

# 1, 2, 3 - Verpa- ckungsfrei!

Forschungsbericht

Nudging as a means of reducing  
packaging in supermarkets

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Abfallvermeidungs-Förderung  
der österreichischen  
Sammel- & Verwertungssysteme  
für Verpackungen

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## Table of contents

1	Introduction .....	1
1.1.1	Problem statement .....	2
1.2	Research goal and research questions .....	4
2	Structure and Method .....	6
2.1	Literature search .....	6
2.2	Coding process and data analysis .....	10
3	Theoretical background .....	13
3.1	Sustainability in Supermarkets .....	13
3.2	Nudging .....	17
3.2.1	Nudge by Thaler/Sunstein .....	18
3.2.2	Critique and considerations .....	24
3.3	Nudging for sustainability: state of research .....	27
4	Results on nudging .....	32
4.1	Relevant literature .....	32
4.2	Defining nudging .....	36
4.2.1	Nudge: Concept and critique .....	38
4.2.2	A typology of nudges .....	43
5	Results on sustainable nudging .....	50
5.1	Nudges for sustainability .....	50
5.2	Nudges for project 123V .....	53
6	Discussion .....	59
7	Conclusion .....	66
8	Bibliography .....	70
9	Annex I: Search results (table) .....	77
10	Annex II: Papers included in the data analysis .....	78
11	Annex III: Document variables (table) .....	81
12	Annex IV: Code book .....	82
13	Annex V: Figures of further data emerging from the coding process .....	86

## 1 Introduction

In 2021, Earth Overshoot Day, fell on the 29<sup>th</sup> of July. This date marks the transgression of the earth's capacity to regenerate the resources spent up to this day. It falls this year on the same date as in 2019, indicating that the fallback of three weeks in 2020 due to worldwide lockdowns amid the Covid-19 pandemic does not reflect a global long-term change in consumption. The human populations exceeding resource consumption leads to a higher environmental deficit spending of resources every year. Even though the seriousness and importance of living inside the planetary boundaries is echoed worldwide (Verplanken/Roy 2015, 251), the means to do so are heavily contested. As governments and supranational organizations endeavor to mainstream environmental policies, academics, private companies, non-profit organizations, and individuals are seeking alternate strategies to facilitate sustainable behavior and consumption.

A venue where sustainable consumption is brought to an everyday level is the supermarket. Increasingly, westernized supermarkets offer various forms of more sustainable products compared to regular selections: organically or regionally produced foods, fair-trade goods, or waste-reducing packaging are typical examples. By adapting their shopping behavior, consumers exert their influence on the demand side of changing production chains, thus contributing daily to a better resource management. Research shows that consumers know about the higher sustainable value of these goods, and the majority intends to organize their shopping accordingly. But these aims diverge widely from the actual shopping behavior, with studies showing that only up to 5% manage to align their shopping choices in supermarkets with their values (Stafford/Graul 2020, 12).

This misalignment is frequently described as value-action or attitude-behavior gap (Welch/Warde 2015, 88). Various strategies have been proposed and researched to support consumers in bridging this gap. As the intention of contributing to sustainability is manifest in these consumers, this dynamic presents an interesting segment to engage with, out of the multi-level, multi-stakeholder endeavor for changing consumption dynamics. To help consumers overcome the value-action gap and align their shopping behaviors more with their intentions, various strategies have been proposed and researched, among them education campaigns or temporary price incentives (Abrahamse 2019, 133). A rather novel strategy to this end, increasingly discussed in recent years, is nudging.

The 'nudge', as described by Thaler/Sunstein (2009) in their namesake book, is based upon the field of behavioral economics, which is clearly distinguished from classical economics. Behavioral economics fundamentally diverge from the classical theory of the so-called 'homo oeconomicus', the rational, all-knowing and self-interest maximizing prototype of humans (Thaler/Sunstein 2009, 7). In contrast to this, humans make choices based on the specific context of decision-making, being influenced for example by the way options are presented, their well-established habits, or even emotional status. Taking this knowledge into account, it can be harnessed to influence people in the moment of making choices. Thus, Thaler/Sunstein's main argument is that in situations where humans are known to behave contradictory to their own best interest, nudging can intervene in a corrective way. These implemented interventions constitute the so-called 'nudges'. This line of argumentation, as well as the increasing international attention, results in rising academic research and application of nudging for sustainable ends. As is argued in this thesis, 'green nudges' (Schubert 2017) or even 'healthy

nudges’ (Cadario/Chandon 2020) can be subsumed as sustainable nudges, if the concept of sustainability is defined accordingly.

The concept of sustainability has evolved over 300 years, while today the most comprehensive and detailed perspective on it is presented in the Agenda 2030, containing the 17 Sustainable Development Goals (SDGs). These provide not only a frame, but also very specific sub-goals on how to achieve more sustainability for people and planet until 2030. In the broadest sense, this thesis encompasses the question if nudging is a valid strategy for achieving the SDGs. If so, the wordplay in the title of this thesis of nudging towards the SDGs stands for a valuable further approach to achieving more sustainability. Narrowing down the aim of this thesis, it focuses on supermarkets, which not only provide a relevant setting for increasing overall sustainability, but which is shown to be an environment where people wish to change their behavior. Thus, this thesis pursues the question if and how nudging could be applied to facilitate sustainable consumption in supermarkets. The project which provides the frame of the following study is presented in the following sub-chapter.

### 1.1.1 Problem statement

This chapter outlines the problem statement of this thesis, which is derived directly from the project ‘1, 2, 3 Verpackungsfrei’<sup>1</sup> (123V). It is a transdisciplinary collaboration of the ‘Institute of Systems Sciences, Innovation and Sustainability Research’ at the Karl-Franzens University of Graz, the ‘Österreichische Ökologie-Institut’ (Austrian Ecology Institute), and the food store chain ‘SPAR’<sup>2</sup> in Styria. The latter collaboration partner points to the focus of the project: reducing waste in supermarkets, while promoting more sustainable food alternatives, described below. The project takes a multi-pronged approach, assessing the current state of waste (production) in the whole food chain, evaluating existing solutions as well as developing new ideas on how to reduce waste. Simultaneously, more sustainable alternatives are promoted.

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<sup>1</sup> This translates loosely to „1, 2, 3 packaging free”, with the rhyme of “3” and “free” transpiring in German too, as intended.

<sup>2</sup> The firm name is written in all capitals, but for reasons of reader-friendliness it will be written as ‘Spar’ in the following.

The introduction of unpackaged food dispensers offering free-flowing foods in bulk, is one of the new additions in various Spar branches in Styria. Picture 1 shows an example of how the dispenser stations look in situ. They contain for example noodles, nuts, cereals or dried fruits, which customers can buy in the amounts desired.

Picture 1: Food dispensers at Spar (provided by project 123V)



Adding more aspects that contribute to sustainable consumption, the foods available in the dispensers are produced organically or regionally, or by the standard of fair-trade. The prices of the foods offered here are similar to those of the pre-packaged goods. Consumers can either bring their own boxes to fill the goods into them, or, as a worst-case workaround, use the paper bags provided by the supermarket. In the latter case, they do not contribute to waste reduction as much. Spar is not the only supermarket implementing unpackaged alternatives in its chain. Zero waste markets have mushroomed in recent years, and other food store chains have endorsed offering at least a few goods in unpackaged form like Marks & Spencers UK (Calnan 2020).

Considering the contribution of these dispensers to increasing sustainable consumption, an obvious prerequisite comes to mind: consumers have to accept and use the devices, and the products need to be regularly bought, so the food store chain can maintain the offer. While the demand for more sustainable products is rising on the consumer side, two main obstacles could prevent the success of the dispensers: firstly, they provide a completely different and

probably new shopping experience for customers, and thus possibly induce a high level of inhibition. Consumers not only have to learn how to operate unpackaged dispensers in the supermarket. Additionally, they have to invest a certain degree of preparation by bringing own boxes for transporting the goods, which proves quite a threshold for some consumers (Marken/Wagenfeld 2020, 34). Both the nonexistent experience on how to handle the dispensers, as well as the need to bring own boxes could prove real barriers for consumers to use the food dispensers. Secondly, consumers who are open to buying packaging-free products encounter difficulties aligning these desires with their behavior, following their habits and staying on the conventional track (ibid., 3, 34). This phenomenon is widely known as “‘value-action’ or ‘attitude-behaviour’ gap” (Welch/Warde 2015, 88).

As argued in the last chapter, nudging as a strategy for bridging this gap is increasingly researched. But while the interest in the concept of nudge has increased, it has garnered steady criticism along with the publicity. Not only is the concept criticized as theoretically imprecise and unclear (Hansen 2016). Academics question the ethicality of nudging, specifically concerning the possibility of manipulation (Bovens 2009; Wilkinson 2013). Finally, researchers describe nudges that can fail or even backfire, but might not be epitomized on as its perceived popularity induces a publication bias. As Osman et al. remark, the “current appetite for using behaviour change techniques is undeniable, with terms such as nudge having become part of scientific and public vernacular. But where do failures fit into the behavioural change enterprise?” (2020, 977). Thus, the question arises as to what the concept of nudging specifically entails, and how it could be implemented to support willing consumers to engage in more sustainable behavior, i.e. by using the food dispensers. The research questions derived from this, as well as the research goal are explicated in the following chapter.

## 1.2 Research goal and research questions

Concerning the criticism of nudging briefly addressed above, it seems that deriving a general understanding of nudging constitutes an important first step to assessing its value as a strategy for achieving more sustainable consumption behavior. Thus, the aim of this thesis is to generate a general understanding of nudging, as well as a clearer perspective of how nudging can contribute to achieving more sustainability. To delimit the study, it focuses specifically on the setting of the food dispensers to be implemented in project 123V, aiming to reveal nudges that could possibly influence willing consumers to adapt their shopping behavior to more sustainable alternatives.

Thus, this study is organized around the following research questions:

1. How is the concept defined by academics engaged in nudging for more sustainability in supermarkets?
2. What kind of nudges are proposed that could be implemented in supermarkets with regard to the food dispensers?
3. What knowledge exists about implementing nudges for sustainability and what benefits do they offer?

Additionally, this study might contribute to assessing the question if nudging undeservedly is perceived as a trend, as implied by the controversies surrounding it, or if it proves a valid strategy for enabling behavior change for sustainability.

## 2 Structure and Method

This chapter outlines the structure and practical relevance of this thesis and the methodological foundation for the research undertaken. To answer the research questions, explicated in chapter 1.2, a literature search and data analysis of previous academic work is conducted. The literature search process closely resembles that of a systematic literature review, as described for example by Ridley (2012, 188 et sqq.) and Gough et al. (2017). The coding process is based mostly on guidelines proposed by Sutcliffe et al. (2017) and is enabled by the program MAXQDA<sup>3</sup>. The whole research process is adapted to the exploratory nature of this study, as reasoned below. Based on the accumulated literature, tailored specifically to the research setting, is submitted to a coding process using Maxqda. This generates the data which is then quantitatively and qualitatively analyzed to answer the three research questions. In the following, the structure of this thesis is briefly outlined. In sub-chapter 2.1 the methodological background for the literature search is presented. Sub-chapter 2.2 summarizes the relevant literature concerning the coding process.

The structure of this thesis is based on the different steps of research. This chapter further outlines the methods applied for both the literature search and the data analysis. Chapter 3 provides the theoretical background for this thesis, with 3.1 detailing the concept of sustainability, 3.2 focusing on Thaler/Sunstein's original proposal for nudging and the main arguments of the ensuing criticism, and 3.3 summarizing previous work on sustainable nudges. Chapter 4 entails the results of the data analysis on the first and second research question. Its sub-chapter 4.1 encapsulates the relevant literature resulting from the literature search, while sub-chapter 4.2 focuses on the ensuing defining traits of nudging and a typology of nudges that can be implemented in supermarkets. Chapter 5 contains the data analysis on the third research question. Specifically, sub-chapter 5.1 presents the information gleaned on the concept of sustainable nudges, as well as the benefits it provides and some considerations. The next sub-chapter 5.2 proposes specific nudges for project 123V, based on the examples arising from the data analysis. Finally, chapter 6 contains the discussion of the results, while chapter 7 concludes this thesis.

### 2.1 Literature search

No literature has been published to this date concerning the specific setting of this study. Thus, to propose nudges specifically tailored to food dispensers being implemented in supermarkets, the relevant areas of research need to be identified. The literature search therefore mirrors many aspects of systematic literature reviews, developing specific search term combinations, inclusion and exclusion criteria and utilizing specific databases for the search. The resulting papers of this literature search form the basis for the following data analysis. This entails developing codes, which are then applied to the sources, thus generating the data later analyzed to answer the research questions. These different steps are detailed in the following.

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<sup>3</sup> The program name is written in full capitals, but for reasons of reader-friendliness it will be written as 'Maxqda' in the following.



To develop the search terms, the most relevant concepts for this study are identified as: nudging (I), supermarkets<sup>4</sup> (II), and sustainability (III), the latter oriented mainly at waste reduction. These concepts I-III make up the basis for the literature search. Each of those concepts is assigned a second related term, to cover a larger amount of possibly relevant results. In a first quick search, the terms are tested and the best possible combination of different terms from each concept was established<sup>5</sup>. Four different search combinations result from this, which are named S1, S2, S3 and S4 ('S' standing for 'search') and depicted in Figure 1.

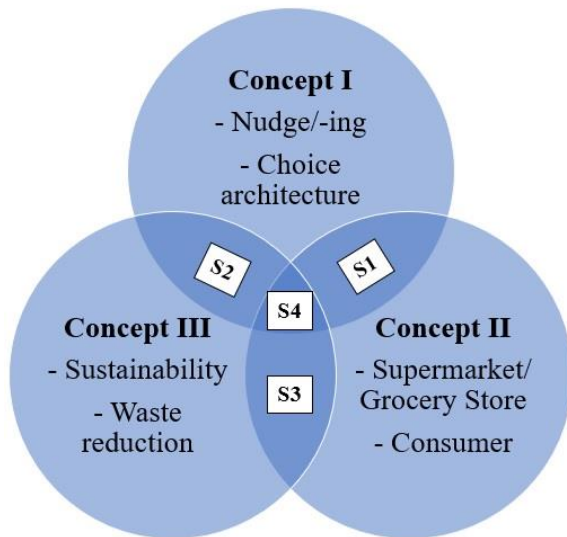


Figure 1: Three search concepts, four search term combinations (S1-S4)

Ridly describes the searching process as “scoping activity” (2012, 190) as it enables an overview over the many papers concerning the perused search terms. Therefore, the different search term combinations, S1-S4 cover relevant aspects of the research questions. S1 aims at general literature on nudging<sup>6</sup> in the supermarket, transferable to the unpackaged dispensers. S2 identically aims at nudging for waste reduction that can be rendered useable for the dispensers. As many results including waste reduction concerned ‘food waste’, this term was excluded from searches including concept III. S3 does not include concept I, papers resulting from this search do not refer to nudging. Rather, the hope was to find interventions not clearly stated as nudges but focusing on waste reduction in the supermarket. S4 merged all three concepts and is the only search term combination that includes consumer. This is due to the fact that using the terms ‘supermarket/grocery store’ instead exploded the search results, and consumers put the focus on the intervention target. To further delimit the search results, the term ‘policy’ is excluded, as many resulting papers concerned nudging as a policy tool, which is irrelevant for this study.

This whole study is conducted in English, as most literature on nudging is published in the academic lingua franca. To guarantee a certain degree of quality, only peer-reviewed papers are

<sup>4</sup> For the purpose of this thesis, no differentiation between supermarkets and grocery stores is made, and they are both included for the sake of generating relevant results.

<sup>5</sup> For example, the terms ‘unpackaged’ or ‘unpacked’ were originally included in concept III sustainability, but it delimited the searches to too few and too irrelevant results. Thus, it was exchanged for ‘waste reduction’, which yielded better results.

<sup>6</sup> Offering the concept of ‘choice architecture’ as alternative. This is further explicated in chapter 3.2.1, suffice to say here that it is closely linked to Thaler/Sunstein’s original work on nudging and refers to the process of implementing nudges.

included in the study. As databases, Science Direct, SCOPUS, MedLine, and Google Scholar are perused for all search term combinations. If possible, the terms are only sought out in keywords, title and abstract. For each search conducted, the database-specific symbols to optimize the results are considered. One example of the search term combinations is depicted in Table 1.

Table 1: Search term combinations

	<b>Search term combination</b>
<b>S1</b>	(nudge OR "choice architecture") AND (supermarket OR "grocery store")
<b>S2</b>	(nudge OR "choice architecture") AND waste reduction NOT "food waste"
<b>S3</b>	(supermarket OR "grocery store") AND waste reduction NOT "food waste"
<b>S4</b>	(nudge OR "choice architecture") AND sustainability AND consumer NOT policy

All databases except Google Scholar propose ‘similar work’, presenting e.g. six other possibly relevant papers after selecting a pdf for download. This is reviewed as well and included in the results if relevant. These are denoted as ‘proposed by database’ in the spread sheet used for documentation (cf. Annex I).

Basing the search process on the ones conducted in systematic literature reviews provided a structured and reproduceable approach to generating relevant literature for this study. But some distinctions between the search presented here and the process in systematic literature reviews are necessary. For one, in systematic literature searches this process is usually conducted by teams of academics, sharing the workload and double-checking decisions made (Ridley 2012, 188). The different setting of this study thus affects the amount of literature being reviewed. For example, the references named in already selected papers could not be additionally reviewed for inclusion. Furthermore, possible duplicates emerging in the searches across different databases cannot be recorded. Rather, only the papers already approved to be included in the study are counted as ‘duplicates’ when appearing in another database.

The review process entails deciding if the papers resulting from the search qualify for the next step (Ridley 2012, 191). This decision is based on the inclusion and exclusion criteria, which are in part pre-determined, and in part evolve during the search process. The exclusion criteria reflect the major topics of papers resulting from the search that are not used for this study. For example, nudges that entail changes to the order of products in one shelf are not included, as the dispensers make up a few meters of store space. The inclusion criteria depict a first overview of the content of the literature relevant for this study. The following Table 2 presents the exclusion and inclusion criteria.

Table 2: Exclusion and inclusion criteria

<p><b>Exclusion criteria: literature concerning...</b></p> <ol style="list-style-type: none"> <li>(1) Pricing strategies, monetary incentives, cashback or rebate programs<sup>7</sup></li> <li>(2) Combined implementation of nudging and pricing strategies or studies about willingness to pay</li> <li>(3) Interventions in other food settings, if they aren't applicable to supermarkets, e.g. smaller food portions at take-away places or food pantries</li> <li>(4) Interventions concerning position choices in one row or shelf, concerning only the cashier aisle, or concerning sweet wrappings</li> <li>(5) Waste reduction or nudging solely in another part of the food (supply) chain, e.g. food manufacturing</li> <li>(6) Digital consumption, online shopping, etc. if not applicable to the supermarket setting</li> <li>(7) Other interventions for more sustainability, e.g. to reduce energy usage in supermarkets</li> <li>(8) Interventions on a policy level, or on a management level (e.g. CSR), e.g. brand architecture</li> </ol>
<p><b>Inclusion criteria: literature concerning...</b></p> <ol style="list-style-type: none"> <li>(1) Medical or dietary issues, which might be combatted by certain interventions in supermarkets</li> <li>(2) Combined implementations of pricing and nudging strategies if nudging was implemented as a sole intervention</li> <li>(3) General interventions in supermarkets which could be applied to 123V, e.g. positioning, promoting, directions, visibility, accessibility or proximity</li> <li>(4) Interventions for healthy or organic foods; Interventions for regional or sustainable foods, qualifying as enabling more sustainability according to the SDGs</li> <li>(5) Plastic or waste reduction in any setting that could be transmitted to the supermarket or concern its shoppers</li> <li>(6) Interventions for sustainable, ethical or green consumption, if applicable or relevant in any way to dispensers in the supermarket</li> <li>(7) Nudges that were tested and didn't show any or even negative effects (as they might be interesting to rule out possible interventions)</li> </ol>

Those papers meeting the inclusion criteria are then assessed for eligibility. Reading and evaluating the papers enables a precise division between papers specifically useful for this study. The guideline for this process is made up by the eligibility criteria. In other studies, these might differ from the exclusion and inclusion criteria. In this study they are identical to the inclusion and exclusion criteria presented above but applied more rigorously: the papers submitted to the eligibility process are all (re-)read closely to assess their potential value for this study. Following this process, the final number of records included in this study is established. The aim is to include minimum 30 papers with different methodological backgrounds from various areas of research to enable interdisciplinary observations.

<sup>7</sup> As monetary incentives and pricing strategies do not count as nudging. This is further elaborated in chapter 3.2.1.

The process of identifying, screening, and finally electing the records relevant for the data analysis is presented with the PRISMA flow diagram (as suggested by Brunton et al. 2017, 153). This is applied to present the results of the literature search in chapter 4.1 as proposed by Moher et al. (2009). This is based on the similar usage in e.g. Möllenkamp et al. (2019). It provides a clear overview on the various steps of the process. Further information on the search process, e.g. the individual number of results for S1-S4 on each database can be found in Annex I.

## 2.2 Coding process and data analysis

This sub-chapter concerns the coding process, which provides the data for the following analysis. Thus, the method for conducting this study is presented, as well as the arguments for the exploratory nature of this study outlined. Coding peer-reviewed published academic work to generate data is again a frequent method in systematic literature reviews (Sutcliffe et al. 2017, 124). As such, their proposed procedure reflects the guidelines for the following study<sup>8</sup>, especially concerning the preparatory process. For the following coding process, the program Maxqda is used, into which the final records included in the analysis are uploaded. The coding process consists of two steps which are briefly explained in the following.

In a first step, Sutcliffe et al. (2017, 125) propose organizing the papers included in the final sources by applying keywords to different traits, e.g. the main topic of the paper, or the type of intervention presented. This enables a first overview over data collected. The program Maxqda automatically generates so-called ‘document variables’ for each paper uploaded, originally containing only bibliographic information. But it is possible to generate own document variables (i.e. the keywords) and insert corresponding values for each document.

Two examples of pre-developed document variables are given here, the full list of document variables and values is available in Annex III. To gain an overview of the results according to contents, a ‘general topic’ variable is introduced to describe the broad concern of the paper, offering the values ‘healthy foods’, ‘sustainable foods’, ‘reducing waste’ and ‘sustainable consumption’. These are developed based on the inclusion criteria depicted above in Table 2. The second example focuses more on the academic context and assesses the ‘type of academic work’, organizing the papers by ‘study’, ‘systematic review’, ‘literature review’, ‘theoretical proposal’ and ‘consumer survey’. The ascription of one value to a paper is based on the author’s own suggestion<sup>9</sup>, with one exception: studies focusing on consumer surveys were specified as such. For the analysis presented in chapters 4 and 5, the possibility of clearly separating studies researching the implementation of nudges for other types of papers. As is further explicated in chapter 3.2, a wide range of diverse types of academic work is of interest for this study, which is why these different types are included in the data analysis.

The second step forming the basis for the data analysis is the coding process. Due to the amount of minimal 30 papers to be included, and the amount of pre-developed codes emerging from the theoretical background presented chapter 3, the status of the study conducted

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<sup>8</sup> As systematic literature reviews mainly focus on specific interventions and compare studies, their methodology does not contribute to the execution or aim or of the coding process.

<sup>9</sup> Of course, these different types of academic work can be further specified, as e.g. scoping systematic reviews, and even the definitions and definitive content of these works vary widely. This is not addressed further as it is not essentially relevant to gaining a first overview on the variety of academic work represented in the final selection.

here needs to be clarified. As Sutcliffe et al. state, the coding process leads to a “large (sometimes vast) quantity of information” (2017, 124). In preparation for the large quantity of information to be extracted, this study takes an exploratory stance. In the words of Singh, “exploratory research is the initial research, which forms the basis of more conclusive research” (2007, 64). As is outlined in chapter 3.2, even though quite some literature and research has focused on nudging, many conceptual, ethical, or indeed empirical aspects seem controversial. Additionally, as described above, no literature up to this date focuses on the specific setting given in study, concerning the implementation of food dispensers in supermarkets. Thus, the focus of this exploratory study lies on presenting the wide variety of findings, with only concentrating on the deeper analysis of a very few aspects. Other observations demanding more in-depth investigation are clearly stated, but not pursued in this thesis.

The coding process includes the development of codes and applying them to the papers. These codes are developed to be coherent, meaningful, reliable, and explicit (Sutcliffe et al. 2017, 135 et sq.). The subjectivity of the coding process is acknowledged as influencing what and how the codes are applied, while attempting to maintain as much objectivity as possible (ibid, 137). Two means of applying codes are relevant for this study: categorical coding, which entails closed, pre-developed, more formal codes (ibid.). These are mostly applied to answer research question one. As the question aims at establishing the most defining traits of nudging, codes are developed based on the original work of Thaler/Sunstein. Sutcliffe et al. demand that for categorical coding “all key concepts within the hypothesis are required to be clear in advance” (ibid.). Thus, the aim of chapter 3.2.1 is to provide the theoretical background to develop categorical codes for research question one. But in addition to pre-developed code concepts, the process remains open to the emergence of further relevant concepts in the sources. This so-called open coding enables the inclusion of unforeseen aspects and is therefore additionally applied to answer research question one.

The second and third research questions are to be answered mostly with open coding, with only a few pre-developed categorical codes established in chapters 3.2.2 and 3.3. In open coding, codes emerge while (re-)reading the sources, they are open, less formal and infer rather theoretical assumptions (Sutcliffe et al. 137 et sq.). The full list of pre-developed and complete final codes is attached in Annex IV. During the coding process, the papers included in this study are read various times to apply the pre-developed and emerging codes. After the final establishment of the last codes through open coding, all papers are read one final time to ensure all relevant segments are coded correctly. The phrases and (semi-)sentences which the codes are applied to are named ‘coded segments’ and form the basis for the data analysis.

The data analysis evaluates the coded segments either quantitatively or qualitatively. The kind of evaluation chosen depends on the topic of the code and is argued accordingly in chapters 4.1 and 5 which present the analysis. For the quantitative data analysis, the Code Matrix Browser function of Maxqda is used. This provides the graphs and figures used as a basis for this analysis. These depict the number of papers containing the concurring code at least once<sup>10</sup>. Based on these, the relevance of e.g. single defintory traits of nudging is established by setting the number of documents containing the code in proportion to the entire number of

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<sup>10</sup> This approach is chosen because relating to the research questions, the frequency of e.g. specific defintory traits of nudging across various papers is of more importance, than the amount of times the code is occurs in one paper. This is the reason why some codes applied for quantitative analysis are only applied once in a document, even though a relevant point is made more often by the authors.

sources The qualitative analysis is based on Maxqda's function of displaying the coded segments of each code. Thus, if the content of coded segments is relevant to answering the research questions in the explanatory sense presented above, they make out the basis for this qualitative appraisal.

### 3 Theoretical background

Sustainability is a current, interesting topic, gaining even more importance as the effects of various planetary crises, like extreme weather phenomena and pandemics, become more frequent. Sustainability is therefore a topic that is relevant not only for academics, but rather policy makers, private companies, and consumers<sup>11</sup>. In a first step, this chapter lays out the origins and a definition of sustainability, based on the Agenda 2030 and its Sustainable Development Goals (SDGs) by the United Nations (UN). In a next step, sustainability is related to different aspects of the project ‘1, 2, 3 Verpackungsfrei’ (123V, cf. chapter 1.1). The following chapter 3.2. presents the concept of nudging and its wider reception until today. Sub-chapter 3.2.1 discusses the original book by Thaler/Sunstein (2008) establishing the ‘nudge’ as a behavioral intervention. The next sub-chapter 3.2.2 concerns considerations and critique on the topic. The last sub-chapter, 3.3, focuses on why and how nudging provides a valid strategy for enabling people to behave more in line with their wish for more sustainability.

#### 3.1 Sustainability in Supermarkets

Sustainability is a term frequently used nowadays but quite unrestricted and ambiguous in its meaning. In daily use, it is applied to any aspect in life supposedly contributing to saving resources or wasting much less. It is perceived as so popular that the concept of greenwashing is even applied to it, confronting politicians or companies with the accusation of using the en vogue expression to appeal to certain groups, rather than genuinely being committed to the cause. Thus, the question arises, what the term encompasses.

In academia, the term is known to carry a long tradition, arising in the 18<sup>th</sup> century from the German forestry sector and being introduced by von Carlowitz in the work ‘*Sylvicultura Oeconomica*’ in 1713 (Grunwald/Kopfmüller 2012, 18 et sq.). It was employed by von Carlowitz arguing that the deforestation should only go as far as the forest could reproduce itself to maintain its extent (ibid.). The term resurfaced more widespread in the second half of the 20<sup>th</sup> century. The Club of Rome’s ‘*The Limits of Growth*’ in 1972 further developed ideas purported by Malthus in the 1790s, describing the finite planet’s failing resources and the future problems of sustaining a rapidly growing population (Portney 2015, 5).

This problem was addressed by the so-called ‘Brundtland Commission report’, published by the UN. It established the reasoning for and aim of keeping inside planetary boundaries, by ensuring sustainable development<sup>12</sup>. This also marks the beginning of the strong influence of supra-national organizations like the UN mainly purporting the topic and developing approaches on how to tackle the global problems deriving from increasing population and consumption. Published in 1987, the Brundtland Commission report was officially titled ‘*Our Common Future*’ (Portney, 1). It states that sustainability aims at safeguarding the earth’s bio-physical environment and to secure the natural resources needed to maintain life. Apart from

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<sup>11</sup> For the purposes of this thesis, the words consumer and customer are used interchangeably in the supermarket context. The discussion on the possible contradiction of the term consumerism and sustainability (addressing the question of how ongoing economic growth and continually rising production can be reconciled with the limited resources of the planet) cannot be touched upon here. Rather the stance is taken that consumers are, in its broadest sense, people organizing their food supply (with varying degrees of financial resources and sophisticated taste).

<sup>12</sup> Various opinions exist as to the difference between ‘sustainability’ and ‘sustainable development’ (cf. e.g. Portney 2015, for a few examples of the discussion). As this differentiation does not concern us here, for the purposes of this thesis they will be used interchangeably.

this rather physical description, the report contains the important condition of sustainable development meeting “the needs of the present without compromising the ability of future generations to meet their own needs” (WCED 39, cited in Portney 2015, 23).

This view still guides many interpretations today, as e.g. the Merriam-Webster Dictionary defines ‘sustainable’ as: “relating to, or being a method of harvesting or using a resource so that the resource is *not depleted or permanently damaged*” (Merriam-Webster, emphasis ASK). Furthermore, the Brundtland Commission’s report established sustainability to be comprised of three pillars, namely environment, economy, and equity. These are seen as interrelated and necessitate positive development in each pillar in order to achieve or maintain it (Portney 2015, 6). As Portney states, “sustainability can be achieved only by simultaneously protecting the environment, preserving economic growth and development, and promoting equity” (ibid).

Based on the Brundtland Commission’s report the so-called Earth Summit, which took place in Rio de Janeiro in 1992, further intensified discussions on sustainable development. In 2001, the Millennium Development Goals (MDGs) were presented by General Secretary Kofi Anan (Hartinger/Leregger 2020, 16 et sq.). Though positively received for their aims, various critique was issued, such as the lack of analytical evaluation or the one-sided focus on so-called developing countries as receivers of development aid (and the developed countries as donors) (ibid., 18). At the Rio+20 Conference in 2012, a follow-up program was instigated, which “should address and incorporate in a balanced way all three dimensions of sustainable development and their interlinkages” (Browne 2017, 90). Thus, the succeeding Sustainable Development Goals (SDGs), were initiated as part of a much more comprehensive framework. The resulting agenda, named ‘Transforming Our World: The 2030 Agenda for Sustainable Development’, was adopted in 2015 by the General Assembly of the UN. Subsequently ratified by 193 member states, the agenda is based on various important aspects that reflect the complexity of issues like climate change and extreme poverty more comprehensively than the MDGs did (Hartinger/Leregger 2020, 27). As alliterative basis the focus on “people, planet, prosperity, peace, and partnerships” (Browne 2017, 94) was established, along with the mandate to “leave no one behind” (Sachs et al. 2019, 5). The Agenda 2030 is organized in three parts, briefly addressed in the following.

The first part of the agenda focuses on naming the challenges facing humankind. It displays the urgency with which problems and challenges like more resilient cities or sustainable production and consumption need to be tackled (Hartinger/Leregger 2020, 24). The 17 SDGs are established as being “integrated and indivisible” (UN 2015, preamble). Concerning the definition of sustainability, the Agenda adopts a more recent stance on the three pillars and names them “the economic, social, and environmental” (ibid.) dimensions of sustainability.

The second part of the Agenda 2030 presents the 17 SDGs along with their 169 targets (i.e. sub-goals) in detail, emphasizing their interdependency and interrelationship. This reflects the systemic and comprehensive approach of the whole Agenda. It contemplates dependencies, target conflicts, synergy potential and trade-offs in an unprecedented extent (Hartinger/Leregger 2020, 30). Hartinger/Leregger (ibid., 27) testify that the term ‘sustainable development’ gains unprecedented concreteness through the SDGs, because it reflects the complexity of societal interrelations while establishing a map as to how the pending problems can be addressed.



In the third part of the agenda, the implementation of the SDGs is outlined. Interestingly, the SDGs clearly emphasize not only importance of states and their policy-makers, but calls on civil society, the private companies as well as academia to support achieving Goals (Hartinger/Leregger 41 et sq.). Beside the global and national level, the local level is prominently named as a sphere of action. As Sachs et al. (2019, 17) put it the, the Agenda 2030 acknowledges that dialogue and learning between different stakeholders can drive change, e.g. governments financing transdisciplinary research on the problems addressed.

As established above, the systemic and comprehensive view of the Agenda 2030, encompassing the SDGs, enables a more contemporary and appropriate understanding of the term sustainability. This understanding relates for example areas as diverse as agriculture, consumption, nutrition, socio-economical inequalities, and waste reduction. Sustainable consumption is one aspect of sustainability relating to many aims of project 123V. Thus, in the last part of this sub-chapter, sustainable consumption is briefly addressed and defined. This is followed by an assessment of possible contribution of the project 123V to more sustainable consumption.

#### The contribution of unpackaged food dispensers to more sustainability

Verplanken/Roy (2015, 243 et sqq.) state that ‘sustainable consumption’ encompasses various behaviors and domains, thus being a term that enables manifold definitions. They list three understandings, exemplifying some of the possible variants, highlighting the (dis-)advantages of each and the necessity to consider the context of its application. Another approach at sustainable consumption is based on perceiving it from the perspective of relating concepts. Verplanken/Roy suggest that sustainable consumption is synonymous with concepts such as “pro-environmental, ecological, green or ethical behaviour” (ibid. 243). As these are the terms frequently used by the authors concerned with forms of sustainable nudging, presented in chapter 3.3, this definition achieved by comprising other concepts is adapted for this thesis. Another argument supporting this broad definition is Verplanken/Roy’s observation that ‘ordinary people’ rapidly relate recycling and preserving natura resources with sustainable consumption (ibid.). Finally, the contents of SDG 12, ‘Ensure sustainable consumption and production patterns’, echoes the encompassment of these different concepts into the understanding of sustainable consumption (UN 2015, Goal 12.) In the next section, the possible contribution of the food dispensers in project 123V to sustainable consumption is discussed. Its aim is not to argue comprehensively that (or how) project 123V specifically contributes to the SDGs. Rather, it points to possible contributions and highlights their potential.

The first and foremost objective of 123V is to reduce waste, meaning to evade the production of packaging overall. As the European Directive on waste (2008/98/EC) states in article 4, preventing waste is the first and most important step in the so-called waste hierarchy (Eur-Lex 2008). The Agenda 2030 argues in line with this, focusing on the reduction, or, in a next step, the increased recycling of waste (UN 2015). One focal point to avoid waste in the food industry on policy level is the prohibition of one-way disposable plastic utensils like cutlery or straws in the EU (Kasper/Leregger 2020, 266). One of the aims of avoiding especially plastic waste is to reduce the micro-plastic reaching the oceans and other waters, hugely impacting life under water (ibid). On the private sector level, the zero-waste lifestyle has led to an increase in packaging-free or low-packaging stores or features of these in regular food chain stores (ibid).

As the foods offered in the dispensers are organic, their production excludes many synthetic pesticides and nitrogen, thus contributing to more soil fertility (Grunwald/Kopfmüller 2012, 158) and providing healthier foods for the consumers. Hartinger emphasizes that ecologic agriculture is an important step towards fulfilling the respective SDGs (2020, 228). Regional foods are not always consistent with less CO<sub>2</sub> emissions, compared to imported goods (as e.g. the product type or seasonality influence the CO<sub>2</sub> emissions as well). But the mode and distance of their transportation contribute to an overall higher environmental sustainability (Lazzarini et al. 2017, 174). Lazzarini et al. summarize that domestic goods are “the most environmentally friendly option when they are in season and derive from sustainable production systems” (ibid). Independently of the emissions, regional products strengthen the local infrastructure and resilience, and are frequently connected to sustainability by costumers (ibid., 165). The fair-trade aspect of the foods offered in the dispensers can contribute to better working conditions globally, as especially certified goods are recognized for contributing to better production conditions (Hartinger 2020, 229 et sq.).

Examining the Agenda 2030, many of these aspects are reflected in it. As is demonstrated in the following, the food dispensers implemented in project 123V can contribute to the following SDG goals and targets (UN 2015, emphasis ASK):

- Goal 2 ‘End hunger, achieve food security and improved nutrition and *promote sustainable agriculture*’
  - 2.4 By 2030, ensure *sustainable food production systems* and implement *resilient agricultural practices* [...]
- Goal 8 ‘Promote sustained, inclusive and *sustainable economic* growth, full and productive employment and decent work for all’
  - 8.4 Improve progressively, through 2030, global *resource efficiency in consumption* and production and endeavour to decouple economic growth from environmental degradation, [...]
- Goal 11 ‘Make cities and human settlements inclusive, safe, resilient and sustainable’
  - 11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other *waste management*
  - 11.a Support positive economic, social and *environmental links between urban, peri-urban and rural areas* by strengthening national and regional development planning
- Goal 12 ‘Ensure *sustainable consumption* and production patterns’
  - 12.2 By 2030, achieve the sustainable management and *efficient use of natural resources*
  - 12.5 By 2030, substantially *reduce waste generation through prevention*, reduction, recycling and reuse

- 12.6 Encourage *companies*, especially large and transnational companies, to adopt sustainable practices and to *integrate sustainability* information into their reporting cycle
- Goal 13 ‘Take urgent action to *combat climate change* and its impacts’
  - 13.3 Improve education, *awareness-raising* and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning
- Goal 14 ‘*Conserve* and sustainably use *the oceans*, seas and marine resources for sustainable development’
  - 14.1 By 2025, prevent and *significantly reduce marine pollution of all kinds*, in particular from land-based activities, including marine debris and nutrient pollution

This provides potential areas of contribution to sustainable consumption by the food dispensers in project 123V. To enable the usage of the dispensers by willing consumers, nudging is researched as a possible strategy in this thesis. The original concept of nudging, as well as the subsequent academic interest and application of nudging in further areas are outlined in the following chapters.

### 3.2 Nudging

Nudging as a possibility to influence people’s choices has received increasing public and academic attention, both on a global scale and across disciplines. Academic proposals for green nudges (e.g. Schubert 2017), or healthy choice architecture (e.g. Thorndike 2020) present strategies how people could be helped in behaving in a way more according with their own preferences. ‘Choice architecture’ is strongly related to nudging and will be elaborated below. Rooted in behavioral economics, these concepts are increasingly proposed and debated, to further sustainability. Nudging originates from the area of policy, with the original authors developing ideas how policy-makers can help “move people in directions that will make their lives better” (Thaler/Sunstein 2009, 6). As the “traditional incentive-based policies often face methodological issues and problems of political feasibility” (Schubert 2017, 329), nudging is seen as an alternative approach to better shape human coexistence from a political perspective. But as the authors of this popular concept state and underline with many examples, nudging poses a valid strategy for private companies as well (Thaler/Sunstein 2009, 6).

Thus, the idea has spilled over to many different areas of life, leading to ideas for “[o]besity prevention in the Supermarket” (Thorndike/Sunstein 2017), or how a short message in hotel room bathrooms led to more people reusing their towels, instead of requiring a new one every day (Schubert 2017, 333). Before discussing further possible nudges for sustainably in chapter 3.3, the following sub-chapter 3.2.1 presents and discusses the original theory and work by Thaler/Sunstein. The next sub-chapter 3.2.2 focuses on critique and considerations concerning nudging,

### 3.2.1 Nudge by Thaler/Sunstein

In 2017 Thaler was presented with the Nobel Prize in Economic Sciences for significant “contributions to behavioral economics” (NobelPrize.org 2021), the academic field which provides the background for nudging. The professor of Behavioral Science and Economics at the University of Chicago collaborated with Sunstein, a fellow professor of Jurisprudence at the Chicago Law School to write ‘Nudge. Improving decisions about health, wealth and happiness’, which was published in 2008<sup>13</sup>. The widespread acclaim, the soon arising interest from different disciplines, but also the critique and refining of the concept in the following years by different authors led to its long-term impact and ongoing reception. Additionally, the foundation of various institutions called Nudge Units or Behavioral Insights Units, entrusted with researching the potential of behavioral economic strategies for policy making led to its rise in importance (Afif 2017). In 2009 Sunstein became the director of the Office of Information and Regulatory Affairs, created by President Obama, which later became the Social and Behavioral Sciences Team (Marron 2015). The Behavioral Insights Team was founded in the UK as one of the first in Europe. Increasingly, many countries and even international organizations like the OECD (2017) research and recommend the use of behavioral insights .

Sunstein and Thaler both continued publishing on the topic, and they are clearly and closely linked to the establishment and success of nudging. Its premise is based on the insights gained from decade-long research in behavioral economics, which stands in stark contrast to classical economics (Hansen 2016, 160). The main difference is the perspective on internal human workings: In traditional economics, the concept of ‘homo oeconomicus’ represents the typical human and is comprised of three values: Strict rationality, possession of all relevant information and available options, and maximization of self-interest (Thaler/Sunstein 2009, 7). The “econ” (ibid.), as Thaler/Sunstein dub it, is extremely flawed, because it explains neither impulsive human decisions nor decisions made people’s own disadvantage. This observation leads them to introduce a different concept: the homo sapiens, called “human” (ibid.), who decides intuitively and is affected by its surroundings and context. By establishing the human as the basis for their perspective on behavior, they can account for the flawed decision making named above. In behavioral economics, human’s bounded rationality (Hansen 2016, 161) and susceptibility to cognitive bias are the basis for any consideration on what determines human behavior or choice making (ibid.).

The ‘human’ way of making decisions depends heavily on its way of thinking. According to the research Thaler/Sunstein’s work is based on, the human relies on two cognitive systems: system 1, or the automatic system, and system 2, the reflective system<sup>14</sup>. This understanding of human thinking was established mainly by Kahneman (2012) and is also called the Dual Process (Cognitive) Theory (Hansen 2016, 162). These two systems of thinking have different functions, dependent on the situation people find themselves in. For routine, intuitive decisions the automatic system 1 takes charge, as it is faster and need less energy than system 2. The reflective system 2 is activated when new, complicated or unexpected decisions are to be made. It is slower and thoughtful, and thus needs more energy (Thaler/Sunstein 2009, 21 et sq.). Table 3 compiles the respective traits clearly.

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<sup>13</sup> Even though the term ‘nudge’ was popularized by Thaler/Sunstein, the concepts and ideas they relate to were pre-existent, as e.g. the often discussed typical nudge called “default” (Thaler/Sunstein 2009, 9) was already discussed in medical policy making (Johnson/Goldstein 2003).

<sup>14</sup> Not to be confused with ‘reflexive’, which implies rather the opposite of what Thaler/Sunstein wish to address.

Table 3: Two systems of thinking (based on Thaler/Sunstein 2009, 22)

<b>Automatic System</b>	<b>Reflective System</b>
Uncontrolled	Controlled
Effortless	Effortful
Associative	Deductive
Fast	Slow
Unconscious	Self-aware
Skilled	Rule-following

Both systems are of importance: if system 2 was mainly in control, every decision would be a complex process involving much effort, deduction and reflection. System 1 makes daily lives a lot easier, by delivering effortless, fast and, most importantly, unconscious decisions. While the interchange of these two systems usually serves humans well, it sometimes can cause problems: choices are sometimes made by system 1, that on reflection might have been better solved in another way (Thaler/Sunstein 21et sqq.). For example, people might be able to eat more healthily if they planned their grocery shopping list at home, based on decisions made in system 2, instead of shopping without a clear notion of what is needed. Confronted with the strategic outlay, price reductions, and other marketing strategies, system 2 is soon overloaded and thus system 1 frequently takes control. This may lead to shopping decisions, which in hindsight seem unnecessary or otherwise inexplicable. The book ‘Nudge’ starts with a similar situation, where the layout order in a cafeteria influences children to either choose more vegetables or sweets (ibid., 1). The authors repeatedly refer to this situation throughout the book, as the classic situation where nudging can make a difference. They present research on how to enable people to outwit system 1, simply by rearranging the order of goods presented. Using this, the consumption of the unhealthy foods can drop by more than 25% (ibid.). This rearrangement is what constitutes a nudge, according to Thaler and Sunstein.

A further hinderance for good decisions that behavioral economics detect in human thinking are biases and heuristics (Thaler/Sunstein 2009, 24). Rational thinking is subject to biases, so even if system 2 is triggered, humans still make worse compared to an econ. For example, the ‘availability’ bias is explained in relation to buying insurances: if a person recently experienced or heard of some catastrophe, like a flooding, they are much more prone to buy an insurance against natural catastrophes. This happens independently of their real living situation (e.g. if they live in a place likely to be flooded) or the statistical probability of another flood coming. Other biases refer more to the automatic system, for example the ‘status quo bias’, or ‘inertia’. This refers to the observation of people not exchanging existing conditions for better options (ibid., 38). Another observation Thaler/Sunstein (ibid., 58) present is ‘herd mentality’, describing humans are social beings, preferring to behave in cohesion with others.

To counteract short-cut, disadvantageous decisions by automatic system 1, as well as the biases influencing reflective system 2 thinking, Thaler/Sunstein propose nudges. They advise harnessing behavioral insights to people’s advantage. As guiding principle in doing so they name libertarian paternalism, a theoretical perspective which the authors outline throughout the book. The main libertarian aspect is to preserve people’s liberty, for example by evading the use of laws or mandates as first course of action. The aim is to not burden people, but “to

make it easy for people to go their own way” (Thaler/Sunstein 2009, 5). Nevertheless, they argue for people to be guided in making decisions best for them, especially in light of the obstacles described above. Thus, Thaler/Sunstein legitimize policy makers trying to “to influence people’s behavior in order to make their lives longer, healthier, and [...] make choosers better off, *as judged by themselves*” (ibid.).

An example of their liberty-preserving nudge is the presentation of one’s household energy use in comparison to the neighborhood in form of a happy or sad emoticon (Thaler/Sunstein 2009, 74 et sq.). While this feedback does not prevent people using energy, it might motivate them to use less, which the participants of a study did (ibid., 75). Thaler/Sunstein foresee some critique of libertarian paternalism, especially of the paternalistic features. They aim to preempt it by stating that it “is a relatively weak, soft and nonintrusive type of paternalism because choices are not blocked, fenced off, or significantly burdened” (ibid., 6).

### Implementation of nudges

Having established the basics of behavioral economics and libertarian paternalism, the focus now shifts on to how nudges are implemented. Thaler/Sunstein address this question from the perspective of who employs the nudges: the so-called choice architects. These are the people creating the decision-making environment for other people, and thus, based on behavioral insights, can influence their choices. As examples of choice architects, Thaler/Sunstein (2009, 3) name real architects designing buildings, parents who present career options to their children, or public official devising forms. By designing these environments in a certain way, the choice architects influence the decisions humans make. This happens intentionally or unintentionally – as Thaler/Sunstein stress, there is “no such thing as a neutral design” (ibid., 3), and the context of a situation is always an influencing factor. As choice architecting is inevitable, Thaler/Sunstein (ibid., 236) propose to use it to the better of people and rely on nudges to this end. This is preferable to the status quo, being that “choice architects in all walks of life have incentives to nudge people in directions that benefit the architects (or their employers) rather than the users” ((ibid., 238). For choice architecture to be successful and work to the well-being of the person being nudged, knowledge of the right incentives is indispensable (ibid., 106).

A consideration on the wording is deemed important here. Thaler/Sunstein do not clearly define choice architecture and allow for (at least) two understandings, implied by the way they use it. When comparing choice architects to real architects, Thaler/Sunstein (2009, 3) seem to stipulate choice architecture as similar to the process of architecting, which includes planning and evaluating in order to achieve a new building, or in this case a change in behavior. In this sense, a paraphrase for choice architecture could be ‘intentionally attempting to influence the situation’, similar to a proposal by Hansen’s (2016, 171) proposal. But a few pages later, Thaler/Sunstein state that a “some changes in the choice architecture could make their lives go better” (Thaler/Sunstein 2009, 10), rather differently implying that choice architecture is the static environment, of which one aspect influences people in their behavior. In this second understanding, a synonym could be the choice environment. These different possible meanings of choice architecture serve as a brief example of some of the unclear phrases Thaler/Sunstein rather frequently state, that possibly led to some of the conceptual issues explicated in chapter 3.2.2.

### A stipulative definition

Following this presentation of Thaler/Sunstein background and motivation for introducing nudges, they *should* be defined. This subjunctive is chosen purposefully to indicate the two challenges tied to this intention. Firstly, Thaler/Sunstein do not clearly state a definition, but offer different descriptions and opinions on what constitutes nudging throughout the book. One of the most concise statements at the beginning of the book is introduced only with the statement “[a] nudge, as *we will use the term*” (Thaler/Sunstein 2009, 6, emphasis ASK) rather than clearly referring to its definitory importance. Still, this passage is understood by most other scholars as being the (closest to a) definition of nudging. As Hansen declares, “Thaler and Sunstein’s original definition is a stipulative one” (2016, 160), meaning it involves “no commitment that the assigned meaning agrees with prior uses (if any) of the term” (ibid.). The here discussed passage, considered by many a definition of nudging, reads:

“A nudge, as we will use the term, is any aspect of the choice architecture that alters people’s behavior in a predictable way without forbidding any options or significantly changing their economic incentives. To count as a mere nudge, the intervention must be easy and cheap to avoid. Nudges are not mandates. Putting fruit at eye level counts as a nudge. Banning junk food does not” (Thaler/Sunstein 6).

The second challenge in defining nudges is that the proposed statement by Thaler/Sunstein “fails to provide the wanted conceptual clarity and consistency needed” (Hansen 2016, 160). Even though this seems to be a clear statement at first sight, the ambiguities inherent to it arise as soon as the theoretical and practical implementation are considered. Also, the nudge examples given by Thaler/Sunstein in their book sometimes contradict their own announcements or restrictions<sup>15</sup>. This issue is further discussed in the next chapter.

These two problems concerning the definition of nudging, briefly outlined above, stress the necessity of establishing a clearer understanding of what nudging entails, before being able to discuss its implementation. Therefore, the last part of this chapter presents supposed traits of nudging, which Thaler/Sunstein mention throughout their book. These serve as pre-developed codes for the coding process undertaken in this study. To this end, they are collected in Table 4, featured at the end of these considerations, to grant a clear overview. The first four defining traits of nudges are stated in the ‘stipulative definition’ of Thaler/Sunstein, presented above. To clarify, in the following this definition will be referred to as the stipulative definition. The four defining traits included in this stipulative definition of nudges are (1) relation to choice architecture, excluding (2) prohibitions or (3) economic incentives as tools, and (4) their easy and cheap avoidance. Table 4 below presents all the defining traits collected in the following. For the purpose of coding open-mindedly, they are reduced to the most important words or statements, to guarantee an open-minded coding process on anything relating to these traits.

Based on the explanations given above, the aspect of nudges triggering either (the automatic) system 1 or (the reflective) system 2 constitutes a definitory trait (5), as the basis of behavioral economics clearly informs on nudging (Hansen 2016, 162 et sq.). Connected to this is one of the main reasons Thaler/Sunstein argue for nudging, which is human’s susceptibility to bias (6). The mandate that nudges should be freedom-preserving (7) is named frequently throughout the book (e.g. Thaler/Sunstein 2009, 253) and was explicated further in connection

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<sup>15</sup> E.g. Thaler/Sunstein frequently stress that economic incentives do not count as nudges, but recount the ‘Dollar a Day’ Program as exemplary nudge. This rewards teenage girls for not being pregnant with a dollar every day of the year. But the sum of 365\$ per year could be argued to provide economic incentives for financially dependent young people (Baldwin 2014, 834).

with libertarian paternalism above. Also elaborated in relation with libertarian paternalism is the aim of making people better off (as judged by themselves), which is thus considered a constitutional trait of nudging (8).

Furthermore, some of Thaler/Sunstein’s nudge examples deliver important insights on their traits. Describing the positive effects of the Toxic Release Inventory in the US, which led to companies strongly decreasing their use of hazardous chemicals, Thaler/Sunstein state that if “companies are able to reduce their emissions at low cost, they will do so” (2009, 202). This is a factor they frequently stress, especially considering companies: a nudge must have no costs not only for the recipient, but also the institution or person nudging must not make losses. A further trait gleaned from examples implies that the goal of making people better off can be achieved by helping them align their actions with their intentions (10): they “interpret the statement ‘I should be saving (or dieting, or exercising) more’ to imply that people would be [...] open to a nudge” to help them do so (ibid., 116 et sq.).

The final important trait gleaned from the book is transparency which constitutes the last definitory trait in Table 4 (11). Thaler/Sunstein implore that the receivers of nudges should know that they are being nudged, and to which end. They stress that in “both the public and private sectors, a primary goal should be to increase transparency” (Thaler/Sunstein 2009, 239). This retort is aimed at “Evil Nudgers and Bad Nudges” (ibid., 238), the title of this subchapter. By ensuring that nudges are transparent, that Thaler/Sunstein hope to forgo the possible problems arising of people employing the insights from behavioral economics to manipulate people (ibid., 240). This danger can arise from both the public and the private sector, but the latter might pose a bigger danger. As they see it, public sector choice architects at least are held accountable by voters, while “managers in the private sector have as their mandate the job of maximizing profits and share prices, not consumer welfare” (ibid.).

This collection of defining traits presents merely a collection of the statements on nudging that are frequently mentioned and is not necessarily complete. The purpose of this collection is to establish the basis for the coding process, with the traits (1-11) constituting the pre-developed codes. Further defining aspects of nudges named in the sources will be included by the open coding process.

Table 4: Defining traits of nudging

<b>N.</b>	<b>Defining traits of nudges</b>	<b>N.</b>	<b>Defining traits of nudges</b>
<b>1</b>	Aspect of choice architecture	<b>7</b>	Freedom-preserving
<b>2</b>	No prohibitions	<b>8</b>	Make people better off
<b>3</b>	No economic incentives	<b>9</b>	Cheap to implement
<b>4</b>	Easy & cheap to avoid	<b>10</b>	Align intention and action
<b>5</b>	Trigger system 1 or system 2	<b>11</b>	Transparent
<b>6</b>	Exploit or counteract bias		

A final remark concerns the negative effects of nudging. Thaler/Sunstein speak of ‘evil nudgers’ which refers to choice architects misusing their knowledge to mislead people. Even though this implies an interesting topic for discussion, here it constitutes another example of Thaler/Sunstein’s unaddressed contradictions in the book. By acknowledging the possibility of ‘bad nudges’, the question arises how the purpose of nudges ‘making people better off’ fits in. If the well-being of people is at the heart of nudging, how can a bad-intended intervention



be described as a nudge as well? And on the other hand, if bad nudges are possible, wouldn't this deserve much more attention and more clearly stated antidotes and remedies? Thinking in practical terms, does e.g. a supermarket setting render commercial marketing strategies (bad) nudges? This question is briefly addressed in the next chapter based on other author's opinion on the subject. Here, these questions go mainly to showcase some of the problematic aspects of the original source.

#### Situations that warrant nudging and similar strategies

After looking at what constitutes nudges, it is prudent to relate what Thaler/Sunstein say about situations that deserve nudges. According to chapter 4, titled "When Do We Need a Nudge?" (Thaler/Sunstein 2009, 79), nudging should help people when they are unable to think of all the consequences for a decision, are overwhelmed by the different options or have to make decisions in seldom and new situations. They specify:

"people will need nudges for decisions that are difficult and rare, for which they do not get prompt feedback, and when they have trouble translating aspects of the situation into terms that they can easily understand" (ibid.).

Thaler/Sunstein present various examples, e.g. choosing a mortgage, which pertains to all of the named aspects. Importantly, nudging can be applied if a situation adheres to at least one of these criteria. Additionally, Thaler/Sunstein (ibid., 83) state that nudges can help when people don't know what they (would) prefer. They do not delve further in the practical implications of this, so one aspect should be highlighted: these situations arise only when system 2 is engaged, meaning when humans activate their deductive and slow thinking. Other situations like their book-opening example of the cafeteria setting or the also frequently named example of the fly etched into urinals at Schiphol Airport (to help reduce spillage) (ibid., 4) surely trigger system 1. These and many other examples offered by Thaler/Sunstein stipulate that nudging can also help change decisions in frequent situations that are easy to understand.

Now considering the focus of this thesis, one point should be clearly established. Even though Thaler/Sunstein focus mainly on public policies, they advise nudges to be employed by companies and other agents of the private sector. This is also made clear by e.g. the cafeteria example they name at the beginning of their book, outlined above. One of the (fictitious) choice architects in this situation works for a supermarket chain and proposes a change in the outlay of products (Thaler/Sunstein 2009, 1).

This shows on one hand that nudging in the supermarket is already happening and welcomed by Thaler/Sunstein. On the other hand, it raises the question which other influences in the supermarket generally exist, before or aside from nudging. Especially considering Thaler/Sunstein's commentary on bad nudges, *commercial* marketing strategies come to mind, which clearly also have the aim of influencing customers. Their aim of tempting consumers to buy more and possibly more expensive (and possibly unhealthy or unsustainable) products fits with Thaler/Sunstein's statement on evil nudging. In contrast, *social* marketing could be seen very similar to nudging from the perspective of making people better off. As Saunders et al. define it, it "is the application of marketing principles to enable individual and collective ideas and actions in the pursuit of effective, efficient, equitable, fair and sustained social transformation" (2015, 165). This terminology invokes the definition of sustainability given in chapter 3.1, based on the agenda 2030 and the SDGs. Possibly social marketing could offer in-

sights on how to differentiate nudging from commercial marketing. Additionally, a differentiation of social marketing and nudging might render interesting insights as well. Thus, the question remains if and how for example those two marketing strategies and nudging differ. This will be further addressed in the next chapter.

The last possible step to clarify nudges, would be to present some nudges that could be applied e.g. in supermarkets. Giving concrete examples of nudges and how they work might further shed light on the essence of the concept. But even though Thaler/Sunstein present many different examples of nudging, they do not list them concisely. The demand for a typification of nudges might be the reason Sunstein presents ten (2014, 585 et sqq.) and 31 (2016, 718 et sqq.) nudges in later publications. But, similarly to the definition of nudging, it is rather imprecise because it is drafted so as to encompass a wide variety of settings (e.g. supermarkets or private homes) and spheres (e.g. public or private). Suggestions like “disclosure”, “warnings, graphic or otherwise” (Sunstein 2014, 586), “increasing ease/convenience [or] using moral suasion” (Sunstein 2016, 718), even bolstered by detailed examples do not provide an easily applicable framework or a basis for developing and testing nudges oneself. Thus, referring to research question two, a categorization of nudges will be attempted, to filter possible forms of nudges that could be implemented in project 123V.

### 3.2.2 Critique and considerations

The criticism stated in relation to nudging is extensive. This is due to the many different aspects being criticized, and the concepts or remedies offered up instead, which in turn generate other and more (academic) responses. This sub-chapter is delimited to give a short overview over the most discussed aspects and open questions. As the study seeks to understand the concept of nudging, the criticism provides valuable insight in assessing it. Thus, the points made here again serve to pre-develop codes for the data analysis. They also present the background against which the results of the data analysis can be reviewed. The resulting codes will be further explicated at the end of this chapter.

As indicated in the last chapter, the work of Thaler/Sunstein has provoked points of critique, concerning the concept itself as well as e.g. ethical aspects. The most discussed issues are presented here, beginning with the nomenclature. Hollands et al. testify to the “lack of definitional and conceptual clarity” (2013, 2), not only by Thaler/Sunstein, but also by other authors concerned with nudging as well as choice architecture. Concerning nudging specifically, (Hausman/Welch 2010, 123 et sqq.) Hausman/Welch criticize that Thaler/Sunstein only offer two negative conditions, a few heuristics and many examples for a definition.

In contrast, a very thought-out, compelling, and well-argued definitions of nudging which leads to much clearer definition of nudging is delivered by Hansen (2016). By carefully evaluating the work of Thaler/Sunstein, interpreting it from the behavioral economics perspective, and clearly defining relevant terms and concepts the following definition is presented:

“A nudge is a function of (I) any attempt at influencing people’s judgment, choice or behaviour in a predictable way (1) that is made possible because of cognitive boundaries, biases, routines and habits in individual and social decision-making posing barriers for people to perform rationally in their own declared self-interests and which (2) works by making use of those boundaries, biases, routines, and habits as integral parts of such at-

tempts. Thus a nudge amongst other things works independently of: (i) forbidding or adding any rationally relevant choice options, (ii) changing incentives, whether regarded in terms of time, trouble, social sanctions, economic and so forth, or (iii) the provision of factual information and rational argumentation.” (ibid., 174).

This extensive and well-argued definition is presented to give an insight into the many hurdles and considerations attached to defining nudging. Coinciding with this definition is a clear differentiation what constitutes libertarian paternalism and nudging, in contrast to Thaler/Sunstein who use these terms quite interchangeably. Hansen states that “in so far as a nudge serves the declared self-interests of those being nudged, it may further be referred to as libertarian paternalism” (ibid. 158). Düber (2016, 449) supports this differentiation as well, similarly arguing that for nudges to clearly adhere to libertarian paternalism, their aim must be the well-being of the people being nudged.

A different approach is taken for example by Baldwin (2014, 835 et sq.), sorting nudges into three degrees, varying in the extent to which they apply to system 1 or 2. They are ordered by the degree they delimit the autonomy of the person nudged. This provides the advantage of addressing conceptual problems of each degree separately, and not having to fit all kinds of nudging into one concept. These brief excursions into the definitory pitfalls of nudging serve as an example for the problems connected to the concept. They cannot be discussed more deeply here, suffice to say that defining the nudge is quite complex. Thus, the results of this study and specifically the first research question might give valuable insights into how nudging is defined by a variety of other scholars concerned with nudges for sustainability.

Assessing the newsworthiness of nudging as a concept, some academics firmly delimit it. According to Düber (2016, 461), nudging only occurs if the person nudged behaves based on cognitive biases, both initially and post-intervention. Thus, Düber (ibid.) argues that nudges only trigger system 1, as opposed to triggering reflective decision making. This strict perspective would render many of Thaler/Sunstein own examples as non-nudges and contradicts some of their statements. But according to Düber (ibid.), the newsworthiness of nudges is constituted in the fact that they intentionally exploit (or harness) biases as a means to overcome other biases.

#### Problems with implementing and researching nudges

Another problematic aspect of nudging refers more to its empirical application. It concerns criticism on the applicability of nudges or choice architecture for empirical research. Mainly, the names of the specific types of nudges that can be implemented are subject to many different understandings. Szaszi et al. (2018) identify two problems when trying to create a typology of existing nudges. Firstly, the names given to the interventions by different authors “focus either on the underlying cognitive processes [...] or on the used interventions” (ibid., 362), e.g. social norms or visibility enhancement. Secondly, and based on this, nudging categories are seldom exhaustive and sometimes redundant, providing much room for confusion and misunderstandings, especially considering their implementation. Thus, Szaszi et al. (ibid.) highly recommend the development of a comprehensive consensus on the nomenclature. Furthermore, they comment on the poor reproducibility of many studies and the difficult data collection and comparison, due to small sample sizes. Future studies conducted on nudging should heed the advice presented in their paper (ibid., 362 et sq.).

An aspect related to the definition of nudging is its differentiation to other (pre-existing) concepts. Specifically, marketing is of relevance for the supermarket setting given in project 123V and thus deserves a few remarks. Hansen refers to this ongoing debate and argues that nudging and marketing must be congruent, based again on the statements by Thaler/Sunstein implying that nudges can be used “‘for bad’ or ‘for profit’ as well as ‘for good’” (2016, 174). In this sense, nudges could be implemented in a supermarket for the profit of the company (marketing), or for the good of the person nudged (referencing libertarian paternalism as stated above) (ibid., 158).

One consideration that frequently comes up in more recent literature on nudging is the question concerning the general and long-term impact of nudging. Grüne-Yanoff (2016) expresses regret that the effectiveness of nudging is generally hard to assess as research on it is marred by methodological issues. Osman/Nelson (2019, 119) investigate attitude, preference and choices and resume that they all change over time due to internal and external factors. Thus, specific nudges may only work for a time (for specific people). Bovens similarly states that “[n]udging may not create sustainable effects on people’s behaviour for the long-term; as time goes on, the level of Nudging required to retain this effect may increase” (2009, 214). Baldwin (2014, 853) outlines that the short-term gain of nudging should not be accepted at the expense of long term, possibly negative effects. A similar question concerns additional factors influencing people which might thus affect the results of nudging. Osman/Nelson (2019, 119) argue that apart from the cognitive factors, social and cultural factors certainly influence people’s behavior.

A further problematic aspect raised e.g. by Düber (2016) is that of perspective. Thaler/Sunstein (2009, 2) argue that the aim of a life-improving nudge is the individual, as with the example of re-arranging food in the cafeteria. On the other hand, they present the “Don’t mess with Texas campaign” which aimed at reducing public waste through ads with famous athletes and ensuing social pressure (ibid., 64 et sq.). As Düber argues, the objective of this so-called nudge isn’t to make “those better off who throw their garbage carelessly away. It is rather about environmental protection or public order” (2016, 499, translation ASK). This evolves into the question of who should be better off, addressed briefly above: should people be better off as judged by themselves, and what does it mean? Does the fact that the planet is cleaner weigh more than the mental load of carrying trash around and having to make an extra effort (as some might see it)? Certainly, some people are happier knowing they contribute to a cleaner environment and thus general societal well-being. But for at least some people, it might seem like a nuisance actually having to change their habits of throwing trash wherever they are. Schmid et al. (2019, 423) additionally observe that the perception of what constitutes the better choice can change over time and depends on the decision-maker. These are questions that Thaler/Sunstein do not consider, and on which the data analysis possibly offers insights.

### Ethical issues

The penultimate consideration concerns transparency. Schubert (2017, 338) addresses this issue with regard to policies, but it can be translated to any situation of choice architect: the temptation of being non-transparent about nudges. Schubert (ibid.) argues this based on findings that communicating the nudge reduces (but doesn’t completely eliminate) the effect of the nudge. This needs to be considered when developing and implementing nudges. But as

Thaler/Sunstein dedicate a whole chapter to the topic of transparency (even though being rather unspecific) and promote it as one of the main strategies to combat “evil nudgers” (2009, 238), transparency should be understood as a constituting element of nudging. Bovens addresses the question by stipulating “that every Nudge should be such that it is in principle possible for everyone who is watchful to unmask the manipulation” (ibid., 217). Baldwin (2014, 837) similarly states that some nudges better secure transparency by potentially enabling the person being nudged to assess the aim and extent of the intervention (and then acting freely on it or against it). These are very theoretical discussions on an aspect that according to Thaler/Sunstein should safeguard nudging against manipulation. Possibly the data analysis sheds light on the question of how transparency is to be guaranteed when implementing nudges, especially in a supermarket setting.

The last issue to be brought up is that of manipulation, and it can only be addressed briefly. There is much theoretical and especially ethical discussion going on about how nudges manipulate people, rendering them means rather than ends (e.g. Blumenthal-Barby/Burroughs 2012; Bovens 2009; OECD 2019; Saghai 2013). Wilkinson (2013) extensively discusses the question of when nudging is manipulative, coming to the following conclusions. A choice architect may not have other intentions than making the person nudged better off as considered by themselves (ibid., 354). Additionally, ‘consensual manipulation’ is possible, as it clearly safeguards the nudge persons autonomy (ibid., 353). Unfortunately, the discussion on if, how and which nudges manipulate people is ongoing. As with transparency, there are much deeper levels of complexity that could be addressed here, but for the aim of this study it must suffice to point out this debate and a few leading positions on it.

The considerations and critique presented in this chapter are extremely condensed and heavily edited, due to the fact that it only serves as a first insight to possible critique on nudging to be voiced in the papers included in the data analysis. The criticism on nudging directly adheres to the research questions one and two, as outlined in chapter 1.2. They are answered based on the analysis of the coded segments, presented in chapters 4 and 5. To do so, the critical points mentioned above are converted directly into codes. This enables a more precise analysis of the criticized aspects. The pre-developed codes entail the debate on nudges triggering system 1 or 2; the difference from marketing; the open questions in research such as the long-term impact and further influences on nudging; the ‘better-off’ question; and the mostly ethical issues of transparency and manipulation.

### 3.3 Nudging for sustainability: state of research

This chapter presents arguments made by academics for further research on nudging, to which this thesis aims to contribute to. Four main reasons are outlined, after which academic insights into nudging for sustainability are presented. Before, a few comments on terminology are required. No satisfying differentiation between the frequently used terms ‘(behavioral) intervention’ and ‘nudge’ was found in the nudging literature reviewed. Thus, these terms will be used synonymously in this thesis. Furthermore, one differentiation is established for the following: ‘Nudge concept’ refers to hierarchically equal concepts of nudging that focus on different aims, e.g. green nudging or health nudges. ‘Type of nudge’ will refer to specific nudges which constitute hierarchically the sub-concepts of a nudge, as e.g. availability nudge or eco-labeling.

Regardless of the criticism briefly mapped out above, behavioral economics and nudging have received increasing worldwide attention and acclaimed recognition. For example, Shankar/Foster (2016), published ‘Behavioral Insights at the United Nations – Achieving Agenda 2030’, demonstrating as to how the UN are implementing nudges to reach the SDGs. In order for the UN Development Program to “have maximum impact, they must be designed using the latest research on what drives people to meaningfully engage with programs” (ibid., 1). They do so in developing the SIMPLER quick guide, giving examples of seven nudges used to “improve programme outcomes and efficiency” (ibid., 2). They further explicate which nudges the UNDP implemented to help fulfill different SDGs with success.

Additionally, the necessity of simplifying sustainability information for customers and enabling them to shop more sustainably, if they wish to, is recognized more and more. For example Asikis et al. (2021) developed a smartphone app that aims specifically at helping with these decisions. Based on the assumption that the cognitive capacity of customers is overwhelmed when trying to opt for sustainable products, the app arranged the relevant information for them. Enabling personal preferences, the app rates scanned products in supermarkets based on 25 categories. These include health aspects such as nutritional values, environmental aspects (e.g. the distance the product was transported), or social aspects (e.g. the working conditions at the manufacturer), thus leveraging sustainability awareness. The concurrent study found that people concerned with sustainability changed their behavior towards more sustainable consumption. Aiming for this behavior change, Asikis et al. state “[c]reating more sustainable consumption patterns turns out to be imperative for mitigating climate change [...] food systems, in particular, play a key role, influencing 12 out of the 17 sustainable development goals” (2021, 1).

### Arguments for further research

This increasing interest and real-world impact of enabling more sustainable behavior constitutes the first of four points presented here, underlining the importance of further research on nudging for academia. The second point is the already existing widespread implementation and research by scholars from various fields, as Szaszi et al. state: “[t]he popularity of the approach has resulted in a movement with an increasing number of research projects dedicated to explore the potential benefit of nudge techniques [...] in several domains” (2018, 355). They cite examples from fields as diverse as transportation, finances, public health, or sustainability (ibid.).

The third point speaking to the importance of further research on nudging is based on the foregoing one: the increasing interest in nudging results in increasing empirical evidence on its widespread implementation and success. As Szaszi et al. demonstrate in their scoping review: their “findings confirm that the empirical basis of the movement is dynamically growing. The applied nature of the field is reflected both in the high proportion of field studies and in the rising number of application [sic!] of nudge techniques in real-world settings” (2018, 362). They certify health-related nudging, focusing on food and drink interventions, as well as sustainability and consumer choice a certain dominance in the field (ibid.). Szaszi et al. provide a systematic scoping review on first insights into how and when nudges work, and underline that many of the applied nudges in their research were successful (93% of the studies represented in their review contained at least one successful nudge) (ibid., 359). At the same time, a wide heterogeneity exists among the conducted studies, which seldom adhere to gener-

alized reporting guidelines and are partly imprecise, due to small sample-sizes or lacking procedural description to replicate them (ibid., 362). They also warn of the publication bias, meaning that researchers hold back on studies of failed nudges because of the pressure to publish positive results, leading to a distorted representation of the success of nudging (ibid. 363). All this combined leads Szaszi et al. to decidedly urge further research on nudging to accumulate more knowledge as to when and how it works (ibid., 362).

The fourth and final point presented here concerns the importance of further research on nudging, specifically sustainable nudging. The visionary goals of the Agenda 2030 cannot be reached solely by enforcing laws and informational campaigns. Rather, Schubert demands to “recognize human behavior to be at the core of many complex environmental problems” (2017, 329) and that “traditional incentive-based policies often face methodological issues and problems of political feasibility” (ibid.). Thus, behavioral economics which centers around the fact that humans are subject to cognitive bias, limited willpower, and bounded rationality, can play another important role in tackling global problems (ibid., 329 et sq.). The examples of Schubert demonstrate that this does not only apply to policymaking, but also to the private sphere of hotels (ibid., 333) or cafeterias (ibid., 338). As the Agenda 2030 holds them accountable for their successful implementation, nudging is also a strategy to consider in the private sector. Thus, it is deemed not only valid to direct academic research towards nudging as possible strategy to fulfil the global goals and a good life for all.

These four arguments on the general importance of research on nudging are probably not exhaustive, but for this thesis they must suffice. As demonstrated above, institutions like the University of Graz and the supermarket chain Spar have developed an interest in nudging as a strategy to help consumers shop more sustainably, which provides the perspective for this study. In the following, a general state of the literature on sustainable nudging is presented, cumulating in a collection of possible definitory aspects of sustainable nudges. Finally, the specific aims of this study are enumerated.

The literature review on specifically sustainable nudges reveals that no work has been done to conceptualize them specifically. Rather, authors on one hand refer to specific types of nudges aiming at one aspect of sustainability, like “self-nudging strategies to drive sustainable consumption behavior” Torma et al. (2018), or “Labels as nudges? An experimental study of car eco-labels” Codagnone et al. (2016).

On the other hand, more and more authors refer to a specific theoretical area or framework relating to the nudge, e.g. ‘healthy choice architecture’ or ‘green nudges’ as cited at the beginning of this chapter. As Szaszi et al. (2018, 362) state, health and sustainability related nudges constitute part of the more researched fields. These areas are those aspects of sustainability that best fit the settings of project 123V, as argued in chapter 3.1. Thus, in the following, the most important literature in the areas of health, green and environmental nudges will be presented, with naming each a few examples of specific nudges (e.g. eco-labels) being most researched in this area.

## Presenting green, environmental, and health(y) nudges

Firstly, Thaler/Sunstein proposals for “Saving the Planet” (Thaler/Sunstein 2009, 193) are presented. One nudge relevant to supermarkets that Thaler/Sunstein name is that of Japan developing a label on carbon footprints. This is to be applied to products in hopes of raising awareness: “[l]abeling shows enormous potential for tackling environmental challenges, precisely because the concepts involved are so abstract and inscrutable to most of us. Numbers, imagery, and product comparisons help to translate and demystify the larger issues” (ibid., 205).

Apart from their suggestions, Thaler/Sunstein again do not address conceptual or philosophical questions concerning nudges with a focus on sustainability. They do not define which implications their statement about making people better off *as judged by themselves* might have on nudges for sustainability. For example, saving energy surely makes ‘people and planet’ better off, but perhaps an individual does not want save energy (e.g. on principle, or because of the additional effort required). Unfortunately, these “philosophical issues” (Schubert 2017, 330) are not addressed in the sources for the data analyst.

Next, recent and important publications on green, environmental and health nudges are presented, as these deliver the most and most relevant search results. Based on these, it is clear that they are the most frequent nudge concepts that relate to aspects of sustainability which are relevant for the setting of 123V. This literature is presented in order to firstly develop a first understanding of the research field, to secondly inform on the development of codes for the data analysis, and thirdly to better assess the final results of this study in the broader context of research. Each of the different concepts of nudges will be reviewed for their general statements on nudging, a possible definition for their concept (e.g. green nudges), the mention of interventions for supermarkets, and conclude with one type of nudge that they state as frequently researched in the area (to gain an overview on how nudges might be typified there).

Most literature on green nudges is based on Schubert's (2017) considerations on this topic. Referring to the general concept of nudging, apart from the critique addressed above, Schubert states that conceptually it is specifically unclear whether nudges should harness or overcome biases, a question clearly still up for debate in the nudging literature (ibid., 331). Concerning green nudges, they are considered to be non-paternalistic, as they aim at increasing social welfare (ibid.). This is further explicated by a definition, stating that “[g]reen nudges aim at encouraging pro-environmental behavior. In other words, they aim at encouraging people to voluntarily contribute to a public good, namely, environmental protection” (ibid.). The frame of the public good and social welfare, clearly relatable to the definition of sustainability given in chapter 3.1, thus guide green nudges. Referring to settings comparable with supermarkets, Schubert states that “changing people's food consumption qualifies as pro-environmental policy, [e.g.] the cafeteria layout modifications famously suggested by Thaler and Sunstein (2008:1–3) can be seen as a green nudge as well. [...] Nudges can also reduce waste” (ibid.). According to these defining statements, green nudges as understood by Schubert may well inform on a concept for sustainable nudges. Finally, nudges named by the author which are frequently researched in this field are eco-labels, which aim at enabling people to maintain or establish an attractive self-image or social norms, which cater to the follow the herd bias (ibid.).

Considering environmental nudges, Slapø/Karevold (2019) will be explicated further as a typical paper for studies on nudging. Interestingly, no specific definition of nudging is given,



apart from a more general statement that “[n]udging involves changing the sequence of options presented and the available information about the options at the moment of choice” (ibid., 2). In quite a few of the named publications, especially in studies, a precise definition of nudging is not given. Even less refer to some of the conceptual or ethical topics addressed earlier. Of the papers reviewed, (systematic) literature reviews are most deeply concerned with these aspects. Thus, to ensure more extensive information on different aspects of nudging, this study includes a wide variety of papers. Concerning supermarkets, Slapø/Karevold confirm the rising interest in behavioral economics for policy-makers, researchers and private companies (ibid., 2).

The third and last nudge concept discussed here are health nudges<sup>16</sup>. Hollands et al.’s (2013) evidence-based theoretical proposal for health interventions in micro-environments is deemed one of the most important publications. The authors express hope that health inequalities may be potentially reduced with health nudges because they require less conscious engagement than other interventions, thus discriminating less against the more deprived (ibid., 2). This constitutes an important cue for the relevance of health nudges for a potential concept of sustainable nudging. Supermarkets, according to Hollands et al. constitute micro-environments, which they see as “small-scale physical and social environments” (ibid.). Next to labeling they present ‘prompting’ as a type of nudge that is frequently researched, defining it as “use non-personalised information to promote or raise awareness of behavior” (ibid. 3). The systematic literature review by Bucher et al. (2016) on the topic offers valuable additional information. Firstly, they refer to supermarkets as being one of the settings where “behavioral interventions may have a socially relevant outcome” (ibid., 2261), while at the same time excluding them from their review as “supermarket-related shopping behavior has been extensively described in the marketing literature” (ibid.). This relates to the question presented above as to how marketing and nudging differ (or not), especially in the supermarket setting. Secondly, they appeal to the choice architects of micro-environments to acknowledge and rise to the responsibility that comes with the job (ibid.).

The insights gained here on nudging for sustainability, especially in micro-environments like supermarkets revealed some important aspects. Most prominently, sustainable nudges focus on increasing social welfare, which includes taking the perspective of the whole society and not necessarily of the individual. Secondly, social inequalities could be reduced through sustainable nudges. In a similar vein, to not further economic inequalities, sustainable nudges should not be based on price changes (thus possibly risking those with fewer financial resources being pressured to certain choices and not voluntarily deciding for an option). Thirdly, the perspective of the SDGs offers a further advantage for a possible framework on sustainable nudges. As stated above, the over-arching framework allows for the interrelations of the different aspects of sustainability to become clear. Subsuming the three concepts of health, environmental and health nudges in one concept might serve as a basis for more transdisciplinary exchange both on a theoretical as well as empirical level. The basis established in this chapter informs on the coding process. The results of this, as well as the data analysis is presented in the next chapters 4 and 5.

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<sup>16</sup> Sometimes referred to as healthy nudges. These terms will be used interchangeably in this study and referred to as health(y) nudges in the data analysis.

## 4 Results on nudging

In this chapter the results of the literature search and data analysis concerning the more general understand of nudges are presented. Chapter 4.1 focuses on the results of the literature search and the most important aspects for their interpretation. Chapter 4.2 is divided into two sub-chapters which answer research questions one and two by analyzing the data coded via Maxqda. Chapter 4.2.1 epitomizes on the definition of nudging by the authors, and the question if a more coherent concept than the one presented by Thaler/Sunstein has evolved. Chapter 4.2.2 concerns specific nudges and how they are categorized and defined. The following chapter 5 answers the third research question on what knowledge on sustainable nudges arises from the sources.

The visual presentation of most of the data is provided by Maxqda. It offers different visual and statistical tools, of which the most suitable are used to generate the graphs and code system matrices presented in the whole of chapter 4. The Prisma diagram presented in the first sub-chapter is based on the template provided by the developers of the diagram.

### 4.1 Relevant literature

This chapter focuses on presenting the results of the literature search, examining the papers that were filtered through the in- and exclusion as well as eligibility criteria and thus constitute the sources for the pending analysis. In the first section, these papers are presented, aided by the Prisma diagram. This gives a concise overview of the process of searching and selecting papers, presenting also the most important numerical aspects. In the second section, the selected sources are briefly assessed, outlining bibliographical information and general observations with regards to the content. This is possible with the help of document variables, a data collection method provided by the program Maxqda.

The Prisma diagram is a widely used tool to protocol and depict the steps and results of a literature search (cf. chapter 2.1). These results stem from searches executed on four platforms with each four search term groups. Each search term group was allotted a specific search term combination, named S1, S2, S3, and S4 as described in chapter 2.1. They each contained or omitted specific words, to find the largest possible quantity of relevant papers over different disciplines (cf. Annex I for the total numbers). The following Figure 2, the Prisma flow diagram, shows the results of the literature search each step of the way.

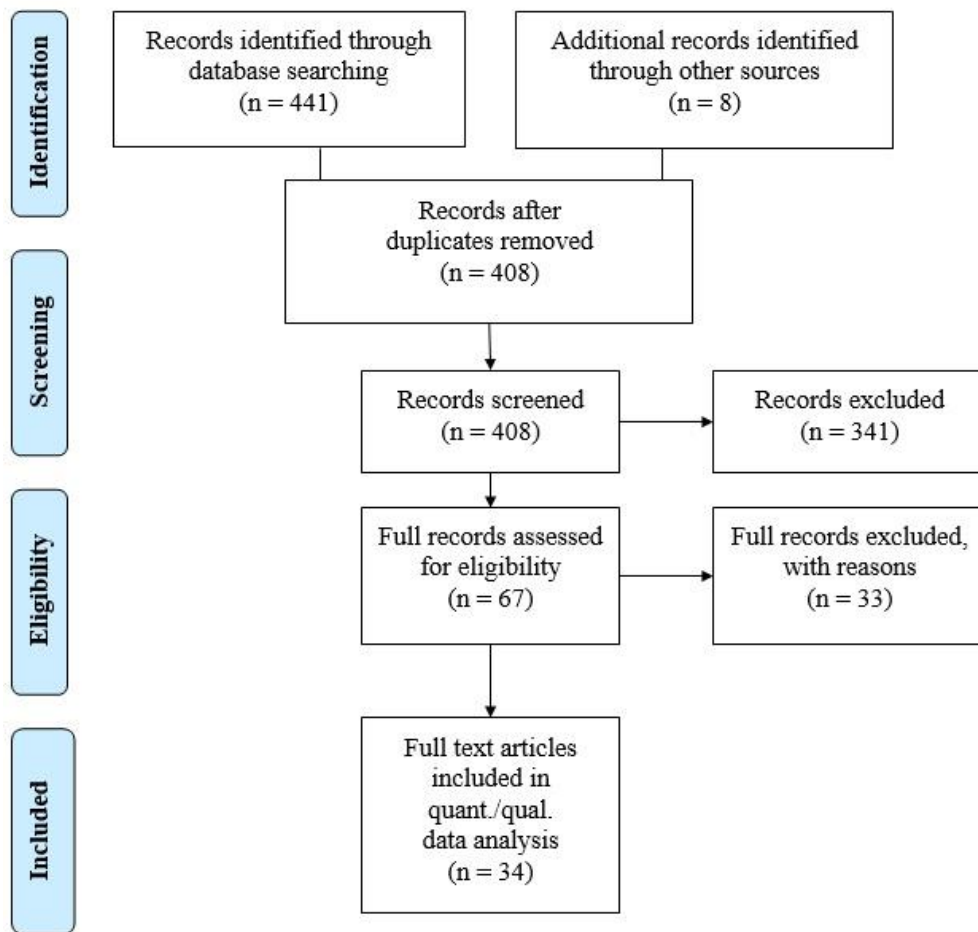


Figure 2: PRISMA diagram (adapted from Moher et al. 2009)

The 408 papers which resulted from the searches were narrowed down by the screening process according to the inclusion and exclusion criteria, leaving 67 papers. These were downloaded and read in full to assess them via the eligibility criteria. The number of papers thus decreased further to 34. The aim to evaluate at least 30 papers, stated in chapter 2.1, was therefore surpassed.

The results stem from the four different search term groups S1-4<sup>17</sup> developed in chapter 2.1. Each search term group represents the combination of two concepts (from concept I-III). S1 combined the concepts nudging (I) and supermarket (II), and S2 nudging and Sustainability (III). S3 connected Supermarkets and Sustainability, and S4 all three concepts. The following Table 5 lists the results at different stages of the process according to the search term combinations.

<sup>17</sup> This is how the combined search term groups, meaning all resulting papers, will be referred to. The papers were grouped in Maxqda according to their search term group, originally in hope of discerning interesting information by comparing them on different aspects. Due to the amount of data gained by the coding process in general, this could not be followed through. But this is the reason the in the graphs of codes the title of the columns is ‘S1-4’.

Table 5: Search term group results

Search term group	S1	S2	S3	S4
No. of total results identified	137	71	92	149
No. of final results included	20	2	1	11
% of papers included	15	3	1	7

The observation that S1 is the most successful search term group is mainly due to the inclusion of the database MedLine and that supermarkets have been frequently addressed as a venue for health nudges. As touched upon on chapter 3.2, quite some research has been done on health nudges, stemming from medical or nutritional research. This leads to the high number of results with this search term combination of nudging and supermarket. This is reflected in Table 6 below, displaying the ‘General Topic’ document variable for the papers included. S2 and S3 yielded the least final results which demonstrates that the topic of waste reduction, with a perspective on the consumer, is neither frequently researched in the supermarket setting, nor in connection to nudges. Many of the results of S4 did not concern nudging or choice architecture (even though this might be expected considering the search terms), which explains the low percentage of final papers included, even though it had the highest turnout in results. This is possibly explained by the use of the term sustainability in this search term group, which might be a popular keyword and thus leads to many results.

The 34 papers resulting from the literature search made up the sources for the following data analysis. For this purpose, they were transferred to the program Maxqda. Before starting with the coding process, which is outlined in chapter 4.2, a general overview over the papers acquired helped assess them. This is provided by the so-called document variables, which are automatically generated for each document uploaded into the program. Additional variables are developed and given designated values, as described in chapter 2. These variables allow for a first overview of the variety of sources. For the whole table of document variables see Annex III. In this chapter the year of publication, the type of academic work, and the main topic of the final papers included in the data analysis is presented visually. This chapter then concludes with a few remarks on further interesting information on the papers.

The year of publication of the resulting papers, shown in Figure 3, points to the rising importance of the topics searched for: the number of papers per year increases almost in line with the number of year dates. Only two papers from 2021 are included because the literature search was conducted only until the end of January of this year.

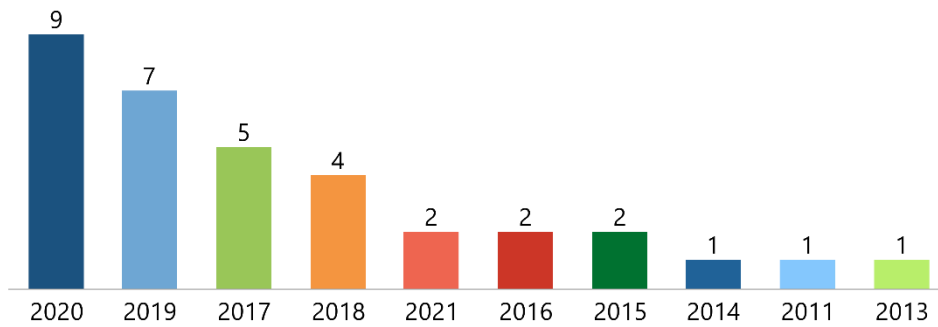


Figure 3: Year of Publication (Document Variables)

The kind of academic work the paper presents was added manually as a document variable. As shown in Figure 4, almost half of the papers (16) were classified as studies, which tested various nudges. Of the other papers, six systematic literature reviews generated databases on existing studies, while five literature reviews critically evaluated (theoretical) findings of other authors. Further five concentrated on theoretical considerations, and the final two conducted surveys with consumers.

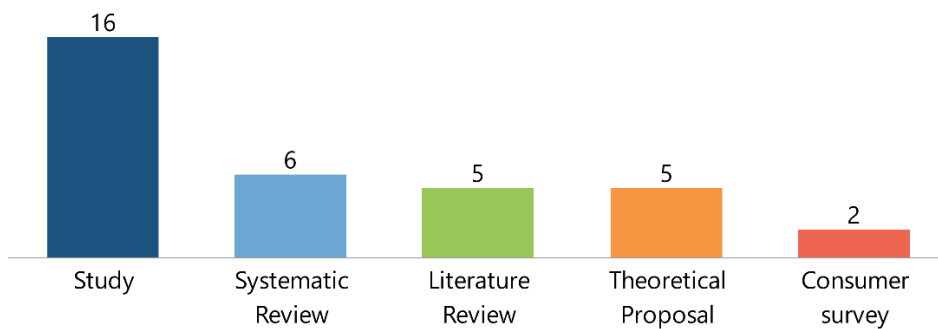


Figure 4: Type of Academic Work (Document Variables)

The (online) journal in which each paper offers another interesting view on the sources. Most papers were published in different peer-reviewed journals from a large diversity of disciplines. Nevertheless, three of the final papers were published in *Ecological Economics*, and two each in *Frontiers in Psychology*, *Appetite*, *Food Quality and Preference*, and *Foods*<sup>18</sup>. All the papers were authored by different first authors except Thorndike (2020) who authored one paper alone and another together on co-authorship (Thorndike/Sunstein 2017)<sup>19</sup>. Some of the papers are written within a certain framework, again exemplifying this with Thorndike (2020): choice architecture is applied specifically to the Supplemental Nutrition Assistance Program (SNAP) (USDA 2021), viewing the topic of interventions in the supermarket from this perspective.

<sup>18</sup> Some other journals included: *Journal of Environmental Psychology*, *Environment and Behavior*, *European Journal of Public Health*, and *Sustainability*, showing the wide variety of academic background to the results.

<sup>19</sup> Many of the authors presented here are generally immersed in the topic of behavior change or nudging and have written various papers on the topic, though oftentimes their other publications did not meet the inclusion criteria presented in chapter 2.

To give a brief overview of the topics of the papers, the distribution of the ‘General Topic’ values are depicted. As Table 6 shows, of the 34 papers almost half epitomize healthy foods, followed by nine papers on sustainable foods. The remaining papers focus evenly on reducing waste and sustainable consumption. For a more specific overview, some examples of the main content are presented.

Table 6: General Topic (Document Variables)

General Topic	No. papers	Content: nudges/interventions...
Healthy foods	15	... for sugar-free foods, fruits and vegetables, and organic foods
Sustainable foods	9	... for regional foods, animal welfare and other aspects of sustainability concerning edible goods
Reducing waste	5	... to produce less waste, to recycle, and for bio-based packaging
Sustainable consumption	5	... for any (more) sustainable products aside from foods

Concerning the theoretical concepts of the papers, three different theoretical concepts are applied in the papers. Unsurprisingly, considering the search terms, 29 refer to nudging, three refer to choice architecture and only two are concerned with the rather general concept of behavioral change. The latter group are two papers which were deliberately included in this study, even though they do not mention nudging. Rubens et al. (2015) is the only result of S3 and concerns an interesting intervention tested in a supermarket that qualifies as nudge, even though the authors do not name it so. The other paper, authored by Lazzarini et al. (2017), resulted from S4 and was included because of its focus on regional foods, which was not represented in any other paper. For these reasons, the two papers are excluded from the analysis of the defining aspects of nudging. They were coded exclusively with the other codes, and thus provide interesting insights for the further analysis.

## 4.2 Defining nudging

This chapter presents the results of the coding process, specifically focusing on research questions one and two, thus: the defining aspects of nudging as well as specific types of nudges that can be implemented in the supermarket. As the pre-developed as well as emerging codes generated more data than expected, this study became an exploratory one, as explicated in chapter 2.2. Before presenting the results in chapter 4.2.1 and 4.2.2, a few remarks on the form of presentation of the data are made in the following. The third and final research question is addressed in chapter 5. Due to the focus of this thesis on the project 123V, the last research question deserved an own chapter as it concerns the implications of this study for the project.

The final stages of the coding process made clear that a limiting approach to the analysis of the large quantity of data is needed. Especially the first research question presented in chapter 1.2, concerning the definition of nudging, resulted in more contradicting and inconclusive results than anticipated. The first in-depth look at the data showed that the concept of nudging is not as clear-cut or definitive as sometimes implied. Contrary to the assertiveness of some authors, or the ease with which they omit crucial conceptual groundwork, this analysis exposes

various (contradicting) understandings of nudging and some conceptual flaws and inconsistencies. Thus, earlier ideas of developing or reaching more conclusive definition of nudging and the related concepts were discarded. The study took on an exploratory stance, which is explained in more detail in chapter 2. As research questions two and three contain more practical information for project 123V, the focus was thus shifted on the analysis of the codes concerning them.

The exploratory research perspective thus offers the advantage that inconclusive findings in one area do not impede proceeding with the analysis in another. The diverse and partly conflicting results concerning the definition of nudging might exhaust the analytical power in a different type of study by trying to structure and solve them conclusively. These problematic issues are pointed out, but do not hinder the presentation of a possible nudge framework in the next step of this thesis. This does justice to the quantity of data that was generated by the pre-developed code, while enabling a qualitative investigation and proposals on the most important aspects. Many of the source papers demonstrate that acknowledging the conceptual problems of nudging do not hinder research on it. Thus, in-depth discussions on e.g. the differential perspectives as to what constitutes nudging, or if and how nudges are justifiable are not the focus of this study, but clearly required based on these findings.

A brief explanation of the coding process, as well as the approach to the quantitative and qualitative data analysis follows. The relationship between codes and sub-codes presented is purely organizational, meaning that sub-codes have the function of either being sub-concepts or specifications of the higher code. If a code requires own sub-concepts, e.g. 'Nudges Trigger System 1 or 2', this main code serves only as a structuring element, and no coded segments were added to it. If a code necessitates specifications, e.g. 'Changing choice architecture', or the specific alternate wording 'Changing Decision Making', both the main code as well as its sub-codes have coded segments attached.

The quantitative data analysis entails the use graphs provided by Maxqda. A figure depicts the number of papers (of the total of 34) that contain the requested code at least once<sup>20</sup>. While the most important graphs will be shown here, every figure used for this analysis can be found in Annex V. In the graphs, the codes are ordered according to frequency. The fields containing the numbers are colored in a spectrum from red to blue, which adds a visual emphasis on the high or low frequency of the code.

A qualitative evaluation of the codes results in an interpretation of the content of the coded segments<sup>21</sup>. Not all citation information offered by the program is used here<sup>22</sup>, rather only the author, year and page number are noted, mirroring the style of the rest of this thesis. But it is important to note that Maxqda does not state the page numbers according to the paper that originally published it. Rather, document *pages are numbered starting with the number one* on the first page and then continue upwards<sup>23</sup>. This numbering style is maintained when citing

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<sup>20</sup> As the aim is to find out how many papers stated a trait, not how many times a statement appears in total.

<sup>21</sup> The coded segments are not depicted in the Annex of this thesis as it would extend it beyond any justifiable extent. The study data in form of a Maxqda file or e.g. the specific coded segments organized by codes in form of a PDF file can be requested from ASK for insight.

<sup>22</sup> The Maxqda referencing style contains too much information, to locate the exact coded segment in the program (e.g. a specific starting and end point, represented as numbers which are only of meaning inside the program). Due to the length of this reference style it was not used.

<sup>23</sup> This means that the referenced segment can be deducted from the original paper by relying on the page number display of the preferred document reader which usually starts with page 1, or by manually counting the pages.

a coded segment, meaning all references of the records used for the data analysis in final chapters of this thesis display this style. Because this is such relevant information for tracing the original segments, this information is repeated at the beginning of each chapter focusing on analysis and interpretation of the data.

#### 4.2.1 Nudge: Concept and critique

The analysis in this chapter aims to answer the first research question, which asks how nudging is defined by other academics theorizing on them or implementing and studying nudges (cf. chapter 1.2 for the detailed research questions). This chapter thus focuses on two main elements, the first of which concerns definitory traits of nudging and concepts related to it. As the data analyzed presented a such diverse perspective, only the most important aspects are elaborated for this exploratory study. The definitory traits of nudging (as established in chapter 3.2.1) are analyzed quantitatively, and the lowest common denominators of the qualitative assessment are presented. The second element concerns the critique on nudging, which is organized along the main arguments established in chapter 3.2.2.

The definitory traits are the focus of the first part of this sub-chapter. The decision to code different aspects of the definition of nudging and interpret those quantitative results from the absence of a tangible definition given by Thaler/Sunstein. Scholars who implement or theorize about nudging are expected to define the concept, or at least name its most important traits. The quantification of these statements presented at the beginning of this chapter allows for an itemization of the definitory traits of nudging, organized by significance. This analysis does not feature a qualitative interpretation of the results on nudging, due to the manifold understandings and complexity of the matter. To be able to maintain enough analytical focus on the practical implementation of nudges, this discussion needs to be postponed for future research. In the next part, the main defining statements about choice architecture, and libertarian paternalism are briefly evaluated. These are also analyzed qualitatively due to fewer data, and slightly more agreement between the authors. In the last step, various critique of nudging and a brief observation on the concept of marketing is presented.

Maxqda references coded segments by starting every document with page one and counting the following pages through. Therefore, the coded segments quoted in the following are referenced in the same way. When tracing the quotes derived from the analysis, the original page number of the publications needs to be set aside, and a page count starting from page one applied.

The following Figure 5 shows the codes concerning the definitory traits of nudging, developed adhering to Thaler/Sunstein's original statements. The in chapter 3.2.1 pre-developed codes (1)-(11) are denoted in the title of the respective codes. The different aspects are only touched upon briefly, due to the complexity and thus length an in-depth discussion of every aspect would entail. As explicated in chapter 4.1, only 32 out of the 34 papers epitomize on nudging as a behavioral concept, so the numbers presented in this figure are to be understood as the number of papers out of 32. The analysis follows the hierarchical order of codes in the graph.



Code System	S1-4
▼ Nudging - Concept, Critique and Related Ideas	
▼ Defining Nudging	
▼ Changing Choice Architecture (1)	16
Changing Decision Making (/Environment/Architecture)	7
Stipulative Definition	17
▼ Nudges Trigger System 1 or 2 (5)	
System 1 Nudges	14
System 2 Nudges	4
Making People Better off (8)	12
Freedom-preserving (7)	12
Exploits or Counteracts Bias (6)	10
Easy & Cheap to Implement (9)	10
No Economic Incentives/Easy and Cheap to Avoid (3+4)	8
No Prohibitions/Bans (2)	7
Making Choices more Convenient	6
Transparent (11)	5
Aligns Intention and Action (10)	3

Figure 5: Defining Nudging (Code Matrix Browser)

Almost two thirds of papers (20<sup>24</sup>) name ‘Changing Choice Architecture’ or the variation ‘Changing Decision Making...’ as an important feature of nudging. Apparently, many authors agree on the fact that to nudge means to modify a status quo which leads to a change in choice (16 papers) or in decision (7 papers). The sub-code of changing decision was included during the coding process, because quite a few authors used this term. Going back to the original text of Thaler/Sunstein (2009), it shows that they mostly use the ‘choice’ terminology. This use of e.g. ‘decision making’ instead may be a semantic bagatelle, born from some authors’ desire to alternate the wording by using ‘decision’ as a synonym for ‘choice’. But it seems valid to point out a possible difference in the meaning, if the aim of an intervention is either to *change the environment* in which the choice is made (the choice architecture), or to *change the decision* making: if the clearly stated aim is to change the decision, it does not contain room for withstanding the intervention, and especially in an easy, freedom-preserving way. This question of terminology also initiates the discussion on the ethics of nudging, which is addressed below. At this point, it is only pointed to the fact that the different use of terminology might be of significance and pose interesting further research<sup>25</sup>.

<sup>24</sup> To receive the number of documents mentioning a code and (various) sub-codes in total, it is prudent not to add up the numbers shown in the tables because some papers contain statements concerning both code and sub-code, and thus count twice in the numbers appearing in the graphs. The ‘retrieved segments’ display in Maxqda was used as source to ascertain the number of documents, in this case implying that three papers contain both the main code and its specification. The possible negative consequences for the interpretation of the numbers were considered to be near irrelevant, based on the small number of overlaps and will not be further discussed here.

<sup>25</sup> Not only choice and decision, but also behavior (change) is frequently used in the sources, seemingly interchangeably, with none clearly distinguishing the differences between them.

15 papers named system 1 or 2 in relation to nudging, linking it firmly with Kahneman's concept of thinking. As addressed in detail in chapter 3.2.1, system 1 is the fast, emotional kind of thinking, while system 2 represents the slow, rational kind. The 14 of those 15 papers are in line with Thaler/Sunstein's argument that nudges trigger system 1, whilst four papers state that nudges address system 2<sup>26</sup>. Still, as system 1 and 2 are incongruent, an interesting discrepancy is clear here: the ways nudging should target a person, either subconsciously or by triggering a conscious reaction, is disputed among the sources and forms the basis for an ongoing conceptual dispute<sup>27</sup>. The code 'Stipulative Definition' refers to the statement outlined in chapter 3.2.1 which is deemed the closest to a definition of nudging offered by Thaler/Sunstein (2009, 6). As this code is applied 17 times, this perception is supported by more than half of the 32 papers. It could thus be argued that this is the clearest definition of nudging that most papers agree on.

The better-off argument states that nudges aim at somehow improving people's lives and is mentioned in 12 of the papers. Similarly, the perspective that nudges must be freedom-preserving is referred to by 12 sources. Compared to how much emphasis Thaler/Sunstein put on these two aspects, it is surprising that not even half of the sources name them. Two further aspects of nudging are each named ten times. They firstly link nudging to biases, stating that nudges either 'Exploit or Counteract' biases<sup>28</sup>, and secondly state that nudges should be 'Easy and Cheap to Implement'. Ten of the papers argue that nudging excludes 'Economic Incentives'. It seems specifically interesting that only a third of the papers name this definitory trait: the avoidance of e.g. price changes might constitute one of the main differences between nudging and commercial marketing. Considering that most papers discuss nudges in commercial settings, it seems prudent to discuss the differences between nudging and commercial marketing, and here a cue that raising or lowering prices do not count as nudges might be required.

The last four defining aspects were named each in less than a quarter of the papers. 'No Prohibitions/Bans' (seven papers) and 'Making Choices more Convenient' (six papers) are quasi-quotations from Thaler/Sunstein's original book. In five papers it is stated that nudges should be 'Transparent' which again is an aspect of nudging that Thaler/Sunstein ardently stress and thus it seems surprising that it is mentioned so seldom. Lehner et al. quote the English House of Lords stating that "[t]he transparency of nudge tools is discussed because nudges influence [...] making choices through mechanisms of which people might not be aware" (2016, 10). Surprisingly, only few authors deem it an important trait of nudging at all, again indicating part of the ethical critique of nudging, addressed below. The statement that nudging 'Aligns Intention and Action', arising from three papers, is interesting as it links nudging again to a higher cause but focuses on the inner perspective of the individual. From this perspective,

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<sup>26</sup> Thus, four of those papers apparently argue for nudges triggering both systems (cf. foot note 24).

<sup>27</sup> The decision for either system has far-reaching consequences, e.g. for a typology of nudges. For example, if authors assert that information giving on flyers or posters counts triggers reflective system 2 but go on to include 'labeling' as a type of nudge (which according to most triggers system 1).

<sup>28</sup> Again, the question of what Thaler/Sunstein or further authors think and what implications this has on the concept of nudging has to be omitted here. But it is deemed as another example of Thaler/Sunstein's (and some other academics authoring papers in the sources) indistinctness, making it hard to grasp the concept properly. Do they wish to counteract bias, thus helping people make choices more rationally? Or do they use the knowledge surrounding biases to exploit them (supposedly) in favor of the person being nudged? Examples for both interpretations can be found in their book. The distinction makes for a completely different framing of the concept and also touches heavily upon the question of free will and manipulation, thus clearly demanding further research.

nudging helps people make choices they would like to make but are hindered from in certain situations. This is frequently named value-action gap, and further discussed in chapter 5.

One topic that is already treated inconsequently by Thaler/Sunstein is the aspect of economic incentives. As mentioned in chapter 3.2.1 they exclude pricing strategies from nudges, but then bring up examples like the ‘Dollar a Day’ program where preventing teenage pregnancy rewards the teenagers with 365\$ a year. This is one of a few contentious examples Thaler/Sunstein give, and three of the papers perpetuate this unclarity, pronouncing pricing strategies a valid nudge. Apart from the system 1 or 2 controversy, this is the second definitory trait that is rather frequently discussed and criticized.

Next, the most important insights on the concepts of choice architecture and libertarian paternalism will be presented. Two thirds of the papers (24) mention choice architecture, and based on a qualitative assessment of these segments, three kinds of understandings of the term can be derived. One group of authors, responsible for nine papers, seem to understand choice architecture as a method, a “tool” (Walmsley et al. 2018, 2) or an action, meaning someone (the choice architect) is deliberately construing to change the “informational or physical structure of the environment” (Lehner et al. 2016, 167). Vigors quotes Johnson et al. stating “choice architecture can focus on; (i) changing *what* is presented to decision-makers [...]; and (ii) altering *how* choice options are presented” (2018, 9, emphasis ASK). Doing choice architecture, choosing this approach, is thus possible by changing the how and what of a decision context.

In contrast, the authors of another nine papers voice their view as “Choice architecture [referring] to the context in which people make choices” (Thorndike 2020, 1). This possibly contradicts the first explicated active notion of *doing* choice architecture by seemingly equating the term ‘choice architecture’ with the ‘context’ of choice making or ‘choice environment’, using it as a passive term, the static thing that needs “changing” (Abrahamse 2020, 2), or “interfering” (Coucke et al. 2019, 3). Finally, the authors of four papers see choice architecture as one type of intervention, implying ‘nudging’ as superior concept. This is a novel approach compared to the first two understandings, who see choice architecture as structurally superior in being the method used to implement nudges or being the context in which nudges are applied. While the first two understandings differ from each other, and could both be argued as being legitimate, this last one surely contradicts the predominant view, as Thaler/Sunstein never name choice architecture as an example of a nudge. Suffice to say, the results of the analysis of this term show that even on a term like choice architecture opinions vary strongly, and the problem of Thaler/Sunstein not defining it explicitly at one point again entails complications.

Libertarian paternalism is referred to much less, only seven papers mention it at all. Interestingly, six of them offer critique on the paternalistic aspects of nudging. For example, Ferrari et al. caution that it might not be so easy to balance the paternalistic aspects of nudging with liberal strategies: “although the authors of the libertarian paternalism defend that nudges should shape behaviours in a transparent manner, the boundaries of the underlying manipulations are not so univocal” (2019, 8). Four papers assuredly connect nudging with libertarian Paternalism. For example, Just/Gabrielyan et al. stress the importance of the libertarian aspect as “it stands to reason that a nudge would represent a welfare improvement relative to a more paternalistic policy” (2018, 7). Not only a precise definition of these concepts, but also the relationship between nudging, choice architecture and libertarian paternalism would deserve

much more in-depth research. As the focus of this study is on the practical implications of nudging, the definitory aspects named here must suffice<sup>29</sup>.

In the next step, marketing as a concept close to nudging will be touched upon. The question raised in chapter 3.2., concerning the differences of commercial marketing, social marketing and nudging, is the reason for this inclusion. This issue cannot be completely resolved, even though a third of the sources (12 papers) mention ‘marketing’. Eight papers made statements implying nudging consists in part of marketing, or is similar in a way e.g., “Salience nudges [...] may be especially promising for supermarket environments, as they target the same type of decision making as traditional marketing strategies” (Hoenink et al. 2020, 2).

Two papers state a clear difference between (unspecified) marketing and nudging: Vecchio/Cavallo note that “standard marketing approaches [are] not necessarily directed to facilitate individual’s and society’s long-term best collective interest (e.g. strategies to capture higher premium prices)” (2019, 3). ‘Standard marketing approaches’ probably refer to *commercial* marketing, and thus point to a possible contrast between it and nudging: the orientation towards society’s well-being (or not). Furthermore, Ohlhausen/Langen state that “[t]o avoid being used as a fraudulent marketing instrument, nudges should be transparent, never misleading, easy to opt-out of, consistent with people’s values, improve the welfare of those being nudged and not violate individual rights” (2020, 2). This is the most detailed kind of differentiation offered in the sources. The argument implies that it refers to commercial marketing, though, again, this is not specified. Thus, Ohlhausen/Langen not only offer a quite extensive definition of nudging compared to others, but at least address the difference to nudging clearly. Lastly only, Broers et al. (2017, 1) and Ferrari et al. (2019, 6) mention ‘social marketing’ as a concept in passing. But neither paper specifically deals with it, thus unfortunately not addressing its relation to nudging.

The final part of this chapter concerns the critique of nudging voiced in the sources. Three main points were derived from 11 papers, as shown in Figure 6.

Code System	S1-4
<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>Ethical and Societal Implications</li> <li> <ul style="list-style-type: none"> <li>Manipulation</li> </ul> </li> </ul> </li> <li>Contradictory Evidence on Nudging</li> <li> <ul style="list-style-type: none"> <li>System 1/2 uncertainty</li> <li>Unclear Concept</li> </ul> </li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>8</li> <li>5</li> <li>6</li> <li>1</li> <li>5</li> </ul>

Figure 6: Critique of Nudging (Code Matrix Browser)

<sup>29</sup> Not to mention the complex or even impossible task that would be systematically developing a model that satisfyingly explains and connects all these models so that it fits across various papers. To make things even more complicated, statements like: “[t]he implementation of behavioral nudges in a nudging intervention is important because they have the strongest impact on consumer behavior” (Coucke et al. 2019, 4) further complicate matters by raising the question what behavioral nudges are and what a nudging intervention is, if the former can be implemented in the latter. This just as an example of the extreme variety of concepts and names used in the sources.

The most mentioned critique (eight papers) is issued on ‘Ethical and Societal Implications’ of nudging, as for example Grilli/Curtis stress that “[n]udges are useful tools for individual behavioral changes, assuming they follow ethical guidelines” (2021, 8). A few papers refer to the criticism offered by other authors, already addressed in chapter 3.2.1. Vigors (2018, 15, 17) refers to Bovens and Baldwin, while Ferrari et al. (2019, 8) cite Grüne-Yanoff and Schubert. Five papers specifically focus on the potential of manipulation, referring in part to the discussion mentioned above on whether nudges aim to change the choice making environment, or the decision itself. The latter implies at least some kind of manipulation, as nudges do not aim to convince via arguments, but much more subtly. As Slapø et al. point out, this manipulation might especially work on “vulnerable consumers and groups” (2019, 25).

The second critical aspect, found in six papers, focuses on ‘Contradictory Evidence’, as e.g. Broers et al. state “the empirical evidence regarding the effectiveness of nudging has thus far remained contradictory” (2017, 4)<sup>30</sup>. This is interesting as it showcases that at least some authors are not convinced of the evidence on the practical use of nudging. Blom et al. (2021, 1 et sq.) are the only authors naming the problematic contradictions surrounding system 1 and 2. The third point of critique is of a conceptual kind (in that it is an ‘Unclear Concept’) and is expressed by five sources, e.g. asserting that “knowledge about the psychological premises of nudging is limited” (Blom et al. 2021, 1), attesting a “lack of definitional and conceptual clarity concerning the applications of choice architecture interventions and nudging” (Broers 2017, 2) and pointing out that “nudging is often used as a ‘catch-all term’ as it is not clear what type of interventions fall under this definition” (Vecchio/Cavallo, 2019, 2).

In the case of critique on nudging, it was specifically checked, how its distribution between papers classified as nudge studies and the other papers fell out. Only two studies (out of 16) mentioned any of the critique named above. Demarque et al. (2015, 3) comment on the ethical and societal implications, while Blom et al. (2021, 1 et sq., 6) mention contradictory evidence on nudging as well as the general conceptual ambiguity.

#### 4.2.2 A typology of nudges

The research question to be answered in this sub-chapter is “What kind of nudges are proposed that could be implemented in supermarkets with regard to the food dispensers?” (c.f. chapter 1.2). Thus, the aim of this chapter is to discuss which specific nudges exist and how they can be implemented. While the forgoing chapter shows how unclear the general concept of nudging is, this chapter structures the different nudges tested, discussed, and proposed in the sources. Based on the data provided by the sources, establishing clear, exhaustive and non-redundant categories of nudges proved problematic. The three reasons for this will be explained below. Thus, a different approach was chosen to structure, define and point out specific types of nudges: an existing framework for typifying nudges is used, to present nudges that could be implemented in a supermarket. The so-called Healthy Eating Nudge (HEN) framework by Cadario/Chandon (2020) will be presented in the following, alongside the advantages it offers compared to other frameworks. The most important benefit is that the HEN was adapted to a Sustainable Food Consumption (SFC) framework by Vandenbroele et al. (2020). Both the HEN and SFC framework are presented in papers adhering to the original

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<sup>30</sup> Not to mention the possible effect of a publication bias, which means that scholars are less probable to report on and publish studies that have no effect, or even worse lead to the contrary result (Broers et al. 2017, 7).

sources of the study. Following this categorization of nudges, a few concluding remarks will address the remaining nudges collected in the analysis, and how they fit into the SFC framework. Again, it is important to note that Maxqda references page numbers not according to the original page numbers of a publication but begins with the page number one for every document. As the analysis is based on the coded segments by Maxqda, this reference system the one used here.

The coding process conducted for research question is based on open coding. The different nudges are assigned a code corresponding with the title the individual authors give the nudge. The idea was to define and (hierarchically) organize the emerging 12 nudges (cf. Annex V.) This was rendered a not feasible task for this thesis, due to three main problems now explicated briefly. The first problem is that different conceptual perspectives shape the nudge nomenclature, as for example Cadario/Chandon note that “the existing frameworks of [...] nudges are either based on the intervention instrument (e.g., a label, size of plate) or based on the hypothesized mechanisms of action (e.g., attention vs. social norm)” (2020, 2)<sup>31</sup>. Indeed, this was confirmed by the analysis of the coded segments, as for example Demarque et al. (2015, 2) investigate eco ‘labels’, which are a nudge in itself according to some, but these authors argue it invokes a social norm. This kind of statement leads to nudges being categorized by two (or even more) different codes, which would render the different categories very indistinct.

The second problem is again of a conceptual kind, referring to the ongoing discussion as to what constitutes a nudge. Specifically, the question if nudges trigger System 1, or System 2, or both, is of issue. Lehner et al. quote other authors seeing labeling as a nudge but go on objecting that “eco-labels are seen as information provision tools” (2016, 9), implying that this triggers rational reflection and decision making. This would exclude information provision from being a nudge on the basis of it catering to system 2. Contradicting them, Abrahamse (2020, 5) and Grilli/Curtis (2021, 2) do count information provision as a nudging tool. To be able to argue one of these cases would necessitate much further research into psychology and Thaler/Sunstein’s works.

The third problem concerns a possible hierarchy of nudges, as some authors imply higher and lower ranking nudges. This is exemplified by means of the so-called visual prompts. Slapø et al. state that “[p]rompts refer to signs, labels and emblems placed on of [sic!] beside the food options [...]. There are two main categories of prompts: signs and symbols, and information rich labels and emblems” (2019, 39), thus organizing them hierarchically. Even though Abrahamse concurs that visual prompts are signs, stickers, etc., they are organized by that stating “[v]isual prompts are a brief form of information provision” (2020, 5). These manifold perspectives on specific nudges impeded the ‘simple’ presentation of all the nudges addressed in the sources. Possibly some of the here presented problems are also the reason that other authors refrain from categorizing the nudges they present, as only very few refer to one of the existing frameworks of nudges.

To solve these problems, the focus turns to existing frameworks, of which a few were addressed in various sources. One of them is very persuasive as it is not only research based, but

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<sup>31</sup> While other authors completely refrain from naming the nudges they propose. For example, Thorndike/Sunstein’s nudge suggestion of placing healthy foods in a particular place, as these “end of aisle (endcap) displays face in three different directions, and [these and] free-standing displays account for 40% of all supermarket sales” (2017, 1) is not clearly specified with a title.

also remedies the conceptual problem concerning nudges addressed above: the Healthy Eating (HEN) framework, which was developed by Cadario/Chandon (2020) and adjusted by Vandenbroele et al. (2020) for Sustainable Food Consumption (SFC) nudges. As reasoned above, it is of more value to the research question to present the most cogent nudging categorization or nudge framework come across in this analysis. To do so, the most recurring frameworks were coded<sup>32</sup>, though none was mentioned more than four times respectively (cf. Annex V). Cadario/Chandon's (2020) HEN framework is not only the one mentioned most, but it is based on a conceptual basis, which will be presented shortly. In their paper, they also give quite a concise overview of important nudge frameworks developed in the last few years (ibid. 4). In doing so, they make the most extensive effort represented in the sources to compare different frameworks. But as Coucke argues, "most of these frameworks are rather explorative, instrumental and descriptive, whereas the framework of Cadario and Chandon on healthy nudges is theory-based and has been empirically validated" (2019, 3).

Thus, the framework which Cadario/Chandon (2020) present offers three main advantages. Firstly, it is based on much previous work by different scholars, which ensures that the nudges "have been tested by enough studies to enable a meaningful meta-analysis" (ibid., 2). Secondly, the main advantage the Healthy Eating nudges (HEN) present is their strong conceptual basis. Cadario/Chandon organize their proposed nudge typification according to the mental activity they trigger. The so-called Trilogy of Mind of cognition, affect, and behavior is based on the long-established concept of tri-partitioning mental activities (ibid.). For this thesis, the conceptual basis presents a very persuasive and beneficial trait, as this counteracts one of the main problems of nudging discovered in the analysis above: the missing foundation of a psychological basis or tested theory, as argued in the last chapter. Of course, this sidelines the discussion on nudges triggering either automatic system 1 or reflective system 2, as they use a three-sided mental activity model. But as stressed above, the discussion on system 1 or 2 nudges on the one hand is far from being decided among nudging scholars, and on the other hand the question is how important it is to nudging. As the HEN shows, other conceptual bases possibly work even better, as they are long-established and validated by many authors. Thus, Cadario/Chandon establish seven nudges based on these three conceptual levels, which will be presented shortly.

The third main advantage of using this framework is that Vandenbroele et al. (2020), incidentally another paper in the sources, refine the HEN framework and apply it to the setting of sustainable food consumption. They, too, base their adaptation on much academic work done and add many examples of sustainable nudges to Cadario/Chandon's work. They even extend it on the nudge level to include Social Norm nudges, which will be addressed more closely at the end of this chapter. The HEN and SFC frameworks combined, as presented by Cadario/Chandon (2020) and Vandenbroele et al. (2020) respectively, is compiled for this thesis in a table based on the statements and examples these authors offer. The conceptual levels and the nudge levels are briefly elaborated, and a few examples stated. The framework presented in the Table 7 (below) will be referred to as Sustainable Nudge Framework (SNF).

The HEN framework refers to general food consumption and eating out, e.g. in cafeterias, and the SFC framework covers a wide array of nudges. To adapt these to the SNF, the examples in

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<sup>32</sup>Only if the specific title of the framework (or the author's, by means of describing it) was referred to in the continuous text it was coded. Solely referencing the author without clearly relating it to a concept was not coded.

the table are selected to fit the setting of the project 123V, meaning the food dispensers. Unfortunately, the last nudge called Size Enhancements lacks relevance for the project, so no examples are listed here. Of course, the SNF contains a few minor issues as well. For example, Cadario/Chandon themselves “acknowledge that the cognitive–affective–behavioral categorization is not iron clad and that it is possible for some nudges to have features that straddle multiple categories” (2020, 2). Vandenbroele et al. explicate this with the example of Descriptive Nutrition Labeling, which apart from triggering the cognitive level can also “evoke emotional and behavior responses [...] people experience emotional gratification from buying organic (i.e. appealing to hedonic attitudes)” (2020, 3). This adheres to the general problem of the success of nudges depending on many different factors, which will be epitomized in the next sub-chapter. But, as all three problems outlined above, this is a challenge that presents itself at any attempt at categorizing nudges. The two frameworks the SNF is based on are still the most comprehensive frameworks contained or explicated in the sources, and thus can be useful for developing nudges to be tested in project 123V.



Table 7: The SNF, based on Cadario/Chandon (2020) and Vandenbroele et al. (2020)

Conceptual Level	Nudge Level	Brief description	Ex. for SNF
<b><i>Cognitively Oriented Nudges</i></b>			
"Seek to influence what consumers know" (Cadario/Chandon 2020, 2)	<b>Descriptive Labeling</b>	Label with bare information e.g. on...	product origins, production process (e.g. organic, fair trade, recycled), or 'free from...!'
	<b>Evaluative Labeling</b>	Label with information graded or enhanced e.g. through stars or red, yellow or green coloring...	as sustainability of products increases (including healthiness as a factor of sustainability).
	<b>Visibility Enhancement</b>	Higher availability of products informs on their importance, like making target products more visible, by e.g. ...	placing them at eye level or increasing the general amount of the target product.
<b><i>Affectively Oriented Nudges</i></b>			
"Seek to influence how consumers feel without necessarily changing what they know" (ibid.)	<b>Hedonic Enhancements</b>	Increase the hedonic appeal of products to trigger emotional responses, e.g. ...	via vivid descriptions and photos, or attractive displays & containers.
	<b>Sustainability Calls</b>	Statements to encourage people to shop more sustainably e.g....	via signs, stickers, verbal prompts and slogans.
	<b>Social Norm Nudges</b>	Describe the real, normative or desired behavior of others and displays other peoples' (dis-)approval...	e.g. by statements, or providing happy or sad emoticons, presenting them similarly to healthy eating calls.
<b><i>Behaviorally Oriented Nudges</i></b>			
"Seek to influence what consumers do (i.e., their motor responses) without necessarily changing what they know or how they feel" (ibid.)	<b>Convenience Enhancements</b>	A physical change the display, e.g. to make it easier to select the target products or more difficult to select the opposite...	like placing the target products in prominent spots and easy to access.
	<b>Size Enhancements</b>	Changing portion sizes on plates and menus.	

As Vandenbroele et al. (2020, 3) state, the transfer of healthy<sup>33</sup> nudges onto sustainable nudges is not always unproblematic, e.g. the importance of color-coded evaluative nutrition labels needing to be in line with what consumer see as bad (thus being red) and good (thus green). This effect might not be as strong with sustainable products, because the association or understanding of what is bad or good here may be unclear or unknown and thus the perception of the label as being valid impeded (ibid., 4). In general, health aspects might be easier to relate to, as more understanding and knowledge about it exists and it is deemed desirable.

The other nudges that were originally coded for this study could very possibly all be organized into the SNF (cf. Annex IV for detailed list of coded nudges). For example, some of the ‘Easy & Simple Messaging’, or ‘Pre-commitment’ nudges would fit the Sustainable Calls nudge, while ‘Salience’ nudges could be organized either into Visibility or Convenience Enhancements. Not all the nudges coded in the sources will be assigned an according nudge in the SNF. This is due to the complications named above, especially the overlapping and contradicting explanations of the different authors. Details and considerations on how to implement them will be epitomized on in the next chapter.

At this stage, Social Norm nudges are addressed, as they are added to the SNF based on Vandenbroele et al.s’ (2020, 6 et sq.) arguments and are also the most-discussed nudges among the sources. According to Vandenbroele et al., a Social Norm nudge is affectively oriented, because it appeals to people’s sense or desire of belonging to the (majority) group. This is invoked e.g. by certain messages or emoticons (ibid.). To specify, Social Norm nudges are divided into three sub-types: descriptive, injunctive, or dynamic norms (or a combination).

Descriptive norms remark on the prevalence of behavior, telling people how others act or choose (Huitink et al. 2020, 2). injunctive norms focus on “what constitutes commonly approved and disapproved conduct in a certain culture (what ought to be done)” (Demarque et al. 2015, 2). The descriptive form is most useful, if the desired decision is already widely made and accepted, and thus presents a decisional shortcut. This nudge mostly comes in form of a statement or short message. The injunctive form rather presents a “morally or socially ‘right’ way of acting” (Chakravarty/Mishra 2019, 1), by instigating the idea of social rewards or sanctions (Kalnikaitė et al. 2011, 8). This is done most frequently by signage like emoticons. To mirror social rewards or sanctions, injunctive norms sometimes are adapted according to situations. A frequent example is that of a smiling or sad-faced emoticon, which change depending on the behavior of the target person (Kalnikaitė et al. 2011, 14). A third form is the dynamic norm, which is most useful “for behavior that is not yet the established norm” (Loschelder et al. 2019, 2), as they “emphasize the increasingly changing norm over time to elicit (pre-)conformity to this change” (ibid., 3). An example might be “[e]very year, more and more consumers buy an increasing number of green products in this shop during each visit” (Demarque et al. 2015, 8). Loschelder et al. (2019, 2 et sq.) give a good overview of the advantages and disadvantages of the different social norms, for further consultation.

Similar to the concept of nudging itself, the nomenclature of specific types of nudges varies widely and is not based on a common understanding. To establish a typology of nudges for

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<sup>33</sup> Authors refer to them differently, as for example Cadario/Chandon (2020) name them ‘health nudges’ and others, like Vandenbroele et al. (2020), ‘healthy nudges’. In this thesis, the name decided upon by the respective author is used. When referring to it generally, the title ‘health(y) nudges’ is chosen. The possible differences between the two names are considered too marginal to have an effect on the content of this thesis.

this thesis, the most compelling framework by Cadario/Chandon (2020), adapted by Vandebroele et al. (2020) is argued to form the most comprehensive and conceptually thought out basis. It is of specific value as it is based on a long-standing psychological understanding of mental activities, and many of the designated nudges have been thoroughly researched. Thus, the emerging SNF, which adapts the framework to supermarkets, serves as blueprint to typify nudges.

## 5 Results on sustainable nudging

The third research question explores what knowledge on implementing sustainable nudges exists and what benefits they offer. To answer this, the foregoing analysis laid important groundwork. The wide array of results and understandings showcased the necessity of a framework for understanding, categorizing and implementing nudges. The last chapter 4.2.2 thus specified nudges for implementation, based on the Sustainable Nudge Framework (SNF). This framework is now reinforced in this chapter with further insight from the data analysis, with a focus on how to implement sustainable nudges. To this end, the most important considerations and constraints concerning sustainable nudges stated in the sources are introduced. Based on this evaluation, the 16 nudge Studies contained in the sources are presented, to give an overview of the academic work done in this area. Finally, and with some caution, the most compelling examples that could be adapted and possibly tested in 123V are epitomized. Again, it is stressed that Maxqda references the page number of a coded segment based not on the original page numbers of the publication. Rather, it begins the page count of every document with number one. This should be heeded when seeking out the references of the coded segments cited here.

### 5.1 Nudges for sustainability

This chapter presents insights gained on what will be subsumed as ‘sustainable nudges’. As the inclusion criteria for this study only included nudges aiming at increasing sustainability as defined by the Agenda 2030, the various green or health(y) nudges discussed in this study are identified as sustainable nudges. Based on this study, the most important insights into their aims are presented. In the latter part of this chapter, a few considerations are presented. These provide an overview of the cautionary comments on implementing nudges explicated in the sources.

Green or environmental nudges are referred to in eleven documents in total. Concerning definitory traits, Just/Gabrielyan (2018, 5) argue that they trigger automatic system 1. Vandenbroele et al. (2020) and Vermeir et al. (2020) sort their proposals according to Cadario/Chandon’s tri-partitioning of mental activities, as explicated for the SNF (see chapter 4.2.2X). Importantly, Ferrari et al. stress that these nudges aim at “gradually moving society in a direction that might benefit all” (2019, 8). Segments on nudges being implemented to ‘further sustainable behavior’ were additionally coded, yielding interesting insights, as e.g. Becker et al. (2014, 3) refer to the Brundtland Commissions Report for the necessity of not delimiting future generations life on earth. Chakravarty/Mishra state that these nudges “cue individuals to voluntarily contribute to a public good, namely, environmental protection” (2019, 2).

Health(y) nudges are mentioned in eighteen documents, with seven further specifying their definitory attributes. For example, Cadario/Chandon state that they benefit people with “long-term healthy eating goals and are aware that they need help resisting unhealthy foods” (2020, 7). Thorndike stresses that healthy choice architecture should focus on improving dietary and lifestyle behaviors “must produce lasting changes in dietary behavior” (2020, 2). Vandenbroele et al. relay the attention nudging is receiving for “improved healthiness and safety of people, and nature preservation” (2020, 8). Referring to the micro-environment, Ammerman et al. (2017, 1) state that the healthy choice should be made the easy choice in retail environments.

Apart from explicating the aim of sustainable nudges, some authors focus on the perspective to be taken when researching or implementing nudges. Vandenbroele et al. stress “[f]or this reason, nudging starts from the perspective of the consumer. Knowing how consumers make food decisions in a complex food environment provides insight into [...] sustainable food purchase choices” (2020, 2). Ohlhausen/Langen argue for the focus being put on people’s perspective by translating Thaler/Sunstein’s idea of making ‘people better off’ to the notion that nudges should be “consistent with people’s values” (2020, 2). But the consumers’ point of view is not only important for researching and implementing nudges. Their power in changing dynamics for sustainable causes also stressed: “[c]onsumers’ decision can be the bottom-up levers for market changes and sustainable development” (Richter et al. 2018, 1), and “changes in consumer food choice habits dictate changes in food supply” (Vandenbroele et al. 2020, 2).

Interestingly, seven papers mention the attitude-behavior gap or similar concepts<sup>34</sup> in relation to sustainable nudges. It is described as an inherently human constraint that keeps humans from acting on their best intentions (e.g. shopping more sustainably), and concluding that nudges are a “potentially effective way to address” it (Broers et al. 2017, 4). Bounded rationality is named in a similar vein, i.e. Lehner et al. explain “that people [...] rely on mental shortcuts and habits” (2016, 2) and thus prevent themselves from acting the way they would if they thought more rationally about it. Thus, as posited in chapter 1.1, nudging is proposed by some authors as a method to overcome the action-value gap. Echoing the original argument of Thaler/Sunstein, nudges could offer a perspective for willing consumers to counteract their own (perceived) flaws and behave more in line with their sustainable intentions.

The general importance of sustainable nudges is increasing, as indicated by Figure 3 in chapter 4.1: the quantity of papers concerning sustainable nudges that were included in this study has increased in recent years. This is confirmed by many papers included in the sources, concurring that nudge studies in these fields are “increasingly being conducted” (Chapman et al. 2019, 1) and thus gaining importance.

The following part of this chapter is dedicated to general a few cautionary considerations. As became clear in the analysis of nudging definitions in chapter 4.2.1, the concept is quite ambiguous. As some of the papers’ authors speak to this problematic situation, five points of consideration when implementing nudges, especially sustainable nudges, are outlined in the following. The first consideration showcases the problems arising from studying sustainable nudges in general, while the next four considerations explicate different aspects of it. Ferrari et al. point to the general problem that “evidence about the adoption of nudging tools in promoting environmentally sustainable practices along the food chain are still relatively sparse” (2019, 2), thus demanding more research on its validity. Thorndike states that “[i]solating the effect of a supermarket intervention [...] is challenging” (2020, 2), questioning even the plausibility of studying the impact of nudges.

On a related note, Huitink et al. refer to the many possible influences on consumers: “in a supermarket environment [...] people have to make food choices with limited cognitive resources, often while under (time) pressure (e.g. hungry, tired, in a hurry)” (2020, 6). This showcases the second consideration, that too many factors (may) influence nudges. Authors

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<sup>34</sup> Without going into the conceptual differences: The attitude-behavior gap is named in four papers, the intention-behavior gap in two and value-action discrepancies in one paper.

argue a wide array of possible influences on nudging, proposing research on “which contextual factors influence their effectiveness” (Blom 2021, 2). Apart from the momentary cognitive situation, as stated by Huitink et al., others ask how “[c]onsumers’ preferences, mental models and social networks can [...] modify the effects” (Slapø et al. 2019, 28). Abrahamse (2020, 6) examines how peoples’ values might influence nudging, while Thorndike concedes that nudges “may not be able to overcome [...] habitual choices” (2020, 2). Also, when “individuals carry a positive predisposition for a particular behavior” (Lehner et al. 2016, 8) like sustainable consumption, or have “personality traits such as environmental concern” (Vandenbroele et al. 2020, 3) sustainable nudges may be more successful. Even socio-economic traits might influence consumers’ reaction to nudges, such as ethnic, cultural or “gender-related factors” (Chapman et al., 2019 10). It seems that some of the different influences on nudging are of contextual, psychological, and even socio-economic nature. This expands the possible explanations for the success or failure of nudges hugely and warrants detailed further research<sup>35</sup>.

The third consideration is on the occurrence of more than one nudge. Authors in the sources observe that combining nudges lessens or furthers their effect, but in an unpredictable way: Ohlhausen/Langen (2020, 13) found that implementing a second nudge alongside the first successful one did not work out, while Chapman et al. (2019, 9) found that only implementing all three nudges at once was effective. The lack of possible explanations as to when and why nudges work together leaves much space for further research. But at this point it seems impossible to predict how exactly the effectiveness of nudges is influenced.

The fourth consideration addressed by scholars is that of the unintended negative effects of nudging. The potential of nudges to backfire, the so-called boomerang effect, is discussed, meaning nudges have “unintended or offsetting effects” (Vecchio/Cavallo 2019, 10). On one hand this could mean the contrary effect of the intended, like in Richter et al.s’ study which found a decline in the sustainable products nudged (2018, 9). They concede that this may be due to psychological factors like reactance, which means the product is not bought e.g. out of defiance and follows “when receivers feel that it is pressing and potentially limits their freedom” (ibid., 10). On the other hand, other behavior may be triggered that renders the effect of the nudge useless. For example after buying something with an eco-label, compensation behavior may follow, which is the “additional purchases of less sustainable products” (Vandenbroele et al. 2020, 3). In this instance, consumers feel gratified for having bought something ‘good’ and in turn don’t take so much care with their further shopping. This is harder to monitor than the boomerang effect and thus it should be considered that even if a nudge is successful, it might have other negative consequences.

The fifth consideration mentioned here concerns the long-term effects on nudging. Thaler/Sunstein do not specifically address this topic, and thus scholars are uncertain on the question if nudges necessarily intend a long-term change in behavior. In this sense, Huitink et al. state that “[m]ore research on the short and long-term impacts [...] is required, [...] as part of a more complex strategy to increase” (2020 6), the sustainable consumption of supermarket customers.

Finally, one brief observation considering the general use of nudging is warranted, as it touches upon the for this thesis generally excluded topic of policy. A few authors clearly state

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<sup>35</sup> A further factor is mentioned e.g. by Hoenink et al., observing that “combining these salient price increases with nudges had the strongest effect” (2020, 9). Economic incentives were definitely ruled out as a nudge, but the combination of nudges with price changes seems to be a field worth of research by its own merits.

that nudging is one possibility to enact more sustainability, but surely not the only one. The problems the SDGs wish to tackle can of course not be solved by one single strategy. As Thorndike remarks:

“[T]o date, no supermarket or other food environment nudging intervention has demonstrated improvement in health outcomes– and for good reasons. Obesity and chronic diseases develop over many years in which an individual makes thousands of supermarket purchases, as well as countless other lifestyle choices” (2020, 2).

This is applicable to any sustainable behavior, and this is why some authors stress that the proposed nudges “should not be meant to replace more strict [sic! ...] policies” (Ferrari et al. 2019, 8) but rather “serve as a useful complement” (Broers 2017, 4).

The five considerations outlined above should be kept in mind when devising and implementing nudges. As noted above, this is only a very short analysis of the most important considerations named in the sources. But it shows that much research still needs to be done on sustainable nudging.

## 5.2 Nudges for project 123V

In the following an overview of the different studies contained in the sources, and the kinds of nudges implemented, are presented. Detailed information on the studies was specified by manually developed document variables which identify certain aspects of the study, like ‘type (and specification) of the intervention’, or the ‘products’ involved. For the whole document variables tables see Annex III. This presentation is not to be seen as an attempt to compare or assess the studies, as a Systematic Literature Review might do<sup>36</sup>. Rather, it is designed to be a quick and structured way of organizing general information on the studies. Of the 16 studies, 13 reported (slightly) positive outcomes, two found no effect and one study produced ‘negative’ results. As to why nudging studies may have no traceable outcomes or even achieve the opposite of their goals will be discussed later of this chapter. The following Figure 7 depicts the different nudges tested in these settings, typified along the sustainable nudge Framework<sup>37</sup>. If a study implemented more than one (utilizable) intervention, these were categorized according to the one that was most relevant to 123V.

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<sup>36</sup> A Systematic Review would be impossible based on such varying study settings, participants, methods etc.

<sup>37</sup> Of course, some categorizations might be discussed on both the conceptual and nudge level, but the decisions were made to the best of knowledge based on the information given by the studies’ authors.

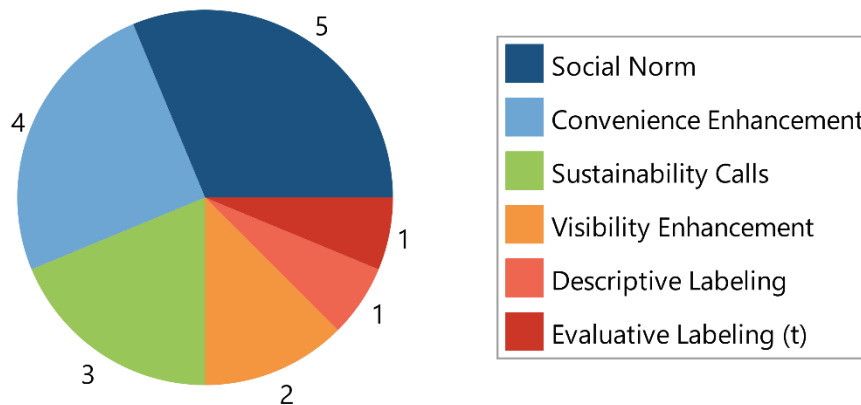


Figure 7: Typology of Nudges in the Sources, based on the SNF

Social Norm nudges and Convenience Enhancements are represented in five and four papers respectively. Sustainability Calls are studied in three, and Visibility Enhancement in two, whilst the others are studied only once. Evaluative Labeling is marked with a (t), as the nudge implemented here is delivered by a specific technical device. Size Enhancements are not represented here, as they do not fit the supermarket setting. But another of the eight SN Framework nudges is missing, as unfortunately no study included Hedonic Enhancements (one of the three affectively oriented nudges). This may point towards a possible niche in for further studies. As to the setting of the studies, half of them were undertaken in real supermarkets, while three took place in virtual reality or online supermarkets, and one was an online questionnaire. The last four were tested in other public commercial settings like a café or canteen. Even though they were set outside of supermarkets, the nudges tested could easily be transferred to the 123V project, because they implemented Social Norm (two papers), Sustainability Calls, and Descriptive Labeling nudges (each once).

In the next section, various nudges presented in the sources in form of studies are discussed. Those presented are deemed to be of particular interest for project 123V, organized in order of the most promising inspirations. These are followed by a few further nudge proposals which were gained from the other papers in the sources. Huitink et al. (2020) implemented combined two nudges at once for their successful study aiming at increasing the number of vegetables bought (especially by families): a Social Norm nudge and a Convenience Enhancement. They construed an inlay (the Convenience Enhancement) for the shopping trolley, which was spread over half the physical bottom and the side of the trolley facing the customer. A message was printed on it (the Social Norm), as can be seen below in Picture 2. The text on the inlay states “[t]he three most popular vegetables in this supermarket are 1) cucumber, 2) avocado and 3) bell pepper” (ibid., 3). The text resulted from a pilot study used to devise the most popular social norm nudges, as well as the two alternatives “Most customers pick at least seven vegetables”, and “Asha, mother of two children: ‘I frequently give my children vegetables as a snack, for instance, small tomatoes, bell peppers or carrots’” (ibid.). The descriptive



norm is used in all three messages reflecting what either most people do, or what one person does most frequently. Picture 2 depicts the inlay.

Transferring this double nudge to 123V is possible in various ways. An inlay could be created for sustainable products in general, focusing on the wide variety of organic, regional and healthy foods present by means of pictures (possibly adding the Hedonic Enhancement nudge to the foray). But perhaps it is sensible to dedicate a specific part of the inlay to the unpackaged goods. Firstly, for practical reasons, it might be good to have an area in the trolley where the unpackaged goods (now possibly packed in the store-offered paper bags or own boxes) are more secure, and the shopper might remember better where it is located in the trolley, so as to not stack other heavy or sharp-cornered products on top.

Secondly, the inlay might draw attention to the possibly until now unknown unpackaged goods. Depending on the size and setting of each supermarket, it may be possible that the dispensers are located in areas or in positions where they have not been acknowledged consciously by some customers. In addition to implementing the inlay, developing a Social Norm message for it might further nudge customers to the unpackaged goods. The Social Norm nudge could be developed in a pilot study as Huitink et al. describe, but due to the fact that the use of dispensers cannot be described as being the norm yet, a dynamic norm is recommended



Picture 2: Trolley Inlay, presented by Huitink et al. (2020, 3)

instead, similar to the example by Loschelder et al. (2019, 2 et sq.), presented in chapter 4.2.2.

Second, Kalnikaitė et al. (2011) present another nudge connected to the trolley: a technical device for Evaluative Labeling, a so-called lambent device which means different lighting systems give information on sustainable aspects of a product scanned, as seen in Picture 3. The device they present forms part of the handlebar and gives information “about food miles (i.e. how far the food product has travelled to arrive at the supermarket) as well as information on whether or not the product is organic” (ibid., 12). Customers can scan the barcode of products and receive feedback via the color and width of the lighting.



*Picture 3: Lambent Device, presented by Kalnikaitė et al. (2011, 1)*

While the findings on the nudge were positive, it is important to note that the paper is from 2011 and thus the oldest one in the sources. As especially technical areas develop fast, transferring this idea to 123V worth researching what options are offered nowadays. Another technical device, explicated in chapter 3.3. The ‘personal shopping assistant’ in form of a smartphone app developed by Asikis et al. (2021) offers information on sustainability to interested customers in supermarkets. The transdisciplinary team developed sustainability criteria and information on a wide variety of products, which could be retrieved by customers by scanning the product barcode. According to the authors, the app was quite successful and further supports the findings by Kalnikaitė et al. that customers are interested in this kind of information and make use of it, if it is presented in an accessible way.

Ohlhausen/Langen’s (2020) study is the only one focusing on Descriptive Labeling, and for 123V especially the development of the labels is of interest. The study focuses on nudging consumers to pick the most sustainable dish in a cafeteria which in itself is not relevant for this project. But they conduct a study to determine the best descriptive labels for each dish, in the categories “regional”, “seasonal”, “organic”, “sustainable” and “healthy”. This could provide interesting insights for the development of descriptive labels for the food dispensers. A second reason the study is of interest, is that the implementation of a second nudge parallel with the Descriptive Labels actually led to lower sales of the designated dish. This is related to the consideration mentioned above that the combination of nudges leads to ambiguous results.

Concerning signs and messages, Chakravarty/Mishra (2019) present a Sustainable Calls<sup>38</sup> nudge by attaching posters to office cubicles and above printers, with the message “reduce, reuse, recycle – use less paper” (ibid., 4) and a crying cartoon tree printed on it. The success of this nudge might warrant applying similar posters next to the dispensers, adapted to the message of using less packaging. A study implementing a Visibility Enhancement nudge is that of Chapman et al. (2019), who successfully implement floor arrows leading the way to nutritious food. This nudge, alongside two others, led to an increase in total sales of the nudged products. Installing floor arrows, leading to the dispensers and the most sustainable foods offered, might be an interesting nudge for 123V, especially in the larger supermarkets offering unpackaged goods.

The two final nudges presented concern the layout of the supermarkets where the dispensers are located. Walmsley et al. (2018) used five years of data from a supermarket store to research the influence of repositioning of the fruit and vegetable stands. They found that the most accessible position at the entrance yielded the highest sales, thus validating the Convenience Enhancement nudge. Relating this to 123V, it may be worthwhile positioning the dispensers immediately at the entrance, or at a very prominent location, facing the customers if possible (instead of lining the aisles they walk along). Coucke et al. (2019) tested a Visibility Enhancement nudge, by increasing the number of shelves dedicated to a more sustainable meat alternative (poultry), while decreasing the shelf space for meat. They found a positive effect for the sales of poultry, but the sales of other meat did not decrease. The possibility of not replacing some, but rather adding more products to the purchase should be kept in mind. The general applicability to the project 123V lies in the notion that more shelf space leads to more purchases, indicating that possibly the more space is dedicated to the dispensers, and the more products are offered in them, the more people might buy unpackaged goods. The conceptual level of the nudge, the cognitive orientation, could explain this effect as people feeling that the more space these products take up, the more they are a requested and a normal product to be bought.

As this research has shown, many studies have been conducted on nudging that can inform on the supermarket setting and sustainability. Before any nudges are tested, it is highly recommended to review the literature consulted for this thesis, or further work. One example of specific information on a nudge is exemplified in the following. When thinking about descriptive labeling nudges, Lazzarini et al. (2017) offer insights on the meaning of sustainable labels for consumers. They self-proclaim their study to be the first to research the “influence of different aspects of production on perceived environmental impacts and social sustainability” (ibid., 12) of foods in a supermarket setting. Resulting from this, they found that organic or fair-trade labels, as well as denoting the country of origin helped customers judge the social and environmental impact correctly (ibid., 10,12).

For project 123V the most relevant is their finding that regional products were rated as very sustainable, underlining the importance of labeling regional foods clearly as such. Nevertheless, especially the effects of the mode of transportation and the seasonality of products are misjudged by the study participants. To address the sustainability of products in a coherent

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<sup>38</sup> In this instance, the title Chakravarty/Mishra (2019) give their nudge themselves is an injunctive Social Norm. As mentioned above, it is not easy to draw lines and exactly categorize every nudge to one title. But in this instance, it was rather deemed a Sustainable Calls nudge according to the SNF based on its static application over ten weeks. As mentioned above, Injunctive Social Norms are more context dependent and usually adapt to the behavior of a person (giving positive or negative feedback).

way, Lazzarini et al. (2017) propose a table similar to a nutritional values table on the back of products, or a comprehensive traffic light guide on the sustainability of products, including diverse environmental and social sustainability aspects (ibid., 12). To develop this, a tool like the one mentioned by Ohlhausen/Langen (2020) might be useful. They reference Engelman et al.'s tool that evaluates different criteria to determine the sustainability of products, based on the

“four dimensions of sustainability [...]. These criteria are, for example, the material footprint, carbon footprint, water demand, floor space demand, fair trade standards, animal welfare considerations, energy content, fibre content, fat content, carbohydrate content, sugar and salt content” (ibid., 3).

This tool is developed specifically for the out-of-home catering, but according to the listed criteria, much of it pertains to supermarket products as well. Additionally, Asikis et al.'s (2021) study can be consulted on how they developed the criteria for sustainability. Employing these to generate tables informing on the sustainability of products would constitute a Descriptive Labeling nudge.

The above mentioned exemplifies the importance of consulting the existing research on nudges, if only to be able to gauge the contribution of the own work to this largely unclear field. Especially the systematic literature reviews presented here present a well-arranged overview of the most important studies, their settings, and effects, for example Slapø et al. (2019).

This chapter epitomized on the knowledge on sustainable nudges resulting from the data analysis. Contrasting the results presented in chapters 4 and 5 with the theoretical basis from chapter 3 forms the basis for the discussion on nudging for sustainability, which is presented in the next chapter.

## 6 Discussion

This chapter integrates the findings from the data analysis with the theoretical background acquired beforehand and answers the three research questions (presented in chapter 1.2). They provide the structure for this chapter.

The first research question asks how nudging is defined by academics engaged in nudging. The data analysis presented in chapter 4.2.1 forms the basis for the answer to this question. A discussion of the definitory traits and the most controversial points researched are presented in the following. As the study is of an exploratory nature, many recommendations to further areas of research are also suggested.

The quantitative evaluation of definitory traits of nudging, revealed little consensus on that matter. The results of the analysis in this chapter demonstrate that not all aspects of nudging named by Thaler/Sunstein are considered equally important or even included in definitory statements about the concept by other scholars. This may be due to the fact that many papers contain only brief definitory statements on nudging. This renders impossible the original idea of coming closer to a clearer and canonical definition of nudging with this analysis. What is more, it demonstrates that the conceptual cloudiness and inconsistency detected already in Thaler/Sunstein's original book has not been improved much or elaborated on in a way adopted by the general academia.

Therefore, the aim of deriving and developing a more concise and up-to-date definition of nudging is not fulfilled. The quantitative display of defining aspects of nudging does not allow for generalizable statements, as there are barely predominant aspects mentioned by all. This study shows that only the related concept of choice architecture and the 'Stipulative Definition' (cf. below) proposed by Thaler/Sunstein are named by at least half of the papers. The perception that this statement counts as a definition, is confirmed by more than half of the papers in this study. Thus, this stipulation seems to be taken as a sufficient and representative definition of nudging for many of the papers represented in these sources:

"A nudge [...] is any aspect of choice architecture that alters people's behaviour in a predictable way without forbidding any options or significantly changing their economic incentives. To count as a mere nudge the intervention must be easy and cheap to avoid. nudges are not mandates. Putting fruit at eye level counts as a nudge. banning junk food does not" (Thaler/Sunstein 2009, 6).

Of course, this stipulative definition encompasses four of the single definitory traits identified, so it represents various traits at once. But in some cases, this is the only definition given (e.g. Chapman et al. 2019) and thus none of the six other possible definitory traits are mentioned. That this suffices for some academics, especially those studying nudges, as a definition is an interesting finding, implying that other authors do not feel the need discuss any of the conceptual problems addressed by so many other academics. Going back to the very specific definition offered by Hansen (2016, 174), it thus remains uncontested as the theoretically most precise definition come across in this thesis (cf. chapter 3.2.2). It is not explicated further here, it only serves as a referral, as Hansen's definition is derived from an extensive, well-organized argumentation which should be consulted to gain full understanding of the arguments. Suffice to say here, it is highly recommended to gain a better understanding of nudging.

The quantitative data analysis revealed that the most contentious traits of nudging are mentioned least in the sources. Especially the concept of transparency, the better-off argument and

the freedom-preserving aspect are named very few times, considering that for some scholars these aspects are the ones that ensure its ethicality. The aim of nudging making people better off was mentioned in roughly a third of the papers, and the question of transparency in only five sources. The small quantity of mentions rendered a qualitative assessment of the exact meaning or understanding of these traits not meaningful in the overall aim of coming to a more canonical understanding of nudging.

Based on the above findings, the concept of nudging seems problematic in the sense that it is a theoretically imprecise, real catch-all term that authors use in distinct ways. This is similarly confirmed by the qualitative analysis of the concept of choice architecture, which is shown to be understood in at least three different ways in the sources. Notwithstanding the definitional problems of choice architecture, this study underlines that the concept is closely related to nudging, as two thirds of the sources refer to it. Libertarian paternalism, the other more theoretical concept named in relation to nudging, is mainly named when referring to critique of Thaler/Sunstein's concept. One possible explanation for this could be the proposition stated above: a clear and practical definition of nudging is seemingly not relevant to many authors of the sources, which renders the mentioning of libertarian paternalism unnecessary. Another possible explanation is that the whole question of paternalism is mostly relevant to nudging as a policy tool. If nudging is to be a policy tool, it draws much attention from political, juridical, and ethical academics. But the question of paternalism presumably does not raise that much discussion when discussing the workings of private companies. This possible connection could well explain the rare mentions of libertarian paternalism in relation with health(y) or environmental nudges in micro-environments.

Other controversial topics like the question of economic incentives, or whether nudges trigger automatic system 1 or reflective system 2 are detected in the data. But even though more than half of the comments on the issue state that nudges trigger system 1, the question cannot be clearly answered, as four papers make the case for nudges triggering system 2. Based on perceived ongoing debate on this question, it might be beneficial for further research to not focus too much on the system 1 or 2 problem. As for example Cadario/Chandon (2020) showcase, other psychological concepts like the trilogy of mind might be better fit to form the theoretical basis for nudging. Additionally, it seems that the uncertainty surrounding this question does not hinder practitioners from implementing nudges. These suggestions deserve further research.

Concerning the critique issued on nudging, the questions of nomenclature already outlined in chapter 3.2.2 are echoed in only a few sources of this study. Five papers address conceptual issues, testifying to the missing definitional clarity. Vecchio/Cavallo (2019) perceive it as a catch-all term, which is decidedly supported by the findings in this study. The ethical questions, especially considering manipulation and the contradictory evidence on nudges are acknowledged by a similarly small number of sources. Of special interest here is the finding that only two of the 16 studies implementing nudges mention any kind of criticism concerning nudging. This points again to the possibility that these questions do not concern nudging practitioners all too much. As shown by this study, the criticism of different aspects of nudging is by no means reconciled. Rather, these aspects warrant further research, especially from the different research areas like ethics, psychology and behavioral economics.

The question of both commercial and social marketing remains rather unresolved. In the following, the commonalities of commercial marketing and nudging are pointed out, as well as

differences proposed. a differentiation is proposed below. Social marketing is addressed afterwards. Though a third of the sources mention ‘marketing’, no consensus can be detected as to how it relates to nudging. Some proposed nudges in the Sustainable Nudge Framework (SNF), like Visibility Enhancements, surely are commercial marketing strategies, already applied in supermarkets. This is in line with Thaler/Sunsteins (2009, 236) original argument that nudging is inevitable and happens everywhere. Unfortunately, none of the sources naming marketing specify insights from research done here, that could help with the understanding of how nudging might work best. It seems that nudging could profit from commercial marketing research. But aside from these empirical considerations, the fact that none of the sources elaborate on the differences to nudging could imply that to practitioners, the differences or commonalities of nudging and marketing are not as relevant.

Based on the quantitative analysis of defining traits of nudging, a case for some differences between *commercial* marketing and nudging can be made. This is based on the fact that a third of the sources name ‘making people better off’ as a definitory trait of nudging: increasing the well-being of people and planet, as for example the Agenda 2030 argues, nudging thus aims at aligning people’s behavior with their intentions with regard to health, waste-reduction or sustainable consumption. It could be argued that some commercial marketing strategies rather aim at increasing the revenue, independent of these aspects. By placing for example sweets and soft drinks close to the cashier, it is made it harder for consumers to shop in line with their intentions (Thorndike 2020, 1). Thus, based on the assertions of Vandenbroele et al. (2020, 2), it is argued that nudging clearly encompasses taking the perspective of the person nudged and aiming for their well-being in the sense of enabling them to align their behavior and intentions. A further difference arising from the sources is that economic incentives are surely a classical commercial marketing strategy. But more than half of the sources assertively exclude these from the repertoire of nudging tools<sup>39</sup>.

As described in chapter 3.2.1, Saunders et al. in turn define *social* marketing as “the application of marketing principles to enable individual and collective ideas and actions in the pursuit of effective, efficient, equitable, fair and sustained social transformation” (2015, 165). It appears social marketing could provide some interesting insights for sustainable nudging, but unfortunately is only briefly named twice in the sources without being elaborated.

To subsume all this in a brief answer to the research question, the nudge-defining aspects most referred to with nudging are the ‘Stipulative Definition’ of Thaler/Sunstein’s original work and the relation of nudging with choice architecture. Based on this study, it can be argued that a more comprehensive, clear definition, (elaborating perhaps the relationship to concepts like choice architecture or marketing) has not evolved in the area of nudges aiming at sustainability in micro-environments. Despite the increasing research on nudging, the various critical considerations on e.g. its ethicality and effectiveness prevail. Further research on these questions is strongly recommended.

The second research question focused on nudges that can be implemented in a supermarket setting, especially for food dispensers as the ones being implemented in the project 123V. The quantitative analysis identified twelve differently named nudges through open coding. But

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<sup>39</sup> This number is reached requesting the number of papers referring either to the ‘stipulative definition’ and the ‘no economic incentives’ defining traits in Maxqda.

clearly defining them clearly was rendered impossible due to their overlapping and contradictory contents. Three main problems were identified, the first and foremost being the nomenclature. The titles of specific nudges are chosen and applied based on various aspects, for example the intervention instrument (e.g. labels) or the hypothetical mechanism of the nudge (e.g. social norms). This inhibited the development of exhaustive, non-redundant and clear nudging categories based on the data generated by the analysis. Thus, the focus turned to existing nudge frameworks similar to Hollands et al. (2013), which is presented in chapter 3.3. The framework mentioned most in the sources, was developed by Cadario/Chandon (2020). It proved not only to be an empirically and theoretically well-based framework. Their Healthy Eating Nudge (HEN) framework was adapted by Vandebroele et al. (2020) to encompass nudges for Sustainable Food Consumption (SFC) and thus provides a valuable basis for discussing sustainable nudges in the supermarket context.

Especially beneficiary is the perspective that the SNF omits the question of nudges triggering the automatic system 1 or the reflective system 2 by organizing the different nudges according to the mental activity they trigger. Basing their typology on the well-established psychological concept of tri-partitioning mental activities, the intended effect of a nudge is made clear according to the conceptual level it is allocated to. The cognitive, affective and behavioral orientation of the nudges Cadario/Chandon (2020) propose, constitute their conceptual strength. The extension of Cadario/Chandon's (ibid.) framework by Vandebroele et al. finally encompasses eight kinds of nudges, all specified quite clearly by both groups of authors: Descriptive and Evaluative Labeling, Visibility Enhancement, Hedonic Enhancements, Sustainability Calls, Social Norm Nudges, Convenience Enhancements, and Size Enhancements. Hedonic Enhancements is a type of nudge that is not represented in the nudges found in this study. Thus, it might be interesting to develop some ideas as to how this type of nudge could be applied to micro-environments like the supermarket. Looking to marketing might reveal some promising approaches in this area, as surely research here has focused on the influence of e.g. different sensory effects on shopping behavior.

The subsumption of all nudges found in the sources of this study into the SNF established in chapter 4.2.2 was not possible due to the limits of this thesis. But it would provide interesting further research to try and integrate other nudges (from other frameworks) into one overarching framework. This could provide a comprehensive basis for further research on nudging in micro-environments aiming at more sustainable shopping behavior.

Thus, the second research question can be answered with the SNF: the typology of nudges provided here is not only based on micro-environment settings but is also oriented towards sustainability. The nudges discussed in the 16 studies included in this thesis are all allotted to the nudges included in the SNF via the document variables (cf. Figure 7 in chapter 5.2 or Annex III for the whole table of document variables).

The third research question finally aims at general knowledge on nudges for sustainability and their possible benefits. Most of the question is answered in chapter 5. It is argued that even though the concept of sustainable nudges is not mentioned in any of the sources, the nudges included and discussed in them qualify as such. This is due to the inclusion criteria of the study, which defines the aim of the nudges as contributing to more sustainability based on the Agenda 2030 and the SDGs. Thus, the insights presented in the sources of this study provide information on sustainable nudges. In addition to presenting some examples of sustainable nudges for the food dispensers in project 123V, a few cautionary notes on nudging, collected



in the sources, are addressed in chapter 5. They showcase problems arising from the research on nudging, including e.g. the uncertainty on which factors influence the effectiveness of nudges. This provides a basis of critical aspects to consider when implementing further studies on nudging.

One possible benefit of sustainable nudges derived from this study is that they do contribute to more sustainability, as defined by the SDGs. The (slightly) positive results reported in the studies on nudges indicate their potential to further healthier and environmentally friendly behavior of customers, thus impacting the food supply chain and achieving more sustainability. Additionally, the further extension and theoretical underpinning of sustainable nudges based on e.g. the SNF benefits researchers studying nudges for sustainable ends, as a more consistent nomenclature evolves. The most important insights gained on sustainable nudges in chapter 5 are discussed in the following.

First and foremost, sustainable nudging does not aim to replace other policies, rules, incentives or interventions aiming at more sustainability, as Ferrari cautions (cf. chapter 5.1). As argued in chapter 3.1, sustainability for people and planet can only be achieved by many different strategies working together. Sustainable nudging, as proposed here, can be seen as a possible addition to these strategies, keeping in mind the crucial considerations mentioned in chapter 5.1. To render research on nudging more reliable and comparable, it is deemed important in clearly separating different areas of nudging. This could yield more certain results on its effectiveness and influences on it. For example, by setting the focus on sustainable nudges in micro-environments pertaining to private companies, some of the conceptual problems concerning nudging as a policy tool become irrelevant. Thus, further research on sustainable nudges for micro-environments could possibly omit some of the ethical discussions on societal implications, setting free more research resources for other questions. As a reverse example, the question of differentiating commercial marketing from nudging is most relevant for sustainable nudging in company-owned micro-environments (compared to nudging as a policy tool).

Another advantage of clearly defining and compartmentalizing different nudging areas is that e.g. the issue of transparency could be discussed more precisely. The question of how to make nudges transparent in supermarkets is, as argued above, possibly not as important to practitioners. This is due to the regular implementation of marketing strategies, which arguably share some important traits with nudging. On the other hand, it is much easier to discuss the question of transparency in the specific setting of sustainable nudging in micro-environments, than based on nudging as a policy tool. As mentioned above, the question of transparency could not be resolved in this study based on the sources. Thus, it is proposed here that for sustainable nudges in the setting discussed in this thesis, the considerations of Bovens (2009) and Baldwin (2014) presented in chapter 3.2.2 suffice. They argue that a person should be able to identify a nudge when being watchful. Of course, the exact meaning and extent of this statement should be further specified in further research. But based on the resources of this thesis, this is one of the few, and thus the most convincing perspective on this issue.

At this point, the statement that nudges should make people better off is addressed once more. As established above, one of the differences between commercial marketing and sustainable nudges is the perspective of ‘making people better off’. This is attributed to sustainable nudging, while commercial marketing is aimed at increasing revenues for retailers. It is stressed here that in the sense of the Agenda 2030 and the SDGs, making people better off does not

only aim at the individual. Rather, making people better off refers to benefiting all and contributing to the public good in the sense of sustainability, as argued by sources included in this study. Thus, the declared aim of the Agenda 2030 of doing good for people and planet frames the perspective of sustainable nudges. Transferred to the food dispensers of 123V, they clearly contribute to the good of both people and planet by reducing plastic waste and providing organic, regional, and fair-trade foods. Thus, implementing sustainable nudges aims at benefiting the individual nudged, but also the people in the community or around the globe, as well as the planet itself. This encompasses a clear consequence for retailers as well. When implementing sustainable nudges, the focus clearly is on achieving more sustainability to the better of people and planet, while the commercial marketing-related aim of increasing revenues is not of importance.

A few of the problematic aspects of nudging could be addressed and resolved in this thesis, at least for the proposed concept of sustainable nudges. But a variety of issues require further research in this field. As shown by the data accumulated for this thesis, the studies included clearly state setting (e.g. supermarket) and aim of the intervention(s) implemented (i.e. sustainability). Thus, more theoretically oriented research in these specific fields could address the generally renowned problems of nudging in these specific contexts. On the other hand, the development of a more reliable, comparable research frame for nudging studies would benefit researchers across disciplines. Thus, the arguments presented in chapter 3.3 for further research on nudging and the demand of Szaszi et al. (2018) for more homogeneity in research is reinforced by the findings in this study.

To summarize the answer to the third research question, this study found no existing concept of sustainable nudging in the data but argues for the understanding of the papers included in this study as sustainable nudges. The data analysis did reveal interesting examples of sustainable nudging in supermarkets, which are presented in chapter 5.2. The benefit presented by the research on sustainable nudges presented here is that it displays the relevance of accumulating e.g. health and green nudges in one framework, as they contribute to more overall sustainability. By creating a stronger theoretical basis for sustainable nudges as well as developing a more coherent research strategy for them, further research could contribute even more to the overall benefit of sustainable nudges.

Concerning the conceptualization of further research, it might provide deeper insight into possible sustainable nudges for supermarkets to either include more sources into a similar study and focus e.g. on filtering and categorizing nudges into the SNF. On the other hand, by concentrating on only a few sources, a more qualitative and deeper understanding of some of the issues addressed in chapter 4.2.1 could be achieved. Additionally, the 16 nudge studies contained in the sources could be evaluated more carefully, concentrating on the influences on their effectiveness mentioned by the authors, to possibly render a clearer picture of when interventions work. Alternatively, these insights could also be gained by comparing and drawing insights solely from systematic literature reviews, which focus exactly on comparing and assessing the setting, the implementation and effectiveness of nudge studies. Furthermore, the later works of authors named in chapter 3 could be consulted. As the sources included in this study were generated by a literature search, they did not include following up on authors who previously contributed to nudging. Perhaps they contributed interesting further insights but did not match the inclusion criteria for this study for some methodical reason.

This study adhered to Singh's statement (denoted in chapter 2.2) that exploratory research represents initial research and can only form the basis for more conclusive research. As noted throughout this thesis, many topics could only be addressed superficially due to the complexity of the matter. Many areas of research that could possibly further inform on nudging, like psychology, ethics, marketing, public policy and of course behavioral economics would have exceeded the frame of this thesis. But as clearly stated throughout this thesis, the research exploratory and thus serves as a starting point for more comprehensive research on the issues raised.

## 7 Conclusion

This chapter briefly summarizes the research conducted in this thesis. Furthermore, the question posed in the title of this thesis, if nudging constitutes a mere ‘trend’ or rather a driver of sustainability, is addressed. The chapter concludes by pointing out the limitations of this study, as well as ideas for further research.

The Earth Overshoot Day is calculated by the Global Footprint Network every year, constituting an international research organization which “provides decision-makers with a menu of tools to help the human economy to operate within Earth’s ecological limits” (Global Footprint Network 2021b). To end the overshoot, they provide various steps to ‘move the date’, ranging from increasing plant-based diet to challenging political leaders to orient decisions towards creating a sustainable future (Global Footprint Network 2021a). As these examples show, not only various strategies are required to ensure a sustainable future for all, but different agents must take steps for more sustainability. The Agenda 2030 and its 17 Sustainable Development Goals (SDGs) argue in line with this, obliging not only policy-makers, but also academics, companies and the individual to take action.

One strategy that is increasingly discussed by policy-makers, academics, and companies is the behavioral intervention nudging, as established by Thaler/Sunstein (2009). Originating in behavioral economics it was developed as a policy tool but has quickly evolved as a widely researched strategy for enabling greener or healthier behavior also in private settings. This thesis researched the possibility of implementing nudges for more sustainability in the specific context of a supermarket, based on project “1, 2, 3 Verpackungsfrei” (123V). The transdisciplinary team of academics at the university of Graz as well as representatives of the food store chain spar aims at reducing waste in the supermarket, while promoting more sustainable alternatives. The specific focus, which this research is oriented towards, is the implementation of unpackaged food dispensers in supermarkets in Styria. But while research shows that people are evermore motivated to change their consumption behavior to more sustainable alternatives, this is rarely followed through (Stafford/Graul 2020, 12). This so-called action-value gap provides a possible obstacle to consumers accepting and using the dispensers. Thus, the question if nudging could facilitate the alignment of consumers’ desires to shop more sustainably by using the dispensers formed the basis of this exploratory study.

To answer the three research questions established in chapter 1.2, this study relied on a literature search of the most relevant literature and comparable studies, followed by a data analysis of the resulting 34 papers. The study presented here is of exploratory nature, as no research has been done before concerning such a specific setting for nudges. The general contents of this research is presented in the following, structured around the research questions.

Research question one concerned the defining traits of nudging named by the sources. As nudging sparks many controversies over its conceptual basis, this study first aimed at developing a better understanding of the concept of nudging. The quantitative analysis of the sources revealed the common practice of academics to accept Thaler/Sunstein’s (2009, 6) proposed stipulative definition of nudging as a main point of reference. Other aspects of importance according to Thaler/Sunstein, such as the requirement of nudges being transparent, and their general aim of making better off, are named only a few times. Thus, no concrete or more specific definition of nudging, especially for the supermarket context, crystallized. It ra-

ther seemed that due to the unequal distribution of criticism on nudging that researchers implementing and studying nudges focus less on the definitory distinctions, while theoretical papers or systematic literature reviews engage more in it.

The second research question asked for the types of nudges proposed in the sources that could be implemented in supermarkets. An existing and refined typology of nudges emerged as highly valuable, due to its conceptual strength and the amount of research that has been conducted on it: the Healthy Eating Nudge framework, proposed by Cadario/Chandon 2020 and adapted by Vandenbroele et al. (2020) to the Sustainable Food Consumption framework. The fusion of the eight nudges presented in chapter 4.2.2, is named the Sustainable Nudge Framework (SNF). This provides a nomenclature and conceptual basis for the nudges discussed for the implementation in project 123V.

The last research question focused the research on the concept of sustainable nudges and the potential benefits it entails. The concept of sustainable nudges does not exist in the sources consulted. Due to the benefits such a concept might provide, it was proposed to extend the SNF with the knowledge accumulated on 'green nudges' or 'health nudges'. Based on the comprehensive framework offered by the Agenda 2030 and the SDGs, sustainability was defined as encompassing not only environmental protection or sustainable consumption, but also health and general well-being – not only of the people, but also the planet. This definition of sustainability forms the basis for understanding sustainable nudges as the implementation of interventions based on the perspective of the individual and aiming at their well-being in every sense. Finally, the most interesting nudges researched in the studies contained in the sources are proposed, with considerations on how to implement them.

The title of this thesis poses the following question: The behavioral intervention "nudge" as a mere trend or a potential driver of sustainability? This question can clearly be answered: nudging is both a trend and a potential driver of sustainability. The increase in papers on the topic going hand in hand with the assertion that nudging is a catch all term, speaks to nudging being a trend. This is possibly perpetuated by the international attention the topic receives, thus ensuing further research. On the other hand, the increasing research produces real results, most of which speak to the influence nudges have on peoples' choice making. Even though the conceptual basis is criticized on various levels, and some studies showcase how nudges can have negative effects, most research testifies to nudging having positive effects. Therefore, emphasis is placed on the statement that nudging poses a *potential* driver of sustainability. More research on the effectiveness of nudges is needed, especially for specific settings like the supermarket.

### Limitations

A few limitations of this thesis are considered in the following. This exploratory study aimed at generating a general understanding of nudges aiming at sustainable behavior. As this is too wide a topic, the scope of this thesis was delimited to the specific setting of project 123V and the example of the unpackaged food dispensers to be implemented in supermarkets. This provided the orientation for the decisions on the method and analysis. But due to the niche-like quality of the setting, the literature search required the collection of literature from various related areas like health and green nudges. This multiplied the number of possible papers to be included and perhaps led to the final inclusion of too many papers to provide an in-depth anal-

ysis. As this study was declared exploratory from the onset, this did not incur finding answers to the respective research questions. But a more in-depth qualitative analysis of the data presented here could provide more clarifying insights on many of the controversies found.

Additionally, the question posed in the title of nudging being a trend or a potential driver of sustainability insinuated another problem that manifested itself in this thesis: nudging is an unclear concept, with no consensus having evolved in this area of research as to how it is specifically understood or what this implies for research. Even though a few papers included in this study delve deeper into the conceptual, ethical, or other critique, many settle for the stipulative definition proposed by Thaler/Sunstein (2009, 6). This provides neither a solid nor a practically applicable basis for research on such a specific topic as this thesis required. Possibly, some academics' rather superficial treatment of the concept is promoted by the trend-like status it has seemingly achieved. Whether or not, this conceptual unclarity consumed much of the theoretical preparation and analytical power of this thesis.

### Further research proposals

Countless opportunities for further research were uncovered in the course of this exploratory study. In the following, only the most pressing further research ideas arising from this study are named. First and foremost, a clearer conceptual basis and agreed-upon nomenclature of the kinds of nudges studied could benefit any further research on nudging. It would render it more comparable, measurable, and aid reciprocal understanding across different disciplines. Thus, developing the inter- or transdisciplinary understanding and concept of sustainable nudges might not only benefit nudging research, but also contribute to more sustainability in general. To this end, it might pose interesting to apply the very precise definition of nudging explicated by Hansen (2016, 174) to the proposed concept of sustainable nudges. Additionally, it might prove interesting to further elaborate on the Sustainable Nudge Framework (SNF), adapted in this thesis from existing frameworks to nudges for furthering sustainability. For example, all kinds of types of nudges proposed by various authors could be organized into the framework, to offer a clear and comprehensive nomenclature of nudges to be implemented.

Another specific topic that merits further research concerns the so-called automatic system 1 and reflective system 2. The extent to which nudges trigger either of these systems is debated in the sources of this study, seldom offering specific explanations. Especially for practitioners seeking to develop nudges for implementation, more clarity in this question could provide benefits. Furthermore, nudging could possibly benefit from insights gained in social marketing, as they share some defining traits. This was unfortunately not epitomized on by the studies contained in the sources. Additionally, research done on commercial marketing could provide important information on what influences the effects of certain nudges and to which extent. Some nudges in the SNF are surely congruent with classical commercial marketing strategies and could benefit from the knowledge provided by academics on these topics.

To subsume, this study provides various ideas on how sustainable nudging could be attempted in the supermarket, to help willing consumers align their behavior with their intentions of shopping more sustainably. Further research on the conceptual basis as well as practical implementation of nudging could lead to a clearer perspective on how it works best. These insights could in turn further sustainable consumption, for example by consumers in supermarkets, as researched in this study. Thus, nudging could contribute not only to fulfilling various

SDGs, but also represent one of the many strategies implemented to move Earth Overshoot Day further back again.

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9 Annex I: Search results (table)

Data base	No. of results identified	Previously found articles	Articles included for screening		Articles excluded based on eligibility		Date of search
			Search results	Proposed by database	Search results	Proposed by database	
<b>Science Direct</b>							
S1	16	0	4	0	2	1	19.01.2021
S2	3	1	1	0	0	0	19.01.2021
S3	9	1	0	0	1	0	19.01.2021
S4	38	1	1	0	6	1	19.01.2021
<b>SCOPUS (Elsevier)</b>							
S1	47	6	7	0	4	0	22.01.2021
S2	16	0	0	0	0	0	26.01.2021
S3	22	1	0	0	0	0	26.01.2021
S4	40	0	3	1	2	2	30.01.2021
<b>MedLine via PubMed</b>							
S1	20	8	3	2	1	1	30.01.2021
S2	2	0	0	0	1	0	30.01.2021
S3	11	1	0	0	0	0	30.01.2021
S4	17	4	1	0	1	0	30.01.2021
<b>Google Scholar</b>							
S1	50	12	4	0	5	0	30.01.2021
S2	50	0	1	0	0	0	30.01.2021
S3	50	0	1	0	0	0	30.01.2021
S4	50	6	5	0	5	0	30.01.2021

## 10 Annex II: Papers included in the data analysis

- Abrahamse, W. (2020): How to Effectively Encourage Sustainable Food Choices: a Mini-Review of Available Evidence. In: *Frontiers in Psychology*. 11, 589674.
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- Coucke, N., et al. (2019): Show Me More! the Influence of Visibility on Sustainable Food Choices. In: *Foods (Basel, Switzerland)*. 8 (6), 186.
- Demarque, C., et al. (2015): Nudging sustainable consumption: The use of descriptive norms to promote a minority behavior in a realistic online shopping environment. In: *Journal of Environmental Psychology*. 43, 166–174.
- Ferrari, L., et al. (2019): Can nudging improve the environmental impact of food supply chain? A systematic review. In: *Trends in Food Science & Technology*. 91, 184–192.
- Grilli, G./Curtis, J. (2021): Encouraging pro-environmental behaviours: A review of methods and approaches. In: *Renewable and Sustainable Energy Reviews*. 135, 110039.
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## 11 Annex III: Document variables (table)

Docu ment group	Author	Year	Theoretical concept	Social Norm	Result of intervention	Type of academic work	General Topic	Commercial setting	Nudge Typification (SNF)
S1	Ammerma	2017	Nudging			Theoretical Proposal	Healthy foods		
S1	Blom, Step	2021	Nudging		Positive	Study	Healthy foods	VR Supermarket	Convenience Enhancement
S1	Broers, Va	2017	Nudging			Systematic Review	Healthy foods		
S1	Cadario, R	2020	Nudging			Systematic Review	Healthy foods		
S1	Chapman,	2019	Nudging		Positive	Study	Healthy foods	Supermarket	Visibility Enhancement
S1	Coucke, Ni	2019	Nudging		Positive	Study	Sustainable foods	Supermarket	Visibility Enhancement
S1	Demarque	2015	Nudging	Descriptive	Positive	Study	Sustainable consum	Virtual Shop	Social Norm
S1	Hoeningk, J	2020	Nudging		No effect	Study	Healthy foods	VR Supermarket	Convenience Enhancement
S1	Huitink, M	2020	Nudging	Descriptive	Positive	Study	Healthy foods	Supermarket	Social Norm
S1	Just, David	2018	Nudging			Theoretical Proposal	Healthy foods		
S1	Kalnikaitė,	2011	Nudging		Positive	Study	Sustainable foods	Supermarket	Evaluative Labeling (t)
S1	Li, Meng &	2013	Nudging			Literature Review	Healthy foods		
S1	Slapo, Helk	2019	Nudging			Literature Review	Healthy foods		
S1	Thorndike,	2017	Choice Arch.			Theoretical Proposal	Healthy foods		
S1	Thorndike,	2020	Choice Arch.			Theoretical Proposal	Healthy foods		
S1	Vecchio, Ri	2019	Nudging			Systematic Review	Healthy foods		
S1	Vermeir, Ir	2020	Nudging			Literature Review	Sustainable foods		
S1	Vigors, Bel	2018	Nudging			Theoretical Proposal	Sustainable foods		
S1	Walmsley,	2018	Choice Arch.		Positive	Study	Healthy foods	Supermarket	Convenience Enhancement
S1	Wijk, René	2016	Nudging		No effect	Study	Healthy foods	Supermarket	Convenience Enhancement
S2	Becker, Cr	2014	Nudging		Positive	Study	Reducing waste	Workout Center	Sustainability Calls
S2	Chakravari	2019	Nudging	Injunctive	Positive	Study	Reducing waste	Offices	Sustainability Calls
S3	Rubens, Lc	2015	Beh. change		Positive	Study	Reducing waste	Supermarket	Sustainability Calls
S4	Abrahams	2020	Nudging			Literature Review	Sustainable foods		
S4	Ferrari, Lin	2019	Nudging			Systematic Review	Sustainable foods		
S4	Grilli, Gian	2021	Nudging			Systematic Review	Sustainable consum		
S4	Lazzarini, C	2017	Beh. change			Consumer survey	Sustainable foods		
S4	Lehner, Mi	2016	Nudging			Systematic Review	Sustainable consum		
S4	Loschelder	2019	Nudging	Descriptive	Positive	Study	Reducing waste	Café	Social Norm
S4	Ohlhausen	2020	Nudging		Positive	Study	Sustainable foods	Canteen	Descriptive Labeling
S4	Richter, Is	2018	Nudging	Descriptive	Negative	Study	Sustainable foods	Supermarket	Social Norm
S4	Steiner, B.	2017	Nudging			Consumer survey	Sustainable consum		
S4	Vandenbr	2020	Nudging			Literature Review	Sustainable consum		
S4	Wensing, J	2020	Nudging	Injunctive	Positive	Study	Reducing waste	Online Question	Social Norm

Table as provided by Maxqda.

## 12 Annex IV: Code book

Nudging - Concept, Critique and Related Ideas
Defining Nudging
Changing Choice Architecture (1)
Changing Decision Making (/Environment/Architecture)
Stipulative Definition
Nudges Trigger System 1 or 2 (5)
System 1 Nudges
System 2 Nudges
Making People Better off (8)
Freedom-preserving (7)
Exploits or Counteracts Bias (6)
Easy & Cheap to Implement (9)
No Economic Incentives/Easy and Cheap to Avoid (3+4)
No Prohibitions/Bans (2)
Making Choices more Convenient
Transparent (11)
Aligns Intention and Action (10)
Critique of Nudging
Ethical and Societal Implications
Manipulation
Contradictory Evidence on Nudging
System 1/2 uncertainty
Unclear Concept
Misunderstanding T&S
Economic incentive
OD - Other Concepts
Groundwork for Nudge
Tversky&Kahnemann - Heuristics & Biases
Kahnemann - Dual-Process Theory of Behavior
CA - Choice Architecture
"Active" Method/Tool
"Passive" Context of Decision Making
A Type of Intervention/Nudge
LP - Libertarian Paternalism
Problems with (L)P
Nudges = L and P (normative)
BE - Behavioral Economics

Definition
Theory & Strategy (Scientific Approach)
About Behavior/Decision Making Context
Contra Classical Economics / Homo Oeconomicus
N is Element of BE
CA/N uses BE
Policy Tool
Marketing
Different from N/CA
Similar to N/CA
Social marketing
DI - Specific Nudges
Specific Concepts
Cadario & Chandon - Healthy Nudges
Hollands -TIPPME - 2017
Blumenthal-Barby & Burroughs - 6 Principles
Dolan et al - MINDSPACE
C&C - Healthy Eating Nudges
Cognitively Oriented Nudges
Descriptive Nutrition Labeling
Evaluative Nutrition Labeling
Visability Enhancements
Affectively Oriented Nudges
Hedonic Enhancements
Healthy Eating Calls
Behaviorally Oriented Nudges
Convenience Enhancements
Size Enhancements
V et al - HEN adapted for SN
Social Norms
Descriptive Norms
Injunctive Norms
Dynamic Norms
Descriptive and Injunctive Norms
Information Provision
Easy & Simple Messaging
Product Placement/Convenience
Labeling

Pre-commitment
Priming
(Visual) Prompts
Salience
(Visual) cues
Default
Scarcity
FI - Further Insights
Human Gaps and Limits
Attitude-Behavior Gap
Bounded Rationality
Intention-Behavior Gap
Value-Action Discrepancies
Green/Environmental/ESFC Nudges
Defining GN
To further sustainable behavior
...behavior change
Rising importance
Additional strategy
Effectiveness uncertain
Examples
Health nudges
Defining HN
To further healthy choices
...behavior change
(Rising) importance
Additional strategy
Effectiveness uncertain
Nudging for Sustainable Food Choices/ESFC
Further research is needed
Studying Nudges is Difficult
Factors influencing Nudging
"Negative Nudge"
Impulsivity
Different groups of people
Mental activities
Habits
Attitudes and beliefs

(Universalism) values
Trust in message/ messenger
Sustainability/Environmental concern
Bad conscience
Pricing
Positive predisposition
Bias
Combining Nudges? (+)
Negative Effects: Boomerang, Reactance, etc. (+) (+)
Long-term Effects (+)
Transparency / communicating nudges (+)
Infos for Sustainable Nudges
Labels
Sustainability of Products

Code book as provided by Maxqda.

### 13 Annex V: Figures of further data emerging from the coding process

Code System	S1-4
<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>Groundwork for Nudge <span style="float: right;">20</span></li> <li> <ul style="list-style-type: none"> <li>CA - Choice Architecture                             <ul style="list-style-type: none"> <li>"Active" Method/Tool <span style="float: right;">6</span></li> <li>"Passive" Context of Decision Making <span style="float: right;">8</span></li> <li>A Type of Intervention/Nudge <span style="float: right;">4</span></li> </ul> </li> <li>LP - Libertarian Paternalism                             <ul style="list-style-type: none"> <li>Problems with (L)P <span style="float: right;">6</span></li> <li>Nudges = L and P (normative) <span style="float: right;">4</span></li> </ul> </li> <li>BE - Behavioral Economics <span style="float: right;">31</span></li> <li>Policy Tool <span style="float: right;">17</span></li> <li>Marketing                             <ul style="list-style-type: none"> <li>Different from N/CA <span style="float: right;">2</span></li> <li>Similar to N/CA <span style="float: right;">8</span></li> <li>Social marketing <span style="float: right;">2</span></li> </ul> </li> </ul> </li> </ul> </li> </ul> </li> </ul>	

Annex Figure 1: Other concepts related to nudging (Code Matrix Browser)

Code System	S1-4
<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>Misunderstanding T&amp;S                             <ul style="list-style-type: none"> <li>Economic incentive <span style="float: right;">3</span></li> </ul> </li> </ul> </li> </ul> </li> </ul>	

Annex Figure 2: Misunderstanding Thaler/Sunstein (Code Matrix Browser)

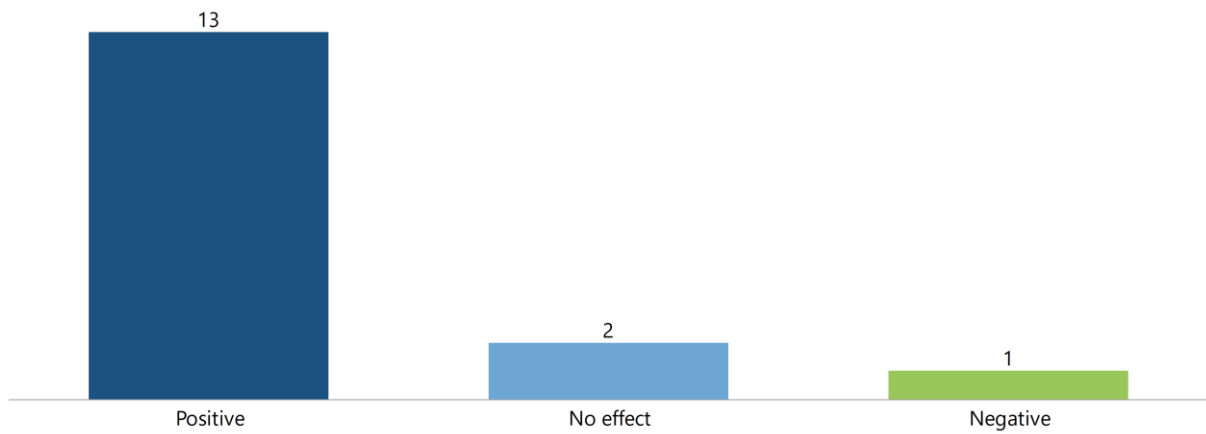


Code System	S1-4
DI - Specific Nudges	
Specific Concepts	
Cadario & Chandon - Healthy Nudges	4
Hollands -TIPPME - 2017	3
Blumenthal-Barby & Burroughs - 6 Principles	3
Dolan et al - MINDSPACE	2
C&C - Healthy Eating Nudges	2
Cognitively Oriented Nudges	1
Descriptive Nutrition Labeling	2
Evaluative Nutrition Labeling	2
Visibility Enhancements	2
Affectively Oriented Nudges	1
Hedonic Enhancements	3
Healthy Eating Calls	2
Behaviorally Oriented Nudges	1
Convenience Enhancements	2
Size Enhancements	1
V et al - HEN adapted for SN	1

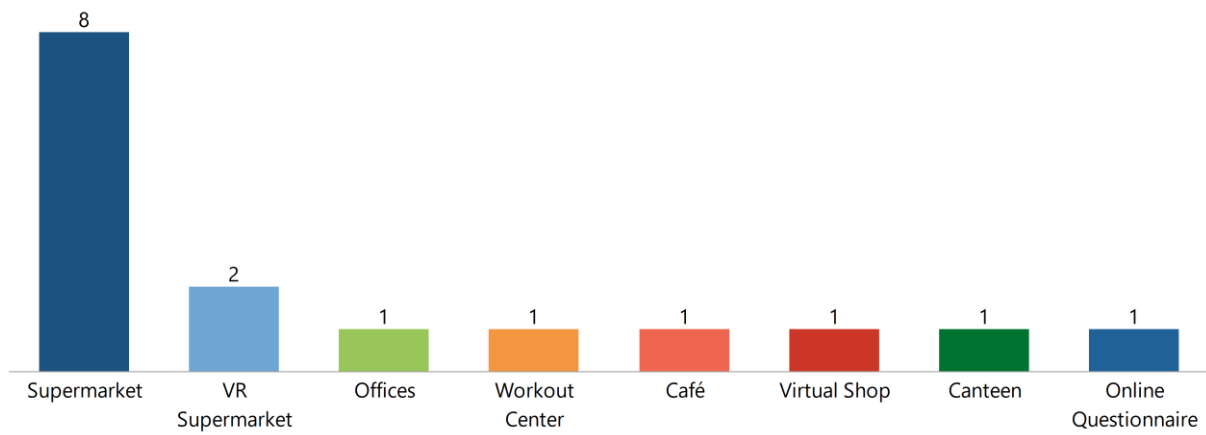
Annex Figure 3: Various Typologies of Nudges (Code Matrix Browser)

Code System	S1-4
DI - Specific Nudges	
Social Norms	12
Descriptive Norms	8
Injunctive Norms	7
Dynamic Norms	3
Descriptive and Injunctive Norms	3
Information Provision	8
Easy & Simple Messaging	4
Product Placement/Convenience	10
Labeling	7
Pre-commitment	4
Priming	5
(Visual) Prompts	2
Salience	4
(Visual) cues	2
Default	3
Scarcity	2

Annex Figure 4: Types of Nudges (Code Matrix Browser)



*Annex Figure 5: Study Results (Data Variables)*



*Annex Figure 6: Commercial Setting (Data Variables)*

Further data can be requested from ASK.