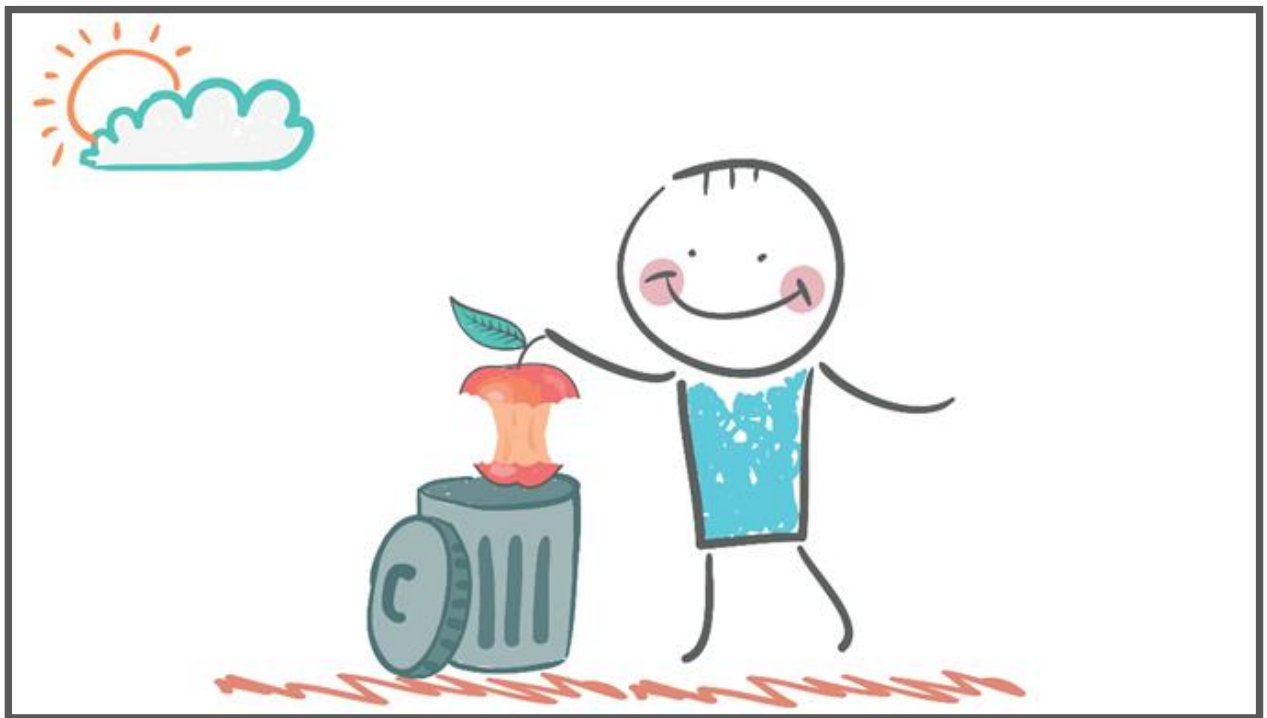


# Sorting for a good cause

- a case study of the relation between sorting and reduction of household waste

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Source: Miljø- og Fødevareministeriet



**AALBORG UNIVERSITY**  
STUDENT REPORT

## Preface

This project is composed in the period of 1<sup>st</sup> of February to 7<sup>th</sup> of June 2019. The project is a master thesis ending the education of Sustainable Cities on Aalborg University, Copenhagen.

The project is concerning the relation between sorting and reduction of waste in households. This is done by looking at the amounts of waste before and after sorting is implemented in households. Understanding the practice of sorting and the attitude among residents are also used to show how sorting of waste affects households.

The reference method is Chicago style. The reference in text is this: (Name year). Page numbers are added when direct citation is used. If a citation is translated from Danish, the original Danish text is added as a footnote.

I would like to thank the persons, who have contributed with their knowledge and engagement in my work. Especially my supervisor Kirsten Gram-Hanssen, who has supported me with knowledge of practice theory. Lina Katan for the guidance in the different perceptions of waste. Thanks to Claus Petersen, Ane Kollerup Nielsen, Mette Ebdrup, Kristina Zacho and Kristoffer Ravnboel for taking their time to provide me with information and knowledge of their work. A special thanks to the seven interviewees, who invited me in their homes and took the time to the interview. Thanks for the talks and the coffee. Your descriptions are appreciated.

I hope you all enjoy the report.

Kirsten Christensen

## Resume

Denne kandidatopgave omhandler forholdet mellem sortering og reduktion af husholdningsaffald. Opgaven tager sit udgangspunkt i, at kommuner implementerer affaldssortering som henteordninger, men skal til at virke for affaldsreduktion af affaldet. Hvordan vil den øgede affaldssortering påvirke reduktionen af affald? Ud fra analyser af husholdningsaffald kan udviklingen af affaldsmængder ses. Ud fra tre analyser af udsortering af bioaffald og to analyser af fraktionerne pap, plast og metal, ses der ikke en tydelig tendens. Mængden af bioaffald stiger i et område, falder i et andet område og er nogenlunde det samme i tredje område. De tørre fraktioner viser samme billede. Pap stiger den ene sted og falder det andet sted. Plast falder i begge områder og metal stiger. Det er dog vigtigt at påpege, at tallene på affaldet kun omhandler affald, der bliver hentet ved husholdningen. Hvis borgerne selv bringer affaldet til genbrugsplads eller bruger det hjemme til eksempelvis kompost, vil det ikke optræde i tallene. Det er imidlertid muligt at implementering af sortering i husholdninger kan betyde at borgerne håndterer affaldet anderledes og således begynder at smide bioaffald i skraldespanden til bioaffald i stedet for at smide det til kompost. På den måde vil det i statistikken kunne ses som en stigning i bioaffald på trods af, at husholdningen ikke nødvendigvis smider mere ud, det bliver bare håndteret anderledes. Ud fra tallene er der ikke en entydig tendens, og det er svært at sige, hvad ændringer i affaldsmængderne skyldes.

Syv kvalitative interviews er blevet foretaget og analyseret for at finde praksis omkring sortering såvel som underliggende holdninger om sortering. Ud fra en praksisteoretisk forståelse er det muligt at finde en praksis for sortering bestående af en tre elementer. Betydningen af at sortere, materialer brugt i forbindelse med sortering og kompetencer brugt til at sortere. Betydningen af praksis knytter sig til praksis og bliver i flere interviews forklaret som nytte for samfundet. Man sorterer for at sikre en god udnyttelse af affaldet. Materialerne brugt til at sortere er - udover affald - skraldespandene. Der er i de fleste tilfælde indendørs skraldespande og udendørs skraldespande. De udendørs skraldespande bliver leveret af kommunen og er derfor ens. De indendørs skraldespande bliver ikke leveret af kommunen, på nær biospanden. Kommunen har leveret en grøn spand, som oftest bliver placeret i skabet under vasken og taget frem under madlavning. Indretning i hjemmet til skraldespandene er forskellige og bygger på folks individuelle kompetencer. Derudover dækker kompetencer også over viden om at sortere. Viden om hvilke produkter der skal i de forskellige skraldespande stammer for nogles vedkommende fra barndommen. Nogle tager viden til sig løbende. Nogle bruger de brochurer, som kommunen udsender om affaldshåndtering.

Ud fra en forståelse af forskellen på hensigt og faktisk adfærd, er det muligt at finde de faktorer der fører til adfærd. Forskellen på hensigten og adfærd kommer særlig tydeligt frem i et af de syv interviews. Her fortæller en borger hvordan han mener, at man bør sortere, når kommunen beder

en om det. Han kan ikke se, hvorfor man ikke skulle sortere. Senere i interviewet kommer det dog frem hvordan besværlighederne med at indrette sit hjem, begrænser ham i at sortere. Der kan også være andre faktorer for at folk sortere eller hvorfor folk ikke sortere. I de syv interviews blev følelsen af at gøre noget godt påpeget. Sortering giver en følelse at have gjort noget godt. For nogle er sortering noget man bør gøre. Det handler ikke om den gode følelse, men om at gøre det rigtige. Hvis kommunen implementerer mere sortering, har borgerne en fornemmelse af, at man bør følge med. Hvis dette ikke er muligt, kan det dog skabe modstand blandt borgerne. Nogle borgere har besvær med at finde plads til de udendørs skraldespande og vil derfor ikke sortere. Sortering fører i nogle tilfælde til, at borgerne bliver opmærksom på mængden af affald, og især mængden af plast og bioaffald bliver fremhævet. Det er underforstået, at det er dårligt at smide så meget ud, men sortering formilder den dårlige gerning. Denne frelse ses endnu tydeligere i byttecentrene på genbrugspladserne. Et byttecenter er et sted på genbrugspladsen, hvor man kan sætte de ting man gerne vil af med, men som stadig er brugbare. Andre borgere kan så tage disse ting med sig hjem. Nogle interviewpersoner påpeger, at det føles godt at sætte tingene i byttecentre og særlig for dem, som ikke kan lide at smide ting ud. Nogle ser det direkte genbrug som en hjælp til andre borgere i samfundet. Generelt er det at bruge byttecentrene en god måde at komme af med tingene. Sortering i husholdningerne fører i nogle tilfælde til øget viden blandt interviewpersonerne om mængden af arten af det affald, de smider ud. Det er dog svært at bruge den viden til ændret forbrug. Ingen af de interviewede mener at have ændret forbrug på grund af sortering. Når interviewpersonerne taler om fordele og ulemper ved sortering, handler det ofte om vaner og rutiner i hjemmet. Det kunne indikere at information og kampagner om sortering skal bygge mere på hvordan man sortere i stedet for hvorfor man sorterer. Det samme kunne gælde for affaldsreduktion. Der er dog en faldgrube i nogle tiltag for affaldsreduktion, såsom direkte genbrug (byttecentrene) også kan betyde, at man øger forbruget. For at undgå denne effekt, kan man se på andre faser end bare når borgerne skal af med tingene. Måske skal man arbejde med de situationer, hvor produkter bliver købt og brugt.

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# 1. Problem analysis

## 1.1 UN sustainable development goals

In 2015 United Nations (UN) published the 2030 agenda featuring the 17 Sustainable Development Goals (SDG). The agenda describes that all member states “...commit to making fundamental changes in the way that our societies produce and consume goods and services. Governments, international organizations, the business sector and other non-state actors and individuals must contribute to changing unsustainable consumption and production patterns...” (United Nations n.d.b, section 28)

SDG 12: Responsible Consumption and Production has its origin in sustainable use of natural resources. The definition of sustainability from the Brundtland-report in 1987 states that the use of resources should be done in respect of the resources needed by current and future generations. (United Nations, 1987) Use of natural resources is increasing worldwide. The developed countries have at least twice the use pr. capita of resources. For some resources, the use is four times the use in developing countries. (United Nations n.d.a) SDG 12 states that one of the big tasks is to decrease the amounts of used resources despite economic growth. That is decoupling economic growth and use of resources. (United Nations n.d.a) In other words, you need to find a solution to use less natural resources in a society where more and more people consume more and more.

SDG 12 has some targets in 2030:

- “achieve the sustainable management and efficient use of natural resources
  - halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses
  - substantially reduce waste generation through prevention, reduction, recycling and reuse”
- (United Nations n.d.a target 12.2, 12.3, 12.5)

## 1.2 Waste hierarchy

The waste hierarchy is a tool to ensure proper handling of waste. In EU Directive 2008/98/EC on waste, the purpose of proper handling of waste is described. The objective for a waste policy is first of all to avoid harm to the human health and the environment and second of all to reduce the use of resources. (European Union 2008) The waste hierarchy consists of five steps in a prioritized order that ensures the environmentally best way of handling waste and is as follows:

- 1) Prevention
- 2) Preparing for reuse
- 3) Recycling
- 4) Other recovery (e.g. energy recovery)
- 5) Disposal.

(European Union 2008)

Prevention is to take measures to avoid waste. This can be extended life span of a product or making products that produce less waste or less hazardous waste. To reuse is to use the product again for the same purpose as it was made. Recycling is to use the material again in the production of the same or other products. In this way the recycled materials can replace virgin materials. Recovery is to use the material for another purpose e.g. incinerate waste to make energy and thereby replace other fuels for energy production. Disposing is when there is no recovery from the waste. The waste is not used for any other function. (European Union 2008)

This waste hierarchy is implemented in the Danish Environmental Protection Act and a part of it is used in the Statutory Order on Waste<sup>1</sup> (Miljø- og Fødevareministeriet 2019a; Miljø- og Fødevareministeriet 2018). The statutory order states that the municipalities have the responsibility and right to handle the waste. The municipal management of waste is based on the waste hierarchy as follows:

- 1) Preparing for reuse
- 2) Recycling
- 3) Other Recovery
- 4) Disposal

(Miljø- og Fødevareministeriet 2018, §12)<sup>2</sup>

The highest step in the waste hierarchy used in Danish municipalities is the second highest step in the European waste hierarchy, as showed in figure 1.

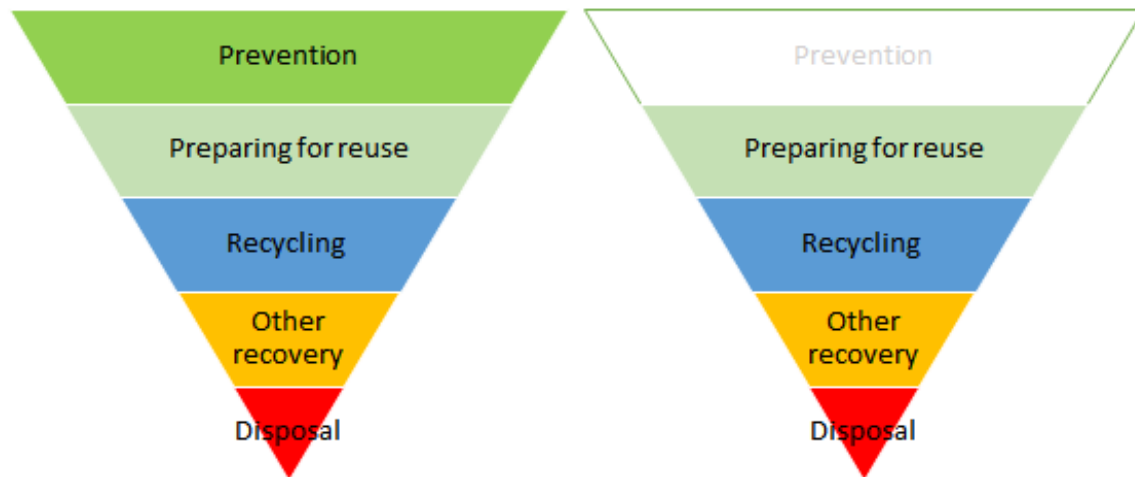
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<sup>1</sup> In Danish: Bekendtgørelse om affald

<sup>2</sup> In Danish:

- 1) Forberedelse med henblik på genbrug.
- 2) Genanvendelse.
- 3) Anden nyttiggørelse.
- 4) Bortskaffelse.





*Figure 1. The difference in waste hierarchy is the top; Prevention. The left triangle reflects the European waste hierarchy. The triangle on the right side is the hierarchy used in the municipalities in Denmark. Own model.*

According to this statutory order, the waste charges payed by the citizens to the municipalities is to handle waste, not to be spent on waste prevention. This also means that the work done by municipalities to move the handling of waste in households up the waste hierarchy does not include waste prevention, as illustrated in figure 1.

This is seen in the waste sector. Traditionally waste treatment and waste prevention has been two different areas of policy. Waste management is traditionally end-of-pipe solutions such as landfill, incineration or recycling. Waste reduction has traditionally not been a part of waste management. (Zacho and Mosgaard 2016)

### 1.3 Danish Waste management

Waste management in Denmark is based on the waste hierarchy and all reusable and recycle resources must be reused and recycled. The resources that can not be used again or used in production of something else can be used for energy recovery. Incineration is based on the waste that is burnable but not reusable or recyclable. If waste can not fit into those categories it is landfilled. (Miljø- og Fødevareministeriet 2018) As shown in figure 2, 69 % of all Danish waste is recycled and 27% is incinerated. Only 4 % of all waste in Denmark is landfilled. (Miljøstyrelsen 2016)

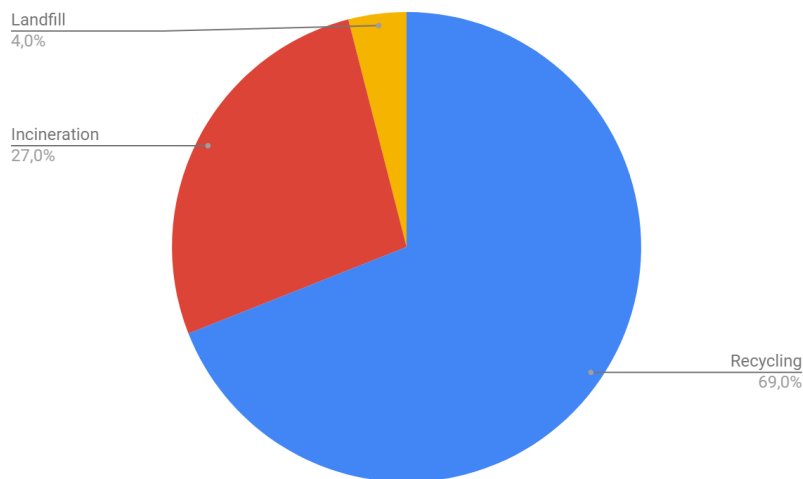


Figure 2. Treatment of waste in Denmark. Own model based on numbers from Affaldsstatistikken 2016 (Miljøstyrelsen 2016)

In 2013 the government launched a resource strategy called 'Denmark Without Waste' giving a vision for how waste management should be done. The goal was to increase sorting and decrease incineration. Recycle of household waste is in focus and the goal is that by 2022 50 % of household waste is recycled. (The Danish Government 2013)

In 2015 the resource strategy was followed by 'Denmark Without Waste II'. In this vision focus shifted from recycling to waste reduction by designing for longer lifetime and reuse of products. Labeling products and sharing economies shall also ensure a longer lifetime of products and less waste generation. The next national plan for waste management in Denmark will be published in 2020. Again the work is to move up in the waste hierarchy. The plan for waste reduction has a focus on industrial waste, but points in direction of waste management of household waste as well. (Miljø- og Fødevareministeriet 2019b).

## 1.4 Sorting and reduction of household waste

As the waste sector traditionally has focused on the end-of-pipe solutions, it is interesting to understand the relation between sorting of waste and reduction of waste in households. What happens to the amount of waste, when sorting is implemented? Is sorting a way to reduce the amount of waste generated? One can argue that more sorting may lead to more awareness among citizens about amount and composition of waste. If you sort, you have knowledge about sorting and might

have put an effort in getting knowledge and making a system at home for sorting. On the other hand, sorting may also be an excuse for throwing out more waste.

Mette Ebdrup is a planner of waste management in Copenhagen Municipality. She expresses her concern in this matter and gives an example of running a campaign for implementing a sorting scheme for bio waste and simultaneously running a campaign about reducing waste of food. She argues that it gives mixed signals to the citizens. She also points out, that the municipality traditionally has worked for waste sorting. The relation between sorting and reducing waste is of their interest and an area, where knowledge is needed as new waste plans include waste reduction. (Ebdrup and Nielsen 2019)

Naboskab is a consultant company working with anthropology in waste trying to promote sustainability and circular economy. (Naboskab n.d.) They have looked into the relation between sustainable consumption, direct reuse, repair and trading on one hand and sorting waste on the other. They saw that if people consume in a sustainable way, reuse, repair and trading, it has a positive effect on sorting. It was however not easy to show. They have no knowledge of the relation the other way around. (Ravnbøl 2019) What happens when citizens start to sort? Do they get more aware of sustainable consumption?

In mapping the amounts of waste in Denmark in 2017, it is stated that “[t]he amount of a given fraction can become bigger, when it is collected in a separate collection scheme.”<sup>3</sup> (Miljøstyrelsen 2018, 32)

This indicates that sorting in some cases can lead to bigger amounts of waste when citizens sort their waste.

A study shows that having recycling as an option leads to higher consumption, if the products are free of charge, such as towel paper on the toilet. (Catlin and Wang 2012). This study shows that recycling can be an excuse for consumption and does this by looking at products free of charge. The study does however not look at waste in the private households.

Another study shows how sorting is a part of the daily life in households, but to minimize waste is done in different situations such as point of purchase and use and repair. (Tonglet, Phillips and Bates 2004)

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<sup>3</sup> På dansk: ‘Den samlede mængde af en given affaldsfraktion kan blive større, når denne indsamles gennem en særskilt indsamlingsordning.’

Stewart Barr examines waste sorting and reduction of waste in households. He also finds, that sorting and reducing waste takes two different approaches. (Barr, 2007) He analyses the relation of the intended behavior and actual behavior by looking at the psychological and situational factors causing the behavior of sorting and the behavior of waste reduction. He finds, that “Access to recycling facilities evidently has most impact on recycling behavior. However, it also has a negative effect on intentions to reduce and reuse waste, a thus far unreported phenomenon”. (Barr 2007, 468)

Does sorting of household waste give an excuse to throw away more? Or is sorting a way of creating awareness of waste, leading to sustainable consumption and reduction of waste?

It is important to distinguish between waste minimization and waste reduction. In many projects and in literature the term ‘waste minimization’ refers to minimize the amount of residual waste, by increasing sorting for recycle and reuse. ‘Waste reduction’ is to minimize the amount of waste generated in total no matter how the waste is treated. (Zacho and Mosgaard 2016)

## 2. Problem formulation

How is more sorting in household waste affecting reduction of household waste?

- Is there a change in the amount of waste? (both residual and the sorted fractions)
- Is there a change in citizens' practice and attitude towards waste management in the household?

### 3. Methodology

In this chapter the theory and methods used in this thesis is described. The problem formulation is answered by two different methods. The first method is to compare the amount of waste before sorting and the amount of waste after sorting to understand changes in the amount of waste. The second method is to use qualitative interviews to understand the practices of handling waste in the households as well as the attitudes towards waste and sorting in the households. Practice theory forms the base for the understanding of practice of sorting and theory of environmental behavior is used to understand the attitudes towards waste handling.

#### 3.1 Reading guide

Figure 3 shows the structure of the report. You have now already been through the first boxes of problem analysis and problem formulation. The chapter, methodology will describe the methods used and theory behind the analyses. Analysis 1 shows the development of the amount of waste when sorting is implemented. In Analysis 2, interviews in seven households are used to find the practices around sorting in households as well as attitudes when sorting is implemented. After the analyses, the results are discussed. The conclusion wraps it all up in the end. Bon voyage!



Figure 3. Reading guide. Own model.



**Environmental values:** The environmental values are described as "... underlying orientations held by individuals toward the physical environment." (Barr 2007, 437)

Barr describes different terms and aspects of environmental values. The aspects of environmental values are whether each individual has a responsibility to change behavior or it is the responsibility of the society. Another aspect is how sustainability is perceived and the relationship between human and nature. Is human superior to nature or is human on the same level as nature. (Barr 2007) It is relevant in the understanding of intention and behavior, as it either gives the responsibility to the individual or not, as well as the understanding of resources and sustainability is determining whether the individual perceives the use of resources as good or bad. Is there a reason for the individual to change or behave in a certain way? (Barr 2007)

Overall environmental values are about the different perceptions of sustainable production and what role the individual citizen has.

Barr describes the intention as a product of the environmental values and the situational and psychological variables (Barr 2007). The situational variables are the physical surroundings and the individual knowledge regarding waste management in the household. The psychological variables are the individual perception of different aspects such as responsibility for the community and society, motivational factors for sorting or reducing waste and the capability of doing something to enhance sorting and reduction of household waste.

Barr explain the variables as follows (Barr 2007):

**Situational variables:**

- Behavioral context. Service concerning waste management such as bins and bags handed out by the municipality or curbside collection.
- Sociodemographics. Barr describes, that research show some relationship between sociodemographic aspects and waste management. The stereotype of a person sorting waste is a young woman living in single-family dwelling, with a high education and a high income. Barr points out, that there is disagreement to how the sociodemographic parameters can be put in relation to waste management in households. According to Barr, the relationship between sociodemographic parameters and waste sorting is accused of being a spurious relationship.
- Knowledge divided in two categories: 1) Abstract knowledge. It is general knowledge of the environmental problems and the impact of sorting waste. 2) Concrete knowledge of how to



sort and where to put the waste. Barr explains that the concrete knowledge is necessary in order to sort waste.

- Behavioral experience. Experience from one domain can be used in another domain. Barr calls it a 'behavioral snowball effect'.

#### Psychological variables:

- Altruistic. It is based on the awareness of the problem, awareness of relevant actions to be made to avoid the problem and an allocation of the agency to perform the action. If you know there is a problem and that every person can make a difference by sorting waste, you think everyone (yourself included) has a responsibility.
- Intrinsic motivation. It makes you feel good to sort, in the same way that helping someone often gives a good feeling. You can also have extrinsic motivations, rewards that are not from inside, but from outside. It can be money for sorting. Barr explains a peculiar effect: The extrinsic motivations are not as good on a long term, and extrinsic can harm the value of intrinsic. E.g. if you get payed to sort your waste, the feeling of doing something good may not appear.
- Environmental threat. The direct link between personal life and the waste problem makes it tangible, e.g. living close to a landfill. The tangible link is perceived as a threat to personal well-being.
- Response efficacy. Perception of a tangible impact, so the effort put into sorting pays off. The perception that it makes a difference when you contribute. In many situations individuals are concerned about their impact. Does my behavior matter in the bigger picture?
- Subjective norms. The effect of others behavior regarding recycling and sorting. When a social norm regarding recycling and sorting is known and accepted one is more likely to adopt the social norm.
- Self-efficacy. The feeling of being able to recycle or sort waste. The perception of the possible actions to take. It is linked to the next factor, logistics.
- Logistics: The perception of what is possible in the personal life under the circumstances given. It is based on three factors: 1) Time to act 2) Convenience of the behavior 3) space to store items.
- Citizenship. Feeling of being part of community that is being part of the decision making and the community spirit.

The environmental values, situational and psychological variables leads to the intention. The behavior is based on the intention but also affected by the situational variables and psychological factors. This

means that the difference in intention and behavior is based on the influence from the situational variables and psychological factors. (Barr 2007)

Barr's framework about environmental behavior focuses on the individual action of recycling and sorting waste. The theory operates with the balance between outer circumstances (situational variables), and inner individual perceptions (psychological variables). The purpose is to understand the underlying factors for the environmental behavior in order to show the complex and different factors in play. With this model Barr aims at the gap between the intention and the actual behavior. (Barr 2007)

In other words, when a person throws something out it is based on several things. First of all the perception of the environment. Is the person concerned about the environment. The situational variables are the outer circumstances, e.g. is there a bin for sorting? Sociodemographic factors such as age and education can also contribute to the prediction of what the person will do with the waste. Knowledge and experience are also situational variables. Does the person have the experience to sort? The psychological variables are the inner perceptions such as the good feeling of doing something good. Perhaps sorting makes the person feel good about herself. How family and relatives discard their waste is also influencing the way this person discards the waste. There are several other variables such as the feeling of belonging to a community and contributing to that community. These are just examples to show the theory works. In this project the theory of environmental behavior is used to show the psychological and situational variables in the households. When the residents start to sort, their change in behavior is based on those intentions and affected by the different variables. The individual stories and perceptions found in the households are understood through this theory.

Barr argues that planning in UK for waste reduction, reuse and recycling is based on creating awareness among citizens. This awareness should encourage citizens to change behavior. This is criticized by Barr and through his model, he shows that changes in behavior are based on more than just knowledge. (Barr 2007)

Awareness leading to changed behavior is also criticized by Kirsten Gram-Hanssen, who compares different understandings of consumption in relation to energy in households (Gram-Hanssen 2014). She argues that there is no clear relation between awareness and changed behavior. Knowledge influences but she stresses that other circumstances also influence consumption. She points to a theoretical approach, where consumption is understood in the context of the practice performed. She

explains how some practices are based on routines and not necessarily awareness of consumption, e.g. cooking and washing. (Gram-Hanssen 2014)

This line of thinking is seen in an article from 2013 from Barr et al. (2013). They argue that understanding waste sorting in households only by behavioral approach is not enough. The practices around handling waste is important and the practices in households need to be understood in order to use it in public planning. Barr et al. argue that understanding recycling and reduction of waste is only possible if you also look into the social practices around handling of waste. (Barr et. al 2013).

To understand waste management in households and the practice around it, I will first introduce the practice theoretical approach and afterwards discuss the theory in relation to this thesis.

### 3.2.2 Description of practice theory

Inge Røpke has written an article about ecological economic studies and the use of practice theory approach (Røpke 2009). The following description is based on that article.

Using a practice theoretical approach means that the analysis is made on the practice. Røpke explains how people in daily life are engaged in practices such as cooking, shopping, working, taking care of their children, etc. These practices often involve usage of things such as equipment, infrastructure, tools and so on. The consumption of those materials is, however hidden or not thought of for many people. As Røpke writes:

“Primarily, people are practitioners who indirectly, through the performance of various practices, draw on resources” (Røpke 2009, 2490).

Røpke highlights that understanding these practices might be a way to understand the consumption of energy, water and other things that are used in the daily routines.

A practice in this theory is a unit of activities and elements. It is recognized as a block or cluster of activities by the practitioners and involves several elements. The practice must be performed by many people and not only a few individuals. There is a common understanding of the practice among the practitioner and this enactment is agreed upon by the practitioners.

Røpke distinguish between practice-as-performance and practice-as-entity (Røpke 2009). Practice-as-entity is the entity of the activity that is the common perception of the activity. Practice-as-performance is the individual performance of that entity and the individual adjustments to the

practice. The practitioner is the carrier of a practice and can reshape and adjust the practice. The elements of the practice are as follows:

- Competence. Skills and knowledge to perform the practice. Skills are often based on experience. Some knowledge is seen in formal rules and some is tacit knowledge. Some competences are used in many different practices and others are specific for a particular practice. The competences are embodied in the practitioner, but also shared as they are a part of the practice.
- Meaning. The practice makes sense. Why the activity is good (or bad) is shared, e.g. healthy and the practitioner copies the meaning. The meaning belongs to the practice and is reproduced when the practitioner carries out the practice.
- Material. The physical objects included in the practice, which also include body parts.

The components are embodied in the practitioner and there is no clear boundary between the components.

Røpke defines a practices by writing: "... a practice-as-entity is a set of bodily-mental activities held together by material, meaning and competence. In other words, a practice can be seen as a configuration of heterogeneous elements." (Røpke 2009, 2492)

Practitioners are, as explained above, carriers of the practice. Agency is thus a part of practice theory but not the focal point in an analysis of practices. Analyzing a practice will focus on the practice, with the agency as an important part of the practice linking the different components. Røpke warns however, that empirical study of practices will be practice-as-performance. Each time a practice is carried out, it is performed by the practitioner. It is therefore important not to lose sight of the practice-as-entity. (Røpke 2009)

Røpke explains how practices compete with other practices to be the one performed by the practitioner. If a new practice is obtained, a change in the former practices will appear. Some practices can exist simultaneously, and other practices replace each other. There is however a path dependency in daily life. Røpke refers to several understandings of how new practices are obtained, but overall people take up practices based on many different considerations. (Røpke 2009) Røpke explains it like this: "... people manage every-day life as a puzzle of many considerations emerging from practices and projects and influenced by their accumulated experience and disposition" (Røpke 2009, 2493). Røpke

argues that in relation to ecological economies it is desirable to understand how practices are changed, how the links between the elements are broken.

The article by Røpke is using practice theory in ecological economies and Røpke puts the practice theoretical approach in relation to consumption. (Røpke 2009)

To consume is part of a practice and the aim is not to consume but to do something else, e.g. cook or take a shower. Seeing people as practitioners and not consumers draws attention to doing instead of having or consuming. In order to use things you need to have the skills, and thus the attention is drawn to the skills used in the practice. The competence used creates a good, intrinsic feeling. Consumption is not to show off with products stating your lifestyle. Rather, consumption is about being competent and using materials and tools to develop the competences. "In this way, competences can work as consumption dynamics." (Røpke 2009, 2496)

A lot of consumption is based on the daily routines and are not subject to reflexivity. Røpke argues that because of this lack of reflexivity, it can cause difficulties to bring environmental considerations into consumption. Practices are carried out with the intention to do something, which means that the consumption is hidden in the practices. (Røpke 2009) When people are asked about their intentions with the practice, the answer might show more reflection than the daily routine is actually given. Røpke argues that bringing environmental considerations into consumption is a big challenge and not likely to change the consumption. The eco-friendly actions serve as "... symbolic indicators of environmental awareness." (Røpke 2009, 2496)

#### 3.2.2.1 Practice theory in waste

This theoretical approach is 'translated' into the waste sector, where the practices of sorting waste is not as hidden as energy or water consumption. Waste is something we all hold in our hand every day several times a day and in different situations. What we do with each piece of waste may not be based on a conscious choice, but we all know the practice of throwing out items. It is however still a byproduct of another practice, e.g. throwing away a newspaper is a byproduct of reading the newspaper. You purchased the newspaper to get the knowledge it contains, not to get the paper to throw away. The different products or materials becomes waste in different situations. Packaging is waste as soon as the main product is used. Food becomes waste when it is no longer healthy to eat. Paper is often a means to communicate information and when that information is obtained the paper is considered waste. Some items can be used again and do not become waste immediately after use.

For instance a plastic container for ice cream can be used a lunch box, paper can be used for shopping list etc. These are just examples showing that items become waste in different situations.

In this project, the approach of practice theory is used as a way to understand the practice of sorting waste. The approach looks at sorting as a phenomenon based on competence, meaning and materials. The practice of sorting is based on

- Competence: the knowledge of how to sort. This includes the knowledge about what the item is made of, how it is sorted and how the sorting bins are arranged in the house and outside the house.
- Meaning: The meaning of sorting is first of all to discard the item. This is done in the best way possible.
- Material: The bins inside and outside the house as well as the items to be discarded.

In this project, the change in materials and perhaps meaning and competence can change the practice and other practices emerge. The interesting part is to see whether this new practice encourages the practitioner to change the practices regarding buying and consumption. When competences and the use of them can lead to higher consumption as quoted above, the competence of sorting might result in even more to be thrown out because you get to use your skill to sort.

### 3.2.3 Using the theories

The difference in the two theories is that Røpke focuses on practices and Barr looks at the agent's choice of sorting waste. The point in a practice theoretical approach is, that consumption makes a practice possible. Consumption is not based on choice to consume, but necessary to perform an activity. The practice theory has its focal point on the practice. The individual carrying the practice is just part of the practice but is not the one in focus. The carrier of a practice is still important as an operator or conductor of the practice, who links the elements of competence, meaning and material together. Barr on the other hand believes there is an intention to do something and looks into how that intention is then leading to the behavior. He sees it as a conscious choice but affected by situational, and psychological factors. The focal point in a behavior theoretical approach is the individual's behavior.

The difference in the two theories is like seeing the world through different lenses. The lens of behavior theory will give an understanding of the individual behavior and the motives behind the

behavior. Looking through the lens of practice theory will show practices being carried out and what elements are used and how they are linked.

The problem formulation in this thesis asks for effects when sorting is implemented in households. What happens to resident's attitude and behavior as well as practice around handling waste.

Gram-Hanssen compares the behavioral approach of understanding consumption to a lifestyle approach and practice theoretical approach. She argues that behavioral approach can be used to understand changes, whereas the practice theory understands the consumption in relation to the practices performed in daily life. (Gram-Hanssen 2014) In this thesis, the focus is on the choice of implementing (more) sorting in households and the affects to the handling of waste in households. Implementing sorting is based on the situational and psychological factors seen in framework for environmental behavior by Barr (2007). How sorting is done in the household in their everyday lives is found through the practice theoretical approach.

## 3.3 Methods

This chapter describes the methods used to answer the problem formulation. The first text describes the preliminary work in this thesis. The next part explains the methods used in the analyses.

### 3.3.1 Preliminary work

The preliminary work in this project is based on scientific articles about waste management and consumption in daily life and reports about waste production, and waste management in Denmark and EU. To get a feeling of where and how to get information regarding waste reduction in household waste, phone calls and interviews were conducted with actors in the waste sector; a municipal owned waste company, private consultancies and planners in Copenhagen Municipality.

#### 3.3.1.1 Kristina Zacho, AVV Hjørring.

*Phone call February 28.*

Kristina Zacho is project employee and former PhD-student at the waste company AVV. The PhD is about waste reduction in households (AVV n.d.), and her knowledge can give an overview of the actions taken in the waste sector regarding waste sorting and waste reduction in households. The phone call was an informal interview, where Kristina Zacho gave her perspective on the idea for this thesis and pointed to Econet for other projects and data regarding waste sorting in households.

Short minutes from the interview is seen in appendix 1.

#### 3.3.1.2 Claus Petersen, CEO and project manager in Econet.

*Meeting in their office in Copenhagen, March 8.*

Econet is a consultancy in waste management. The company analyses waste and advises about waste management. In many of their projects, they combine sorting and weighing of waste with surveys and interviews with residents. (Econet n.d.) Claus Petersen gave me access to data from previous projects, although GDPR should be followed. Knowledge on the individual household should be kept anonymous.

This meeting gave an overview of different projects in Denmark and the different ways of analyzing waste. It also gave me access to data from previous waste analyses. The data is used in chapter 4 analysis 1. Minutes from the meeting is found in appendix 2.

#### 3.3.1.3 Kristoffer Ravnbøl, CEO and founder of Naboskab.

*Email from April 9*



Naboskab is a consultancy with a focus on anthropology and waste (Naboskab n.d.). Contacting Naboskab had the purpose of getting the anthropological point of view to the relation between sorting and reduction. The email is found in appendix 3.

#### 3.3.1.4 Ane Kollerup Nielsen and Mette Ebdrup, planners of waste management, Copenhagen Municipality.

*Meeting March 13.*

Copenhagen Municipality has implemented sorting of household waste in steps and latest sorting of bio waste was implemented. Interviewing two planners from the municipality gives knowledge of how this sorting and waste reduction is handled in the municipality. As explained in chapter 1. Problem Analysis, there are restriction to what a municipality can do in order to minimize waste generation. This gives the municipality some challenges to waste reduction and how to plan for that. The interview gave the municipal view on sorting and reduction of waste in households and the different aspects in planning and doing these initiatives.

Minutes from the interview found in appendix 4.

#### 3.3.2 Quantitative analysis

The quantitative analysis shows the development in the amount of certain fractions when sorting is implemented in households.

As described above, Econet has conducted many waste analyses and data from some of those analyses are used in this thesis to show how the amount of waste develops when sorting is implemented. As Econet offered access to several data sets, it gave the opportunity to choose from different types of data. The criteria for choosing the data to this thesis are:

- A sorting scheme in households was implemented in households
- The amount of waste was weighed before the implementation and again after the implementation

Another choice is about the size of a sample. Some waste analyses are based on waste from individual household, other analyses uses batches of approximately 100 households. For this thesis the analyses of batches were chosen. The batches are chosen because the individual household weighing might be too detailed in the sense that changes in the household in the time for collecting data influences the amounts. E.g. vacations leaving no waste at home, or if one has a birthday and opens a lot of presents, there might be much more paper compared to any other day. In a batch these special conditions does

not affect the whole amount of waste in the same way. To show the effect of sorting, the data collected must be detailed enough to show the little variations. I expect that, if there is an effect of discarding more waste due to more sorting, it will be a minor change in the big sets of data and may even disappear in very large samples. Waste discarded in other ways than curbside collection is not a part of the analyses. If citizens bring waste to the recycle centers it will not show in the analyses of bins in the household. One can argue that data from collected waste, recycle stations and common bins can be used to understand the development of generated waste. Using this kind of data will show a picture of the waste generated on a macro-level. It will not show the waste that is used in other ways at home (composting, sold as second hand products, burned in campfires or boilers for individual heating in households). It will however be difficult to see whether the waste collected from common bins and recycle stations are from residents, where sorting is implemented. If the scope is zoomed even further out, details might disappear. If the timespan is big and all waste data for a society is included, changes in society will influence the data. New technologies or change in lifestyle will affect the composition of waste. For instance, the more internet shopping might give more cardboard waste in the households.

To sum up, if the scope changes to individual households, there is a risk, that events in the household will disturb the data. If the scope is changed to look at waste on a bigger level, it will be hard to find the details, and the data might be affected by changes of other circumstances in society such as economical crisis or change of lifestyle. The scope of household waste analyzed in batches is chosen to show the details asked for in the problem formulation.

The choice of fractions measured is also important. For this thesis food waste is measured. Food waste is one of the few fractions, where consumers have a choice of buying more or less. Many other fractions are byproducts of something else, e.g. packaging.

According to waste mapping from 2017, Danes threw out 1552 gram/person/week of food waste. This fraction is then divided into avoidable and unavoidable food waste. The unavoidable food waste is what you can not eat, such as peel and skin of fruits. The avoidable food waste is the edible part of food that has been thrown out instead of eaten. Of the food waste in Denmark in 2017 54 % was avoidable food waste. (Miljøstyrelsen 2018)

Data from two different analyses are chosen for this thesis. One is an analysis from Sønderborg from 2018 and the other is an analysis from Silkeborg from 2016. The two waste analyses conducted by Econet measures the residual waste before and after implementing a sorting scheme. This means that Econet has analyzed the residual waste before sorting was implemented and used that as a baseline.

Econet sorted the residual waste and weighed all the different materials found in the residual waste. 3-7 months after the sorting scheme was implemented, Econet again analyses the residual waste to see how sorting schemes affect the amounts in the residual waste. The fractions that were sorted out are also analyzed. The analyses conducted by Econet have the purpose of showing how different kinds of bags and bins affect sorting. How good is the sorting? Is food, for instance, still ending up in the bin for residual waste? Econet also measures the sorted fractions to see how pure they are. Do people sort well?

Econet has studied the residual waste before and after sorting was implemented. Their focus is on the development of amount and composition of the residual waste, and how to minimize residual waste. In this thesis, the data is used to show the amount of food waste, cardboard, plastic and metal found in all fractions before and after sorting was implemented. The numbers from the analyses during the test period is used to see if the amounts of food waste, cardboard, plastic and metal increases or decreases in total (no matter what bin they were found in) compared to the baseline. It means that baseline in this thesis and baseline used by Econet is the same. The analyses are however not the same. Econet measures the amount and composition of residual waste after sorting is implemented and compare that to the baseline. In this thesis the comparison is between the baseline and the sorted fraction for instance of food plus the food waste found in the residual waste after sorting was implemented.



*Figure 5. Shows the use of data for this thesis. Own model*

Figure 5 illustrates the calculations for chapter 4 Analysis 1. The calculations are found in appendix 5.

### 3.3.3 Qualitative analysis

The results from the qualitative analysis shows the practice of sorting and the attitudes among residents in seven different households. The analysis is based on seven qualitative interviews. Semi-structured life world interviews are used in this project to gather knowledge of the understandings, perceptions and practices citizens have about waste sorting and consumption. The semi-structured life world interview is by Kvale and Brinkmann "... defined as an interview with the purpose of

obtaining descriptions of the life world of the interviewee in order to interpret the meaning of the described phenomena.” (Kvale and Brinkmann 2009, 3). Knowledge comes out of the conversation between the researcher and the interviewee and the task for the researcher is to interpret the descriptions made by the interviewee. (Kvale and Brinkmann 2009)

### 3.3.3.1 The choice of interview persons

In selection of interview persons, I use what Flyvbjerg calls “Information oriented selection: Cases are selected on the basis of expectations about their information content.” (Flyvbjerg 2006, 203)

The purpose of the interviews is to obtain knowledge of how implementation of sorting schemes in households affects people’s attitude and practice of sorting waste.

The selection of interview persons is based on several parameters. As explained in chapter 3.2 Theoretical approach, waste is something we all handle every day. As the aim of this thesis is to understand the attitudes and practices of sorting and consuming, all citizens were relevant to interview. Narrowing it down was done by first of all finding a place, where a sorting scheme for bio waste was implemented recently. Again, the food waste is picked as one of the fractions, as that gives people a choice of throwing out more or less, meaning buying too much or not. The expectation was that if sorting recently was implemented, citizens were able to describe that change of the thought or practices leading to more sorting.

In Copenhagen municipality the implementation of a sorting scheme for bio waste started in 2017. All households received an indoor bin, bags for that bin and a letter introducing the new fraction. The bin and the bags are shown on the picture of figure 6. Single-family houses also received an outdoor bin for bio waste, but had the opportunity to deselect the sorting scheme of bio waste.



Figure 6. Indoor bin and bags offered by the municipality. Own picture

By choosing single-family houses there was a chance, that they had given it a thought, even though having the bin did not mean they had to use it. The active choice would be not to have the bin. So one assumption was, that the households might have actively thought about sorting of bio waste.

Each house has its own bins and another assumption was, that having your own bin instead of a common bin shared with your neighbours, will create a feeling of responsibility or ownership of the bins and keeping them nice and clean.

In the streets of Sverrigsgade and Brigadevej in Copenhagen Municipality, there are 28 single-family houses.



*Figure 7. Some of the houses on Sverrigsgade and Brigadevej. Own picture.*

There is individual waste collection, which means that each household is responsible for their own waste bin. There are 5 compulsory fractions and three optional. Four times a year big items of waste are collected.

Compulsory waste bins	Optional waste bins
<ul style="list-style-type: none"> <li>- Paper</li> <li>- Plastic/metal</li> <li>- Hazardous waste (includes electronics and batteries)</li> <li>- Garden waste</li> <li>- Residual waste</li> </ul>	<ul style="list-style-type: none"> <li>- Cardboard</li> <li>- Biowaste</li> <li>- Compost</li> </ul>

All those fractions are being collected curbside. (Københavns kommune 2018) The residents have to bring glass to a common container on the nearby corner. Besides those fractions, there are recycle stations across the city, the nearest being on Vermlandsgade 1 km away. The fraction of bio waste as an optional scheme was implemented in Sverrigsgade and Brigadevej in 2017. Because of the compulsory fractions all residents were relevant to interview. As explained above, the purpose of the interviews is to obtain knowledge of the life worlds and interpret the practices and attitude around waste handling in the household.

A letter in the mailbox was the first contact to the residents. The letter was handed out Tuesday 2<sup>nd</sup> of April. The letter announced that I would knock on their door the following Sunday and ask for an interview. (cf. appendix 6) I did not mean to interview them that Sunday, but to set a date for the interview in the coming weeks.

That Sunday four persons would like to participate, two persons would like not to participate and two people hardly had the time, but would like to help, if I needed respondents in the end. But a few other things also occurred helping me choosing interview persons and sharpening my interview skills. In the morning a grumpy old man called my cell phone and told me that I should not knock on his door as he was part of a festival taking place nearby about democracy and sustainability in the neighbourhood. He explained to me, that I ought to join the festival because of my educational background. In one of the houses, I met a man, who immediately said, that he had been trying to send me an email, but never got around it. He was angry about the solutions made by the municipality. There was no room in the streets for all those bins. Even though he would like to sort, he could not find a reasonable solution and the municipality was of no help. After 20 minutes of enthusiastic talk and showing me the challenges in the street, I asked him about making a proper interview. He was not interested as he was ill and did not have the time. Those examples of angry citizens, who had a focus of either complaint about the solutions provided by the municipality or by my timing and engagement warned me that some citizens might have another agenda if they agree to do an interview with me. There is a risk, that the whole interview would circle around the unhelpful municipality and not the daily life and practices when sorting waste.

In another house, a man would like to participate, but it had to be that Sunday. I agreed even though the interview guide was far from done. I thought I could use the interview as a test of the interview guide and the skill of interviewing and interpreting the description of his life world. The interview revealed that the interview guide should have another focus and after transcribing the interview I

learned more about how to control and conduct interview. This Sunday I got knowledge of how to correct my interview guide, what the angry citizens were angry about and a few appointments for interview in two weeks time.

The number of interview persons is based on the rule of thumb, that the same statements appear again or as Kvale and Brinkmann describes it: “until a point of saturation, where further interviews yield little new knowledge” (Kvale and Brinkmann 2009, 113). That number is however hard to predict beforehand. I assumed that four was not enough interview persons and went another round of knocking doors the following Wednesday and got three more appointments and a few more back-ups, if I needed more interviews. I choose to stop at seven interviews. As Kvale and Brinkmann explain there is a risk of having too many interviews as the empirical work of analyzing the interviews will take more resources than available. (Kvale and Brinkmann 2009)

### 3.3.3.2 Interview guide

The questions are made with attention to the thematic and dynamic purposes as Kvale and Brinkmann explains it. (Kvale and Brinkmann 2009) This means that the interview guide is both to ensure knowledge creation, but also to ensure a natural flow in the conversation and making the interview person comfortable before asking more personal questions. The purpose of the questions are firstly done and an interview guide is based on this. As explained, the draft for the interview guide focused on the reasons for sorting. It was however clear from that test interview, that sorting may not be an active choice and people do not remember the thoughts and motives for adding each fraction to the daily handling of waste. In the final interview guide the practice theoretical approach was more used and asked for descriptions of the daily life as well as design and placing of the bins inside the house and outside the house. The interview guide is found in appendix 7.

The purpose of the interviews is to understand practices of sorting and understand the change from not sorting bio waste to actually sort. Another purpose is to find the psychological and situational factors for sorting. The questions to the citizens are put in an every-day language. The interview guide consists of questions for

- Those, who changed practices when bio waste was implemented,
- those, who already sorted out bio waste (for composting)
- those, who choose not to sort out bio waste

Interviewing those, who choose not to sort out bio waste was interesting in this project as they live in an area, where they have to make an effort to avoid the bin for bio waste. It is a choice taken and the

reasons to do so are interesting in the sense that the attitude might be more distinct. It also turned out that everyone sorted something.

At the end of each interview the sociodemographic parameters of the household was found, if not revealed during the interview. Those parameters were

- Age of the residents
- Member of the household
- Education and employment

First part of the interview guide is relating to practices and ask the interview person to describe the practice of handling waste in the household. This can be either each fraction or a description of preparing a meal. Second part is based on the theory of behavior and asks for reasons to sort and how that makes the interview person feel. The second part is used only if answers to the first part did not reveal the values and attitude towards waste.

The interview guide was used as a guide. As Kvale and Brinkmann argues, it is the job of the interviewer to make the conversation running. They argue that in some cases the interview guide can look like an agenda, with the important issues and not real questions. (Kvale and Brinkmann 2009)

In this project, there was an interview guide with questions, but the guide was not followed strictly during the interviews. This means that the questions were not followed in the correct order, and the wording differed according to the conversation taking place. This made the conversation more fluent, but might also have caused that the interview persons did not answer the same questions. As these answers are not used quantitatively this is not of harm to the outcome of the interviews. The purpose of the interviews was to get diverse descriptions of the practice of sorting and the motives for sorting. The slightly different questions and language was a means to ensure the dynamic process and making it a nice and comfortable conversation.

The interviews are all conducted in the homes, some in the kitchen, some in the garden. In this way it is easier to make the understand the life world, or daily life, tangible. The things used for sorting was there in the kitchen and the gardens. Each interview lasts approximately an hour. In the letter sent out to the households I explain, that if the households consists of several members, all members are welcome to participate in the interview. In several of the interviews, there is one person being interviewed and the spouse comes and goes to the interview.



#### 3.3.3.3 Using data from the interviews

All interviews are recorded and all interview persons are anonymized in this thesis. In the letter sent out this was made clear and when conducting the interview I again explained that the recorded interview was for my work and the interview persons will be anonymous in the report.

The data from the interviews is handled by listening through the interviews writing down the different statements or practices and noting the time in the interview, see appendix 8. Those statements and descriptions are used in the analyses of practices and psychological and situational factors in chapter 5 Practices and attitudes

### 3.4 Sub-conclusion

To understand the effect sorting of waste has in the households two different approaches are taken. First of all data on waste collected curbside before and after sorting is implemented, will show the development in the amount of waste. Second part is a qualitative understanding of the practices and attitudes found among the citizens. To understand the behavior and the practices two theories are used. Theory of behavior is a framework explaining the gap between intention and behavior of the individual when looking at environmental behavior. According to the theory, the intention is based on environmental value and psychological and situational variables. The situational variables are the outer circumstances such as service provided, sociodemographic factors and experience. The psychological variables are the inner perceptions, such as the feeling of what you can do, what you can contribute with and how that makes you feel. The behavior is affected by situational and psychological variables. This effect is what makes the difference.

Practice theory understands environmental behavior through practices. The aim is to understand consumption of various kind, but in terms of energy, water and waste, consumption is just a hidden part of a practice. The practice is performed to do things like cooking and taking a shower. To understand the consumption, you need to understand the practice. A practice is a recognizable entity, which is enacted by the many people. It consists of three elements: Meaning, competence, material. People are carriers of the practice, when they perform the practice.

The difference in the two theories is the focal point of analyzing. The theory of behavior has the individual as the focal point, whereas the practice theory has the practice.

In this thesis the theories are used to understand the practice of sorting, but also to understand the underlying motives.

The preliminary work on this thesis project is based on articles and reports as well as contacts to relevant persons and companies. Kristina Zacho, project employee in AVV and author of a PhD about waste reduction in household waste pointed me in direction of Econet. It is a consultancy making waste analyses and used in many different projects. Claus Petersen, CEO of Econet offered to help with data and knowledge in general in the Danish waste sector. Another consultant, Kristoffer Ravnboel from Naboskab has the anthropological approach to waste management in households and was also contributing with knowledge in the preliminary phase. Finally an interview with two planners from Copenhagen Municipality, Ane Kollerup Nielsen and Mette Ebdrup gave the municipal insight in waste planning for households.

To answer the problem formulation two different methods are used. First method is to compare the amount of waste before and after implementation of sorting schemes in households. From different waste analyses conducted by Econet it is possible to extract data to use for the analysis in this thesis. The data chosen are from projects run in Sønderborg and Silkeborg, where residual waste is sorted and weighed and used as a baseline. The first analysis of the residual waste is made before sorting schemes of food waste was implemented. 3-7 months after implementation of the sorting scheme another analysis of the waste is made and the development in the amount of waste is possible to find. The waste is collected from approximately 100 households in each batch. Batches were chosen in this thesis, as it may be possible to show small changes in the waste. It however, does not take waste brought to recycle stations or discarded in other ways into account. If waste from individual bins was analyzed, it will be too sensible to events in the household. If waste from households, recycle stations and common bins were used, the details would disappear in the numbers and it would be impossible to know whether the waste was from households with the sorting scheme or from other households and companies.

The second analysis is based on interviews with citizens in single-family houses in an area, where sorting of bio waste was recently implemented. This selection of interview persons was based on expectation of the knowledge obtained in the interviews. The single-family houses can ask the municipality not to be a part of the sorting scheme of bio waste, but have 5 other compulsory fractions. The assumption for choosing these houses was, that the residents have thought about implementing sorting of household waste or not. Another aspect is the individual bins for each household. There might be a feeling of responsibility and ownership of the bin.

The contact to the interview persons was initiated by a letter in the mail box and followed by a knock on the door. One man wanted to do the interview the day I knocked the door. Even though I was not prepared, the interview helped me sharpen my interview skills and the interview guide. Besides the test interview, I got appointments with seven people.

The interviews are conducted at the interview person's home and takes approximately an hour. The first part of the interview guide is based on a practice theoretical approach, where the interviewee is asked to describe how waste is handled in their home. It is followed by more explicit questions to the attitude regarding sorting and ending in questions regarding socio-demographic parameters such as age, members of the household, education and work.

The interviews are all recorded, but anonymized and other names are given to the interview persons, as explained in the letter and again during the interview.

## 4. Analysis 1 - Development in amounts of waste

A part of the problem formulation is to understand the effect on the amount of waste when more sorting of household waste is implemented (cf. chapter 5 Problem formulation). This analysis will therefore show the amounts of certain material before and after sorting of that material was implemented.

As explained in chapter 3.3 Methods, this analysis is conducted in such a way that the amount of food waste found in the residual waste before the test period, is compared to the amount of food waste found in the sorted fraction and the residual waste. In that way the amount of food waste is seen before and after the implementation of the sorting scheme. The data comes from two different waste analyses conducted by Econet (cf. chapter 3.3 Methods). The first analysis is showing the development in food waste. The second waste analysis is also measuring other fractions, such as cardboard, plastic and metal. The numbers for these materials are also used in this thesis, and the same procedure is used to find the amount of the different materials in the waste before and after sorting is implemented.

### 4.1 Sønderborg

One set of data is from a waste analysis conducted in Sønderborg 2018 (Lerche and Petersen 2018). It consists of two areas with 92 and 93 households.

Area 1, Broager was used as the baseline study based on two weeks collected waste. The residual waste was sorted and registered in 16 fractions and formed the baseline for the two areas in Sønderborg.

In both areas the citizens received a little bin to use in the kitchen and a bin to put outside. In Broager the citizens were given a bag of plastic to use in the indoor bin. In area 2, Augustenborg the citizens were given a paper bag for the indoor bin.

The analysis for the baseline was conducted in January 2018. Three months later the analysis of the collected waste was conducted again in both areas. The analysis of waste ending the test was based on the following fractions:

- Food waste
- Residual waste

The residual waste after implementation of sorting was analyzed by sorting in 16 fractions and weighted.

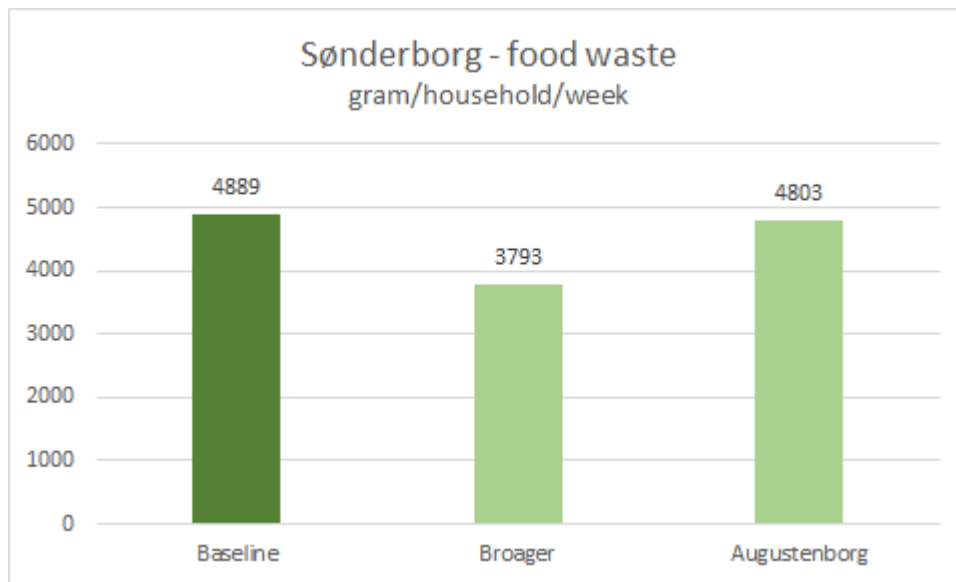


Figure 8. Food waste in Sønderborg. Own model based on numbers from Lerche and Petersen 2018.

Figure 8 presents the numbers from the data. Econet comments, that the numbers from Broager during the test period seems to be wrong and suggests that something must have gone wrong in collecting and saving the waste for the analysis. The amounts were very small for all fractions in Broager. The numbers are therefore not interesting in the thesis, but serve to show that this type of analysis is sensible to the practical circumstances. The amounts of waste from Augustenborg decreases a little compared to the baseline. The food waste in baseline was 4889 gram/household/week. Food waste in Augustenborg is 4803 gram/household/week, which means a decrease of 86 gram or less than 2 %. The decrease is however so small, that it is hard to say, that it is a significant decrease.

## 4.2 Silkeborg

Another analysis was conducted in two areas in Silkeborg municipality (Petersen, Hansen and Mayland 2016). One area, Sejs consisted of 212 households. The other area, Kjellerup consisted of 234 households. The households got a bin divided in two compartments to use for residual waste and food waste. Another two-compartment bin and a single-compartment bin was given each household for three dry fractions; paper/cardboard, metal/hard plastic and glass. The bins for the dry fractions were used differently in the two areas. In Sejs, the single-compartment bin was used for glass and in Kjellerup the single-compartment bin was used for paper/cardboard. The other fractions were put in

the two-compartment bins. Each area was divided in two and each of those divisions used different bags for food waste (paper bag, biodegradable bag, plastic bag and no bag).

The fractions collected curbside in the test period were

- Food waste/residual waste.
- Paper and cardboard. Paper was already sorted out. The new thing was the sorting of cardboard.
- Metal/hard plastic. New fraction.
- Glass. Was collected curbside in the test period. Normally glass was sorted by citizens and brought to the containers a small distance from their home. New thing was, that it was collected by the household.

The test period of the different bags and bins was week 19 (start of May) until week 40 (start of October) 2015.

Baseline was determined on the basis of two samples of residual waste from 100 households each collected in week 11. One sample was from Sejs and the other sample was taken in Kjellerup. The residual waste was sorted in 14 fractions and weighed. It is however important to mention, that the fraction paper was collected curbside before the test period, but was not a part of the baseline. Glass was brought (by residents) to a common glass container fairly close to the house. The fraction of glass, however, was not a part of baseline either. It therefore makes no sense to bring numbers for glass and paper into the calculations for this thesis as the amounts of those fractions before the test period are unknown.

In week 38 two samples from each area (four samples in total) were used to analyze the amounts of waste sorted and the composition of these fractions. The size of a sample was again 100 households, so this analysis is based on waste from 400 households.

It is possible to compare the amounts of the following fractions to the baseline:

- Food waste
- Cardboard
- Metal
- Plastic

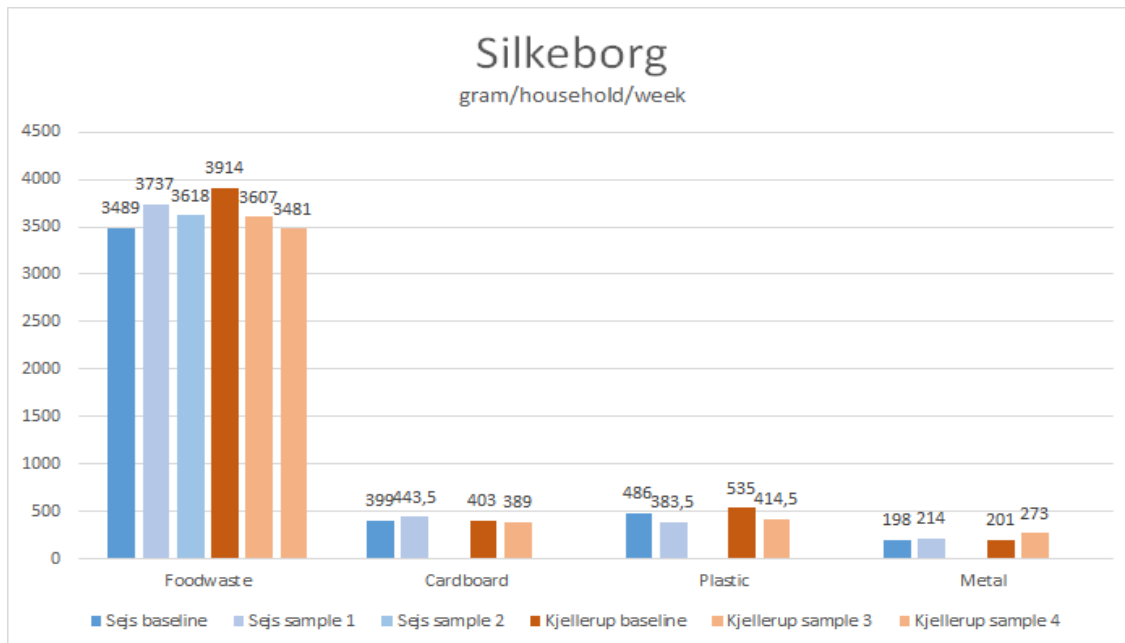


Figure 9. Waste collected in Sejs (blue) and Kjellerup (red). Food waste is based on two samples from each area, and the dry fractions are based on one sample from each area. Own model based on numbers from Petersen, Hansen and Mayland 2016.

Figure 9 shows first of all how big the fraction of food waste is compared to the dry fractions. It also shows that there is no clear tendency to the development of amount of waste. In Sejs food waste increases by 4-7% after sorting was implemented. In Kjellerup the food waste decreases by 8-11% after sorting was implemented. The amount of cardboard has the same development as food waste. In Sejs the amount of cardboard increases by 11%, but decreases in Kjellerup by 3%. Plastic decreases in both areas by 21-23%. The fraction of metal increases in Sejs by 8 % and increases in Kjellerup by 36%.

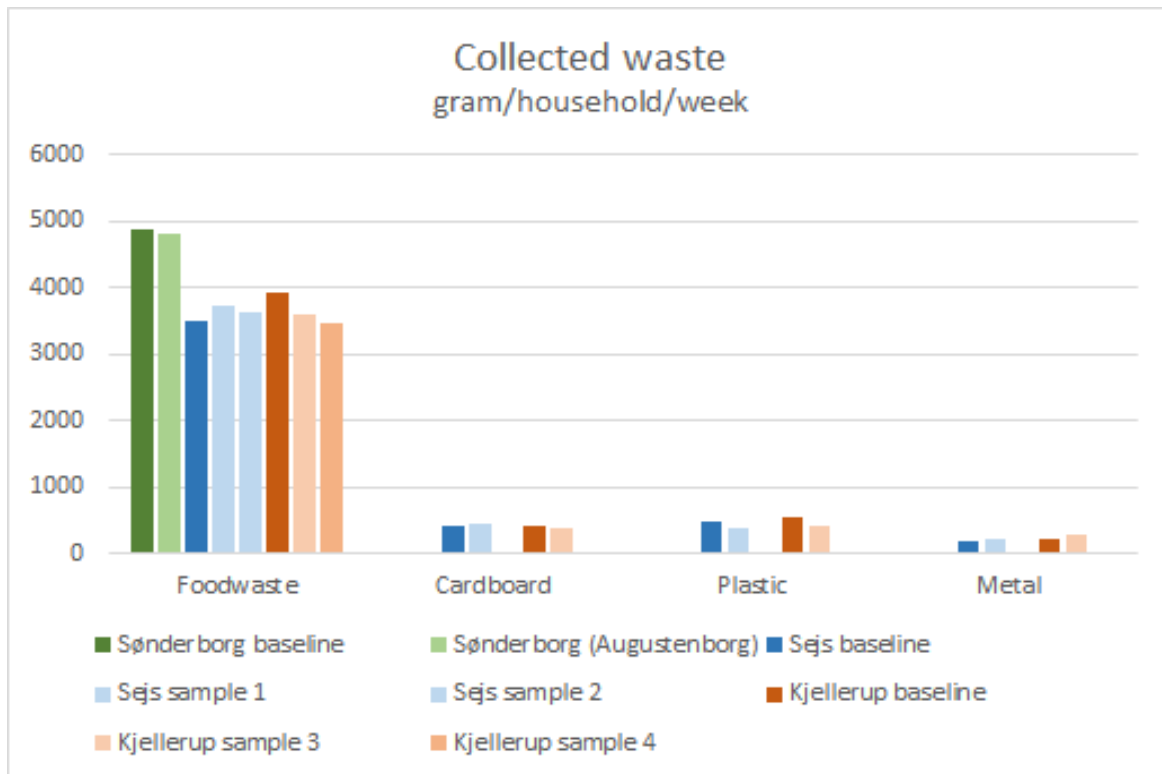


Figure 10. The development of food waste in Sønderborg and food waste and the dry fractions in Silkeborg. The invalid numbers from Sønderborg (Broager) are not a part of the graph. Own figure based on numbers from Lerche and Petersen 2018 and Petersen, Hansen and Mayland 2016.

Figure 10 shows the results from the different areas. The analysis of food waste in Sønderborg and Silkeborg shows, that there is no clear pattern of the development of amount of food waste when sorting is implemented. In Sønderborg the amount of food waste was almost the same before and after the test. In Silkeborg one sample showed an increase in amount of food waste and the other sample showed a decrease. Cardboard shows the same pattern; an increase in the amount of cardboard in Sejs and a decrease in Kjellerup. Plastic shows a decrease in both areas and metal shows an increase in both areas.

From these numbers there is no tendency to either increase or decrease the amount of waste after sorting is implemented. This shows however that not all fractions decrease as a response to more awareness about waste among residents.

### 4.3 Discussion of the findings

In the numbers from Sønderborg it is shown that the analyses are very dependent on the right collection and storage of the waste to be analyzed. By choosing to use data based on batches of waste (see chapter 3.3 Methods), it is not as sensitive to events in each household, but the amount of waste is still affected by other practical circumstances. The developments in the amounts are dependent on



the baseline. If the measure of the baseline is flawed the rest of the analysis will be wrong. There is no reason the data from Econet to believe the baselines are flawed. Looking at the graph there is, however a peculiar coincidence for the development of food waste, cardboard and metal in Sejs. Whatever has caused the change, it has affected several fractions. One reason can be the numbers in the baseline.

Starting to sort in the household may lead to other changes in the handling of waste. Some may begin to sort in many more fractions and bring it to the recycle stations, or stop bring some of the fractions to the recycle stations. What citizens bring to the recycle stations is not a part of the baseline nor the analysis after sorting was implemented. The increase in food waste can be caused by changed waste management in the households. If the residents were used to put some food waste in the garden or give it to animals, but now use the bins for food waste, it will be reflected in the numbers. This does not mean that they buy more food and throw away more food waste. The citizens just manage the same amount of waste in a different way.

When Econet made the waste analyses, they tested different bins and bags to see, how that affects sorting. They based on the numbers on the baseline and implicit assumed that the amount of the waste would be the same after sorting was implemented. In this thesis the numbers are used to show the amounts of certain fractions, e.g. food. By doing that I do not take the different bins and bags into consideration. Implementing sorting might mean changes in the amount of waste as well as changes in attitudes and perceptions of waste and consumption. But may be the different bags and bins causes different considerations. It may be that the amount of food waste collected in the area with no bags handed out to the residents, not increases as much as the amount of food waste in the area where special bags were handed out. This may be caused by the different perception and motives to sort. Some may feel that the lack of bags sends a signal, that sorting is not important and therefore does not care about sorting. It may also be that the extra effort the residents have to put into finding a proper bag leads to more reflection about sorting and therefore a bigger change in behavior.

In this sense it proves the conclusion to that analysis: There is no clear tendency of how the amounts of waste is affected by implementation of sorting. The numbers does not say what causes the different developments.

#### 4.4 Sub-conclusion

This analysis shows, that there is not a clear tendency in the development of amount of waste when sorting is implemented. The different fractions develop in different ways and even within the same fraction, the development differs from one sample to another. The amount of food waste in

Sønderborg hardly changed after sorting of food waste was implemented in the households. In Sejs the amount of food waste increased by 4-7 % and in Kjellerup the amount of food waste decreased by 8-11%. The amount of cardboard increases in Sejs, but decreases in Kjellerup, whereas the amount of plastic decreases in both areas and the amount of metal also increases in both areas.

The number used to understand the amounts of waste before and after sorting could be biased due to practical circumstances. In Sønderborg one sample is flawed because of wrong collection or storing of waste. When citizens start to sort, they might also change other routines of handling waste, which affects the numbers for amount of waste. An example of this is to bring waste to the recycle station, that used to be discarded in the bins collected curbside, or bio waste that used to be used for composting, now being discarded in the bin for bio waste. In both cases, the household does not discard more waste, they just discard in another way resulting in bias in the data. Another aspect of the data is the nature of the data. The data was made in projects aiming at testing different bins and bags. The different bins and bags are, however not taken into account, when used in this thesis. In this sense, it proves the conclusion to that analysis: There is no clear tendency of how the amounts of waste is affected by implementation of sorting. The numbers does not say what causes the different developments.

## 5. Analysis 2 - Practices and attitudes

This analysis seeks to find an understanding of the practices and attitudes regarding sorting of waste in households based on the interviews with the residents.

As argued in chapter 3.3 Methods, the houses were chosen because sorting of bio waste was implemented recently. The choices related to either sort bio waste or not, was expected to be distinct in the interviews. In the households there were also other fractions, that were compulsory to have. This meant that even if the households did not sort bio waste, they probably sorted out other fractions. This meant, that even if the interviewee argued that they did not sort, the interview revealed they sorted in some way or another.

### 5.1 Gallery of residents

A brief introduction to the interviewee and their households will start this analysis. The age of the persons are in parentheses in this description and in the analysis. The summary of the interviews is found in appendix 8. The summary is partly a transcription, partly noting where in the interview the good points are expressed (cf. chapter 3.3 Method).

The first two households are very concerned about climate change.

**Rasmus** (54) lives together with his wife (61) and their son (15). They are very concerned about the environment and participate in a protest, that is not called a protest but a climate reminder every Thursday. They are now vegetarian for environmental reasons and try not to fly too much. Their son is from Vietnam, so the flying happens now and then, to visit the country. Rasmus is CEO in a fund supporting Danish movie production. The wife is a writer. They bought the house 15 years ago, costing 2.7 million DKK at that time. They sort in many more fractions than the sorting scheme explained in chapter 3.3 Methods.

**Bodil** (52) lives with her husband (47), their daughter (17) and their son (15). The daughter goes to boarding school (efterskole). The son has autism and goes to a special school close to where they live. The wife works 25 hours a week as a midwife and the husband is a full time researcher in young people and drugs. Their home is extremely messy and the garden is not taken care of for quite a while. The wife explains how they aim at having a garden growing wild. To see how a garden will look, when it is not taken care of. They sort out biowaste and compost it in their garden. Paper is shared with the neighbours.

The next three women are retired and sorts mainly because they think you ought to, as a good citizen.

**Marianne** (69) lives alone on the first floor of her house. She rents out the ground floor to a student. She has lived in the house the last 25 years and is a retired nurse. Marianne sorts in the compulsory fractions.

**Sara** (68) lives together with her husband (71) on the ground floor of a bigger edition of the houses. On the first floor lives an English family, who just moved in. Sara is a retired priest and her husband used to work in Danmarks Naturfredningsforening (The Danish Society for Nature Conservation). They bought the house in 2013. They sort in all the compulsory fractions and share the bins with the family upstairs and the lady next door.

**Helle** (63) lives together with her husband (64). She is a retired nurse and holds a master of pedagogical anthropology. She worked the last two years at the hospital on Bornholm (an Island in the Baltic Sea) while her husband stayed in Copenhagen. Her husband worked as an architect until he retired two years ago. He does not like the looks of all the waste bins in the garden and have made a cover of wickerwork to cover the bins. That is however not easy to remove and put back. They hardly sort, but Helle would like to sort more. She just moved back from Bornholm and has to get used to sorting again.

The final two households are younger couples.

**Anna** (41) lives with her husband (39) and their two children (5 and 8). Anna is from Sweden but has lived in Denmark the last ten years. She is a doctor and studies medicine in Sweden. Her husband is a software developer working here in Denmark. They have lived in the house the last ten years. They sort out the compulsory fractions and would like to sort out bio waste, but has no room for the outdoor bin.

**Morten** (39) lives together with his girlfriend (31). Morten is a historian and the girlfriend is an architect. They have lived in the house the last two years. They have the compulsory bins and try to sort somewhat. Morten has tried to get smaller bins as he finds it hard to find the space for the bins in the garden.

The analysis is divided in three parts. In the first part, the practice of sorting is found in the interviews as well as the individual deviations of the practice. The second part is an example of the gap between intention and behavior that Barr understands through his framework. The third part are the motives for sorting and the attitudes towards consumption. In quotes from the interviews are added words or breaks to ensure the meaning. In that case brackets like these [ ] are added. As all interviews were conducted in Danish, the quotes are translated into English. The Danish quote is in the footnote after each quote.

## 5.2 The practice of sorting

As Røpke warns, the case study of a practice will always be a study of practice-as-performance and it is easy to lose sight of the practice-as-entity. (Røpke 2009) What you obtain knowledge about is the performance in the life worlds of the interviewees (cf. chapter 3.3 Methods). As written in chapter 3.2 Theoretical approach, the practice of sorting is in this thesis based on the elements of knowledge of how to sort, the meaning of discarding items in a proper way and the material of bins and items to discard. This practice is a combination of sub-practices such as sorting inside the house, empty the bins to the outside waste bins and making sure the bins outside are placed curbside when the waste lorries come to empty the bins. In the interviews, the practice of sorting include these sub-practices and other are occasionally added, such as bringing waste to the recycle center. The following text is scrutinizing the practice of sorting found in the seven households.

### 5.2.1 The meaning of the practice of sorting

The meaning found in the practice is, as described to get rid of things in a proper way that is safe for humans and nature. In all the interviews it is implicit, that sorting is perceived as a better solution than tossing the waste in the bin for residual waste. Understanding it through a practice theoretical approach shows that the practice has gained the common meaning, the enactment that makes it the normal thing to do. The meaning is belonging to the practice of sorting and is adopted by the practitioners, who reinforce the meaning when performing the practice (cf. chapter 3.2 Theoretical approach). However the meaning variates when the residents are asked about deeper reflection to why sorting is good.

In one interview, Helle argues that it would be stupid not to use the resources:

Helle: *"It is silly to burn it, when you can use it, really. For mould or something else."*<sup>4</sup> (Helle 63).

Helle explains how she uses the coffee grounds for the flowers in the garden. In many of the interviews the response is, that they do not know exactly know what happens to the different fractions. Hopefully it is treated in the best way possible for humans and environment.

Sara explains how sorting is the obvious thing to do.

Interviewer: *"What are the reasons for you to sort?"*

Sara: *"it is self-evident. I don't know why you shouldn't do it. What can be recycled in a reasonable way, shall not be litter other places."*

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<sup>4</sup> Helle: Det er da fjollet at brænde det af, når man kan bruge det, altså. Som muld eller andet.

Interviewer: *"It can be used in a better way?"*

Sara: *"It can be used in a better way. There must be some kind of environmental improvement in these systems."*<sup>5</sup> (Sara 68)

The obvious is backed up by the argument about the environment, but in the interview it takes a little while for her to find that argument. In a practice theoretical approach this is an example of a practice that is enacted. You just do it. The meaning of the practice, the environmental benefit, is attached to the practice. The practitioner, Sara, takes that meaning and uses that as the good reason for her to sort. In another interview, Helle starts out by saying that the meaning behind the practice is not something she thinks about a lot.

Interviewer: *"is it a feeling that sorting is good?"*

Helle: *"Well, it is not something I think about, but it is the underlying thought. It is good for the environment. Especially when it is being collected and then recycled. That happens for both paper and plastic. You can see that"*<sup>6</sup> (Helle 63)

By the last sentence she refers to the labels on products made from recycled materials, that was discussed earlier in the interview.

As Røpke describes, these practices are done based on routines. When asked about more reflection to why this is done, the residents can explain more, but in the daily life, they do not give it that much of a thought. (cf. Chapter 3.2 Theoretical approach)

Another example is when Anna is asked about the good in sorting.

Interviewer: *"You say it is good to sort. Why is it good?"*

Anna: *"I'm thinking it can be recycled. That is the hope. That it can be recycled. I don't know what happens to it."*<sup>7</sup> (Anna 41)

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<sup>5</sup> Interviewer: Hvad er grundene til at I sortere?

Sara: Det giver jo sig selv. Jeg kan ikke se, hvorfor man ikke skulle gøre det. Det der kan genanvendes på rimelig vis, skal jo ikke ligge og flyde andre steder.

Interviewer: Så det kan bruges bedre?

Sara: Det kan bruges bedre. Der må være en miljøforbedring i hele det her system.

<sup>6</sup> Interviewer: Er det en fornemmelse af, at det er godt at sortere?

Helle: "Altså det står jeg ikke lige og tænker over, men det er jo den bagvedliggende tanke. Det er godt for miljøet. Specielt når det så bliver samlet ind, bliver genbrugt. Det gør både papir og plastik. Det kan man jo se.

<sup>7</sup> Interviewer: Du siger, det er godt at sortere. Hvorfor er det godt?

Anna: Jeg tænker, så kan det genbruges. Det er forhåbningen. Det kan genbruges. Jeg aner ikke hvad der sker rigtig med det.

The families, who are very environmental concerned uses the argument of resource scarcity. If we all want to live here and continue our lifestyle, we need to handle the resources more efficiently.

Interviewer: *"What is the reason for you to sort?"*

Rasmus: *"well, if this planet shall survive, we need to reuse the resources. We can't keep extracting resources"*<sup>8</sup> (Rasmus 54)

The wife from the other family with a big concern for the environment also perceives sorting as a way to save the planet. When asked about the reasons to sort she answers:

Bodil: *"You have to. We don't really have a choice. We are dying in crap. We have a world sanding up in junk. We just have to. We must do something."*<sup>9</sup> (Bodil 52)

The different perceptions can be understood as deviations in the meaning of the practice and that the meaning is reproduced and shaped in the households. The answers reveal that there are individual reasons to sort the waste. Some find it stupid not to use the items that are so easy to reuse or recycle, others think of the resource scarcity. Those reasons are fairly similar, but the first has a more practical eye for efficiency, whereas the latter is about global sustainability and environmental concern.

### 5.2.2 The material of the practice of sorting

The material used in the practice is the waste and the bins. There seems to be a path dependency in the sense that the bin for residual waste is placed under the sink in the kitchen and when sorting is implemented, the new bins are added under the sink. The old practice is copied and adjusted to the new material. In the practice theoretical approach the practitioner is more inclined to be recruited to a practice, if the person already has experience with similar practices (cf. chapter 3.2 Theoretical approach). It is also the behavioral snowball effect explained by Barr in his theory of behavior (cf. chapter 3.2 Theoretical approach). In one interview this was however not the case. The bin for residual waste was still placed in the cupboard under the sink, but there was no bin for the other fractions under the sink. The other fractions were put in the outside bins as soon as they became waste.

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<sup>8</sup> Interviewer: Hvad er årsagen til at I sortere?

Rasmus: Jamen det er jo at hvis den her klode skal overleve, så skal vi genbruge ressourcer. Vi kan ikke blive ved med at trække ressourcer ud.

<sup>9</sup> Bodil: Det skal man jo, vi har jo ikke rigtig noget valg. Vi er ved at dø af skidt. Vi har en verden som sander til i bras. Det skal vi bare. Vi bliver nødt til at gøre et eller andet.

Interviewer: *"Do you have several bins under the sink?"*

Sara: *"No, we only have one. Because we could have... well, the middle station is not under the sink, but a short while on the table on the way out here [...] It is not that far."*<sup>10</sup> (Sara 68)

The interesting part is however that the outside bin for the residual waste was placed next to the bins for metal/plastic, paper and garden waste. There is no reason in the argument to have a middle station for residual waste either. Why should it be more inconvenient to bring the residual waste to the bin outdoor as soon as the waste is generated? The system for sorting and the system for residual waste differs. It can be understood as if there is some left of the old practice of throwing it all in residual waste. Røpke refers to the words 'social fossils' and describes how they can be found by the artefacts that are still existing, but no longer in use. (Røpke 2009) In this case the artefact, the indoor waste bin is still in use, but the newer additions to the practice of throwing out, sorting, is not following the same practice. It can also show, that sorting is perceived as something different than throwing out, and might not be done as often as throwing the waste in the bin for residual waste.

There are different types of indoor bins and indoor arrangements for sorting. One explains how the indoor bins make it possible to sort in a busy daily life:

Anna: *"We have to have that [indoor bins], otherwise it doesn't work."*

Interviewer: *"Then you would have to go back and forth many times?"*

Anna: *"Exactly. It is a busy daily life, so it has to be convenient. But I think it works really well to have the three things under the sink, where we... And then we have refundable bottles, which is also in the kitchen."*<sup>11</sup> (Anna 41)

Another has trouble finding the right system indoor:

Morten: *"The kitchen is really not build so you can have the things in a convenient way. If it was, it would be a lot easier. It is built for you to have one bin and nothing else."*<sup>12</sup> (Morten 39)

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<sup>10</sup> Interviewer: Har I flere skraldespande inde under vasken?

Sara: Nej, der har vi kun en. Fordi vi kunne jo så have.. altså hvilestationen er ikke under vasken, men det er kun et kort øjeblik på køkkenbordet på vej ud her [...] Vi skal jo heller ikke langt.

<sup>11</sup> Anna: Det bliver vi næsten nødt til, ellers fungerer det ikke helt.

Interviewer: så skal man rende frem og tilbage flere gange?

Anna: Ja, lige præcis. Det er også en travlt hverdag, så det skal være nemt. Men jeg synes det fungerer rigtig fint at have de der tre ting under vasken, hvor vi... og så har vi pantflasker også, som vi har ude i køkkenet.

<sup>12</sup> Morten: Køkkenet er ligesom ikke bygget til, at du kan have tingene et nemt sted. Hvis det var det, ville det være meget nemmere. Det er bygget til at du har en skraldespand og ikke så meget andet.



All households were offered an indoor and an outdoor bin for bio waste and bags for the indoor bin, as described in chapter 3.3 Methods. The outdoor bin is the same size as the residual and the indoor is a little, green bucket. The green bucket is not fixed in the cupboard, but can be moved around. In the households the green bucket is moved from the cupboard under the sink to the worktop table in the kitchen.

Marianne: *"I simply place the green bucket on the table and cut my vegetables and down they go [in the bucket] and old flowers, down they go. Food left overs, down they go. It is placed under the sink and when I cook, I take it out. That is, if it is for more than just me, right?"*<sup>13</sup> (Marianne 69)

In some cases, the material of the practice was changed and the household had made their own system of bins and containers around the house.

Rasmus: *"We have a little bin under the sink. And then, can you see the little white container over there? That is for compost. [...] Then we sort glass. We have always done that, because the glass container is right over there [pointing to a place outside of the house]. And we sort cardboard and paper. Under the sink is a bag for batteries and low energy light bulbs and things like that. [...] Once a month or something like that, we throw it all in the back of the car and bring it to the recycle center. We sorted hard plastic as well until we learned that it goes in 'small burnable items'. There was no special place for hard plastic. We have many books, because my wife is a writer, so they go to an antiquarian bookshop or to reuse in the trading centers. So that is self-organized waste sorting."*<sup>14</sup> (Rasmus 54)

These different descriptions serve to show, that in general there is an indoor system of sorting and an outdoor system. The indoor is organized by the residents and differs from household to household. The outdoor bins are provided by the municipality and are therefore similar. Placing the bins in the garden or in the street is a problem that seems to be present in all households. Some

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<sup>13</sup> Marianne: Jeg tager simpelthen spanden op på bordet og snitter jeg mine grønsager og ned med dem og gamle blomster, ned med dem. Madrester ned med dem. Den står under køkkenbordet og når jeg laver mad, tager jeg den op, altså hvis det sådan er mere end til mig selv, ikk' altså.

<sup>14</sup> Rasmus: Vi har en lille skraldespand der under vasken. Og så har vi, kan du se den der hvide bøtte derover, der kommer vi al kompost ned i. [...] Så sorterer vi glas. Det har vi altid gjort, for der står en glascontainer lige derover. Så sorterer vi pap og papir. Nedenunder vasken hænger en pose til batterier og lavenergipærer og sådan noget [...] En gang om måneden eller sådan noget, så smider vi det om bag i bilen og så kører vi det til genbrugspladsstationen. Hård plast sorterede vi også indtil vi fandt ud af, at det blev bare smidt i småt brændbart. Der var ikke et specielt sted til hård plast. Bøger er sådan noget, som vi har meget af, fordi min kone er forfatter, de ryger så til antikvariat eller til genbrug til de der byttecentraler. Så det er selvorganiseret affaldssortering.

households share some fractions with the neighbour, some have tried to ask for less bins. In one household they do not have the outdoor bins, but take it all by car to the recycle center.

### 5.2.3 The competence to carry out the practice of sorting.

The competence is divided in skills and knowledge. The skills of placing and using the bins is described above. The knowledge of what material goes where seems to be found in different ways.

One argues that a lot is learned in the childhood:

Morten: *"There is to a great extent a lot about sorting and such coming from home. I can see that I sort fairly similar to how my parents sorted."*<sup>15</sup> (Morten 39)

Some points to the information given by the municipality as the different sorting schemes were implemented.

Interviewer: *"How do you know what to put where?"*

Helle: *"I know that because it says in this [showing a pamphlet from Copenhagen Municipality]. We get these 3-4 times a year. It usually says something about what you can throw in. And I think you can go to the website, where the calendar is. Once I had an overview lying, to work it out. If I was in doubt, I could just read it."*<sup>16</sup> (Helle 63)

In another case the spouse in the household is interested and knows what to sort.

Interviewer: *"How do know what to put where?"*

Sara: *"My husband is very interested in things like that, so we have a guide you can pull out"*<sup>17</sup> (Sara 68)

In the household of a very environmental concerned family they try to learn more and more. Rasmus explains how they talk about it at home and keep trying to gain knowledge about it:

Interviewer: *"How do you know what should be sorted out where?"*

Rasmus: *"We discuss that all the time. Is it hard plastic, is it not hard plastic. Is it cardboard, is it not cardboard? The window envelope, I will have to take the window out. There are ongoing discussions."*

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<sup>15</sup> Morten: Der er i høj grad også meget om sortering og sådan noget, som kommer hjemmefra. jeg kan se, at jeg nogenlunde sorterer som mine forældre sorterede.

<sup>16</sup> Interviewer: Hvorfor ved du hvad der må komme i hvad?

Helle: Det ved jeg fordi det har stået i den her [folder fra kk om affald] Vi får jo de her 3-4 gange om året. Der står som regel noget om hvad man må smide i. Og jeg tror også man kan gå ind på hjemmesiden. Der hvor kalenderen ligger. På et tidspunkt havde jeg en oversigt liggende, for at kunne finde ud af det. Hvis jeg var i tvivl, kunne jeg lige læse.

<sup>17</sup> Interviewer: Hvordan ved I hvad der skal i hvad?

Sara: Min mand er meget interesseret i sådan noget, så vi har en guide man kan hive ud.

*At one point Anna thought you could throw porcelain in the container for glass. It is knowledge you pick from those... 'Waste lorry comes around' and then you read 'oh my god, you can not...' something you have done for a long time, is not allowed anymore. We get wiser in this. All this about that there is difference in the plastic is not only something we get wiser about, the industry gets wiser as well. Now we are moving away from plastic tooth brushes to wooden tooth brushes and then the tube for tooth paste is not recyclable. You pick it up."*<sup>18</sup> (Rasmus 54)

Everyone has the knowledge of sorting in some degree, but where they get it from differs in the interviews.

Observing the practice is as difficult to do without observing practice-as-performance (cf. chapter 3.2 Theoretical approach). The observation is an example of how the practice is carried out in this case. The following text is describing on a more individual level the practices, deviations and values. The meaning of a practice, when talking about practice-as-performance, is aligning with the values and social and psychological variables used in the theory of behavior.

### 5.3 Example of the gap between intention and behavior

As described in chapter 3.2 Theoretical Approach, Barr uses his framework to explain the gap between intention and behavior. This gap is found explicitly in one interview, where the interviewee called Morten has a clear idea about why sorting is important. He believes that you ought to sort your waste, if you are asked to. He argues, that someone, who has the right knowledge has made a decision about asking households to sort and therefore you as a citizens ought to follow that course.

Interviewer: *"Why do you sort?"*

Morten: *"Because we are asked to. First of all: Why not? [...] If you can make things work in a practical perspective, why not do it then? There is a good purpose to it. If you can get things sorted and disassembled, so it has a positive effect to both humans and environment. Then why not do it? I don't see a reason.. I don't see a reason not to do it. Second of all: the authoritarian part. When you ask*

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<sup>18</sup> Interviewer: Hvordan ved I hvad der skal sorteres hvor?

Rasmus: Det diskuterer vi også hele tiden. Er det hård plast, er det ikke hård plast. Er det pap, er det ikke pap. Den der rudekuvert, der må jeg lige pille ruden ud. Det er løbende diskussioner. På et tidspunkt troede Anna man kunne smide porcelæn ud i glascontaineren. Det er viden man samler op fra de dersens... 'affaldsvognen kommer forbi' og så sidder man og læser.. 'gud, man må ikke' noget man har gjort i lang tid, må man ikke mere. Vi bliver klogere på det her. Det her med at der er forskel på plast er jo ikke kun noget vi bliver klogere på, det er også noget industrien bliver klogere på. Nu er vi så også gået væk fra plastiktandbørster til træandtørster og så er der noget med at tandpastatuber ikke er genanvendelige. Man samler bare op.

*people to do it, you probably just do it. I don't think I need to question.. Someone took a decision. And we don't get punished, which means that we might not sort every time, but over all try to be fairly good.*"<sup>19</sup> (Morten 39)

In line with the last point in the quote above, later in the interview he explains that he and his girlfriend do not sort that well and argues that the arrangement in the kitchen is not suited for several bins, and the bins outdoor takes up too much space. He has tried to limit the number of bins and found the smallest possible of the compulsory bins. He also describes how they try to sort, but in the daily life, when things are busy, they sort less.

In behavior theory, Barr distinguish between the outer circumstances and the inner perceptions and ideas of the individual (cf. chapter 3.2 Theoretical approach). As many of the outer circumstances are similar in the households interviewed for this thesis, it is the inner values that differ the most. The outer circumstances is the service provision, in this case the curbside collection of the five compulsory and the additional fractions. Another circumstance is the sociodemographic factors. Sociodemographic is discussed in several papers and a clear pattern is not found (Schanes and Gözet 2018; Barr 2007)

In the case of Morten, what he finds inconvenient regarding sorting is both the indoor arrangement of bins and the outdoor bins. He describes how the house is arranged for a single bin indoor.

Morten: *"It is more of a practical problem. The kitchen is really not build so you can have the things in a convenient way. If it was, it would be a lot easier. It is build for you to have one bin and nothing else. And then, glass can wait till I go there. Metal, I can just fit some foil in some cans. Bio, it must be squeezed in some where, and it has to be placed on something, because it might drip and become disgusting. Plastic is just a mess on top of it somewhere. If you had more space, and it was build smart for it, there is no doubt it would be a lot easier. Imagine if you had five small bins right next to each other like the containers outside, it would be so much easier. Then I don't think it would be something you thought of as inconvenient."*(Morten 39)<sup>20</sup>

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<sup>19</sup> Interviewer: hvorfor sorterer I?

Morten: Fordi vi bliver bedt om det. For det første: hvorfor ikke. [...] hvis man nu faktisk kan få tingene til at virke ud fra et praktisk synspunkt, hvorfor så ikke gøre det. Der er jo et godt formål med det. Hvis man kan få tingene sorteret og skilt ad, så har det jo en positiv effekt på både mennesker og miljø. Så hvorfor ikke gøre det. Jeg kan ikke se nogen årsag.. jeg kan ikke se nogen grund til hvorfor man ikke skal gøre det. For det andet. Den autoritære del af det. Når man beder folk om det, så gør man det nok bare. Jeg synes ikke jeg behøver stille så meget spørgsmål.. Der er nok nogen, der har taget en holdning. Vi bliver jo ikke straffet, så det gør nok også at vi ikke altid gør det, men overordnet set forsøger at gøre det nogenlunde.

<sup>20</sup> Morten: Det er mere et praktisk problem. Køkkenet er ligesom ikke bygget til, at du kan have tingene et nemt sted. Hvis det var det, ville det være meget nemmere. Det er bygget til at du har en skraldespand og ikke så meget andet. Og så, glas

It seems that the questions he starts out with; why not sort, when someone asks you to? Is answered by himself in the very first sentence: It is more a practical problem. The intention is to sort, but the psychological factor of logistics is influencing him to sort less. Barr explains logistics, which consists of the three factors: Time to act, convenience of the act and physical space for storing (cf. chapter 3.2 Theoretical approach). In the quote above the convenience, or actually the inconvenience is mentioned and the problem with room for the waste bins inside the house.

In a practice theoretical approach the example shows that the practice of sorting is adjusted by the practitioner. He argues that he would like to follow the practice and sort, but has considerations such as the arrangement in the kitchen and the lack of space in the garden. The practice of sorting is seen in the household and the meaning of sorting is still that the system takes care of waste handling in the best way possible. The convenience of the practice is perceived differently and Morten finds it hard to find the space for the bins. The competence of arranging the kitchen in a way to have room for more bins is lacking.

The lack of space for the outdoor waste bins is expressed in several of the interviews. One can argue that the factor is not a psychological factor, but a situational factor. What makes it a psychological factor is the fact, that they all have a garden and have the physical space. The problem is that they would like to have space for recreation in their gardens. It then becomes a matter of priority and that is a psychological factor. Whether the considerations are good or not, is not in the scope of this thesis. The purpose of the garden is in many cases recreational and that contradicts with the use of garden for storage of waste.

Making a useful sorting system indoor is found in the Rasmus' home. He explains how he saw a system of tubs, normally used by brick layers, made for sorting of waste, and was impressed by the aesthetics: Rasmus: *"Then we thought: that is an aesthetic solution, which we can accept [...] I actually think that is crucial, that it is an aesthetic solution."*<sup>21</sup> (Rasmus 54)

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kan stå til jeg skal derhen. metal, der kan jeg nok lige komme folie ned i nogle dåser. Bio det skal sådan boks ind et eller andet sted, det skal helst stå på noget, for hvis det drypper, så bliver det ulækkert. Plastik det ligger bare som en ruin ovenpå et eller andet sted. Hvis du havde mere plads og det var bygget smart til det, så er der slet ikke nogen tvivl om at det ville det være nemmere. Forestil dig at man havde fem små skraldespande lige ved siden af hinanden ligesom containerne derude, så ville det være så meget nemmere. Så tror jeg ikke det var noget man som sådan var noget man ville tænke over, at det var besværligt at gøre.

<sup>21</sup> Rasmus: Så tænkte vi, det er en æstetisk løsning, som vi også kunne acceptere [...] Det tror jeg faktisk er ret afgørende, at det er en æstetisk løsning.

As described previously the arrangement of bins and buckets in Rasmus' home is adjusted in different sizes of bins and baskets as well as placement in the home. Their competence to make a system for the indoor sorting is very high and they have put a lot of effort into it.

## 5.4 Motives and attitudes

The following text analyses different motives to sort. It is based on the most distinguished findings in the interviews and supported by the theories.

### 5.4.1 Intrinsic, good feeling or salvation

Another variable in the theory of behavior is the intrinsic feeling of doing something good. It was expressed in several of the interviews. One resident explains that sorting makes her feel good and throwing things out does not make her feel as bad, because it is sorted.

Interviewer: *"How do you find sorting? Is it inconvenient? or easy?"*

Marianne: *"It feels good, I think."*<sup>22</sup> (Marianne 69)

She explains how sorting makes her realize how much plastic she throws away and gets back to the good feeling of sorting.

Marianne: *"It feels good. Even though it takes up space. It doesn't feel as bad to throw things out when it is being sorted, I don't think so."*<sup>23</sup> (Marianne 69)

This corresponds with the intrinsic feeling of doing something good that Barr uses in his model (cf. chapter 3.2 Theoretical approach). As explained in chapter 3.2 Theoretical approach, the good feeling of being able to conduct this practice might lead to a higher consumption. This is shown in the statement above, where Marianne feels good about herself when she sorts. Getting rid of stuff is not as bad, because it is sorted. She later on explains how sorting has made her realize how much she throws out, but it has not made her change her consumption.

In a practice theoretical approach, you can understand her statement as an agreement to the practice-as-entity. She agrees that sorting is good and has the competences to use the material to sort. It is however difficult to say, that by using the competences she might consume more. As discussed in chapter 3.2 Theoretical approach, sorting is a byproduct of another practice. You sort as a byproduct

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<sup>22</sup> Interviewer: Hvad synes du om at sortere? Er det besværligt eller nemt at sortere?

Marianne: Nej, nej. Det synes jeg ikke. Det føles godt synes jeg

<sup>23</sup> Marianne: Det føles ikke helt så slemt at smide noget ud, når der bliver sorteret, synes jeg ikke.

of cooking or gardening. In this sense the use of competence for sorting might not lead to more sorting, as the amount of waste to be sorted is based on other practices. It does show, however, that the bad feeling of throwing out (consuming) is excused or replaced by the good action of sorting. This attitude is also explained by another resident.

Sara: *"I think it is scary how much plastic there is[...] But one doesn't feel as bad about it, because one believes that it goes into the system, right?"*<sup>24</sup> (Sara 68)

This indicates that even though there is a lot of plastic in their waste, the sorting makes it not as bad. This kind of salvation is seen more explicit later in the same interview, when talking about the trading centers at the recycle centers. It is a place, where you can put still functional items, that you want to get rid of. Anyone else can take the items. (ARC n.d.)

Anna: *"I think, when you must discard things, and there is something, which you think should not be tossed. Then I think it is a really good idea. I really think it is good to deliver it to the trading station. It feels a lot better. Especially for my husband, who doesn't like to throw things away. Then it is really good that you can go there. And others might use it. It is really good. So I think, there should be... well, I think it is of great value. Because you can't... Well you keep buying new things, and there is always... then you get too many things. You have to discard something. If it is functional, it can be hard to throw it in 'burnable items', so we do that often, put it over there. I think it is a good idea."*<sup>25</sup> (Anna 41)

This description of the use of trading centers, shows that the bad idea of throwing out still functional things is replaced with the good feeling of putting the items for someone else to use. It is kind of salvation for consumption. It still shows the competence of ensuring that the items are used again and not just thrown away. And as Røpke describes the use of competence might lead to a higher consumption (cf. chapter 3.2 Theoretical approach).

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<sup>24</sup> Sara: Jeg synes det er skræmmende, hvor meget plastik, der er. [...] Til gengæld har man det ikke så skidt med det, fordi man har en tro på at det ryger ind i et system, ikk.

<sup>25</sup> Anna: Jeg synes når man selv skal af med tingene, og der er noget, man ikke synes skal smides ud. Så synes jeg det er en super ide. Altså jeg synes virkelig det er godt kunne køre det over til byttestationen. Det følles meget bedre. Især for min mand, som ikke kan lide at smide ting ud. Så er det virkelig godt at man kan tage det derover. Og så er der andre, som kan bruge det. Det er virkelig godt. så jeg synes, der skulle være.. ja.. Jeg synes den har stor betydning. Fordi man kan jo ikke, altså... man køber hele tiden nye ting, der kommer hele tiden.. og så man får alt for mange ting. Så man bliver nødt til at smide noget ud. Hvis det så er funktionelt er det jo svært bare at smide det i 'brændbart', så det gør vi tit, sætter det derover. Det synes jeg er en rigtig god ide.

Another aspect is what Barr calls the citizenship (cf. chapter 3.2 Theoretical approach). The feeling of being part of a community and taking part and sharing in this community. It is expressed in the quote above, when Anna explains that someone can use the item. She later elaborates:

Anna: *"I also think it is a very nice feeling to bring items that we don't need anymore, and then someone, who doesn't have that much money, for instance refugees, or whoever it can be, who can't afford to buy things, can have some. I really think... It also feels nice."*<sup>26</sup> (Anna 41)

This is an attitude expressed in several of the interviews. When talking about the trading centers, Marianne explains:

Marianne: *"It is a brilliant idea, brilliant idea. And it also works, so one thinks 'shall this be thrown out, or not?', then that is a good middle course. Then it can go there. May be someone can find it and use it."*<sup>27</sup> (Marianne 69)

This quote shows that Marianne perceives throwing out is bad, when it comes to items that still work. She implies that if the item still work, it should not go to recycling, but rather to some kind of reuse. The trading center is a middle course, so she can leave the items there and may be some one can reuse them. This can be interpret as an excuse to consume more than you need. Consumption is based on other practices as well and one can argue, that the trading centers is at least a way to ensure reuse of some items, that otherwise would just go to recycling.

This good feeling of sorting was also by some expressed as a pride of the solutions in their homes. In one house they decided not to have bio waste as they already sort out for composting. The process of composting happens in a special container placed in the garden with worms in the container. Bodil explains how well it works and especially the efficient worms.

Bodil: *"They are completely crazy, the worms, they eat a lot. There is 5 years of compost out there. It is crazy worms."*<sup>28</sup> (Bodil 52)

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<sup>26</sup> Anna: Jeg synes også det er en rigtig dejlig følelse at kunne gå derhen med nogle ting, som vi ikke har brug for mere. og så kan nogle, som ikke har så mange penge, eks flygtninge eller hvem det nu kan være, som ikke har råd til at købe ting, og så de få noget. Altså jeg synes det er virkelig.. Det føles også rart.

<sup>27</sup> Marianne: Det er da en glimrende ide, glimrende ide. Det er da også sådan, når man står der ' skal det ud, eller skal det ikke ud?', så er det en meget god mellemting. Så kan det komme derhen. Så kan det være nogle, kan finde det og bruge det.

<sup>28</sup> Bodil: De er fuldstændig sindssyge de der orme, de æder monstermeget. Det er 5 års kompost der ligger derude. De er sindssyge orme.



She explains how they can use a little of the mould in the garden, but that is not why they have compost. She is more focused on the effective worms.

Bodil: *"I think if you threw a baby down there it would be gone by 24 hours. It is crazy. They are monsters out there."*<sup>29</sup> (Bodil 52)

Bodil is very proud of the compost solution. Beside this description of the compost and the worms Bodil and her husband later on explained how they gave away a handful of those worms to family.

Another example of a solution to be proud of is the system described in the text about arrangements in the houses. Rasmus explains how they have made a self-organized waste sorting system. When Rasmus describes the system, he is very proud and enthusiastic about the solutions. He explains happily how the solutions work very well for them. He gets up and starts showing the bins and containers. A bit of salvation is seen. He explains how much is wasted in the nearby dwellings, and at the dormitory, where his daughter lives. He ends the talk about waste he sees in the city by saying:

Rasmus: *"It is complete absurd how much is discarded. It provokes me a lot."*<sup>30</sup> (Rasmus 54)

Those stories are excellent examples of how the use of competence gives a good feeling. It is not about having as much as it is about doing (cf. chapter 3.2 Theoretical approach).

#### 5.4.2 The wrong feeling of not sorting

The opposite of the good feeling of sorting is the bad feeling of not sorting. Many of the interviewees expressed that sorting is something you ought to do. A kind of a civil responsibility we all have. They talk about a wrong feeling of not sorting.

Sara: *"We wouldn't dream of throwing it all out, even if we are other places. We would at least sort out glass and batteries. It feels wrong."*<sup>31</sup> (Sara 68)

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<sup>29</sup> Bodil: Jeg tror, hvis du smider et spædbarn derud, så er det væk efter 24 timer. Det er helt vildt altså. De er nogle monstre derude.

<sup>30</sup> Rasmus: Det er helt absurd hvad der bliver smidt ud. Det provokerer mig sindssygt meget.

<sup>31</sup> Sara: Vi kunne ikke drømme om at smide det ud, selv når vi er andre steder. Så ville vi tage glasset fra i hvert fald og batterier. Det føles forkert.

Marianne: *I feel excellent about sorting it. I think it makes sense. I actually think it would be awful to go back to throwing it all in one bin*<sup>32</sup> (Marianne 69)

This can be seen as urge to follow the practice of sorting. The practice of sorting is the enacted agreement of how to treat your waste. It is now more normal to sort, than not to sort. It is mentioned in several interviews that you just ought to sort. The meaning of the practice is seen clearly. Anna talks about not sorting:

Anna: *"It just feels wrong, one knows that."*<sup>33</sup> (Anna 41)

When asked about sorting makes her feel good she hesitates a little. It is not the good feeling of sorting, but more the wrong feeling of not sorting that is in her mind.

Anna: *"I haven't thought much about it, but yes. It feels wrong not to. We could do a lot, but if you have the ability just to do a little in your daily life, I think it feels good."*<sup>34</sup> (Anna 41)

She continues by explaining their decision about bio waste.

Anna: *"When we got bio waste, I really wanted it. I am used to it from Sweden. [...] I think it makes so much sense. We talked to the neighbours about it, but we just couldn't... there was no room for one more [bin]. I am angry that they [the municipality] can't make them [waste bins] a bit smaller and then collect them more often. One has to [sort], it is that feeling one has."*<sup>35</sup> (Anna 41)

The bad feeling of not sorting is also seen in households, where sorting seems too difficult because of the bins.

Helle: *"I use paper, and I use garden waste. I actually don't use the other one. And I feel bad about it. I ought to use it."*<sup>36</sup> (Helle 63)

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<sup>32</sup>Marianne: Jeg har det udmærket med at sortere det. Jeg synes det danner mening. Jeg synes faktisk det ville være forfærdeligt at skulle tilbage til at putte det hele i en spand.

<sup>33</sup> Anna: Det føles bare forkert, altså det ved man jo godt.

<sup>34</sup> Anna: Jeg har ikke tænkt meget over det. Men jo. Det føles forkert ikke at gøre. Vi kan gøre rigtig meget, men hvis man har mulighed for bare at gøre lidt i sin hverdag, så synes jeg det føles rart.

<sup>35</sup>Anna: Da vi fik bioaffald, ville jeg rigtig gerne. Jeg er vant til det fra Sverige. [...] Jeg synes det giver så god mening. Vi snakkede om det og vi snakkede med naboen. Men vi kunne bare ikke.. altså der var ikke plads til en mere. Jeg var sur over at de ikke kunne lave dem lidt mindre og så hente dem oftere. [...] Man skal, det er den der følelse man har l.

<sup>36</sup>Helle: Jeg bruger papir, og jeg bruger haveaffald. Den anden bruger jeg faktisk ikke mere. Og det har jeg også dårlig samvittighed over. Det burde jeg gøre.

Another resident has trouble to find space for the paper bin and have therefore chosen not to have one. When talking about what she does with paper she explains:

Marianne: *"I throw it out and it worries me every single time I do it. But I don't know where to bike with it."*<sup>37</sup> (Marianne 69)

This is in a practice theoretical perspective showing that the practitioner would like to follow the enacted practice, but other circumstances makes it impossible. With a behavior theoretical approach, this is about the self-efficacy and logistics, the perception of what you can do. It is dependent on time in your daily life, convenience and space to store the waste. In this case, the space to store the items is lacking. It is therefore inconvenient for Marianne to sort out paper, even though she would like to. This is also an example of the gap between the intention to sort and the behavior in the end.

#### 5.4.3 Following the system

As described in chapter 3.3 Methods, there are five compulsory fractions in each house and three optional fractions, which are being collected curbside. The residents must bring glass to a common container a few meters away on the nearby corner. Refundable bottles and cans are brought to a supermarket and the refund is collected. All other types of waste must be brought to the recycle center. When asked about sorting of waste in the households, most people explained about the fractions being collected curbside. In many of the interviews, the amount of fractions the resident sort out is based on the fractions collected curbside. One explicitly differs between the fractions collected curbside and the others.

Morten: *"Glass is not a part of the sorting in households. It is placed in the hallway."*<sup>38</sup> (Morten 39)

Barr describes how the system of curbside collection is very important, when citizens are asked to sort (Barr 2007). There are several descriptions in the interviews of how the residents follow the system. If one more fraction is added, they adjust their sorting system and start to sort out that fraction.

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<sup>37</sup> Marianne: Hvad gør du med papir nu? Jeg smider det ud (papir) og det ærgrer mig hver eneste gang jeg gør det. Men jeg ved ikke hvor jeg skal cykle hen med det.

<sup>38</sup> Morten: Glas er jo ikke som sådan en del af husholdningssorteringen. Det står ude i entreen.

Sara: *"We moved in here in '13 and we kind of followed with the waste bins that came. The more bins the more sorting. Bins came before sorting, if you know what I mean. In our former house, we only had one waste bin and we did not sort."*<sup>39</sup> (Sara 68)

Another explains that she started sorting as the municipality implemented the sorting schemes:

Interviewer: *"The other things you sort out, have you always done that or is it gradually added?"*

Marianne: *"Garden waste, I have always sorted that of course. Plastic and metal, no, I have actually not. I haven't sorted that, no. It was thrown in the residual. Otherwise I had to bring it somewhere by bike... and have some placed in the garden."*

Interviewer: *"So you started sorting when the bins were implemented?"*

Marianne: *"Yes"*<sup>40</sup> (Marianne 69)

Another interesting point is that when the curbside collection of certain fractions is implemented, it seems that the residents feel they ought to follow the sorting schemes. If that, for some reason, is impossible for them, they explain why that does not work for them. The interesting part is, that they feel, they have to explain why they do not follow the system. It links to the description earlier of how sorting is the normal, stabilized practice. Not performing that practice is the extraordinary. In the interview with Helle, I start out by explaining what the interview is about. When I say, that I want to know how they handle waste in the household, Helle immediately explains why their sorting is inadequate:

Helle: *"Actually we would like to sort more, than we do, but we get so many big waste bins. And we have so many bins...well. And where should we put them? Then they are difficult to access. That means, that one doesn't use them that much. The two years I was on Bornholm means that I have to get used to sorting again. But my husband doesn't bother to sort. He thinks one should, but he is annoyed that*

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<sup>39</sup> Sara: Vi er flyttet herud i '13 og så er vi ligesom fulgt med de spande, der kom. Jo flere spande jo mer sortering. Spandene kom før sorteringen, hvis du forstår hvad jeg mener. Der hvor vi boede før var der kun én, og der sorterede vi ikke.

<sup>40</sup> Interviewer: De andre ting, du sorterer, har du altid sorteret dem, eller er det kommet løbende, sådan?

Marianne: Haveaffald, det har jeg sorteret fra, selvfølgelig. Plast og metal, nej, det har jeg faktisk ikke. Det har jeg ikke sorteret, nej. Det er røget ned i fælles. For ellers skulle jeg jo cykle et eller andet sted hen med det... og have noget stående ude i haven.

Interviewer: *Så det begyndte du at sortere, da containerne kom?*

Marianne: Ja.

*there is not a shared place somewhere, where you can bring big items. Because it is a lot of bins.*"<sup>41</sup>  
(Helle 63)

The inconvenience of the sorting system is expressed in several interviews. As Helle explains about her husband, it can lead to resistance among the residents. If sorting becomes too difficult or inconvenient, the residents just throw all waste in the same bin.

In another interview Marianne complains about the big waste bins outside.

Marianne: *"It can't be right that each parcel must have five big containers."*<sup>42</sup> (Marianne 69)

She agreed with the neighbours to share bins, but the municipality would not agree to that arrangement. It was also Marianne, who did not find space for the bin for paper, and therefore throws it in the bin for residual waste. Some households unofficially share waste bins with the neighbours. There is however still not space enough outside for the bins. Bodil has tried to get a smaller bin for plastic from Copenhagen Municipality, but has not succeeded yet.

Bodil: *"It [sorting] needs to be easy for people and it requires flexibility and they lack that in Copenhagen Municipality"*<sup>43</sup> (Bodil 52)

Morten agrees and has also tried to get smaller bins for some of the waste. For now, he has chosen not to have a bin for cardboard, but still sorts it and brings it to the recycle center.

Morten: *"The way we bring card board these days is in our car. I think that is annoying. Copenhagen Municipality is very inflexible. You have waste bins for all fractions and they are not even close to being full, not even residual waste. It gets three quarters full if we discard a lot. Metal and plastic is [collected] every eighth week, and we only put [our bin] out every second time."*<sup>44</sup> (Morten 39)

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<sup>41</sup>Helle: Vi ville egentlig gerne affaldssortere mere end vi gør, men vi får nogle kæmpestore beholdere. Og vi har så mange beholdere, så det.. altså. Og hvor skal vi have dem stående. De er svært tilgængelige. Det gør så, at man ikke bruger dem så meget. De to år jeg har været på Bornholm, har gjort, at jeg skal ind i en vane igen. Men min mand gider ikke at sortere. Han synes man skal, men han er irriteret over at der ikke er en samlet plads et eller andet sted, hvor man kan gå hen med de store ting. Fordi det er ret mange beholdere.

<sup>42</sup>Marianne: Jeg synes ikke det kan være meningen at hver lille parcel skal have 5 store containere stående.

<sup>43</sup>Bodil: Det [at sortere] skal være let for folk og det fordrer en vis fleksibilitet og det mangler de altså i Københavns Kommune.

<sup>44</sup>Morten: Den måde vi kører pap på for tiden er i vores bil. Det synes jeg er rigtig irriterende. Københavns Kommune er meget ufleksible. Man har en beholder til alle fraktioner og det ikke i nærheden af hvad vi smider ud, ikke engang restaffald. Den bliver ¾ fyldt hvis vi smider meget ud. Metal og plast er [indsamlet] hver ottende uge, og vi sætter kun [vores skraldespand] ud hver anden gang.

The almost empty bins still take up a lot of space and Morten finds that very annoying, when the bins are too big for their need.

#### 5.4.4 Does the awareness lead to changed behavior?

The perception that awareness of consumption will lead to less consumption is discussed in chapter 3.2 Theoretical approach. In the interviews, the residents were asked to comment on the amount and composition of their waste. First step of this is to understand whether sorting creates awareness of amounts and composition of the waste

Interviewer: "Has it been an eye-opener to sort?"

Anna: *"Yes, I think for many it is, how much plastic there is. Because you don't think about it. It is so easy to throw it in the bin with everything else. But when you then... well, we have to empty that [indoor bin for plastic] all the time."*<sup>45</sup> (Anna 41)

In the interviews the amounts of plastic were often mentioned, but others note other fractions.

Helle: *"I think there is a good deal of bio waste. When we are only two, there is food waste because we can't manage to eat it all"*<sup>46</sup> (Helle 63)

This quote is an example of what happened in many of the interviews. The amounts and compositions of waste might be surprising, but it can be reasoned by their daily life. They can explain what causes this amount of waste, but not change the amount.

In other households it does not create awareness or reflection about what to discard. It might also depend on how well the sorting is organized and how much sorting is happening. In the household with challenges to make an arrangement in the kitchen, they might not sort a lot. Morten explains, that sorting has not lead to reflection about what they discard.

Interviewer: *"Has it caused thoughts about what you throw out?"*

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<sup>45</sup> Interviewer: Har det været en øjenåbner at sortere?

Anna: Ja, det tror jeg det er for mange, altså hvor meget plast der er. For man tænker ikke over det. Det er så nemt at smide det ned i skraldespanden sammen med alt det andet. Men når man så, altså vi skal jo tømme den der [indendørs skraldespand til plast] hele tiden.

<sup>46</sup> Helle: Jeg synes der er en del bioaffald. Når vi kun er to, er der også madaffald, fordi vi ikke kan nå at spise det hele op

Morten: *"no, not really. There is a lot of cardboard. By far, most of it goes in the normal waste. We don't have that many cans. Glass is for itself anyway. We are pretty bad at sorting plastic. Paper and cardboard. Paper is not a lot. Cardboard is self-evident, it is big boxes. Bio, yes, if there is a pineapple, it takes a lot of space. It does not get me thinking. May be it would, if it all was thrown in one bin. Then I would think about how often I went out with the waste."*<sup>47</sup> (Morten 39)

This explanation by Morten might also be as a result of hardly any sorting.

As described many of the residents say, that sorting makes them feel better about discarding all that plastic.

Some give examples of how they try to act environmental friendly, but they say, that it is not based on sorting. It is just one more thing they can do in line of behaving environmental-friendly.

Marianne explains how she uses reusable bags when she goes shopping.

Interviewer: *"It hasn't changed anything, when you go shopping?"*

Marianne: *"No. Only that about the shopping bag. But I have been pretty consistent beforehand. It might move in that direction, but I haven't changed anything."*<sup>48</sup> (Marianne 69)

The environmental concerned Rasmus explains how they keep thinking about what they buy. It is however not because of sorting.

Rasmus: *"We have changed the consumption pattern. We shall buy less clothes. And only clothes, which are produced under decent circumstances. It is not because of waste sorting."*<sup>49</sup> (Rasmus 54)

Rasmus continues with different kind of patterns. He does not like all the packaging that is around food.

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<sup>47</sup> Interviewer: Har det givet anledning til at tænke over hvad I smider ud?

Morten: Nej, egentlig ikke. Der er meget pap. Langt det meste går stadig i almindelig skrald. Dåser har vi ikke så mange af. Glas går i sin egen under alle omstændigheder. Plastik er vi ret dårlige til at gøre. Papir og pap. papir får vi ikke så meget af. Pap giver sig selv, det er kæmpe kasser. bio, jo , hvis det er ananas, fylder det meget. Det sætter ikke nogle tanker i gang. Det ville nok være, hvis det hele skulle i én skraldespand, så ville jeg tænke over hvor tit jeg gik ud med skrald.

<sup>48</sup> Interviewer: Det har ikke ændret noget, når du er ude at handle?

Marianne: Nej. Kun det med plasticposen, men det har jeg været rimelig konsekvent med i forvejen. Det kan sagtens gå i den retning, men jeg har ikke ændret noget.

<sup>49</sup> Rasmus: Vi har ændret forbrugsmønster, vi skal købe mindre tøj. Kun tøj som er produceret under ordentlige forhold. Det er ikke på grund af affaldssortering.

Rasmus: *"In Irma, they have something where you can take off the waste, or packaging and then put it in the waste bin. At the end of the checkout. Also just to say... to give a statement. Why the hell does two avocados have to be in a plastic tray and cellophane. It is me, who get the trouble, then I have to..."*<sup>50</sup> (Rasmus 54)

Marianne has also tried to unwrap the food as a statement, but ended that again, as it was too inconvenient. She concludes:

Marianne: *"It is not a protest that matters anyway. I don't know how you make them stop it [all the extra packaging]."*<sup>51</sup> (Marianne 69)

They both agree that this statement is not because of awareness from sorting, but a more general knowledge. Rasmus seems to have packaging as his key issue. He encourages the retail chains to have higher standards regarding packaging. Marianne explains how it is out of her hands to change the packaging on the products she buys.

Sorting seems to create awareness in some households. But using the awareness to change in behavior is hard. The reasons to why there are these amounts of waste is seen in many of the interviews, but the urge to change is missing. In many cases the environmental friendly actions are not caused by increased awareness from sorting. Even if the residents would like to reduce the amount of waste, it is difficult for them. It is changes in bigger systems they need, such as less packaging.

In general, the motives to sort are based on a feeling that you ought to sort or sorting gives a good feeling. There seems to be a feeling of duty to follow the system. If the municipality asks you to sort out one more fraction, you ought to do it. Sorting mitigates the bad feeling of throwing things out. Direct reuse on the trading center mitigates even more, you might even call it salvation. Some residents have trouble to find the place for the bins and that causes resistance to sort.

Even if the residents become more aware of what they throw out and the amounts of it, they do not change their consumption accordingly. A few resident mentions action taken to avoid waste, but they argue that the actions taken are not because of sorting.

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<sup>50</sup> Rasmus: I Irma har de jo sådan en, hvor man kan pille deres affald af, eller indpakning og så putte det ned i en skraldespand, forenden af kassen. Det gør jeg tit. Også bare for at sige.. statement, altså hvorfor fanden skal to avocadoer ligge i en plastbakke med cellofan. Det er mig, der får balladen, så skal jeg stå der..

<sup>51</sup> Marianne: Og det er alligevel ikke en protest, som batter noget. Jeg ved ikke hvordan man får dem til at holde op med det [ekstra emballage].



Those motives and attitudes corresponds very well with the practices theoretical approach of understanding sorting. The meaning in the practice is the same as the reasons to sort. The inconvenience with the bins are the same as lack of competence to arrange the bins. The waste is the material in both theories.

## 5.8 Sub-conclusion

Two different theoretical approaches are used to understand the practice of sorting and the motives to sort. Practice theory focuses on the practice in the three elements; meaning, material, competence. The meaning of sorting found in the interviews is, that sorting ensures that the materials are handled in the best way possible for human and nature. The meaning in the practice of sorting deviates from the different households. For some residents, is a way to ensure recycling of natural resources and serves as an action of environmental concern. For other residents, sorting is smart, because it would be stupid not to use what you already have. The material for performing this practice is the waste to be sorted as well as the bins used indoor and outdoor for the different fractions. The outdoor bins are given by the municipality, whereas the indoor bins are individual solutions. The practice of sorting is therefore also the competence of making arrangements in the house, often the kitchen to facilitate sorting. The competence of placing bins indoor and outside is in some houses lacking as other considerations such as room for recreation and other purposes are prioritized higher than waste bins. The behavior theory focuses on the individual behavior, and how intention and behavior is different due to different factors and values. An example of the gap between intention and behavior is seen in a household, where the resident wants to sort, but is challenged by the lack of a system for the indoor bins. The intrinsic feeling of doing something good is explained in several of the interviews as a result of waste sorting. Others explain how not sorting feels wrong. In a practice theoretical approach this shows, that the practice is broadly agreed upon and the enactment of that practice makes practitioners urge to follow the practice. The residents follow the system, in the sense, that they start to sort another fraction, when the municipality is implementing a sorting scheme with curb side collection and individual bins for the households. If a new fraction is implemented and it for some reason is impossible for the resident to follow, they feel bad about it. They feel, that they ought to follow the sorting schemes. In one case a household sorted in more fractions than the curb side collection covers. In that case, the residents had different indoor system consisting of different bins and containers placed different places in the house, adjusted to their waste generation. The resident brought all the waste to a recycle station instead of using the scheme of the curb side collection. Implementing sorting schemes that are too inconvenient to the residents can create resistance among to citizens and mean that the citizens do not use the sorting schemes. Even if the resident finds it

important to sort and feel they ought to sort, the inconvenience drags in the other direction and the residents do not sort. Sorting gave in some cases the residents an understanding of the amounts and composition of waste. It was often mentioned that the amount of plastic was surprisingly big. Other residents saw their amount of food waste as big. Some residents did not think about the amount or composition of waste. The awareness of the amounts and composition of waste did not lead to changes in behavior regarding shopping practices, when asked about it. The residents can describe the reason for this amount of waste, but have not changed the practices leading to waste. If they used toothbrushes made of wood or a reusable shopping bag they said, it was something they started doing even before they started sorting. Sorting gave in some cases a form of salvation. Discarding big amounts of plastic did not feel as bad, when it was sorted. The same salvation is seen in the descriptions of the trading centers. If you need to get rid of things that are still functional and place them in the trading center, so others can take the things for free, you feel you contribute to society.

## 6 Discussion

This discussion will take its point of departure in the limitations of the methods used in the analyses. Discussion of the data used in chapter 4 Analysis 1 is already discussed in that chapter. This means that the limitations of the methods are concerning the analysis of the qualitative interviews. The new findings in the analyses are explained and put in relation to the problem described in chapter 1 Problem Analysis.

### 6.1 Amounts of waste

When Econet made the waste analyses, they tested different bins and bags to see, how that affects sorting. They based on the numbers on the baseline and implicit assumed that the amount of the waste would be the same after sorting was implemented. In this thesis the numbers are used to show the amounts of certain fractions, e.g. food. By doing that I do not take the different bins and bags into consideration. Implementing sorting might mean changes in the amount of waste as well as changes in attitudes and perceptions of waste and consumption. But may be the different bags and bins causes different considerations. It may be that the amount of food waste collected in the area with no bags handed out to the residents, not increases as much as the amount of food waste in the area where special bags were handed out. This may be caused by the different perception and motives to sort. Some may feel that the lack of bags sends a signal, that sorting is not important and therefore does not care about sorting. It may also be that the extra effort the residents have to put into finding a proper bag leads to more reflection about sorting and therefore a bigger change in behavior.

In this sense it proves the conclusion to that analysis: There is no clear tendency of how the amounts of waste is affected by implementation of sorting. The numbers does not say what causes the different developments.

### 6.2 Interviews

To validate the results one must look at the methods used. The interview is based on the skills of interviewing. (Kvale and Brinkmann 2007) The interpretation of the answers in the interviews is also a personal skill based on knowledge in the subject and the theory used. Conducting the interviews were based on active listening and follow up questions to the answers given by the interviewee.

#### 6.2.1 Choosing the case of the seven households

As explained in chapter 3.3 Methods, the households were chosen based on expectations to the information found in those households. The expectations were that attitudes and motives would be more distinct, based on two assumptions. The first assumption was that single-family houses had made a choice about sorting. The second assumption was that individual waste bins would give a

responsibility and ownership of the waste bins among the residents. The expectations were shown to be present in many of the interviews. In many of the households they explained about their considerations of adding another fraction to the sorting systems indoor and in the garden. The problems of finding room for the bins, shows that many of the residents gave sorting a lot of thought. The assumption that there will be ownership and a feeling of responsibility for the outdoor waste bins was also confirmed. Many of the interviewees described the struggle when having individual bins. Several of interview persons had to move the bins from the garden through the houses to the street when it was time for the waste lorry to empty the bins. Others find it annoying that people in the street uses the bins for their waste. Morten explains how he often finds bags of dog shit in the waste bins for either bib waste or paper.

Morten: *“when you put it [bin] on the back [street at the end of the garden], there is always dog shit, when we collect it [bin] again. I am the one spotting it as I am the one collection them [bins] again. I get annoyed [...] What the hell. I don’t bother to pick them up. But then it [sorting] doesn’t really matter. I am aware that they don’t ruin the big picture. But it is the principle of it... any idiot can see that is not a bin for common waste.”*<sup>52</sup>

Choosing the case of the houses on Sverrigsgade and Brigadevej serves to show an example of how residents manage their waste. Many municipalities in Denmark have implemented sorting schemes. Some fractions are to be sorted out by law, whereas others are requirements to be implemented soon. The different ways of living such as single-family houses, apartments, city, suburb, countryside might influence the practice of sorting and the motives and attitudes towards sorting. In general, sorting schemes with curb side collection are implemented in these years. As Flyvbjerg argues there is much learning in context-specific cases. (Flyvbjerg 2006)

### 6.2.2 Choosing the persons

As described in chapter 3.3 Methods, I received different reactions to my request of interview persons. One man thought it was a good purpose, but hardly had the time. He agreed to do a phone interview some day from work, but only 15 minutes. I chose not to interview him because I wanted a longer conversation and was concerned that the details would not come forward in a phone interview. This as well as the examples in chapter 3.3 Methods shows that there were some people, which I chose

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<sup>52</sup>Morten: Når vi nu stiller ud på bagsiden, der er jo konsekvent fyldt med hundelort, når vi så samler. Det er mig der opdager det, for det er oftest mig, der tager dem ind. Jeg bliver direkte irriteret [...] Hvad fanden. Jeg gider jo heller stå og samle dem op. Men så går det hele jo sådan lidt fløjten. Jeg er godt klar over, at det ikke er dem, der ødelægger det store billede. Men det rent principielle i.. altså enhver idiot kan jo se, det der ikke er en affaldsskraldespand.

not to interview. I based the decision on the concern about the outcome of the interview. I was not sure, that the details about their daily life would come forward.

The selection could have been more precise, if a survey among all the households had been made. The survey would show where the extreme cases of households were in terms of environmental concern, members of the household, employment of the residents. Under the circumstances given this was not possible due to time limits. When zooming in on something, you leave out other things. The choice of the seven households made it possible to obtain specific knowledge about their routines, behaviors and motives. A survey would also show what I did not select.

When you send out a letter to residents asking them to tell you about their waste, you first get to hear from those residents who have something to complaint about and those who are very proud of their system. The proud stories found in the analysis may be highlighted, because I asked for stories.

### 6.2.3 Conducting the interviews

The purpose of the interview was to understand the lifeworld. The interview was as close to a conversation as possible. Many of the questions asked for descriptions of the daily life. In the questions for bigger reflection, knowledge about waste was requested. But me as a student, who has knowledge about the waste sector, made it an uneven relation. The uneven relationship between the interviewee and me, might have caused that they told me less or could be afraid of giving a wrong answer. Due to this pitfall I saved the bigger questions for the end of the interview. My aim was not to test them in their knowledge of waste, but rather to understand what they base their practices and motives on. In many cases they answered that they did not know. I anticipate, that they were comfortable enough to speak freely. As described in chapter 3.3 Methods, the interview guide was made with a focus on the thematic and dynamic process, building up to more complicated questions in the end.

## 6.3 Using the two theories – did it work?

In making the interview guide, and after the first test interview, it was clear that it was much more about doing than having. The draft for the interview guide was based more on behavior theory and asked for motives and reflection, which sometimes was not there. It felt a bit awkward to force more meaning into the habits. After the test interview I went home and read the theories and tried to make a guide based more on doings. The final interview guide is a mix of the two theories. The interview

person did not know of the two theories and I tried not to stay too strict to one theory at a time. It resulted in fine conversations.

I found that some elements in the practice-as-performance were somewhat similar to the situational and psychological variables from behavior theory. I ended up looking for the same things, for instance the meaning of a practice is also the motives to sort. If the meaning is attached to the practice, but the practice-as-performance is what happens in this household now, it becomes individual. The focus is still on the practice, but the individual view is easy to use in behavior theory as that the focal point in that theory.

When citizens explain how and why they sort, it is often with convenience/inconvenience in mind. The underlying meaning of sorting is implicit, that sorting is good. The meaning corresponds with the campaign Mette Ebdrup and Ane Nielsen talks about, where a text explains how much energy you can make out of a certain amount of bio waste. (Ebdrup and Nielsen 2019) In general the campaign explains how good sorting is for the systems and infrastructure in our society. This meaning is found in the interviews, when asked about the good in sorting. If we all agree to some point, that sorting is good, may be even important, the task is to make it convenient.

The translation from the system thinking to the way citizens act, is missing. The campaign shows what sorting is good for, but does not tell how to sort. The competence of sorting is something each practitioner has to find for himself or herself. If the campaigns explained what to do with certain product or in certain situations, it may be easier for citizens to use in their daily life. My personal experience is that many people have questions regarding the practical tasks of sorting. For instance how clean the plastic need to be, or whether a milk carton can go in the fraction of cardboard. The planners could take these fractions and explain how to handle it in the kitchen, when it becomes waste. Another way of showing the convenience can be to explain the arrangements in the home. During the interview with the municipal planners, Mette Ebdrup explains how she uses a shopping bag on the kitchen door for the dry fractions that are going to be sorted. Every morning she takes the shopping bag to the backyard and sorts the waste. It is on her way to get her bike for work. She brings the now empty shopping bag to work and uses it in the afternoon for shopping. (Ebdrup and Nielsen) This routine makes sorting sound so convenient and easy to administer in a busy daily life. It is an example of how sorting is made tangible. The focus is on how to sort instead of the reasons to sort.

The same recommendations can be used in the work for waste reduction. Instead of the good reasons for reducing waste, the good ways to do it, should be stressed.

As shown in the chapter 5.4 Motives and attitudes, the salvation found in sorting is also seen in direct reuse. Using the trading centers is the good way to get rid of things that are still functional. It becomes a salvation for the consumption. The trading centers is also an example of how waste reduction is seen in the end-of-pipe that Zacho and Mosgaard explains (Zacho and Moesgaard 2016). The task is to have actions of waste reduction in other situations such as purchasing and using a product. To ensure the responsible consumption and decouple consumption and high living standards you need to consume in other manners than is seen at the moment.

## 6.4 Sub-conclusion

The analysis is based on interviews with seven different households. Choosing the seven households is based on two assumptions: 1) The resident have thought about sorting or not and 2) the individual bins for each house makes the residents take ownership and responsibility of the bins and of their waste systems in the household. Both assumptions were proven in the interviews in the seven households. When zooming in on those seven households, it was possible to get specific, detailed knowledge about their practices, attitudes and motives regarding sorting and waste. It would however be useful to select interviewees based on factors like environmental concern, members of households, employment of the resident. Based on a survey, ensuring diversity in the knowledge obtained as well as knowing what was deselected would have been possible. Due to limitations of time in this project, the selection of interview persons was based on conversations on the doorstep, when asking for an interview.

The interviews were conducted as a conversation between the interview person and me. The aim was to obtain knowledge of the practices as well as motives and attitudes. To understand the underlying values, questions about their knowledge were asked. Me, as a student in this sector made it an uneven relationship, and could influence on their answers. They might have been afraid of giving a wrong answer. To avoid this, this type of questions were saved to the last part of the interview, where the comfort and trust was build.

Based on knowledge obtained from the test interview, the interview guide used in the rest of the interviews were focused more on practices and habits than values, motives and attitudes. The interview persons themselves explained about the convenience or lack thereof when asked about sorting. It seems that the good reason for sorting is something they all agree upon, but performing the practice is something else. The message of the campaigns run by the municipality is that sorting is good for the system and the infrastructure in our society. The campaign does not show how to sort,

although this is what the citizens have in mind, when asked about sorting. This indicates, that campaigns explaining to sort, either specific products or in specific situations would be beneficial.

Reducing waste can be explained in the same way. Instead of informing why reduction is important, the information should be about how to reduce waste. The salvation seen in sorting is also present when talking about direct reuse in the trading centers. Traditionally waste management has been about end-of-pipe solutions, which means at the point of discarding. In this sense, the practices are only concerned about how to get rid of stuff. To reduce the amount of waste, you also need to look at the phases before discarding, that is purchasing and using the products.



## 7 Conclusion

The aim in this project is to understand the relation between sorting and reduction of household waste. How is sorting affecting reduction of household waste? This is examined in two different analyses in this thesis. The first analysis finds the development of the amount of waste in households before and after sorting is implemented. The second analysis uses theory of environmental behavior and practice theory to understand the practice and attitudes in sorting of household waste.

In the first analysis numbers from waste analyses show the amount of waste before and after sorting. The development in the amounts of waste is however not clear. The analysis of the data shows, that food waste in the first area slightly decreases with less than 2 %. In another area the food waste decreases by 8-11 %. In the last area the food waste increases by 4-7 %. The results for the dry fractions also show different developments. The amount of cardboard increases by 11% in one area and decreases by 3% in another area. Plastic decreases in both areas by 21% and 23% and metal increases by 8% and 36%. In general there is no clear tendency in the development. The data used for the analysis stems from waste analyses of batches of household waste taken before and after sorting was implemented. This is however taking waste brought to recycling stations into account, as well as waste discarded at home such as composting. Implementing sorting may cause change in handling of waste and bias the data.

The next analysis is based in two different theoretical approaches. Theory of environmental behavior is used to understand the attitudes when sorting is implemented. In order to understand the practice of sorting, the theory of practice is used. The theory of environmental behavior explains the difference between intention and behavior. Intention is based on environmental values as well as situational and psychological variables. Situational variables are the outer circumstances, such as service provision, experience and sociodemographic factors. The inner, psychological variables are the logistics, feelings of contribution, self-efficacy and intrinsic feelings based on the perception of the individual. The intention is again influenced by the situational and psychological variables when becoming the behavior of the individual. In other words, the difference in intention and behavior is the influence of the situational and psychological variables.

The practice theory understands consumption as a part of practice. The reason for consumption is not to consume, but to carry out different practices, such as cooking and taking a shower. Waste is a byproduct of another practice. Normally you buy a product to use it for something, not just to throw it out. The focal point in practice theory is the practice, whereas the focal point in behavior

theory is the person. In a practice theoretical approach the person is a carrier of a practice, and therefore part of the practice, but not the main element.

Seven qualitative interviews are conducted and analyzed to understand the practice of sorting and attitudes of the residents regarding sorting. The seven households are single-family houses with five compulsory waste fractions to sort and individual waste bins. They are placed in Copenhagen Municipality where sorting of bio waste as an optional fraction was implemented in 2017.

From the seven interviews, the practice of sorting was found. The meaning of sorting is that sorting is good. The waste is handled in the best possible way, using the materials for other products and ensuring to pollute as little as possible. The material of sorting are the bins and the waste. The bins outside are provided by the municipality and the struggle of having room for them in the small gardens are explained in many of the interviews. The arrangement inside the houses are diverse. The municipality provided the green bin for bio waste but for all other fractions, the residents have to make a system themselves. In general, there are indoor bins, often placed in the kitchen. The competence of sorting is then to make an arrangement with all the bins in the garden and the indoor bins in the kitchen. The knowledge of what goes where is tacit in many cases. It is something they learned as children or pick it up here and there. Some residents use a pamphlet from the municipality when in doubt of how to sort.

Approaching sorting with the theory of behavior shows the gap between the intended and actual behavior. One resident argues that you sort, because you are asked to. Further, in the interview the situational and psychological variables make him sort less than intended. The variables are expressed as the inconvenience in placing the bins in a kitchen that is built for one bin only.

The intrinsic good feeling of sorting or the wrong feeling of not sorting is expressed in the interviews. Many feel they ought to sort out the fractions that are collected curbside and some even feel a salvation by sorting. The feeling when throwing out all that plastic is not as bad, when the plastic is sorted. This salvation is also seen when placing items in the trading center, where still functional items can be put and others can take them for free. It gives a good feeling to place the things that are to be thrown out, especially for those, who do not like to throw things away. The hope is that others can use the products and thereby it is helping society. There is however also resistance towards sorting because of the inconvenient, big bins in the garden.

Sorting waste leads in some households to knowledge of amounts and composition of the waste discarded in the household. The residents do not use this increased awareness to change the consumption. Some try to avoid plastic but it is not because of sorting of waste. Some would like to avoid the packaging, but do not see how to avoid it.

In general, the descriptions of sorting say that the residents want to sort, because it is a good thing you ought to do. It can however be too difficult or inconvenient. The salvation found in sorting and especially in direct reuse makes generation of waste (consumption) less bad.

These results are valid for the seven interviews. Other places may have other conditions such as service provided, living standards, combination of residents and households. However, in Denmark sorting with curbside collection is being implemented many places.

From the interviews the reasons to sort seems to be clear, but the competence it is lacking. Implementing sorting in daily life is difficult and takes time and effort. Instead of running campaigns about the good reasons to sort, it may be beneficial for the municipality to inform about sorting of specific products or in different situations. The same advice goes for reduction of waste. The salvation seen in the direct use, shows that actions taken to reduce waste may result in higher consumption in the households. It is therefore important to ensure waste reduction in the phases of purchase and use and not only when the products are discarded.

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Reference for the picture on the front page:

<https://genanvend.mst.dk/nyheder/nyhedsarkiv/2017/flertal-af-borgerne-oensker-at-udsortere-organisk-affald/>

## 9 Appendices

- 1) Interview with Kristina Zacho
- 2) Meeting with Claus Petersen, Econet
- 3) Email from Kristoffer Ravnbøl, Naboskab
- 4) Interview with Ane Kollerup Nielsen and Mette Ebdrup, Copenhagen Municipality
- 5) Calculations of dataset
- 6) Letter to households
- 7) Interview guide
- 8) Interview with households
- 9) Report from Econet (Sønderborg)

A compilation of the appendices are found in the following link:

<https://drive.google.com/drive/folders/1fCDVGBZ5xvsFUvnMw54xFhs0VLyOWWJ5?usp=sharing>