To measure the individual degree of sorting household waste, respondents in both surveys were asked to respond to the question: "How much of the household waste do you sort?". Hence, the degree of household waste sorting is measured as a stated variable. It could be argued that to measure the actual degree of sorting would be favorable compared to self-reported data. This was unfortunately impossible

because the renovation company, Søre Sunnmøre Reinhaldsverk, lost data related to the weighing of household waste (kg of unsorted waste per household) due to a computer accident.

Because the aim of this study has been to measure individuals' motivations for sorting household waste and how the institutional setting might influence motivations, the survey included sets of questions that were developed to capture different motivational aspects – see Tables 1 and 2 for an overview of the questions asked and the abbreviations used in the text.

First, the set of questions that investigated the individual motivation for sorting household waste included questions covering aspects assumed relevant for the social or "we logic" such as "I want to see myself as a responsible person" and "it is my duty to sort waste to contribute to a better environment". Other questions were included to cover the individual or "I logic" such as "it is economically profitable for me to sort waste" and "I get a good feeling from sorting waste". Questions are partly based on a survey by Berglund and Matti (2006). Other questions cover the SDT dimension; that a regulation can be more or less integrated into the self. The perceived locus of causality is an important determinant for how integrated the regulation is. Questions measuring normative reasons express an internally perceived locus of causality, while questions related to encouragement from the municipality, information about positive environmental consequences from sorting waste, and individual economic gain have an externally perceived locus of causality.

A second set of questions is developed to capture different perceptions of WEIGHT. According to CIE, an economic incentive will carry expectations about an "I logic" that individuals may or may not be directed by. The set of questions is therefore developed to capture reasons that both agree and disagree with this logic. Hence, since the set of questions also includes reasons for disagreeing with the "I logic", (WEIGHT), we have also implicitly measured perceptions about the "we logic", (FIXED).

As CIE and SDT – in line with a wider literature¹² – postulate that values might influence and guide both motivation and behavior of individuals, a set of questions measuring values related to environmental concern was included. To map these values we included the revised form of the New Environmental Paradigm developed by Dunlap and Van Liere (1978), which is the most frequently used scale to measure environmental concern (Dunlap, 2008; Fransson and Garling, 1999). The NEP scale consists of 15 items. Eight items represent a positive attitude towards an ecological worldview (pro NEP) and seven items measure an antagonistic attitude towards an ecological worldview (anti NEP). In applying the scale, we have followed recommendations from the literature (Dunlap and Van Liere, 2008; Hawcroft and Milfont, 2010). We included the NEP scale only in the 2012 survey.¹³ Ideally, it should have been included in both surveys, but because the scale maps fundamental values, the results will likely not change much over time. The low number of respondents in the 2012 survey (only approximately half of respondents from the 2009 survey have responded to the NEP scale) is, however, a weakness because small samples are always problematic.

Finally, because SDT assumes that emotions, both negative and positive, are closely related to how integrated a regulation is, we included a set of questions exploring different kinds of emotions related to sorting waste in the 2012 survey. The set of questions explore emotions related to sorting waste other than only hedonic (i.e., I sort waste because it gives me a good feeling), but also emotions more in line with the eudaimonic tradition (i.e., to sort waste gives me a sense of being

¹² E.g., Dunlap et al., 2000. New trends in measuring environmental attitudes: measuring endorsement of the new ecological paradigm: a revised NEP scale. *Journal of social issues* 56, 425–442. Fransson, N., Garling, T., 1999. Environmental concern: conceptual definitions, measurement methods, and research findings. *J. Environ. Psychol.* 19, 369–382.

¹³ The project that has carried out the research presented here had not, when the 2009 survey was conducted, included all aspects of the theoretical framework applied here. For this reason, the NEP scale or the set of questions exploring emotions related to waste sorting was not included in the 2009 survey.

⁹ For budgetary reasons, the 2009 survey was limited to 500 questionnaires.

¹⁰ It should be noted that the project that undertook the research presented here did not plan a second survey, because the WEIGHT's termination was not foreseen when the WEIGHT in Ulstein was chosen as a case study.

¹¹ A weakness that should be noted is that respondent's income could have been included in the socioeconomic variables.

Table 1
Confirmatory factor analysis^a.

	Mean	SD	Loadings	Cronbach's alpha
^b Confirmatory factor analysis 1:				
Norms; being a responsible person (RESPONSIBLE)	3.06	0.71		0.709
I want to see myself as a responsible person	3.27	0.74	0.60	
I want others to see me as a responsible person	2.80	1.01	0.56	
I should do what I expect of others	3.10	0.91	0.56	
Norms; doing the right thing (RIGHT_THING):	3.37	0.64		0.720
It is my duty to sort waste to contribute to a better environment	3.38	0.74	0.66	
I think that to sort household waste is something one should do even though it does not pay off individually	3.36	0.71	0.61	
^c Confirmatory factor analysis 2:				
WEIGHT is a good idea because (WEIGHT_GOODIDEA):	2.51	0.97		0.830
...I can choose for myself how much to sort and pay for the rest	2.48	1.21	0.71	
...punishes those that are sloppy with waste sorting	2.49	1.17	0.74	
...gives a clear economic reason to sort waste	2.57	1.20	0.79	
WEIGHT is a bad idea because (WEIGHT_BADIDEA):	2.23	0.97		0.736
...I want to choose for myself how much waste to sort without being punished economically	1.91	1.18	0.56	
...to sort waste is a citizen duty and should be promoted by other means than economic incentives	2.31	1.31	0.68	
... it punishes big households	2.47	1.28	0.72	
^d Confirmatory factor analysis 3:				
Pro New Environmental Paradigm (ProNEP):	3.33	0.92		0.858
We are approaching the limit of the number of people the earth can support	3.24	1.37	0.66	
When humans interfere with nature, it often produces disastrous consequences.	3.27	1.27	0.78	
Humans are severely abusing the earth	3.32	1.28	0.78	
Plants and animals have as much right as humans to exist	3.71	1.12	0.64	
The earth is like a spaceship with very limited room and resources	3.30	1.22	0.63	
If things continue on their present course, we will soon experience a major environmental catastrophe	3.15	1.21	0.75	
Anti New Environmental Paradigm (AntiNEP):	2.76	0.84		0.869
Humans have the right to modify the natural environment to suit their needs	2.85	1.26	0.67	
Human ingenuity will insure that we do not make the earth uninhabitable	2.98	1.18	0.60	
The earth has plenty of natural resources if we just learn how to develop them.	3.65	1.10	0.62	
The balance of nature is strong enough to cope with the impacts of modern industrial nations	2.15	1.09	0.75	
The so-called "ecological crisis" facing humankind has been greatly exaggerated	2.65	1.19	0.84	
Humans are meant to rule over the rest of nature	2.48	1.19	0.69	
Humans will eventually learn enough about how nature works to be able to control it	2.57	1.09	0.64	

Source: 2009 survey (n = 196) and 2012 survey (n = 86).

^a Rotated factor loadings. Cut off at 0.5.

^b In order to answer the question "What makes you sort household waste?" the respondents were asked to consider different statements and to tick the answer option that best matched their view. The responses were given on a scale from 1 to 4: 1 = this does not match at all with my view, 2 = this match a bit with my view, 3 = this match partly with my view, 4 = this match completely with my view.

^c Respondents were asked to consider different statements and the responses were given on a scale from 1 to 4: 1 = this does not match at all with my view, 2 = this match a bit with my view, 3 = this match partly with my view, 4 = this match completely with my view.

^d Respondents were asked to consider different statements and the responses were given on a scale from 1 to 5: 1 = completely disagree to 5 = completely agree.

satisfied or being autonomous). Because the responses were somewhat low for the 2012 survey, we have chosen to use these data descriptively.

Focus groups conversations were conducted in April 2013. Participants in two of the groups, in total six people, were picked from respondents in the 2012 survey. The third group consisted of four people, all working at the waste disposal company SSR. Due to difficulties in

recruiting individuals to the focus groups, the study ended up with fewer participants than what is recommended and fewer than planned for, which may cause some biases in the responses captured (Ryan, 2009). In addition, other written sources such as newspaper articles and official papers have been studied to understand the processes of and responses to introducing and terminating WEIGHT.

Table 2
Description of variables used in the empirical analysis.

Independent variables	Description
Waste price scheme	0 if weight-based waste fee (WEIGHT) and 1 if fixed yearly waste fee (FIXED)
RESPONSIBLE	Factor: Norms; being a responsible person.
RIGHT_THING	Factor: Norms; doing the right thing
WEIGHT_GOODIDEA	Factor: WEIGHT is a good idea
WEIGHT_BADIDEA	Factor: WEIGHT is a bad idea
	In order to answer the question "What makes you sort household waste?" the respondents were asked to consider different statements and to tick the answer that best matched their view. The responses were given on a scale from 1 to 4: 1 = this does not match at all with my view, 2 = this match a bit with my view, 3 = this match partly with my view, 4 = this match completely with my view.
	The statements were:
PROFIT	"It is economically profitable for me to sort waste"
ENCOURAGEMENT	"Encouragements from municipality about sorting waste"
INFORMATION	"Information about positive consequences from waste sorting motivates me"
GOOD_FEELING	"I get a good feeling from sorting waste"
AGE	Responses were given in number of years lived.
GENDER	Responses were given as 0 if female or 1 if male
EDUCATION	Responses were given on a scale from 1 to 4: 1 if elementary school, 2 if high school, 3 if technical school and 4 if college or university.

4.3. Statistical Analysis

Because the surveys include several questions (variables) measuring potentially the same motivational aspect, so-called latent variables (Bartholomew et al., 2008), we ran confirmatory factor analysis (CFA) on each set of questions included in the survey (described in the above section). The three CFAs reduced 24 questions to six factors¹⁴ (Table 1). In short, CFA investigate concepts that are not easily measured directly by collapsing a number of variables into a few interpretable underlying latent variables or factors. The loadings offer an evaluation of the relationships (i.e., correlations) between observed variables and the latent factor. The Cronbach's alpha is an estimate for internal consistency and measures whether several items that propose to measure the same general construct produce similar scores. Values above 0.7 are in general evaluated as acceptable. Hence, the internal consistency for the factors in Table 1 is satisfactory.

To investigate the assumed relationship between sorting degree and motivational aspects associated with different institutional logics, we constructed three models (Table 5). Model 1 includes data from both surveys and we ran multiple regressions (random-effects GLS regression¹⁵ and ordered logit) to investigate the assumed relationships between sorting degree and motivational aspects. The two waste-fee schemes were represented by a dummy. For model 2, data from only the 2009 survey were included and a multiple OLS regression and ordered logit were run. Note that the variable measuring individual economic gain – PROFIT – is relevant only in 2009 and hence is included only in this model. The same statistical analysis was run for model 3 that included data only from the 2012 survey. When testing the relationship between the response to WEIGHT and different kinds of motivation, we ran a logit regression (Table 6). Finally, multiple OLS regression and ordered logit regression were run to test the relationship between sorting degree for the two groups and different kinds of motivational aspects (Table 7).

5. Results

5.1. Reported Degree of Sorting Household Waste

Stated sorting degree of household waste was measured in both 2009 and 2012. The average self-reported level was relatively high, above 4 on a scale from 1 to 6, where 1 is nothing and 6 is everything. The degree did not change considerably over time (Table 3).

Both surveys included questions to map how the two waste-fee schemes affected the level of stated waste sorting. In 2009, almost half the respondents reported that WEIGHT had made them increase their waste-sorting efforts, (later termed the “more group”). The other half reported that their efforts remained the same, (the “same group”). This latter result reveals two things. First, the introduction of WEIGHT seems to have triggered a divided response among the respondents and second, the sorting degree before WEIGHT was introduced must have been close to the levels in 2009, although somewhat lower because the “more group” report an increased effort as a response to the introduction of WEIGHT.

In the 2012 survey, 73.3% state that their sorting efforts are the same as under WEIGHT. The share of respondents stating that they have either increased or decreased their sorting efforts is about the same size and indicates that the waste-sorting level is about the same in 2012 as in 2009. This assertion is supported by a stable reported sorting degree over time from 2009 to 2012 – see Table 3.

5.2. Emotions Linked to Sorting Waste

As outlined in Section 4.2, SDT assumes that emotions may be closely linked to how integrated a regulation is into an individual's self. For

¹⁴ The NEP scale includes 15 items, but two items did not load high enough and were therefore not included in the factor.

¹⁵ For the random effect regression, the panel data set was denoted as unbalanced.

Table 3

Stated response to a change in waste fee regime on waste sorting degree.

	^a WEIGHT 2009		^b FIXED 2012	
	Mean ^c	%	Mean ^c	%
Stated response to change in waste fee scheme on waste sorting degree				
All respondents	4.3	100	4.4	100
I sort more	4.4	48.2	4.3	14.0
I sort the same as before	4.2	50.8	4.5	73.3
I sort less	3	1.9	3.8	10.5
Don't know		0.0	4.5	2.3

Source: 2009 survey (n = 196) and 2012 survey (n = 86).

^a WEIGHT is the weight based waste fee introduced in 1 January 2009.

^b FIXED is the fixed yearly waste fee reintroduced in 1 January 2011.

^c Responses to the question “How much of the household waste do you sort?” were given on a scale from 1 to 6: 1 if nothing, 2 if a little bit, 3 if some, 4 if pretty much, 5 if most and 6 if everything.

Table 4

Emotions linked to sorting household waste (%).

What kind of emotions do you relate to sorting household waste?	1	2	3	4	5	Mean	Number of responses
	Disagree				Agree		
A sense of satisfaction	5.3	7.9	34.2	36.8	15.8	3.5	76
A sense of independence	5.4	16.2	41.9	27.0	9.5	3.19	74
A feeling of being forced	54.7	24.0	13.3	6.7	1.3	1.76	75
A sense of good conscience	2.4	4.8	25.0	40.5	27.4	3.86	84
A feeling of being controlled	54.8	27.4	9.6	4.1	4.1	1.75	73
A sense of being proud	11.0	17.8	39.7	19.2	12.3	3.04	73

Source: 2012 survey.

example, individuals will typically experience externally regulated behavior as controlling, or when the regulation is more integrated, the regulation will be associated with higher levels of well-being.¹⁶ In general, the results show that to sort household waste gives rise to mainly positive emotions. Negative emotions such as a feeling of being controlled or forced, were hardly reported at all. See Table 4.

5.3. Motivation for Sorting Household Waste

The CIE postulates that a change in the institutional context such as a change in the waste-fee scheme may change people's motivation and behavior related to sorting waste. For example, it could be expected that the sorting degree would drop when the economic incentive was removed. These hypothesized relationships have been investigated and the results are presented in Table 5. Model 1 in Table 5 reports, however, no significant change in stated sorting degree linked to the change in waste-fee scheme from WEIGHT to FIXED. Regarding the different kinds of motivational aspects of sorting waste, we find that over time it is RIGHT_THING that is the most important determinant in explaining peoples' waste sorting degree. Further, model 1 reports a weak positive relationship between sorting degree and ENCOURAGEMENT and GOOD_FEELING. The variable INFORMATION shows a counter intuitive result. That is, there is a significant negative relationship between sorting degree and INFORMATION. We will come back to a possible explanation for this in Section 6.1.

¹⁶ We are aware that the concept “well-being” is defined differently in various disciplines. Here we are inspired by how the concept is used in SDT and as outlined in Ryan et al. (2011).

Table 5
Results from testing the relationship between motivations and household waste sorting degree.^a

Independent variables:	Dependent variable: stated household waste sorting degree											
	Model 1				Model 2				Model 3			
	Both WEIGHT 2009 and FIXED 2012				WEIGHT 2009				FIXED 2012			
	Random GLS ^d		Logit		OLS		Logit		OLS		Logit	
	Coef.	St.err	Coef	St.err	Coef	Sterr	Coef	Sterr	Coef	Sterr	Coef	Sterr
Constant	1.66	0.60	−0.13	0.13	0.93	0.65			−0.42	0.93		
Waste price scheme	−0.01	0.14	−0.07	0.30								
Factors:												
RESPONSIBLE	0.29**	0.13	0.70***	0.25	0.37***	0.15	0.85***	0.30	0.53**	0.26	1.64**	0.76
RIGHT_THING	0.45***	0.14	0.84***	0.26	0.56***	0.14	1.15***	0.31	0.35	0.26	1.03	0.69
WEIGHT_GOODIDEA	0.01	0.07	0.02	0.14	−0.07	0.09	−0.14	0.18	0.03	0.13	0.27	0.39
WEIGHT_BADIDEA	0.06	0.08	0.18	0.14	0.10	0.08	0.19	0.16	0.14	0.13	0.61	0.37
Single variables:												
PROFIT					0.13*	0.08	0.30*	0.17				
ENCOURAGEMENT	0.14*	0.08	0.21	0.17	0.05	0.09	0.06	0.19	0.13	0.13	0.40	0.37
INFORMATION	−0.29***	0.10	−0.63***	0.19	−0.30***	0.10	−0.70***	0.22	−0.00	0.16	0.00	0.43
GOOD_FEELING	0.13	0.10	0.37*	0.20	0.07	0.12	0.18	0.23	−0.09	0.23	−0.35	0.63
Control variables:												
AGE	0.01	0.01	0.01	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.03	0.02
GENDER	−0.01	0.17	0.05	0.29	−0.04	0.18	−0.06	0.36	0.22	0.26	0.77	0.73
EDUCATION	−0.05	0.07	−0.13	0.13	−0.01	0.08	−0.03	0.16	0.25**	0.11	0.77**	0.34
R-sq.:			R ² _{pseudo} :0.093		R ² _{Adj} :0.259		R ² _{pseudo} :0.1333		R ² _{Adj} :0.268		R ² _{pseudo} :0.224	
within = 0.10			LR chi ² :52.56		Df:11		LR chi ² :55.01		Df:10		LR chi ² :27.63	
between = 0.25			N = 200		N = 143		N = 143		N = 50		N = 50	
overall = 0.23												

^a Statistical significance is denoted as *** = 0.01, ** = 0.05 and * = 0.10.

^b Responses to the question “How much of the household waste do you sort?” were given on a scale from 1 to 6: 1 = nothing, 2 = a little bit, 3 = some, 4 = pretty much, 5 = most, 6 = everything.

^c See “Table 1 confirmatory factor analysis”, for details.

^d A Hausman test was run to decide for either fixed effect model or random effect model. Based on the outcome, a random-effects GLS regression was run.

Model 2 includes data from the 2009 survey when the WEIGHT was introduced. According to CIE, this waste-fee scheme may express expectations about an “I logic”. Hence, the variable PROFIT is relevant and included in this model. The results report a weak positive relationship between stated sorting degree and PROFIT. Apart from this reported relationship, the results from model 1 are mostly repeated in model 2. The exception is that there is no significant relationship between GOOD_FEELING and sorting degree.

Model 3 includes data from the 2012 survey (i.e. when FIXED is reintroduced).¹⁷ PROFIT is no longer relevant and therefore not included. Noting the reduced sample size, we observe some changes compared to the two other models. For example, there is no relationship between the sorting degree and the factor RIGHT_THING. This leaves RESPONSIBLE as the most important variable explaining how much household waste respondents sort. EDUCATION has a moderately positive significant effect on the sorting degree in model 3.

Focus-groups participants pointed out that norms such as a sense of duty or responsibility are important reasons for sorting waste. Typical comments when the issue of motivation was discussed were: “It is about duty. To be a responsible person thinking about the future”¹⁸ or “For me it is an ethical issue. We make free with Earth’s resources. To sort waste has nothing to do with the economic incentive”. Others emphasized an environmental motive: “My desire to act environmentally friendly is stronger than saving a few coins”. Others were more positive towards the economic incentive and expressed that it had somehow triggered a “competitive instinct”. One participant noted that “Without the weight-based system we would not have focused so much on sorting. We would not have made a sport out of waste sorting”.

5.4. The Divided Response to the Weight-based Waste Fee

As stated in Section 5.1, there seems to be a divided response to the introduced economic incentive (i.e., the “more group” and the “same group”). To investigate what might explain this (whether respondents were directed by an “I logic” or a “we logic”), we tested the relationship between either being in the “same group” or the “more group” and the different aspects of motivation.

The results indicate that there is a relationship between being in the “same group” and to find the economic incentive to be a bad idea (WEIGHT_BADIDEA) and to hold proNEP values. Correspondingly, there is a relationship between being in the “more group” and to find that the WEIGHT is a good idea (WEIGHT_GOODIDEA). Noteworthy is that the number of respondents is somewhat limited because the NEP scale, from where the two factors (i.e., proNEP or antiNEP) are derived, was only included in the 2012 survey.

To further explore respectively the institutional “I logic” and “we logic”, we explored whether the two groups reported differences regarding what motivates them to sort household waste. According to the results, the respondents in the “same group” report a significant positive relationship between the stated sorting degree and the two factors RESPONSIBLE and RIGHT_THING, and a negative significant relationship between the sorting degree and INFORMATION. Respondents in the “more group” however, report a significant positive relationship between stated sorting degree and PROFIT.¹⁹

¹⁷ Noteworthy is that because responses in the 2012 survey are somewhat limited, there is uncertainty regarding the results.

¹⁸ All discussions were in Norwegian. Citations are translated by the authors.

¹⁹ It could be interesting to see if the two groups’ respective motivations changed over time (i.e., when FIXED was reintroduced). However, the numbers of respondents from the 2012 survey are small when divided into two groups (23 and 27). The uncertainty about the results when n is so small would be too big to make the basis for interpretation. Consequently, we chose not to include this type of analysis.

5.5. Illegal Waste Disposal

Illegal waste disposal is of two main types: First, illegal waste disposal outside the municipality's renovation services (e.g., burning or dumping waste illegally in nature); second, throwing the wrong kind of waste into a waste fraction (e.g., paper diapers into the paper fraction). To investigate these types of illegal activities involves certain challenges (e.g., people may underreport such actions). Different kinds of data were included to gain a realistic understanding of the scope of and the various practices related to illegal waste disposal (focus-group conversations, newspaper articles and minutes from SSR's board, in addition to the two surveys). All data sources reported an increased practice of both types of illegal waste disposal. It would have been interesting to run statistical analysis on data from the surveys to investigate the hypothesized relationships between increased illegal waste disposal as a result of the wish to save costs due to the introduction of the WBWF. However, this was not possible as response rates were too low and unreliable.

The focus-group conversations revealed information about the illegal disposal of household waste. An increased practice of both burning and burying waste in the garden was mentioned. One example given was that of an elderly male neighbor who burned his incontinence diapers, causing a rather unpleasant smell in the neighborhood.

The focus group with SSR representatives confirmed that throwing things in wrong waste fraction was a quite common practice after the WEIGHT implementation. This resulted in increased work for SSR employees such as extra hours of sorting waste after the household waste was brought to SSR's waste disposal facilities. Typical examples of this practice would be to put paper diapers into the paper fraction. A characteristic response from waste container owners when asked why they had thrown waste into the wrong waste fraction would be to ask, "But is it not a paper diaper?" or "But is this DVD player not made of plastic?"²⁰ Informants from SSR referred to these types of actions as "stretching the sorting categories" (emphasis by various respondents).

Finally, minutes from the meeting in the supervisory board where it was decided to terminate the weight-based waste system give further support to the results from the focus groups indicating that the introduction of WEIGHT led to a substantial increase in both types of illegal waste disposal. "When one thinks of environmental concerns, the weighing of waste gets much of the blame for that waste ends up where it should not – c.f. the debate about illegally dumped waste at sea and on shore, burying of waste, burning, using the neighbor's waste container, etc." (author's translation) (Reinhaldsverk, 2010).

6. Discussion

6.1. To Sort Household Waste Is a Meaningful Citizen Duty

Interpreting the above findings we will start by using the SDT framework to analyze the types of motivation the respondents report to have effect on their waste sorting degree. This will in turn give us a better understanding on how an economic incentive interacts with this practice.

First, we find that over time, norms related to doing the right thing for the environment – RIGHT_THING – apparently is the most important motivation (model 1 in Table 5). Consequently, respondents seem to have grasped the meaning of sorting waste (i.e., to save the environment). Hence, an assumption that according to SDT is needed for a regulation to obtain a high degree of integration has seemingly been fulfilled. The other significant normative motivation – RESPONSIBLE – adds however nuances to the picture. Since RESPONSIBLE is about expectations related to other people rather than the primary reason for sorting waste (i.e., saving the environment), this factor is categorized

as an *introjected* regulation and thus signals that the regulation is only superficially internalized. In turn, this indicates an element of attaining ego-enhancement as described in Section 2.2, indicating that sorting waste might also be performed to avoid social discomfort, as well as fulfilling some personal perception of inner wishes for doing the right thing.

Further, SDT also assumes that greater psychological well-being is associated with a higher degree of perceived autonomy. As an indicator of well-being we have measured emotions related to sorting waste in two ways. First, we found that respondents reported mainly positive emotions related to the practice per se. Very few reported negative emotions. On the other hand, we found that there is not necessarily a relationship between a good feeling from sorting waste – GOOD_FEELING – and how much waste one sorts. However, this latter result is not automatically an indication that the practice is not integrated. Considering that waste is sorted several times daily, often while doing something else, like making food, it is somewhat unrealistic to expect the practice to trigger positive emotions. On the contrary, we argue that when integrated, the practice is rather characterized by being habituated and executed without much emotion whatsoever. This does not exclude that when asked to consciously evaluate the practice, respondents might associate positive emotions with it (i.e. they relate eudaimonic well-being to the practice).

A somewhat surprising result though is that information about positive consequences from waste sorting – INFORMATION – has a strong negative relationship with the degree of waste sorting. A possible explanation, in line with SDT, is that if it is necessary to have information about what good the practice accomplishes to find motivation, one has not inwardly understood why one should sort waste. Hence, one has not made it to one's own reasons for sorting waste. Nevertheless, that the negative relationship is so strong is a puzzle.

Finally, encouragements from the municipality – ENCOURAGEMENT – apparently also play a small role in explaining how much people sort waste. This may indicate that the regulation also has an element of external locus of causality. However, this variable plays a minor and less certain role for why people in Ulstein sort household waste.

When investigating the motivations involved in the two waste-fee schemes separately, we find that the motivation involved when WEIGHT was implemented (model 2 in Table 5) does not deviate much from what we found when analyzing the two systems together. The weak positive relationship between encouragements from the municipality and the sorting degree has disappeared and instead there is a weak positive relationship between individual economic gain from sorting waste – PROFIT – and the degree of waste sorting. Consequently, the introduction of WEIGHT seems to have had a small positive effect on the degree of sorting.

Regarding the reintroduction of FIXED the picture changes somewhat (model 3 in Table 5). The positive relationship between norms linked to being a responsible person – RESPONSIBLE – and the waste sorting degree persists. However, the positive relationship between norms linked to doing the right thing for the environment – RIGHT_THING – and the waste sorting degree no longer exists. Following SDT, the practice is consequently less integrated in 2012 than in 2009. A possible explanation might be that when WEIGHT was introduced, the focus shifted from reasons with an internal locus of causality (such as RIGHT_THING) to reasons with an external locus of causality (such as PROFIT and RESPONSIBLE). What we observe in the 2012 survey then, is the effect of this shift where norms articulating norms like the ones in the factor RIGHT_THING no longer plays a role as a motivator. This result renders it possible to speculate that an effect of WEIGHT is that people no longer see the meaning of sorting waste. The focus on weight and profits has disillusioned people in why it is important to sort waste – that is, the eudaimonic well-being has decreased. Another result related to the shift from WEIGHT to FIXED is that the sorting degree does not change (model 1 in Table 5). According to mainstream economics it could be expected that the sorting degree would drop when

²⁰ Only certain soft plastics were expected to be sorted in the plastic-waste fraction. A DVD player is also categorized as "electric waste" and should be returned to the type of shop where it was bought so it can be handled properly.

the economic incentive was removed. However, this does not happen. Unfortunately though, results that include data from when FIXED was reintroduced is rather uncertain given the limited number of respondents in the 2012 survey.

All things considered, strong evidence exists that sorting waste is largely integrated and internalized into the self of the respondents, although the results indicate that some variation exists dependent on institutional system. So far, this study supports earlier studies that found that sorting waste is within the sphere of “being a citizen” or “in the moral domain” (Berglund and Matti, 2006; Biel and Thøgersen, 2007; Bruvoll et al., 2002; Chan and Bishop, 2013; Thøgersen, 1996).

6.2. A Divided Response to the Economic Incentive

According to CIE, institutions have the power to express expectations about what kinds of motivation and behavior are pertinent in a given situation. Consequently, it could be expected that a change from a fixed to a differentiated waste fee could change the logic from a “we logic” to an “I logic”. However, these possible shifts depend on one’s initial perceptions of the practice, how integrated it is into the self and also the strength of the economic incentive (i.e., the institutions). Given that sorting household waste is largely integrated into the respondents and that WEIGHT must be considered a relatively weak economic incentive, it is not certain what the outcome would be.

Interestingly, the results reveal that the respondents gave a divisive response²¹ to the introduction of WEIGHT (i.e., the “same group” and the “more group”). So what does this mean? From what CIE postulates, it is probable that the “more group” is guided by an “I logic” that WEIGHT introduced. But, what about the “same group”? Is this group still directed by the “we logic,” and why did they not change the type of motivation? In the following we will try to offer some plausible answers to these questions.

First, the data indicate that the motivation of the “more group” is shifted to an “I logic” by the introduction of the economic incentive. This is probable as it is a positive relationship between being in the “more group” and to express appreciation of WEIGHT (Table 6). This may not be such a surprising relationship, i.e., those respondents who cherish the logic of WEIGHT got motivated to sort more waste. The surprise is rather that as many as half of the respondents, (i.e., the “same group”) actually question the introduction of WEIGHT and that their stated response was to continue as before WEIGHT was introduced. What determine these different perceptions of WEIGHT?

Investigating the fundamental values or beliefs related to environmental concern may indicate an answer to this question.²² Even though the number of respondents is relatively low, we find a strong positive relationship between being in the “same group” and holding pro NEP values (Table 6). One interpretation of this – in line with the two theories applied – is that if values related to environmental concern like pro NEP are integrated into the self. You hold an internal locus of causality (i.e., being self-determined) for why you sort household waste. What seems to happen when an economic incentive is introduced is that respondents in the “same group” adhere to the logic they already hold, which is to sort waste because this coheres with their inner values and conviction of being environmentally concerned, i.e. a “we logic”. Hence, the external incentive is irrelevant and may even for some cause annoyance.

²¹ We are aware of that “a response” is normally considered as some kind of action. One may argue that the inaction of the “same group” (i.e., they sort the same amount of household waste as before WEIGHT was introduced) is not a response. In our opinion, it is interesting and important to find out the reasons for why people are inactive and to underline this point we characterize both apparent inaction (‘same group’) and action (‘more group’) as a response. Hence, the economic incentive initiated a divided response.

²² Noteworthy is that despite the fact that the NEP scale was included only in the 2012 survey we included these factors in the logit model. We justify doing this by assuming that fundamental values do not change considerably over time, at least not in the three years from the 2009 survey to the 2012 survey.

Table 6

Results from testing the relationship between motivations and being in the “more group” or the “same group”.^a

Independent variables:	^b Dependent variable: being in “same group” or “more group”	
	Logit	
	Coef.	St.err
Constant	6.17	3.50
^c Factors:		
RESPONSIBLE	−0.28	0.60
RIGHT_THING	−0.12	0.62
WEIGHT_GOODIDEA	0.80 [*]	0.45
WEIGHT_BADIDEA	−0.89 ^{**}	0.40
^d ProNEP	−0.85 [*]	0.46
^e AntiNEP	0.09	0.40
Singel variables:		
PROFIT	0.21	0.32
ENCOURAGEMENT	0.06	0.40
INFORMATION	−0.05	0.67
GOOD_FEEING	−0.85	0.64
Control variables:		
AGE	0.01	0.03
GENDER	−0.85	0.83
EDUCATION	−0.25	0.29
	R ² _{pseudo} :0.233	
	LR- χ^2 :20.35	
	N = 63	

^a Statistical significance is denoted as *** = 0.01, ** = 0.05 and * = 0.10. Source: 2009 unless stated otherwise.

^b Responses were given as 0 = “I sort the same as before WEIGHT was implemented” (“same group”) or 1 = “I sort more household waste after WEIGHT was implemented” (“more group”). Source: 2009 survey.

^c See “Table 1 confirmatory factor analyses” for details. Source: 2012 survey.

However, if the locus of causality for why you should sort waste is not internal, you seem to be open to follow the external logic given to you from the institutional change. In this case, it is the “I logic” of an economic incentive, which is to pursue the goal of saving costs that represents the introduced logic. So, even though the respondents did increase their efforts to sort more household waste, they have not grasped the meaning of sorting waste in any depth. Rather, it seems easy for them find meaning in the economic incentive, i.e. that they can save costs.

This explanation is further supported by the different motivational structures of the two groups (Table 7). For the respondents in the “same group” there is a positive relationship between the sorting degree and norms that express a “we logic” – and the factor RESPONSIBLE. On the other hand, for the “more group”, there is a positive relationship between the sorting degree and to be motivated by economic reasons (PROFIT) (i.e., institutions that express an “I logic”). In turn, this offers nuances to what we found in Section 6.1 – i.e., that normative motivation related to doing the right thing for the environment seemingly is the most important factor that explain the sorting degree – and underlines that there are more than one motivational dimension that explains people’s actions.

This being said, there is another possible factor that may explain why the “more group” is guided by the economic logic. Just as well, as respondents may have an external locus of causality considering why they should sort household waste, they may also hold an internal locus of causality related to frugality. Frugality is potentially a strong motivational factor in some people’s life and may be just as integrated in individuals as others values such as being environmentally concerned. However, this study did not include items that made it possible to investigate this potential association.

The division of respondents’ motivation and action that we observe in the 2009 survey coincides well with predictions of both CIE and SDT. The economic incentive brings an “I logic” that carries a set of institutions and expectations that has the strength to motivate and boost efforts to sort more household waste. However, not everyone accepts the logic of the economic incentive. Those with an internal locus of

Table 7

Results from testing the relationships between motivations and waste sorting degree in the “same group” and the “more group”.

Independent variables:	Dependent variable: stated household waste sorting degree							
	Model 1				Model 2			
	WEIGHT 2009, “same group”				WEIGHT 2009, “more group”			
	OLS		Logit		OLS		Logit	
	Coef.	St.terr	Coef.	St.terr	Coef.	St.terr	Coef.	St.terr
Constant	−0.26	1.26			2.20	1.15		
^b Factors:								
RESPONSIBLE	0.47*	0.27	0.89*	0.48	−0.04	0.23	−0.18	0.49
RIGHT_THING	0.72***	0.23	1.42***	0.45	0.13	0.30	0.51	0.60
WEIGHT_GOODIDEA	−0.04	0.16	−0.11	0.28	0.07	0.18	0.19	0.37
WEIGHT_BADIDEA	0.04	0.14	−0.02	0.24	0.15	0.16	0.43	0.34
^c Single variables:								
PROFIT	0.21	0.15	0.40	0.28	0.25*	0.15	0.54*	0.33
ENCOURAGEMENT	0.03	0.11	0.29	0.30	0.17	0.18	0.29	0.37
INFORMATION	−0.35**	0.17	−0.81**	0.33	−0.24	0.21	−0.42	0.40
GOOD_FEELING	0.04	0.23	0.16	0.39	0.30	0.22	0.54	0.42
Control variables:								
AGE	0.01	0.01	0.03	0.02	0.00	0.01	0.00	0.02
GENDER	−0.01	0.31	0.04	0.59	0.18	0.26	0.43	0.52
EDUCATION	−0.06	0.13	0.05	0.25	−0.13	0.11	−0.31	0.23
	R ² _{Adj} :0.267		R ² _{pseudo} :0.169		R ² _{Adj} :0.039		R ² _{pseudo} :0.089	
	Df:11		LR chi ² :32.13		Df:11		LR chi ² :15.59	
	N = 64		N = 64		N = 67		N = 67	

Statistical significance is denoted as *** = 0.01, ** = 0.05 and * = 0.10.

^a Responses to the question “How much of the household waste do you sort?” were given on a scale from 1 to 6: 1 = nothing, 2 = a little bit, 3 = some, 4 = pretty much, 5 = most, 6 = everything.^b See “Table 1 confirmatory factor analysis” for details.

causality, i.e. they are autonomous for why they sort waste, rather questions the economic incentive and continue sorting waste as before. Hence, we find support for the predictions by CIE, that institutions hold the power to define which logic is pertinent to specific contexts and thereby which rationality that is anticipated. However, this change in logic came to realization only to a certain degree, which in this case was destined by individuals’ internal locus of causality (i.e., how autonomous they are with respect to the reasons for why they should sort household waste).

6.3. The Disruptive Effect of the Economic Incentive

Earlier studies have found divergent results regarding a possible increase in illegal disposal of waste due to the introduction of a differentiated waste fee. However, in our case it is evident that this took place at a relatively large scale. In trying to explain why the illegal behavior increased when WEIGHT was introduced, we find that the logic or reasoning linked to saving costs corresponds well with this type of behavior. That is, it would be expected that those respondents that are directed by the “I logic” of saving costs may have a greater propensity to improper disposal of waste as this also will save them costs. This is a predictable outcome assuming that the respondents in the “more group” is less environmentally concerned, hence they have in general less emphasis on doing the right thing from a perspective of environmental concern. However, we do not have reliable data at the level of individuals, a fact that makes it impossible to empirically test the suggested explanation.

7. Conclusion

At the start of this paper we raised the question if, respectively under what conditions economic incentives are effective in promoting environmentally friendly behavior. Most relevant studies analyzing this question are grounded in the rational choice model, as are also the reasons for introducing an economic incentive in the first place. However, in our study we have investigated this issue by using a combination of institutional theory and self-determination theory. This approach has provided a confirmation both of findings from previous studies and

new insights into understanding how an economic incentive affects people’s motivation and behavior related to this practice.

In terms of confirmation, our study support previous findings that the main motivation for sorting household waste is within the moral domain. Normative motivations linked to doing the right thing for the sake of the environment and being a responsible person play key roles in explaining why people sort household waste. This result was proven to be stable over time and may serve as an example of how important moral-based motivation is in people’s lives.

Concerning effectiveness of the economic incentive to boost efforts to sort household waste, we found a divided response to the introduction of WEIGHT. Half the sample stated they were motivated to sort more household waste, half reported they continued as before. We promote a possible explanation for this divided response through applying the theoretical frameworks of both CIE and SDT. According to CIE, the economic incentive brings an “I logic” forward motivating some to sort more household waste. However, not everyone is guided by the “I logic” of the economic incentive. Those with an internal locus of causality for why they sort waste (cf. SDT) (i.e. being autonomous) instead question the economic incentive and continue sorting waste as before. Hence, we find support for institutions holding the power to define which logic is pertinent to specific contexts and thereby which rationality is anticipated. However, in our case this is true only to a certain degree, depending on how autonomous people are with respect to the reasons for why they sort household waste – i.e., how strongly internalized the norm of sorting is.

Regarding the increased disposal of illegal waste, this was not completely unexpected as earlier research have made evident that this is a likely result from introducing an economic incentive. Still, the extent of this practice, to the degree that it was one of the main reasons for why WEIGHT was terminated, was somewhat surprising. Unfortunately, the small sample, the low response to the questions on illegal disposal and the unreliability of this type of data made it impossible to empirically study what kind of motivation characterizes such actions. Still, the reported scope and creativity related to this practice are noteworthy.

The combination of theories applied here has opened up for other kinds of interpretations and explanations than those typically offered when explaining the ability of economic incentives to promote

environmentally friendly behavior. To apply only the rational choice model, even extended versions, offers limited insights into why economic incentives may or may not promote environmentally friendly behavior. We argue that this is due to the one dimensionality of the rational choice model. The strength of both SDT and CIE is their inclusion of social structures that enables a more dynamic and – we argue – more realistic understanding of how individuals are motivated and behave.

Important policy implications can be drawn from this study. The observed divided response to the economic incentive and how this response seemingly is related to internalized values and convictions are important messages to policymakers as it clearly indicates that motivation is by far more complicated than what is postulated by economic theory. In addition, a differentiated waste fee scheme causes increased expenses related to the implementation phase of the waste fee scheme and a real risk of unwanted illegal disposal of waste. All in all, if the wish is to implement an effective measure to ensure sustainable behavior, this study sends a clear message that caution is needed if one is to consider introducing a differentiated waste fee scheme.

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Paper 4: A relational approach: the case of a differentiated waste fee

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Abstract: The paper responds to identified needs in the literature to develop analytical frameworks that include both individuals and social structures in the analysis of a social phenomenon. The paper attempts to combine two theories that both use a relational approach when studying social phenomena – i.e., Self-Determination Theory (SDT) and Classical Institutional Economics (CIE). The combination is operationalized through an analysis that includes individuals' *integrated sense of self*, as outlined by SDT, and *institutional settings*, as outlined by CIE. The theoretical framework has been applied when studying how perceptions about an economic incentive is influenced by a) the institutional setting – defined as a curbside waste management system with two kinds of waste fee schemes; and b) the integrated sense of self – represented here by beliefs about human-nature relations based on the New Environmental Paradigm-scale. Regarding the findings, it can be observed that the institutional settings influenced individuals' perceptions of a differentiated waste fee. Furthermore, ecological beliefs play a role in shaping individuals' perceptions about whether a differentiated waste fee is seen as supportive of a good habit, or not. Combining the two approaches have proved to be productive, but leave also some unanswered questions that call for further investigations.

1. Introduction

Analyses of economic incentives are dominantly based on the subjective rational choice theory (RCT) that forms the core of mainstream economics. The basic assumption of RCT is that individuals make rational choices through maximizing subjective individual utility. Investigating individual choices has therefore been given a predominant role. Little attention has been paid to the role that social structures, such as institutions, might play in shaping people's motivations and actions. However, some theoretical attempts have been made to combine emphasis on *both* agents and social structures to give better insights about how to best explain social phenomena. This way forward have by some been named a *relational approach* (Archer, 1996, 2009; Donati, 2015; Emirbayer, 1997; Ritzer & Gindoff, 1992, 1994).

A relational approach holds the potential to give new insights to areas where neoclassical theory has failed to give adequate answers. This applies, for example, to responses given to price incentives that seem more complex than what standard economic theory predicts. This includes for example instances where efforts have been reduced as a response to the introduction of an economic reward (Frey & Jegen, 2001; Frey & Oberholzer-Gee, 1997; Gintis, 2000; Gneezy, Meier, & Rey-Biel, 2011).

In addition to this general theoretical call for social theory to link agency and structure, the concern has also been raised in the case of more specific thematic areas – e.g., regarding the explanation of environmentally significant behaviors (Steg, Bolderdijk, Keizer, & Perlaviciute, 2014; Steg & Vlek, 2009; Stern, 2000). Stern (2000: 415) for example states: "A first step toward understanding the complexities is to elaborate on the truism that behavior is a function of the organism and its environment". Others have stated that individuals and their environmentally relevant choices are "an interactive product of personal-sphere attitudinal variables (A) and contextual factors (C)" (Guagnano, Stern, & Dietz, 1995). However, the literature that specifically addresses environmental action, dominantly emphasizes the individual, and treat contextual factors mainly as external constraints that have the potential to 'trigger' individuals' behavior in an instrumental way (Steg, 2016; Steg et al., 2014; Stern, 2000). To see social structures, such as institutions, as something that create meaning and give directions for individuals' actions, is for the most part left outside the scope of investigation.

To include relational aspects in research is demanding. One attempt has been made by Heller and Vatn (2017) by combining two theories based on relational perspectives – i.e., Self-Determination Theory (SDT) and Classical Institutional Economics (CIE). Sharing much common theoretical ground, a combination is argued to strengthen the analysis as CIE emphasizes structures more and SDT has a greater focus on the individual. Heller and Vatn (2017) apply this theoretical approach on an empirical case investigating how motivation and behavior in relation to waste sorting are affected by the introduction and termination of a weight-based waste fee. The study found, among other things that only half of the respondents was motivated to sort more waste due to the introduction of the weight-based waste fee, and that individuals' integrated environmental considerations as well as different views on the introduced waste fee could explain the divided response.

The aim of this study then, is to apply the same theoretical framework on a similar case – here comparing a fixed and a frequency-based waste fee – to further explore to what extent a com-

bination of SDT and CIE can help expand our insights concerning the use of economic incentives in environmental policy.

More specifically, the analyses will emphasize individuals' *integrated sense of self*, as this is outlined by SDT, and *institutional settings*, as outlined by CIE, when investigating perceptions about a differentiated waste fee. The institutional settings are represented by a curbside waste management system distinguished by the two kinds of waste fee schemes as referred to above – one differentiated and one not. It is assumed that a frequency-based system – while also differentiated – may create different responses compared to a weight-based system. This is so as it may be considered a weaker incentive. The integrated sense of self is represented by beliefs about human-nature relations – i.e., pro-ecological and anti-ecological beliefs as these are stated by the New Environmental Paradigm Scale (NEP scale) (Dunlap, Van Liere, Mertig, & Jones, 2000). The study has the potential to provide new insights into how an economic incentive is perceived and how the underlying factors defined above influence these perceptions. Since this study employs the same theoretical framework on a similar case as Heller and Vatn (2017), it is moreover possible to compare the results from the two studies, offering added value regarding our understanding under what conditions economic incentives work as intended and when they do not.

The remainder of the paper is organized as follows: Section 2 presents the theoretical framework, including how the two theories will be attempted combined. Material and methods are presented in Section 3. Section 4 reports the results, and these are further discussed in Section 5. Section 6 offers concluding comments. References can be found in Section 7.

2. Theoretical framework: a relational approach

Over the years, several attempts have been made to link agency and structure in social research – see e.g., Ritzer and Gindoff (1994) for a review. One of the main arguments for the importance of this linkage is "that neither social individuals nor social wholes can be explained without analyzing the social relationships between them" (Ritzer & Gindoff, 1994: 14). These approaches are often referred to as being relational as the main idea is to investigate the relation between individuals and social structures.

As stated above, RCT's focus is on the subjective individual and leaves social structures, such as institutions, aside when explaining social phenomena. This has, however, been much criticized, not least by classical institutional economists (e.g., Hodgson (1998, 2007) and Vatn (2005, 2015)). Contrary to RCT, CIE emphasizes social structures and postulates that the type of rationality that guides individual choice depends on the institutional context. Therefore, understanding social structures is fundamental to the interpretation of human action. Further, CIE and SDT share the view that social structures are important determinants for human motivation and behavior, but offers different entries to study the phenomenon. In the following I will describe the two theories.

2.1. Self-Determination Theory

The main concern of SDT is what characterizes human motivation, and the theory is developed by psychologists – see e.g., Deci and Ryan (1985); Ryan and Deci (2000, 2017); Ryan,

Sheldon, and Chirkov (2011). SDT is an individual-focused theory like RCT, but has a fundamentally different understanding of the individual. As opposed to what traditionally has been the dominant trend in psychology – i.e., to investigate the shortcomings in the human cognitive or emotional psyche – SDT is concerned with the positive sides of human nature and assumes that we are "inclined to learn, to grow, to assimilate cultural values, and to connect and contribute to others" (Ryan et al., 2011: 35).

SDT assumes three basic psychological needs to human flourishing and mental health; that is *autonomy*, *competence* and *relatedness* (Ryan & Deci, 2000, 2017; Ryan et al., 2011). Formally, SDT comprises six mini-theories. Each of these addresses one facet of motivation or personality functioning (selfdeterminationtheory.org., 2017). This paper draws especially on the mini-theory Organismic Integration Theory (OIT), which elaborates on *autonomy*¹. OIT advocates autonomy as a key concept for understanding human motivation and behavior, and refers autonomy to "volition – the organismic desire to self-organize experience and behavior and to have activity be concordant with one's integrated sense of self" (Deci & Ryan, 2000: 231). Ryan and Deci (2000) argue that only autonomy-supportive contexts will yield integrated self-regulation. Autonomy understood as a basic psychological need allows individuals not only to be "free in pursuing their potentialities and needs, but also to merge easily with a larger social whole" (Maslow, 1962; as cited by Ryan et al., 2011: 21).

OIT is based on a classification scheme for types of motivations where one important distinction is between intrinsic and extrinsic motivation. Ryan and Deci (2000: 56) define the former as "the doing of an activity for its inherent satisfactions rather than for some separable consequence." Extrinsic motivation is, on the other hand, seen as "a construct that pertains whenever an activity is done in order to attain some separable outcome" (ibid.: 60). Noteworthy is that it is the latter type of motivation that constitutes the theoretical scope for combining SDT and CIE. I will come back to this in Section 2.3.

Extrinsic motivation is divided into four sub-categories, and the division is made possible by the assumption that all individuals undergo a lifelong *socialization process*. The category is thus determined by how internalized the regulation is into the self. A more thorough presentation of the following categorization of extrinsic motivation can be found in Ryan and Deci (2000).

First, the most autonomous form of extrinsic motivation is represented by an *integrated* regulation. This implies that the regulation is fully assimilated into the self, and new regulations are brought into congruence with one's other values and needs. This level also represents what can be experienced as the *integrated sense of self*. It is also assumed that in order to fully internalize a regulation, people must inwardly grasp the meaning and worth of the value or regulation (Ryan & Deci, 2000). The second level is an *identified* regulation which presupposes that the person has identified herself with the personal importance of the behavior. The third is an *introjected* regulation. This level of integration is mostly about enhancing or maintaining self-esteem, and includes internal rewards and punishments like pride and guilt. The least in-

¹ This study is limited to studying different kinds of motivation related to sorting household waste. Hence, *autonomy* is a relevant concept that will be discussed. The concepts *relatedness* and *competence* are not emphasized in this paper.

tegrated level of extrinsic motivation is an *external* regulation. This refers to external rewards and punishments and involves feelings of control.

The understanding that SDT offers about how extrinsic motives are internalized and integrated into the self has been operationalized in this study in two ways. First, *the integrated sense of self* has been operationalized through mapping individuals' beliefs about human-nature relations based on the NEP-scale – i.e., a pro-ecological or an anti-ecological belief. Second, perceptions of a differentiated waste fee have also been mapped – e.g., to be a good idea because it gives the opportunity to save costs. Furthermore, these perceptions about the differentiated waste fee scheme can potentially, depending on the integrated belief, be linked to the sub-categories of extrinsic motivation. For example, if a pro-ecological belief is part of your integrated sense of self, it is assumed that your perceptions about a differentiated waste fee are mainly negative. This assumption follows from another assumption, namely that a person who sees herself as part of nature, and thus has a responsibility to respect the environment, will be motivated to do the right thing for the environment based on duty considerations, and not through saving costs. Accordingly, an anti-ecological belief will potentially correspond with a positive attitude towards the differentiated waste fee since there is no conflict between your integrated sense of self and to save costs – i.e., the economic incentive.

The four categories of extrinsic motivation described above can further be classified based on from where the individual perceives that the justification of the regulation stems – i.e., from outside or from within herself. An external justification – i.e., an experienced *external locus of causality (ELOC)* - includes the two least integrated levels: *external* and *introjected* regulations. An internal justification - i.e., an experienced *internal locus of causality (ILOC)* – includes the two most integrated levels: *identified* or *integrated* regulation (ibid).

2.2. Classical Institutional Economics (CIE)

While SDT starts off with the individual, CIE has a stronger focus on structures, with an emphasis on institutions and the role these play for perceptions and motivation. As part of a broader field of institutional theory, CIE draws on insights from, for example, sociology and political science. The academic roots go back to the American institutional economists such as Thorstein Veblen and John R. Commons (Vatn, 2005). Unlike, RCT, CIE gives emphasis to the interdependency between institutions and individuals when analyzing social phenomena and human action. Various definitions of *institutions* have been proposed in the literature. They are here defined as rules and practices – more specifically as *conventions*, *norms* and *formally sanctioned rules* (Scott, 1995; Vatn, 2005). March and Olsen (2006: 8) emphasizes that institutions "provide codes of appropriate behavior, affective ties, and a belief in a legitimate order." The focus of attention is on social structures, and the interdependent dynamics between institutions and individuals' motivations and behavior.

CIE postulates that "individuals are able to accommodate their behavior to a variety of logics or rationalities" (Vatn, 2005: 105). Institutions help defining which logic that is appropriate and should be emphasized. Hence, institutions have the power to influence behavior by forming individuals' interests and perceptions (Hodgson, 2007). According to CIE, some institutional contexts give emphasis to individual interests – as in markets – and self-regard is a possible interpretation of what 'drives' choice in such a context. This kind of logic is here referred

to as 'I logic'. In other contexts, the issue is about what is better for a group or a society, and social considerations is considered appropriate – i.e., 'we logic'. The appropriate logic is defined by present conventions and norms (Vatn, 2005). While Etzioni (1988) emphasizes that even individual rationality demands socialization to function well, the collective logic behind norms is important because it may solve coordination problems for which the individual alone can find no resolution (Vatn, 2005) – e.g. an environmental problem such as waste disposal.

With reference to the case presented in this paper, CIE suggests that a norm exists that guides people to sort household waste – i.e., there is a norm that solves the evident collective decision problem. Further, CIE suggests that a differentiated waste fee potentially can introduce a different kind of motivation for why people should sort household waste – i.e., to save costs. One possible outcome is therefore that the two kinds of waste fee schemes – i.e., either a fixed or a differentiated waste fee – represent different kinds of rationalities. That is, a fixed waste fee scheme supports a rationality where what 'the right thing to do' is emphasized, whereas the frequency-based waste fee scheme supports a rationality that focuses on individual utility in the form of cost reduction. Introducing a frequency based scheme could result in a shift in focus – from doing the right thing to saving costs. It could however also imply that the frequency-based waste fee gives no meaning for the actors.² Regarding waste sorting it should also be noted that even though this practice is considered to mainly be motivated by norms and moral considerations, some studies have identified a duality in people's motivation and behavior whenever an economic incentive has been introduced (Berglund, 2005; Berglund and Matti, 2006; Hage et al., 2009; Thøgersen, 1996). Typically, municipalities have started out with a non-differentiated fee system seeing sorting as something that people 'should do'. Introducing a differentiated waste fee in such a situation might imply that both a moral and an economic motivation operate and that there is an interdependence between the two of them (Berglund, 2005; Hage et al., 2009; Thøgersen, 1994; Thøgersen, 1996).

Furthermore, CIE posits the importance of values and beliefs. While institutions, like norms, are action-oriented rules, beliefs represent what a person takes as truths about what constitutes the world and values conveys what is important in life such as ethical and moral considerations. Further, both beliefs and values legitimize and protect institutions (Vatn, 2005). CIE also embraces what Berger and Luckmann (1967) postulate about the role of knowledge and values in the legitimation of institutional order. Knowledge, in the form of beliefs, is needed to explain the order of things: "Legitimation not only tells the individual why he *should* perform one action and not another; it also tells why things *are* what they are. In other words, 'knowlegde' precedes 'values' in the legitimation of institutions" (Berger & Luckmann, 1967: 111).

Thus, both beliefs and values play important roles in the formation of perceptions. That is, the ability to reflect and to attribute meaning into logics that institutions potentially express is dependent on beliefs and values that form perceptions about the world. Hence, logics does not "reside in the institutions and their external functionalities, but in the way these are treated in

² The reader may ask why we do not call this 'crowding out' of norms or intrinsic motivation (e.g., Bowles, 2008; Cardenas et al., 2000; Frey, 1997). We avoid that language because 'crowding out' has been so strongly linked to changes in parameters of a utility function, while CIE emphasizes the change in logic (e.g., between utility maximization and appropriateness).

reflection about them" (Berger & Luckmann, 1967: 82). That is, the logic does not occur until individuals through their ability to reflect, ascribe institutions this quality. The personality – including the individual's social history formed as beliefs, values and internalized institutions – influences both perception and the significance a person gives to a certain context – be it individually or socially oriented. This way, institutions become interpreted and in turn these interpretations will cause variation in behavior – i.e., we talk of potentials, which cause actions to vary both between and within contexts.

2.3. Operationalizing the combination of SDT and CIE

In the above sections, I have presented how concepts like *integrated sense of self* (SDT) *extrinsic motivation* (SDT) and *institutional settings* (CIE) are operationalized. In the following I will address how these concepts can possibly complement each other to increase our understanding of a social phenomenon, which in this case regards perceptions of a differentiated waste fee. In short, what enables the two theories to be combined is that CIE, just as SDT, emphasizes that institutions, beliefs and values are social constructs and stress the importance of the process of socialization where institutions, values and beliefs are internalized and integrated into the self of individuals (Berger & Luckmann, 1967; Richard M. Ryan & Deci, 2000; Vatn, 2005). In general, the 'work division' between the two theories is that CIE focuses on the content of institutions *in situ* and how these might hold the power to determine different kinds of motivation and actions – e.g., individual rationality ('I logic') or social rationality ('we logic'). SDT on the other hand addresses the life-long process of internalization and integration of social constructs into the self of an individual, and how these relate to individual autonomy in the present. An important part of SDT's understanding of autonomy is from where an individual perceives that the justification for an action originates – i.e., from outside (ELOC) or from within (ILOC) the individual.

More specifically, the four categories of extrinsic motivation outlined by SDT correspond with the two kinds of logics that CIE postulate. That is, reasons that address appropriateness correspond with a 'we-logic' (CIE), but also an internal justification (internal locus of causality), which includes both integrated and identified motivation (SDT). Furthermore, reasons that address external justifications (external locus of causality) – i.e., either a concern for what others might think (introjected motivation) or also economic concern as a reason to sort waste (external motivation) – corresponds with an 'I logic' (CIE). Then, depending on the institutional settings in place, and the present integrated sense of the self, these categories of motivation can work as analytical entities to analyze a social phenomenon such as perceptions of a differentiated waste fee.

For example, if you hold a pro-ecological belief it is assumed that you will favor an institutional 'we logic' as this is in accordance with your reasons for sorting waste – i.e., the right thing to do. This implies that the reasoning is perceived as an internal justification - i.e., ILOC. If, on the contrary, the integrated sense of self includes an anti-ecological belief, it is likely that you will favor the institutional setting that carries an 'I logic' – i.e., positive perceptions of a differentiated waste fee. Accordingly, this implies an external justification – i.e., ELOC. In addition, and since CIE postulates that an institutional setting has the power to define which logic that is the appropriate one, there is also a potential that the institutional set-

ting in itself will be decisive in forming individuals perceptions about the differentiated waste fee.

The approach outlined above responds to the calls addressed in the introduction made by for example Steg et al., (2014: 27): "we should get a better understanding of how situational factors, vis-à-vis individual factors, affect pro-environmental behaviour" and that "situational factors have not been explicitly considered in prominent theories on pro-environmental behaviour change yet (ibid: 25). A strength of the present approach is therefore that it combines two already established theories that each offers an in depth understanding of either individual (SDT) or situational (CIE) factors – i.e., situational factors are here addressed as institutional settings. In turn, the combination of CIE and SDT offers therefore also a broad theoretical framework for interpretation of the results.

3. Material and methods

3.1. The setting

Historically, the Norwegian waste fee scheme has been organized as a fixed yearly waste fee (FIXED). This has changed somewhat after the municipalities were strongly advised by Norwegian authorities to differentiate the waste fee according to the degree of sorting, and some municipalities have acted upon this encouragement and implemented such a scheme. So far, there are at least three ways that Norwegian municipalities have ensured differentiation – i.e., by volume, by frequency or by weight.

This paper includes a frequency-based waste fee (FREQUENCY) where the waste fee is split in two parts. One part is fixed and equal for all households. The other part is differentiated with regard to number of times the unsorted waste is picked up at the curbside of the household. This implies that the household every week must decide if the waste container should be emptied or not, and correspondingly if the household's waste fee should increase or not.

Data were collected from six Norwegian municipalities – i.e., three with a fixed yearly waste fee: Askim, Eidsberg, Kragerø – and three with a frequency-based waste fee: Os, Askøy and Kristiansand. All six have similar socio-demographic characteristics and are middle-sized municipalities with a town center. At the time of investigation, all municipalities had implemented a curbside collection for three or more waste fractions – i.e., unsorted waste (all), paper/cardboard (all), plastic (all, but Kristiansand) and organic waste (all, but Os and Askøy). Other waste fractions such as glass, metal, hazardous waste, electronic waste, textiles etc. had to be brought to central collection points or to larger waste dumps.

There is a requirement for Norwegian municipalities to balance the income from the waste fee with the management costs of the household renovation services. At the time of data collection, the fixed yearly waste fees³ amounted to 2249 NOK in Askim, 2543 NOK in Eidsberg and 3353 NOK in Kragerø. For the municipalities with a frequency-based waste fee, the fixed part of the waste fee amounted to 1893 NOK per year for households in Os and 1918 NOK in Askøy. The fixed part of the frequency-based waste fee scheme in Os and Askøy included 12

³ All prices on waste fees includes VAT

compulsory pick-ups per year due to prevention of health hazards and smell, especially in the summer. The marginal cost for any additional pick-ups of unsorted waste amounted to 33 NOK in both Os and Askøy⁴. Each household had at the time of investigation the possibility to have the unsorted waste picked up every week. To use this service every week amounts to a maximum yearly waste fee of 3193 NOK in Os and 3218 NOK in Askøy.

The frequency-based waste fee scheme in Kristiansand was somewhat differently designed compared to the waste fee schemes in Os and Askøy. That is, the waste fee scheme in Kristiansand was split in two parts (the fixed part amounted to 1754 NOK), but there was a marginal price on two waste fractions - i.e., unsorted waste and organic waste. The fixed part of the waste fee scheme included 13 compulsory pick-ups of the organic waste and this were also due to prevention of health hazards and smell. The marginal cost for any additional pick-up of organic waste amounted to 28 NOK and the marginal cost of a pick-up of unsorted waste amounted to 34 NOK⁵. The households had the possibility to have both fractions picked up every week.

3.2. Sample and household survey

To investigate how both individual and structural factors affect perceptions of a differentiated waste fee scheme, a survey was conducted in the six municipalities in 2010. 1800 households were chosen randomly – i.e., 300 in each municipality. Each household received a letter sent by postal service where they were asked to visit a website with a link to a questionnaire. The letters were addressed to the household as a unity. To ensure a random and representative selection of respondents, it was asked that the questionnaire was answered by an adult, 18 years or older, that most recently had her or his birthday. After two rounds of telephone reminders, the response rate was 31 %.

To investigate different perceptions of a differentiated waste fee, the surveys included different sets of questions with related statements. First, a set of six statements was included that addressed how respondents perceived and evaluated a differentiated waste fee scheme. The theoretical justification for the statements is from CIE and the intention has been to capture reasons for why people might agree respectively disagree with the postulated 'I logic' of an economic incentive – i.e., a differentiated waste fee. This latter aspect is also the background for why the statements include claims that a differentiated waste fee is either a good or bad idea. More specifically, two of the statements address reasons for evaluating the differentiated waste fee as a bad idea – i.e., to sort waste is something you should do regardless of saving money (NOT_TO_SAVE) and households with many people are punished economically (BIG_HOUSEHOLDS). Noteworthy is that the latter statement regards what is considered a fair payment for the waste management service, and do not address the aspect of sorting waste. However, it is included to investigate if the differentiated waste fee conveys a kind of generalization of the 'I logic', and not just the intentional 'I logic' linked to saving costs. Furthermore, four statements addressed reasons for evaluating it as a good idea – i.e., a differen-

⁴ This fee refers to what the waste company defines as a “standard subscription” for households that includes a 140 l container for unsorted waste. It is possible to subscribe for a larger container which will give a higher marginal cost for each pick up of unsorted waste.

⁵ This fee refers to a subscription that includes a 120 l container for unsorted waste. It is possible to subscribe for a larger container, which will give a higher marginal cost for each pick up of unsorted waste.

tiated waste fee gives the opportunity to save costs (GOOD_TO_SAVE); it supports a good habit (GOOD_HABIT); those who sort little waste is punished economically (GOOD_PUNISH); it works as an economic carrot (CARROT). See Table 1 for details.

There is one circumstance that should be mentioned, due to a misfortunate over-sight the questions aiming at exploring if a differentiated waste fee is perceived as supporting a good habit (represented in the dataset by the variable GOOD_HABIT) was only included in the surveys distributed in municipalities with FREQUENCY.

Table 1. Description of variables.

Variables:	Statement description
	'I find a differentiated waste fee to be a...'
NOT_TO_SAVE ^a	'...bad idea because to sort waste is something you should do regardless of saving money'
BIG_HOUSEHOLDS ^a	'...bad idea because households with many people are punished economically'
GOOD_TO_SAVE ^a	'...good idea because a waste fee that I can influence gives me the opportunity to save costs'
GOOD_HABIT ^a	'...good idea because it supports a good habit'
GOOD_PUNISH ^a	'...good idea because those who sort little waste is punished economically'
CARROT ^a	'...good idea because it works as an economic carrot'
PRO_ECO_PARAD	Factor: see table 3 for details
ANTI_ECO_PARAD	Factor: see table 3 for details
Institutional setting	0 if fixed waste fee (FIXED) and 1 if frequency-based waste fee (FREQUENCY)

Note:

^a Responses to the statements were given on a scale from 1 to 5 where 1=completely disagree to 5=completely agree.

Furthermore, the NEP scale was included to investigate how two kinds of beliefs about human-nature relations influence individuals' perceptions about a differentiated waste fee. The NEP-scale represents fundamental beliefs "about the nature of the earth and humanity's relationship with it" (Dunlap et al., 2000: 427) and will represent what SDT postulates about the experience of an 'integrated sense of self'. The NEP-scale consists of 15 statements or items. Eight items represent a positive attitude towards an ecological worldview – i.e., a pro-ecological belief (PRO_ECO_PARAD), and seven items measure an antagonistic attitude towards an ecological worldview – i.e., and anti-ecological belief (ANTI_ECO_PARAD). The pro-ecological belief represent a positive attitude towards an ecological worldview emphasizing that there are limits to how much natural resources humans can extract and use, and that there is possibility of a human made ecological crisis. The anti-ecological belief expresses an ecological view of human domination where humans are in the center of the universe – i.e., anthropocentrism – and a view that postulates that humans are exempt from the con-

straints of nature (Dunlap et al., 2000: 431). The two beliefs are thought relevant in this case as sorting household waste is a practice introduced to save the environment. Recommendations from the literature have been followed when the scale has been employed (Dunlap & Van Liere, 2008; Hawcroft & Milfont, 2010).

Third, the two kinds of waste fee schemes are included in the analysis as a binary variable named 'waste fee scheme' where 0 denotes a fixed waste fee scheme (FIXED) and 1 denote a frequency-based waste fee scheme (FREQUENCY). CIE assumes that the curbside waste management system in itself represents an institutional setting that articulates expectations that you should sort waste – i.e., to sort waste in order to save the environment – a 'we logic'. Hence, FIXED is assumed to articulate this kind of logic. FREQUENCY on the other hand, is assumed to articulate an additional or alternative logic emphasizing the possibility to save costs through sorting waste - i.e., an 'I logic'.

Finally, socio-demographic variables – i.e., age (AGE), gender (GENDER) and level of education (EDUCATION), were included. Descriptive statistics for the respondents in the two types of waste fee schemes are presented in Table 2.

Table 2. Socio-economic variables.

Variables	Description	FIXED		FREQUENCY	
		%	N	%	N
GENDER	0 = Female,	49.1	140	52.7	138
	1 = Male	50.9	145	47.3	125
EDUCATION	1 = Elementary school	9.9	28	9.2	24
	2 = High school	50.9	145	38.5	101
	3 = University	39.3	112	52.3	137
INCOME	1= less than NOK 50 000	2.9	8	1.5	4
	2 = between NOK 50 001 and 100 000	2.5	7	1.1	3
	3 = between NOK 100 001 and 300 000	31.1	86	28.1	73
	4 = between NOK 300 001 and 500 000	42.8	118	43.1	112
	5 = Between NOK 501 000 and 700 000	14.9	41	13.8	36
	6 = Above NOK 700 000	5.8	16	12.3	32
		Mean	St.dev	Mean	St.dev
AGE	In years	34.12	14.33	31.33	13.89

A possible pitfall is the relatively low response rate that in this case might imply a bias in the sample towards being more dutiful compared to the average population. However, as long as it is the relative difference in perceptions that is investigated, this is considered to be a manageable bias.

3.3. Statistical analysis

The NEP scale includes several statements measuring the same aspect, so-called latent variables or factors (Bartholomew, Steele, Galbraith, & Moustaki, 2008). The literature is not clear on how many dimensions the NEP-scale includes (Dunlap et al., 2000). This was therefore a subject that needed to be explored, and I ran therefore an exploratory factor analysis. Using a factor loading cut-off at 0.5, two distinct factors were formed that includes eight of the origi-

nal 15 statements. See Table 3 for details. Although somewhat low, the Cronbach Alfa is satisfactory for both factors and indicates a good internal consistency.

Ordered logit was used to investigate the assumed relationships between environmental beliefs (PRO_ECO_PARAD, ANTI_NEP), waste fee schemes (0 indicate FIXED and 1 indicate FREQUENCY), socio-demographic variables and the various perceptions of a differentiated waste fee scheme (see Tables 1 and 3 for description and abbreviations of the variables and factors included in the regression analysis). The goodness-of-fit indicator – Pseudo R² – reported for the six ordered logit models vary. The highest Pseudo R² value reported was 0.11, which is acceptable. It concerns the model including the dependent variable NOT_TO_SAVE. The lowest measured value was 0.02, which is questionable. This is the case for the model with the dependent variable BIG_HOUSEHOLDS. The Pseudo R² values reported here can mostly be interpreted as acceptable, although not excellent (values from 0.2 to 0.4 are considered an excellent fit - e.g., McFadden (1977)).

Table 3. Factor Analysis^a.

	Mean	SD	Loadings	Cronbach's alpha
<i>PRO_ECO_PARAD; pro 'ecological paradigm' beliefs from NEP-scale</i>	3.35	0.75		0.688
When humans interfere with nature it often causes catastrophic consequences	3.29	1.19	0.55	
Humans are severely abusing the environment	3.74	1.02	0.62	
The natures balance is fragile and easy to interrupt	2.99	1.08	0.51	
If things continue on their present course, we will soon experience a major ecological catastrophe	3.37	1.02	0.60	
<i>ANTI_ECO_PARAD; anti 'ecological paradigm' beliefs from NEP-scale</i>	2.60	0.70		0.621
Humans have the right to modify the natural environment to suit their needs	2.88	1.16	0.54	
Human ingenuity will insure that we do NOT make the earth unlivable	3.10	1.03	0.52	
The balance of nature is strong enough to cope with the impacts of modern industrial nations	2.18	1.02	0.53	
Humans will eventually learn enough about how nature works to be able to control it	2.64	1.04	0.53	

Notes:

^a The respondents were asked to evaluate the given statements on a scale from 1 to 5: 1=completely disagree to 5=completely agree.

4. Results: perceptions about a differentiated waste fee scheme

CIE postulates that institutions hold the power to define which logic that is appropriate through influencing individuals' interests and perceptions. In order to test this assertion, the relation between the two kinds of waste fee schemes and different perceptions about a differentiated waste fee scheme was tested – see Table 4.

Table 4. Perceptions about a differentiated waste fee scheme^a

Independent variables	Dependent variables:								
	GOOD_PUNISH			BIG_HOUSEHOLDS			CARROT		
	Coef	St.err	p	Coef	St.err	p	Coef	St.err	p
Institutional setting	1.16	.18	.00	-.76	.17	.00	.98	.17	.00
PRO_ECO_PARAD	.33	.12	.01	.14	.12	.23	.13	.12	.26
ANTI_ECO_PARAD	.48	.13	.00	.20	.12	.10	.19	.13	.14
Control variables:									
AGE	-.02	.01	.01	-.00	.01	.82	-.01	.01	.05
GENDER	-.09	.18	.60	.06	.18	.76	-.34	.18	.06
EDUCATION	-.13	.14	.36	-.11	.14	.42	.34	.14	.02
INCOME	-.03	.09	.73	-.08	.09	.36	-.01	.09	.95
R ² _{pseudo}	.05			.02			.04		
LR chi ²	69.13			30.18			57.14		
N	473			477			475		

Table 4 cont. Perceptions about a differentiated waste fee

Independent variables	Dependent variables ^a :								
	NOT_TO_SAVE			GOOD_TO_SAVE			GOOD_HABIT		
	Coef	St.err	p	Coef	St.err	p	Coef	St.err	p
Institutional setting	-1.86	.19	.00	1.6	.18	.00			
PRO_ECO_PARAD	.17	.12	.17	.15	.12	.22	.82	.18	.00
ANTI_ECO_PARAD	.22	.13	.09	-.01	.13	.89	.17	.20	.38
Control variables:									
AGE	.03	.00	.00	-.01	.01	.01	.02	.01	.03
GENDER	-.19	.18	.29	-.07	.18	.71	-.29	.27	.29
EDUCATION	-.30	.14	.03	-.01	.14	.94	.12	.21	.58
INCOME	.08	.09	.43	.05	.09	.56	-.09	.13	-.35
R ² _{pseudo}	.11			.07			.05		
LR chi ²	166.49			111.23			31.55		
N	486			477			234		

Note:

^a See Table 1,2 and 3 for descriptions of variables

The results report a positive relationship between the variable 'institutional setting' (FIXED = 0 and FREQUENCY = 1) and GOOD_PUNISH, CARROT and GOOD_TO_SAVE. All three variables express appreciation of the logic inherent to a differentiated waste fee. Further, the results report a negative relationship between 'institutional setting' and NOT_TO_SAVE and BIG_HOUSEHOLDS. Both of the dependent variables address a differentiated waste fee scheme as a bad idea.

Similarly, from the individual level, and in accordance with the predictions of both CIE and SDT, it was expected that individuals would give preference to the statements that articulate the same expectations as the integrated sense of self – i.e., either of the two beliefs about human-nature relations. However, there are few significant relationships between the two beliefs about human-nature relations and perceptions about a differentiated waste fee scheme. That

is, there are positive relationships between both PRO_ECO_PARAD and GOOD_PUNISH, and ANTI_ECO_PARAD and GOOD_PUNISH. In addition there is a positive relation between PRO_ECO_PARAD and GOOD_HABIT.

The results linked to the socio-demographic data show a positive relationship between age and the two dependent variables NOT_TO_SAVE and GOOD_HABIT. There are negative relationships between age and the dependent variables GOOD_TO_SAVE, GOOD_PUNISH and CARROT. In terms of gender, it can be observed that males emphasize a positive attitude to economic incentives – i.e., NOT_TO_SAVE, GOOD_HABIT and CARROT – relative to women. When it comes to education, there is a positive relationship with CARROT and a negative one with NOT_TO_SAVE.

5. Discussion

In the following I will first comment on the results that regard how institutional settings affect perceptions about a differentiated waste fee. I continue with the results relevant for the two beliefs about human-nature relations and how they affect perceptions about a differentiated waste fee scheme. Finally I comment on other individual factors such as age and gender.

5.1. Institutional settings and perceptions about a differentiated waste fee

The results regarding how institutional settings influence perceptions about a differentiated waste fee scheme follow, without exception, the expectations derived from CIE. More specifically, individuals give preference to statements that favor the logic they currently experience. For example, the respondents exposed to FIXED agree to a greater extent with the two statements that question a differentiated waste fee scheme, compared to those living in municipalities with FREQUENCY. First, you should sort waste regardless of saving money (NOT_TO_SAVE), and second, a differentiated waste fee is a bad idea because big households are punished economically (BIG_HOUSEHOLDS). The two statements reflect different aspects of a differentiated waste fee, though. The former can be linked to a 'we logic' as it promotes expectations about appropriate behavior. The latter regards a different type of issue, namely what is considered fair with regards to the payment for the waste management service.

Correspondingly, individuals living in municipalities with FREQUENCY lend, compared to those living in FIXED, greater support to statements that favor a differentiated waste fee. They find this kind of scheme to be a good idea because it works as an 'economic carrot' (CARROT), the fact that they can influence the amount of fee they have to pay (GOOD_TO_SAVE) and that it punishes those that do not sort so much waste (GOOD_PUNISH). The two first statements highlight the individual benefit, both as a motivator ('economic carrot') and the more tangible part that you can reduce costs. The third statement includes an aspect of controlling others – i.e., punishing those that do not sort so much waste.

These results give support to CIE's postulations about how institutions express expectations about logics through influencing which perspectives that are considered as correct and which values are appropriate. This supports the idea of plural rationalities – that individuals may hold both individualistic and more social values and perspectives, and that the institutional

context influences which of these that are conveyed and adopted. Furthermore, the results show that even the statement that addresses whether it is bad that a differentiated waste punishes big households seems influenced by the institutional setting. Although one should be careful about the interpretation of a single finding, this might indicate that shifts between 'we' and 'I' oriented institutions have implications beyond the key focus of the institution. If people transfer a core logic of an institution to also affect other related issues, the effect of institutional change, respectively which institutions dominates in a society, will be much more pronounced than what would otherwise be expected.

5.2. Ecological beliefs and perceptions about a differentiated waste fee

The results regarding how the integrated sense of self, represented by the two ecological beliefs, relate with perceptions about a differentiated waste fee were somewhat mixed. For example, it was expected that those with an integrated pro-ecological belief would not cohere with the logic of the differentiated waste fee. According to CIE a differentiated waste fee might create a conflict between a 'we logic' that individuals hold (integrated pro-ecological beliefs) and a possible 'I logic' (the possibility of saving money that a differentiated waste fee scheme give). However, this is only a potential conflict that could have been activated for example if the introduced 'I logic' is perceived as improper when combined with the already existing 'we logic'. Correspondingly, a positive correlation was expected between an anti-ecological belief and statements that express an appreciation of a differentiated waste fee such as GOOD_TO_SAVE and CARROT. The latter was expected on the grounds that individuals who experience an external locus of causality for why they sort waste are likely to appreciate alternative reasons to sort waste than doing the right thing for the environment. These predictions, however, were not supported by the data. However, it was also expected that individuals that see themselves exempt from the constraints of nature (ANTI_ECO_PARAD) should *not* appreciate waste sorting as a 'good habit' and this was confirmed.

Furthermore, two positive relationships were identified between a pro-ecological belief and statements that express appreciation of a differentiated waste fee. The first relation is with the statement that favors the idea of punishing economically those that do not sort (GOOD_PUNISH). This positive relation was expected given that it is in the interest of environmentally committed individuals' that others also contribute. To punish those that do not contribute might therefore seem like a good idea. However, the result that identified a relation between those with an anti-ecological belief and the idea that favors the idea of punishing economically those that do not sort waste, was not expected.

The second relation regards the statement that appreciates the differentiated waste fee to be supportive of a good habit (GOOD_HABIT). Regarding those respondents identified with an anti-ecological belief, no correlation was identified with GOOD_HABIT. This was an expected result as it is not likely that individuals that see themselves exempt from the constraints of nature should appreciate waste sorting as a 'good habit'. However, the result that identifies a relation between PRO_NEP and GOOD_HABIT was not given since the claim favors the idea of a differentiated waste fee, but does this on the grounds of what is considered appropriate. Hence, the argument of the claim emphasizes the positive effect of the behavior in itself – i.e., that sorting waste is a good habit – and not what one can achieve in saved costs. That

way, it is what is considered appropriate that are given preference ('we logic'), and not the external motive of saving costs ('I logic').

These reflections about a pro-ecological belief and GOOD_HABIT might also contribute to an explanation for the results reported above where no relation was identified between a pro-ecological belief and to disagree with the 'I logic' of the economic incentive since waste sorting is a moral issue. This is so since the results suggest that the differentiated waste fee is evaluated - by those with an integrated pro-ecological belief - as offering support to a good habit ('we logic'). Hence, no conflicts with an 'I logic' is activated.

In comparison to the above, it is notable that the study by Heller and Vatn (2017) found that a differentiated waste fee – in the form of a payment per kg – was evaluated as somewhat problematic by those with an integrated pro-ecological belief. More specifically, those respondents that reported that they were not motivated by the weight-based waste fee to sort more waste – rather they reported skepticism about the fee – were characterized by an integrated pro-ecological belief. The present study revealed however, that those with an integrated pro-ecological belief had a positive attitude to the economic incentive in the sense that it was supportive of a good habit. Since the two studies are not identical, some caution must be made when comparing and interpreting the results from the two studies. Still, this indicates that there is no automatic relation between an integrated pro-ecological belief and how you perceive a differentiated waste fee scheme.

Although there is little information in the data that can offer a clear answer to why individuals with a pro-ecological belief perceive the two waste fee schemes so differently, there are some inherent differences to the two schemes that might help us to at least speculate. The weight-based waste fee scheme can be seen as more intrusive into people's lives compared to the frequency-based one. The latter might possibly also induce an element of mutuality or reciprocity. For example, the kilogram based system may influence or force you to think through how much each of the items that you want to throw actually weighs, and whether you want to pay for the extra weight or not. Hence, the weight-based waste fee scheme might be viewed as a punishment by those already strongly motivated. It might also be that the weight-based system is the one, compared to the frequency-based, that most clearly signals the economic incentive that the environmentally motivated finds unnecessary, or maybe even provocative.

Regarding the frequency-based waste fee scheme, the decision that will affect your fee is rather linked to a decision regarding when/how often the waste is going to be picked up. It is the volume of the whole container that sets the limit (and not every kilogram). Hence, the frequency-based waste fee gives a larger degree of freedom and implicitly also a greater degree of responsibility and trust – i.e., reciprocity. The frequency-based waste fee scheme might therefore give a feeling of paying for a service and the differentiation might be perceived as an encouragement, and not a punishment.

These suggestions are in line with the emphasis that SDT gives to how well-being is linked to individuals' perceived freedom to choose to live in accordance with the inner self. These results that address how differences in the integrated sense of self influence the interpretation of a differentiated waste fee scheme – i.e., be a supporter of a good habit or not – address a point made earlier that individuals, in their meeting with institutions, interpret them. Furthermore,

that logics does not "reside in the institutions and their external functionalities, but in the way these are treated in reflection about them" (Berger & Luckmann, 1967: 82).

5.3. Other individual factors

It is notable that other individual factors than those related to beliefs about nature-human relationships significantly influence perceptions of a differentiated waste fee scheme. The older one is, the more people express perceptions going somewhat against the economic logic of a differentiated scheme. The same seems to be the case with female vs. male respondents. The effect of education seems to increase the acceptance of the economic logic. It should be noted though, that the tendencies – especially for gender and education – are not very strong, as several relationships are insignificant. Where there is significance, results are, however, consistent. This supports the wider hypothesis of the role of socialization on values and perceptions.

6. Conclusion

The aim of this paper has been to attempt to develop an analytical framework, based on SDT and CIE, which makes it possible to include both individuals' integrated sense of self and institutional settings in the analysis of a social phenomenon. In this particular study, the intention was furthermore to show the potential of such a combination in a study about what determines expressed perceptions regarding an economic incentive. The case chosen was that of a differentiated vs. a non-differentiated waste fee. The combined approach made it possible to include emphasis on *both* agents and social structures. More specifically, this study has looked at how perceptions about an economic incentive is influenced by a) the institutional setting – a curbside waste management system with two kinds of waste fee schemes – and b) the integrated sense of self – beliefs about human-nature relations.

The most consistent finding is how the two institutional settings were decisive in forming individuals' perceptions about a differentiated waste fee. This gave confirmation to CIE's postulations about how an institutional setting conveys expectations about what the appropriate logic is and this way influence individuals' perceptions. The results provided by using the perspective of SDT – i.e., how the integrated sense of self influence perceptions – add nuances to the picture. For example, the two kinds of ecological beliefs seemingly determine individuals' perceptions about whether a differentiated waste fee is perceived as supportive of a good habit, or not. This result address the point made that individuals, in their meeting with institutions, interpret them. This latter point is further strengthened by comparing the results from this study with those by Heller and Vatn (2017) – i.e., a similar study that investigated individuals' responses and perceptions of the introduction and termination of a weight-based waste fee. One of the main findings is that only half of the sample was motivated to sort more waste due to the introduction of the weight-based waste fee. Furthermore, and opposite of what this study found, the logic of the differentiated waste fee was questioned by those that belong to the group identified with an integrated pro-ecological belief. Finally, the results regarding age and gender give further support to the wider hypothesis of the role of socialization on values and perceptions.

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