DETECTING THE EFFECT OF DIGITAL NUDGES ON CUSTOMER RESPONSE IN E-COMMERCE ENVIRONMENT

Empirical study

Master's Thesis
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Abstract

Human decision making is not always rational. It can be influenced through different heuristics, which are the basis for nudge theory. Nudge theory provides interesting insights to topics such as governance, politics and business. When nudge theory is applied to digital setting, so-called digital nudging, although it is important for business practice, it remains as a relatively new topic in academia.

This thesis aims to determine the effect of three chosen nudges on customer response in an e-commerce environment. More specifically, the current study investigates the effect of reviews, shipping information, and low stock nudges on customer response based on an experimental e-commerce platform. The response is recorded with a questionnaire with a specific focus on four dependent variables to measure the customer responses between the nudge variants.

The results of the study show that individual digital nudges examined (reviews, low stock and shipping information) result in more positive customer response than no nudging at all. Additionally, the combination nudges created from the individual nudges show that when nudging is done 'incorrectly', digital nudging can result into less positive customer response than having no nudging at all, as the results showed significantly lower customer response for one of the examined variants.

The findings of this study contribute to the research on digital nudging regarding the particular nudges it examined, but also shows significant differences in nudges that are in wide-scale use in different online shops. Thus, from a practical perspective, these results might provide interesting insights to any e-commerce manager.

Keywords nudge theory, e-commerce, digital nudging, online shopping, customer response

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Tiivistelmä

Ihmisten päätöksenteko ei ole aina rationaalista. Siihen voidaan vaikuttaa erilaisten heuristiikoiden avulla, jotka toimivat nudge-teorian pohjana. Nudge-teoria tarjoaa mielenkiintoisia oivalluksia aiheisiin kuten hallintoon, politiikkaan ja liiketoimintaan. Kun nudge-teoriaa sovelletaan digitaalisiin ympäristöihin, niin sanottuihin digitaalisiin nudgeihin, tämä liiketoiminnan kannalta tärkeä teoria ei ole vielä saavuttanut samankaltaista akateemista kiinnostusta kuin nudge-teoria.

Tämän tutkimuksen tarkoituksena on määritellä kolmen valitun digitaalisen nudgen vaikutus asiakasreaktioon. Se tutkii arvostelujen, toimitustietojen ja alhaisen varastotilan nudge-elementtien vaikutusta kokeellisen, tutkimusta varten rakennetun verkkokauppa-alustan avulla. Asiakasreaktio mitataan kyselyllä, jossa keskitytään neljään muuttujaan, jotka mittaavat kolmen nudgen välisiä eroja.

Tutkimuksen tulokset osoittavat, että kaikki kolme tutkittua nudgea johtavat, kun ne esitellään erikseen, korkeampaan asiakasreaktioon kuin se, että tuotesivulla ei ole nudgeja lainkaan. Sen lisäksi tutkitut nudge-yhdistelmät osoittavat, että kun nudgeaminen tehdään 'väärin', niin digitaaliset nudget voivat johtaa alhaisempaan asiakasreaktioon verrattuna siihen, että kyseisiä nudgeja ei käytettäisi lainkaan.

Tulokset lisäävät ymmärrystä tutkittujen nudgejen käytöstä sekä osoittavat, että tutkittujen nudgejen välillä, jotka ovat suuressa käytössä läpi verkkokauppojen, on tilastollisesti merkittäviä eroja. Nämä erot voivat olla olla käytännöllisiä esimerkiksi verkkokaupan parissa työskenteleville.

Avainsanat nudge-teoria, verkkokauppa, digitaalinen nudge, asiakasreaktio

Acknowledgements

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1 Introduction

Human decision making is not always rational. It can be influenced through different heuristics, which are the basis for nudge theory (Thaler & Sunstein 2008). The theory provides interesting insights into such topics as governance, politics, and business (Hansen & Jespersen 2013). However, when the nudge theory is applied to digital environments, so-called digital nudging, although it is important for business practice, it remains as a relatively new topic in academia. Little is known in particular when appling nudge theory to digital context such as websites and online shops (Mirsch et al. 2017; Weinmann et al. 2016).

This study aims to determine the effect of three chosen nudges on customer response in an e-commerce environment. More specifically, the current study investigates the effect of reviews, shipping information, and low stock nudges on customer response based on an experimental e-commerce platform. The response is recorded with a questionnaire with a specific focus on four dependent variables to measure the customer responses between the nudge variants.

This chapter will present the background and motivation for the study. Then, it will go through the research objectives and questions of the study. Thirdly, the chosen research method will be briefly introduced. Finally, the scope and structure for the study will be presented.

1.1 Background & motivation

Nudge theory proposes that positive and indirect or implied suggestions and signals could influence individuals or groups in their behavior and decision-making (Thaler & Sunstein 2008). Studying these signals or 'nudges' help us understand why certain choices and decision are made and thus enables the design of choices and choice environments.

Nudge theory and specifically digital nudging have been established as a valid behavioral economic theories and they have received increasing research interest recently (Mirsch et al. 2017; C. Schneider et al. 2018; Weinmann et al. 2016). However, this thesis is interested in narrow section of digital nudges often presented in online shops through the internet and thus the context specific academic research is limited.

Research into digital nudges contributes to understanding individual choice behavior when interacting with digital entities (Bammert et al. 2020). Digital entities, such as e-

commerce platforms or online shops, are complex digital structures with different elements, and many of these elements can be categorized as nudges, which this thesis will show in Chapter 2. It is of high importance to understanding how these nudges affect the customer response, especially when several previous studies have done into nudging show that nudges can provide both positive and negative results (Luo et al. 2019; D. Schneider et al. 2020). As websites and online shops are full of these digital nudges, understanding their effect is beneficial both to the user, and to the e-commerce manager or company. When the user understands the effect of digital nudges, they are capable of doing more rational decisions and when the e-commerce manager understands these effects, they can design their own websites and online shops accordingly.

From theoretical perspective research on digital nudging in e-commerce is limited, and few studies have been done with the angle this thesis will take, which is to examine digital nudges presented on a product page. The literature background section will show the lack of research in more detail later. This thesis will be exploratory in nature but hopes to produce meaningful academical findings regarding the effect of the chosen three nudges to customer response. In addition the current study hopes to inspire other academics to explore the topic of digital nudging in e-commerce.

From a practical perspective, the nudges chosen for this particular study are in wide-scale use in many online shops, and thus, the implications of this research might provide interesting insights to any business operative, entrepreneur, digital marketer, or product owner who is responsible for an e-commerce platform.

1.2 Research questions

This study focuses on digital nudges that are in wide-scale use in different e-commerce environments and platforms. E-commerce, or electronic commerce, refers to the purchasing of goods or services online, often through specific platforms (Shopify, 2021). Specifically, the current study concentrates on reviews, shipping information, and low stock nudges, which will be examined by simulating a product page environment to questionnaire respondents.

Although many other digital nudges can be present on any given product page, this study chose to examine the three different nudges mentioned above based on the academic background presented later and their high usage on the Shopify e-commerce platform (ShopifyApps, 2021).

This study aims to find out if and how different digital nudges presented on a product page affect the customer response. The study aims to answer two main research questions:

Question 1: Which of the three chosen nudges (reviews, shipping information, and low stock) is the most effective in producing a positive customer response?

Question 2: Which *combination* of the three chosen nudges (reviews + shipping info, reviews + low stock, and shipping information + low stock) is most effective in producing positive customer response?

The word effective here implies higher or more positive results to the dependent variable questions. The purpose is not to look at questions individually but rather as a summary based on the nudge variant to get a better overview of the possible effect of each individual and combination nudge.

The three chosen nudges for this study are reviews, shipping information, and low stock. The second chapter will explain the motivations behind the choice of these nudges. Customer response is measured with four main dependent variable questions regarding information interest, interest to purchase specifically the presented product, perceived quality, and interest to purchase in the online setting, respectively. More details about these variables are presented in Chapter 2.4.

1.3 Research method

For this study, an experimental e-commerce platform was built using Shopify to customize the three nudges that were to be tested. First, the base product page was first designed, after which the three nudges and their combinations were designed and edited. Then, screenshots of these different product page versions with different digital nudges would be presented in the form of a questionnaire.

The questionnaire includes questions related to demographic information, dependent variable measurement (mentioned in Chapter 1.2), and questions related to TV usage, the product chosen for the product page. Qualtrics was utilized in creating the questionnaire, and Amazon Mechanical Turk was used to collect the responses with most of the respondents from The United States.

Questionnaire questions, nudge choice, and nudge design were based on the academic and non-academic motivations outlined in the theoretical background chapter. The

theoretical background chapter will also explain concepts used in the study, examines previous case studies, and shows the existing research gap.

This study is exploratory in nature. As the following chapter will show, few studies draw inspiration from, even though multiple non-academic case studies have been conducted on the same digital nudges as this thesis attempts to examine (Mirsch et al., 2017).

1.4 Structure of thesis

The structure of the thesis is as follows. First, Chapter 1 presents the background and motivation, research questions, and the research method. Then Chapter 2 will go through the relevant literature, where the focus will be on the theoretical background, foundation and hypotheses for the study.

Thirdly, the methodology of the study will be presented in Chapter 3. Both the design of the main product page and the nudge design will be shown together with the questionnaire outline. Chapter 4 will present the results and analysis of the study, including averages, ANOVA, correlations, and Tukey's test of all nudge variants. The data is categorized into two sections: single nudges and nudge combinations. The analysis aims to answer the research questions presented in this introduction part and the hypothesis set in Chapter 2.

The final chapter, Chapter 5, presents a summary of research questions and answers to those questions. This chapter concludes with the practical and theoretical contributions of the present study, as well as suggestions for future research and limitations of the study.

2 Theoretical background

This part of the thesis will go through the relevant literature. This chapter aims to explain concepts that will be used in the study, and then it will examine previous case studies and shows the existing research gap. Finally, this chapter will present the research basis and hypotheses for the study.

2.1 Literature review

2.1.1 Nudge theory

Nudge theory is a modern theory to understand how people think and make choices (BusinessBalls 2020; Mirsch et al. 2017; Thaler & Sunstein 2008; Weinmann et al. 2016). It proposes that positive and indirect or implied suggestions and signals could influence individuals or groups in their behavior and decision-making (Thaler & Sunstein 2008). Nudge theory is widely used in explaining influences on how people make decisions and behave, especially influences that are unhelpful or unnecessary, with an aim to remove or alter them (BusinessBalls, 2020). These unhelpful 'nudges' can be found everywhere — especially in advertising, business, and government. Some of these nudges are accidental, many very deliberate.

A perfect example of nudge theory in action is recycling. Recycling is not mandatory or required by law. However, by making it easier for people to recycle through added recycling incentives and opportunities and educating them about it, the government is pushing, or nudging, people towards recycling.

Nudge theory became known through the book '*Nudge: Improving Decisions About Health, Wealth, and Happiness*', written by American academics Thaler and Sunstein (Thaler and Sunstein, 2008). The theory is heavily influenced by the work of the psychologists Tversky and Kahneman (Tversky and Kahneman, 1974). Kahneman and Tversky focused on different heuristics, psychological effects that affect decision making on their work from which Thaler and Sunstein took inspiration from.

Another term often used together with nudging is the design of choices or choice architect, a term introduced by Thaler and Sunstein (Thaler & Sunstein, 2008). Johnson et al. (2012) expand on this term by creating tools for a choice architect. They also highlight that these choice architects have a significant influence on their subjects by, for example, changing the order of alternatives, default selection, and ease of use, to name only a few.

In short, nudge theory is the science of subtly directing people into the 'right' decision or alternative. It suggests that people make a decision somewhat irrationally and instinctively, rather than more traditional behavioral sciences believe, which is that humans make decisions logically and rationally. Thus, the design of choices should be based on irrational and instinctive decision-making. Notably, nudge theory is a relatively new theory, and as such, the research conducted on it is limited. Especially, there is a lack of studies that investigate nudge theory in the digital sphere.

2.1.2 Heuristics

As mentioned above, originally, Thaler and Sunstein based their work on psychologists Daniel Kahneman's and Amos Tversky's research on heuristics (Thaler and Sunstein, 2008). Although Thaler and Sunstein focus on specific heuristics as being pretty much synonymous with nudges, nudge theory has expanded together with digitalization over the years. However, as these original heuristics act as a base for the theory, it is important to note what they are. These heuristics are a core part of the nudge design process described in Chapter 2.4. These heuristics are (Minoi et al. 2020, p. 3):

1. Anchoring and adjustment
2. Availability
3. Representativeness
4. Optimism/over-confidence
5. Loss aversion
6. Status quo bias and inertia
7. Framing
8. Temptation
9. Mindlessness
10. Self-control strategies
11. Conforming – following the herd
12. Spotlight effect
13. Priming
14. Language and signage design
15. Feedback

Even though it might be possible to make a perfect decision by taking much effort and calculating all possible options and outcomes, this is not very practical. These real-world decisions are made "*using fast and frugal heuristics, rules of thumb, that would satisfice (meet some less than perfect criterion), rather than maximize utility over the long run*" (Rachlin 2003, p. 409). In this vein, heuristics are mental shortcuts that can facilitate problem-solving by reducing the cognitive load (ibid), making immediate judgements more effective. However, irrational or inaccurate conclusions often result due to these heuristics (DecisionLab 2021).

2.1.3   Digital nudging

Mirsch et al. (2017) provide an exhaustive overview of exemplary digital nudges together with relevant psychological in their literature review of digital nudging research. They heed the same call as Weinmann et al. (2016), which was for further research to better understand the mechanisms underlying digital nudging. As there are a limited number of sources, the goal of this section is to present examples of research on digital nudging in the e-commerce context, while also covering the important themes around digital nudging like ethics.

2.1.4   Digital nudging in e-commerce

Digital nudging can be considered as a 'sub-theory' of nudge theory. Although it is based on the same principles, the context is very different as the information and different nudges are all in digital form. Weinmann et al. (2016) explain digital nudging as "*the use of user-interface design elements to guide people's behavior in digital choice environments*" (Weinmann et al. 2016, p. 434). They also define a "digital choice environment" as user interfaces like web-based entities (websites, online stores, etc.) and screens which require people to make decisions. Mirsch et al. (2017) have a very similar definition of digital nudging, which is that it is "*an approach based on insights from behavioral economics that applies user interface (UI) design elements to affect the choices of users in digital environments*" (Mirsch et al. 2017, p. 634-635) .

There are few digital nudging studies done in the e-commerce context. Dennis et al. (2020) examine numeric and semantic priming in e-commerce. They note that research regarding e-commerce has mostly focused on conscious rational cognition. However, they also claim that priming can influence buying choices, as suggested by the research into

psychology and marketing. So, they conducted several experiments in order to examine the effect of numeric priming and semantic priming. They find small effect on consumers' willingness to pay when numeric priming was used. However, this was the case only when it was unclear what the value of the product was. After the manufacturer's suggested retail price (MSRP) was displayed, they found numeric priming not to affect the results. Semantic priming, on the other hand, had a more significant effect on willingness to pay. This effect was significant but more minor when MSRP was shown. Thus, their findings show that 'correct' digital nudging, specifically in e-commerce context, can have a significant positive impact on

Another study conducted by Luo et al. (2019) examines e-commerce cart targeting. Specifically, they examine the effects of scarcity and price incentive nudges to purchase rate, when these nudges are presented in the shopping cart . Their results indicate that ECT (e-commerce cart targeting) has a substantial impact on consumer purchases. Their digital nudging produced a 29.9% higher purchase rate when compared with the targeting was towards users without shopping carts. They also found that this incremental effect is moderated. They note that by showing a price incentive, the effect is amplified, but if the same price incentive is given without a shopping cart, it leads to ineffective e-commerce targeting.

Additionally, Luo et al. (2019) found that giving a scarcity message attenuates the impact on consumer purchases. What was especially interesting about the study is that the scarcity message, which is costless to produce, was 2.3 times more effective than giving the consumer a price incentive, specifically in the early stages of shopping. However, the price incentive was 11.4 times more effective than than giving a scarcity notification in the later stages of the purchase funnel, which shows the difference in effect of a nudge depending on the shopping stage where the digital nudge is presented.

Toreini & Maedche (2018) take a different approach in their paper. They note that digital nudging might be less effective than expected. Due to this, more invasive methods to investigate digital nudging are needed. They propose using other interfaces, like eye-tracking technology, can help us examine the possible effect of digital nudges better. They suggest that real-time feedback is given to users who do not recognize a digital nudge. Although they have not conducted their study yet, their paper outlines an interesting approach to studying the effect of digital nudging in an e-commerce context, where multiple nudges are present, thus determining whether the test subject or user has noticed a particular

nudge might prove to be complicated. As such, eye-tracking software might provide interesting insights when examining digital nudges.

A deeper look into these above-mentioned studies show that there are many different digital elements, which can be interpreted as digital nudges. All studies have taken a slightly different approach in determining what constitutes a nudge. However, all agree on the basic principles of the theory and how it helps to understand user behavior in the digital context. All three studies also examine digital nudging, specifically in the e-commerce context, and some find nudging to be effective while also noting that if done incorrectly, digital nudging might produce negative effects (Luo et al. 2019).

2.1.5 Ethics of digital nudging

As nudge theory is about designing choices, it presents some ethical problems such as manipulation of the user and driving users towards unwanted outcomes (Nevala, 2020). It is worth noting that the nudge theory was originally planned to help people with design choices (Thaler and Sunstein, 2008), which encourage helpful decisions for the user or person performing those choices. With this regard, it was initially meant as an ethical concept. Specifically, it was not designed to be a mechanism for commercial gain but rather a theory and framework towards the betterment of society (BusinessBalls 2020). However, from the very beginning, nudge theory has developed to have much more significant implications. Thus, the ethics of the theory are essential, which has been researching more widely.

Lavi (2018) argues that the academic literature focuses too much on the positive aspects of the theory and does not address 'libertarian paternalism' (Lavi 2018, p. 4). They continue to argue that nudge theory infringes the welfare of individuals and third parties, rather than promote it. The article aims to determine if the law should recognize a liability for harmful and 'evil' nudges. The author concludes that through legislation and guidelines there should be liability for the use of the nudges. Although no legal limitations for nudge design currently exist, this paper shows and argues well on behalf of such regulation for the future.

Nevala (2020), on the other hand, examines 'dark patterns' and their use in e-commerce. Nevala defined dark patterns as "*intentional, deceptive design decisions that were made to take advantage of psychology, to manipulate the user into making decisions that were unintended and unwanted; creating value for the service that employs them*" (Nevala 2020, p.8-9). In short, they can be considered unethical nudges. They also notes that

these dark patterns are effective, and there are several core reasons for it: technological development, which makes it harder for the user to recognize these patterns, limited human cognition, and biases. Interestingly, she also notes that the likelihood of a website containing these dark patterns increases with the popularity of the website. In addition, by their estimate roughly 11% of e-commerce websites have dark patterns (ibid). This is a significant percentage, and even though it is likely that some of these dark patterns are unintentional, they are still in wide-scale use.

Ethical questions regarding nudge theory are becoming increasingly important (Goldstein & City, 2014; Hummel & Maedche, 2019; Nevala, 2020). Shopify and other platforms have enabled through their app store a fast implementation of various elements that can be categorized as nudges. In some cases, these third-party app providers create hurtful nudges, as often the primary goal of these apps is to create as much revenue as possible. This type of free third-party marketplace, combined with very little oversight on the features of the apps, leads to app providers who create evil nudges by design in pursuit of more 'effective' apps in terms of sales.

2.2 Research gap

The purpose of this chapter is to highlight the existing research gap with digital nudging and e-commerce. The studies presented in this chapter are closest to the approach that this thesis attempts to take. All papers explained in detail their nudge design and examined their results specifically through the nudge theory. Nevertheless, even though their core approach is similar, they lack the same context — e-commerce — as in this thesis.

Bammert et al. (2020) focus on exploring the potentials of digital nudging for business processes, and concluded that digital nudging provides a valuable foundation for Business Process Improvement (BPI). They also note that digital nudging is similar to A/B testing in a sense that it enable fast validation of improvement ideas. Digital nudging also reduces the latency to improve these processes. Their study is a broad take on the potentials of digital nudging. However, their note of digital nudging being a sort of A/B testing is important, as this thesis will structure the data collection in a similar way to web-based A/B testing.

A more concrete example of nudge theory is the case study by Schneider et al. (2020), which examines nudging users into digital service solutions with the case focusing on how the adoption of Electronic identification (eID) can be increased through changing the environment where decision are made, based on nudge theory. They examined two nudges:

default options (eID vs. offline ID as default) and popularity signals (presence vs. absence of social proof). They found that both examined nudges increase eID adoption, although they note that the default option design is a double-edged sword.

In another similar digital nudging case study, Wijland et al. (2016) researched the effectiveness of nudging in a mobile environment and specifically with banking apps. They focused on youth engagement and found that nudging can supply critical new insights and ideas for features or improvements. Their research revealed that banking app design could benefit from digital nudging, which they noted is a "*fundamentally different approach (relative to traditional methodologies) that prioritize intuitive interfaces over non-intuitive-based designs, and, in particular, that behavioral economics and nudging can supply valuable insights and ideas for new features or refinements*" (Wijland et al. 2016, p. 61).

Although the above-mentioned studies are close in their nudge design and theoretical background as this paper, they are still in a different context, as no study focuses on e-commerce and the effect of digital nudges often present on a product page. However few general findings can be noted from these studies. Main finding being that the effect of digital nudges is often statistically clear, either positive or negative. Additionally, these studies all highlight the importance of the nudge design process and note that multiple variations of any given nudge should be tested, in order to find its effect.

2.3 Theoretical foundation

This part of the theoretical background chapter will present the theoretical foundation for the study. First, it will argue how and why nudge theory should be the primary academic background for this study. Then, it will explain what nudges were chosen for the study and why. Next, it will summarize the most important elements in the process of designing nudges based on previous studies. Finally, it introduces the measurements of customer response.

2.3.1 Nudge theory as a base

As previously shown, a number of studies like Tan et al. (2018) and Huang et al. (2018) have examined digital elements, such as reviews and social sharing, respectively. However, few studies have chosen to study multiple nudges together.

Previous studies, such as Luo et al. (2019), have shown that nudge theory can be applied to e-commerce and elements often shown in online shop environments. Additionally, Weinmann et al. (2016) described digital nudging as using user-interface elements to guide people's behavior in a digital choice environment, which this study is attempting to do. Mirsch et al. (2017), who have a very similar definition of digital nudging as Weinmann et al. (2016), also encourage others to examine digital nudging further while providing an list of exemplary nudges and psychological effects that have been researched thus far. The examples presented in the paper, such as checkboxes and information providing elements, are similar elements that this thesis aims to study. Thus, nudge theory and their literature review offer grounds to study product page elements in the e-commerce environment. Their study will also help to analyze the results.

2.3.2   Choice of nudges

Due to the practical nature of the study, the main motivation in the choice of nudges for the study was non-academic. To be more precise, the main motivation for nudge choice was to choose nudges that are the most popular among different e-commerce platforms.

Shopify, one of the largest e-commerce platforms (Shopify, 2021), was chosen for the study due to its practicality, which is explained further in Chapter 3. Shopify has an app store with thousands of third-party apps (ShopifyApps, 2021), which enable the use of different digital nudges. Their App store shows the review count for each app, and this review count was taken into account while considering possible nudges.

One of the most used app types is review apps (Truitt, 2020). These apps allow the shop owner to enable customer reviews for the products. Multiple studies have been done on the effect of reviews like Djurica et al. (2017). However, these studies often examine the effect of reviews alone or their content. Thus, reviews were chosen to be one of the nudges to be used as it is widely used and studied, but not often together with other nudges. Also, according to Truitt (2020), 91% of users read reviews when shopping online, and 84% trust them as much as they would trust a personal recommendation. This makes reviews interesting to examine as a digital nudge. Reviews-nudge was designed and implemented with an app called "Loox-reviews" (Loox, 2021).

Another type of app that is available through the Shopify App store is Sales booster - apps. The goal of these apps is to boost conversion rate within the store, and they do it through various means, including nudging. These nudges often add information to product

or cart pages, such as shipping information, a quantity of stock left in the product, and possible offers.

For this study, an app called "Ultimate Sales Boost" was chosen, as it enabled the design of separate nudges with one app (ShopifyApps, 2021). These nudges were shipping information and quantity of stock. They were chosen due to their popular usage (Shopify, 2021) and their slightly different nature. Whereas shipping information is a very passive nudge as it only presents information, stock quantity can be considered to be much more pushing nudge as it highlights low stock and creates a fear of missing out.

In the end, two Shopify Apps were chosen to produce three individual nudges.

2.3.3 Design of nudges

There are different tools on how to design a nudge. Johnson et al. (2012) present tools available for these 'choice architects' in their paper. They also divide these tools into tools used in structuring the choice task and to tools that are used to describe the choice options. On the other hand, Meske et al. (2017) showcase a process model for the design of nudges. They combine both, persuasion and nudging into one digital nudging process model. They do this by deriving different nudge elements, conditions, and steps from literature into one model. Even though this paper chose to follow a different model, it is essential to note that multiple models for nudge design exist.

This thesis will take a slightly more practical approach than the studies mentioned above by building a tailor-made platform to enable different nudges through Shopify. Thus, this thesis chose to follow Weinmann et al. (2016) model for designing a digital nudge, where needed. As Shopify was the platform of choice, some aspects of the nudges could not be edited, so the model was utilized for those nudge elements that could be edited. This model presents three main steps for creating a digital nudge. These three steps are (Weinmann et al. 2016, p. 435):

1. Determine the type of choice to be influenced
2. Determine the heuristic or bias that might influence the user
3. Design the element and user-interface pattern that supports the hypothesis of the heuristic or bias

The first step focuses on the nature of choice. The choice can be binary, continuous, or discrete (two or three products/options). The second step considers the heuristic or bias that might affect the decision of the user. Examples are given by Weinmann et al. (2016) include the decoy effect, middle-option bias, and status quo bias (defaults). Finally, the last step is about designing the user-interface element, which utilizes the second step's heuristics. For example, in a subscription-based service, one might design higher- and lower-price alternatives around preferred options.

Meske et al. (2017) present a literature review on relevant psychological effects and exemplary nudges. They find a total of 20 psychological effects that have been examined in digital nudging. The most frequent of these effects are: framing, status quo bias, social norms, loss aversion, anchoring and adjustment, hyperbolic discounting, decoupling, priming, and the availability heuristic Meske et al. (2017, p. 2592-2593). Even though all of these psychological effects would be interesting, only three could be chosen for this study. Each chosen nudge has a different psychological effect. These psychological effects based on the nudges mentioned in the previous chapter are:

Table 1: Nudge and psychological effect

Nudge	Psychological effect
Reviews	Affect heuristic
Shipping information	Loss aversion
Low stock	Availability heuristic (scarcity)

Reviews

Affect heuristics is a emotional based mental shortcut where the decision making of people is heavily influenced by the emotions they are feeling at the decision moment (Cherry, 2020). Tan et al. (2018) study the effect of reviews by comparing respondent's evaluation of restaurants. They study two groups, one of whom only shown positive reviews and the other only shown negative reviews. Similarly to this study, they manipulate review elements on a web page to see their possible effect. They note that affect heuristic might be the most relevant heuristic when a user is processing a large number of reviews.

In addition, Browning et al. (2013) also study the effect of reviews in the tourism industry that reviews are likely to be tagged with varying degrees of positivity or negativity

by users, which serve as cues for decision making. However, it is important to note that other scholars attach reviews to heuristics such as social norms (Röthlisberger, 2020).

Shipping information

Most research related to the effect of shipping information in e-commerce is related to different pricing strategies and the effect of offering free shipping (Wang & Bae, 2020; Wu et al., 2021). However, for this study, it was important that the designed nudge does not bring any monetary value but rather information for the user.

Bonastre & Granollers (2014) present 64 heuristics as a tool to evaluate the UX (user experience) of e-commerce sites. Although they focus on creating a checklist for professionals, this checklist is also a digital nudge list. Each item listed as 'heuristic' is a digital element that can be designed and influences user decision-making. They note shipping information to be one important element to consider as it is often presented in many locations from product page to checkout page. This study is interested in shipping information presented on the product page.

Loss aversion can be expressed with the expression "losses loom larger than gains" (Behavioraleconomics.com, 2017; Kahneman & Tversky, 1979). In essence, it means that losing something has about twice as powerful emotional impact (pain) when compared to the psychological effect of gaining something (pleasure). The nudge design for shipping information in this thesis will note a deadline for ordering the presented product, and thus this paper hypothesizes that the presence of this information might trigger loss aversion.

Low stock

Low stock as a nudge is a simple information snippet, which displays the stock quantity available of any given product on a product page. The psychological effect of low stock nudge is scarcity as shown by Trinh Anh (2014). Their focused on the effects of scarcity on consumer purchase intention by using a nearly identical message design as this study will use. Although they used the term *stimuli* rather than nudge and examine multiple variations of the same low stock message, their research design is very similar to this study.

It is important to note that the low stock nudge could also be interpreted to trigger loss aversion, just like the shipping information. As the respondent will see only one item in stock, it might trigger this effect. However, based on the Trinh Anh (2014) study, scarcity is more likely effect to trigger.

The purpose of the thesis is not to dive deeper into the theoretical background of each psychological effect but rather make sure that these chosen nudges invoke a different psychological effect in the respondent.

2.3.4 Measuring customer response

To measure the possible effect of digital nudges, this thesis chose four different variables to measure customer response. These variables were chosen to describe the multiple stages of the purchase decision-making process. They were also inspired by Teichert et al. (2018), who show in their paper a unified framework for consumer's persuasion process. Although they do it from an advertisement point of view, the steps they outline persuasion stages that fit the goal of this thesis, which is to examine different stages in the customer journey to purchase in an e-commerce environment.

They outline these stages (Teichert et al. 2018, p. 4-5):
- Ad examination
- Information search
- Positive attitude change
- Integration into evoked
- Purchase intention

Based on these stages, four variables to measure overall customer response were developed, which would later be measured with questions. These variables were information interest, interest to purchase specifically the presented product, perceived quality, and purchase an interest in the online setting for the product.

Information interest

Information interest, or information search Teichert et al. (2018), means the willingness to seek further information on any given product or service (Bettman et al. 1998). It is an integral part of the purchase decision process (ibid). The same is noted by Lauraéus (2011), who studied purchase decision making and uncertainty in consumer online search. They use measurements such as shopping time and the number of brands considered as the measurement of information interest, which is not possible in this study as it will focus on the individual product page. However, they show that this is an important stage in evaluating

customer's interest in a product, especially in e-commerce, where trust is often an issue and users search for product from multiple e-commerce sites in one session (ibid).

Interest to purchase specifically the presented product

For the product page that would be presented in the study, a product had to be chosen. As people differ in what they are willing to order online. For example, Karimi et al. (2015) find that when the knowledge of a consumer on the product in question increases, they engage is more intensive decision making process. Thus, this variable would measure product-specific purchase intent rather than the broader interest to purchase in an online setting.

Perceived quality

Perceived quality is *"the consumer's judgment about a product's overall excellence or superiority"* (Zeithaml 1988, p.5-6). It has been shown that the perceived value is influenced by the perceived quality, which is a predictor of online repurchase intentions (Sullivan & Kim 2018). Furthermore, perceived quality can be viewed as *"a form of an overall evaluation of a product"* (Zeithaml, 1988 p. 12-13).

Interest to purchase in an online setting

As mentioned, a TV was chosen as the product for the product page image, and people are more likely to purchase specific products online than others. For example, Levin et al. (2005) examine the different preferences for online and offline shopping and find that electronics are more likely to be bought offline when compared to airline tickets, books, and computers. Thus, it is important to measure to interest to purchase the shown product specifically in an online setting.

Information interest and interest to purchase online are measured through a 7 point Likert scale from strongly disagree (1) to strongly agree (7), while interest to purchase specifically the presented product and perceived quality are measured through a Likert scale of 1 to 4, Not at all interested - Very interested.

2.4 Hypotheses

This thesis will investigate four hypotheses.

Table 2: Summary of hypothesises

	Hypothesis
H1	The presence of **digital nudge** (i.e., reviews, shipping information, and low stock) leads to a more positive customer response than the presence of no nudge.
H2	The presence of a **digital nudge combination** (i.e., reviews + shipping information, shipping information + low stock) leads to a more positive customer response than the presence of no nudge.
H3	The combination nudges lead to more positive customer responses than the individual nudges.
H4	Customers' responses to different nudge variants are different on a statistically significant level.

H1 + **H2** – Based on studies by Dennis et al. (2020) and Luo et al. (2019), in which clear positive differences between nudge variants compared to no nudging was found, this thesis expects *any nudge* or any *nudge combination* to result in more positive customer response than no nudging at all (H1 + H2).

H3 – Based on the same studies (Dennis et al. 2020; Luo et al. 2019) as in the first two hypotheses, this thesis also expects more nudging than less nudging to results in higher customer response.

H4 – Although the study conducted by Hummel and Maedche (2019) shows that statistically significant nuding treatments were found in only 62% of studies and that depending on category and context, the median effect of nudges is 21%, this study will set out a hypothesis that its results are statistically significant. The reason for this is that through practical nudge design, this chapter aims to create an environment where respondents more easily notice nudge variants. This is done by standardizing the design of the base product page. The methodology chapter explains this in further detail.

3 Methodology

This chapter will present the methodology used in the empirical parts of the study. At first, the structure of the questionnaire through which the study was done will be presented. Secondly, this questionnaire is broken into sections which are then explained. Thirdly, it will explain the process through which the base product landing page was created and designed. Finally, it will go through the design of the nudges used in the study.

3.1 Structure of questionnaire

The questions were divided into three categories: demographic information (questions 1 – 4), dependent variable questions (questions 5-8), and additional information (questions 9 – 11). The questionnaire is available in Appendix A.

3.1.1 Demographic information

Demographic information questions consisted of age, gender, income, and education levels. These questions helped to understand the population that responded. This was crucial in this case, where Amazon Mechanical Turk was used to collect the data, and as such, the delivery was randomized.

3.1.2 Dependent variables

Four relevant dependent variable questions were developed based on theoretical research outlined in Chapter 2. These questions and variables were.

Table 3: Summary of questions and variables

Question	Variable
Would you be interested in finding more about the product you saw?	Information interest
I would consider buying a 4K smart TV as my new TV set	Interest to purchase specifically a 4K TV
I believe this product is of high quality	Perceived quality
Are you interested in buying this product if you saw it in an online store?	Interest to purchase in an online setting

The purpose of these dependent variable questions was not to prove that nudge X increases the interest to buy the product Y by some amount but rather examine the answers to all questions as a whole between nudge variants. All significant differences between the dependent variables within the same nudge would be interesting, but that would not be the main interest of the study.

3.2 Additional information

Since study aims to imitate real-world online shops, there needed to be a product. This product ended up being a 4k Smart TV. Thus, the additional information questions were designed to get more information on the usage of TVs by the respondents.

However, it is important to note that having these questions in the questionnaire made it possible to do basic checks of the TV usage of the respondents to make sure that at least most of the respondents owned a TV and watched it regularly. As shown in Figure 1, 94.6% of the respondents owned a TV, and 94.8% of the respondents said they watch tv sometimes, often, or always.


a) Do you own a TV?   b) How often do you watch something on TV?
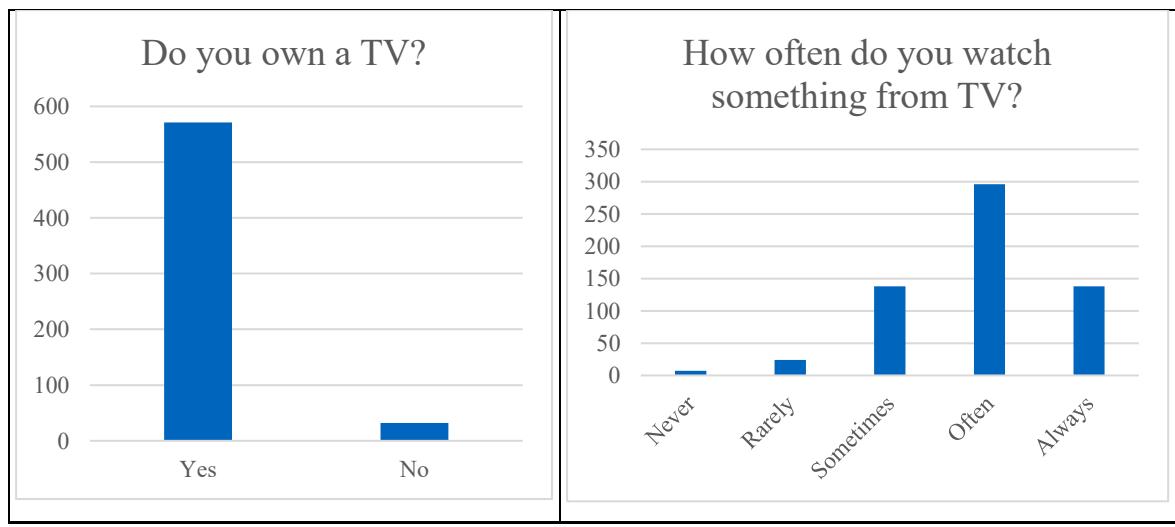
Figure 1. TV ownership & TV usage of respondents

3.3 Categorizing questionnaire

The questionnaire variants were categorized into two categories: single nudges and nudge combinations. It enabled looking into both 1) which individual nudge resulted in the more positive customer response and 2) which combination resulted in the more positive customer response. The study was conducted via Qualtrics, and most of the answers came from the US. An example view of the questionnaire is illustrated in Figure 2.
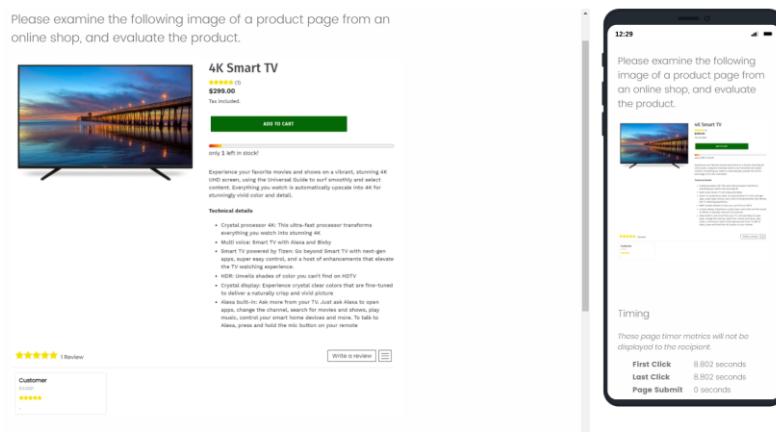
Figure 2: Screencapture of the questionnaire

3.4 Design of the base product landing page

The core of the study were the different variations of a mockup e-commerce product page that were shown to the respondents between questions 4 and 5. These variations had either i) no nudge, ii) one nudge, or iii) a combination of different nudges.

These nudges were designed by first building an experimental e-commerce webshop for the study. The chosen platform was Shopify, as Shopify offers easy and quick implementation of the desired product page. However, before nudges could be implemented, a product needed to be selected first, and other environmental entities like product descriptions needed to be typed. These elements did not change between the variations.

The goal of the study was to create as a standardized test as possible. This meant that the product chosen needed to be an everyday product that is found in most households. In addition to that, above mentioned product description needed to be neutral in tone to exclude its possible effect on the study. In other words, the product description did not include any kind of reference to the possible nudges that were present, as this would have skewed the results.

TV was ultimately chosen as the target product. Mainly because most households have a TV. Another possible product of choice was a smart phone, for the same reason. However, as the respondents were from the US, showing a specific brand smartphone might have affected the results of the study (Cornelia & Pasharibu, 2020; Kim et al., 2020). Also, choosing a TV made it possible to "standardize" the product, meaning that there is no brand visible in the variations, and the product was named simply "4K Smart TV".

The product description and the price for the product were taken from a random Amazon 4K TV listing, and brand names, more unique features, and other more brand/feature specific "marketing" language were edited away. The product description consists of a short marketing description and more detailed technical details. The purpose of the information was to create authenticity to the image variants, meaning that the end goal of the variants was to create a sense of a screen capture from a real online shop, even though the product page was tailored for the study.
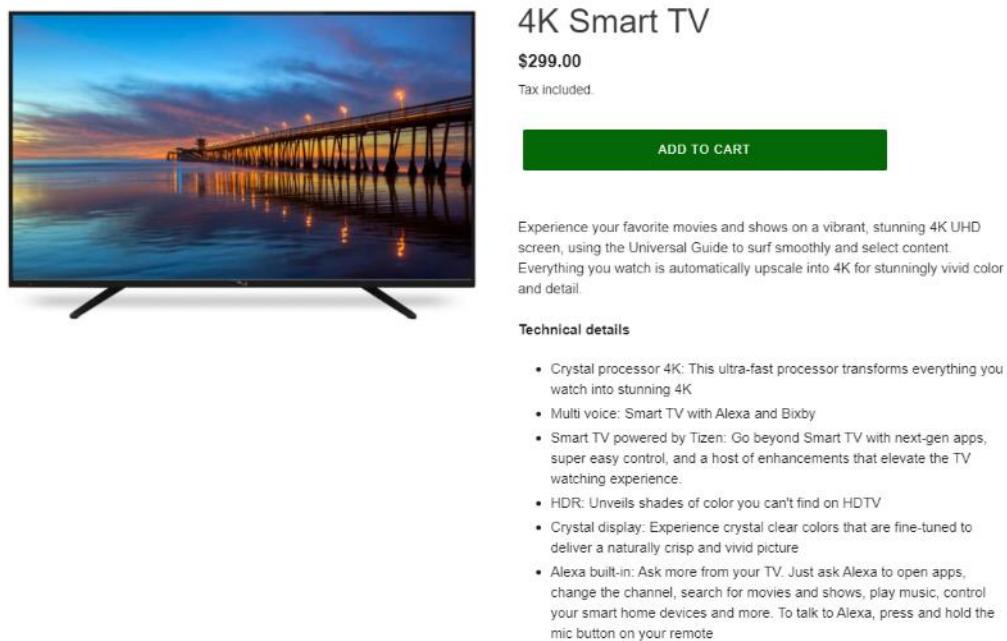
Figure 3. End design of product page without any nudges

There are usually many other design elements on the product page, such as delivery and return info, social icons and sharing, chat for customer support, and the menu hierarchy of the website. However, as seen in Figure 3, the end design of this study is very stripped of extra elements. Through this and previously mentioned design choices, the end result became very plain. This was the goal, as this study was mainly interested in different popular

nudges and how they affect the user's response. By stripping the images of extra elements, the nudge variant that was examined was easier to notice for the user.

3.5 Design of nudges

There were a total of three unique nudges implemented to the design. These were done by utilizing real-world Shopify apps, which allow the user to add different elements to the product page, such as the possibility for an anonymous user to write a review and stock counter.

Two Shopify apps were chosen for the study, namely Loox-reviews (Loox, 2021) and Ultimate Sales Boost (Ultimate Sales Boost, 2021). Loox-reviews was used for the reviews-nudge, and the Ultimate Sales Boost app was used in creating Shipping-info and Low stock nudges. The apps were chosen for two reasons. First, they are both in the top 5 downloaded apps in their respective categories (ShopifyApps, 2021), and second, they allowed for the customization of these nudges in a way that was fitting for the purposes of this study.

3.5.1 Review nudge

For the review nudge, one review was manually done for the product, where the review text was kept empty, and the review score given was 5 out of 5 stars. Otherwise, standard settings were chosen from the app settings. This meant that there were 2 elements of the review visible in the figures: top above the price and at the bottom below the product description (see Figure 4 below for the final version).
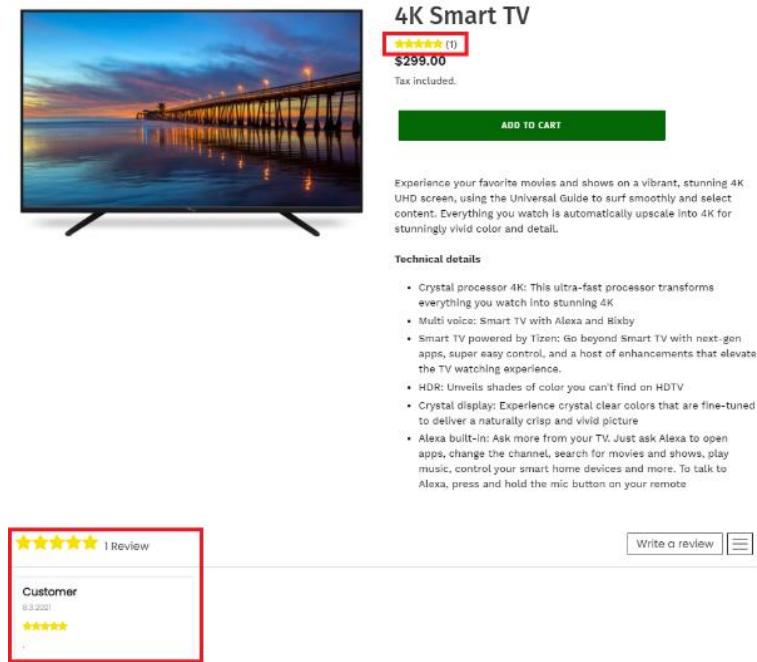
Figure 4. Review nudge

3.5.2 Shipping info nudge

The Shipping info nudge was implemented with the Ultimate Sales Boost app, as mentioned above. This nudge included a simple text below the product price:

"🚚 Order within 4 hours and 9 minutes to get your order delivered within 7 days"

Standard app settings were used, although this study used phrasing "within X days" rather than dynamic date, which is more common in e-commerce environments. The result of implementing the nudge in the experiment product page can be seen in Figure 5 below:
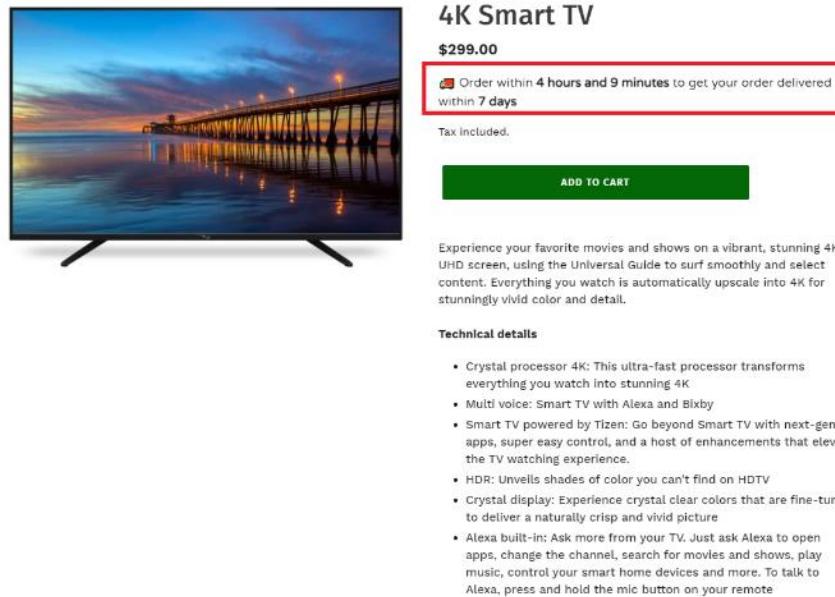
Figure 5. Shipping info nudge

3.5.3 Low stock nudge

For the third and last nudge, low stock, the same Ultimate Sales Boost app was used for the shipping info. This app allows the user to set the threshold manually when to show this nudge, meaning how many products need to be "in warehouse" before showing it to the user. In this case, this study set both the stock to 1 in order to simplify the nudge. The result of implementing the nudge in the experiment can be seen in Figure 6 below:
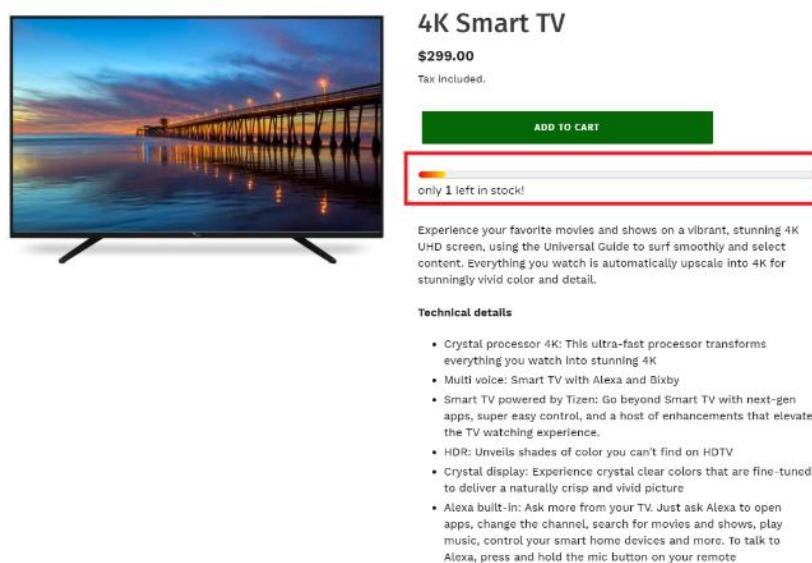
Figure 6. Low stock nudge

3.5.4 Combination nudges

The last three nudge variants are combinations of the previously mentioned nudges. All settings and dimensions of the individual nudges were kept the same. These nudge images are available in Appendix B.

4   Results & analysis

As the questionnaire data consisted of 7 separate variants, the first step in data analysis was organizing and cleaning the data. Then the dummy variables were decoded into the data. Consequently, the data included seven extra dummy variables, each variable representing a singular nudge or a nudge combination. Analyses were done within two categories: single nudge or nudge combinations.

Two types of data analysis software were used: Excel (Analysis ToolPak) and Python. Means, correlations, two-way ANOVA's, and regressions were done in Excel, while Tukey's test was conducted in Python.

The results of the study are organized in the following way. First, the respondents' demographic information is presented, followed by means and mean analysis using ANOVA, followed by correlations and Tukey's test.

4.1   Responses by variant

There was a total of 616 responses between the variants, and the divide between the variants was as follows:

Table 4: Responses by variant

No Nudge	103 responses
Reviews	90 responses
Shipping info	89 responses
Low stock	87 responses
Reviews + Shipping info	84 responses
Reviews + low stock	73 responses
Low stock + Shipping info	90 responses

4.2   Demographic information of respondents

Figures 7-10 below show the demographic information of respondents. The sample size and variance between nudge variants were relatively the same as the whole population. The respondents were mostly millennials, with the most answers from age groups 23 to 30 and 31 to 40. Around 70% of the respondents were male, and 30% female. Most respondents had a bachelor's degree or higher. The income distribution of respondents was more even than

other demographic variables, with 64% of the respondents earning more than 30,000$ USD per year.
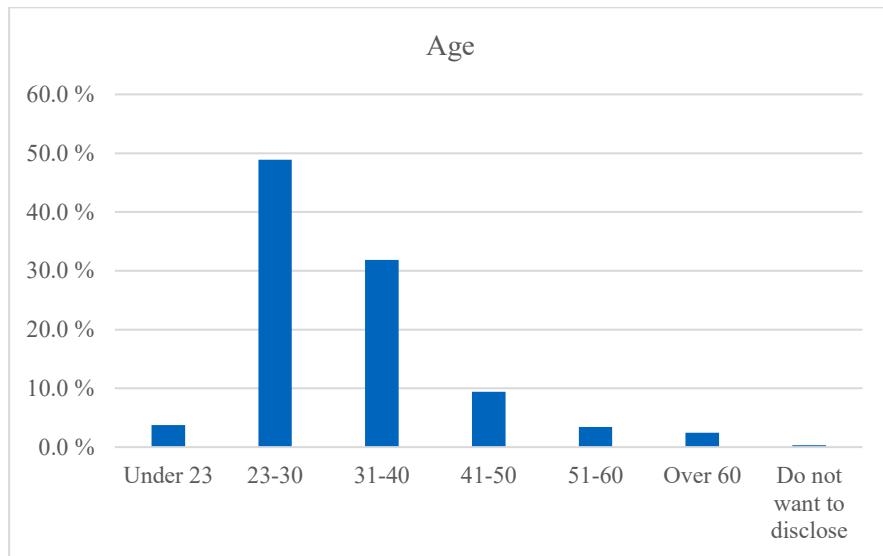
Figure 7. Age of respondents
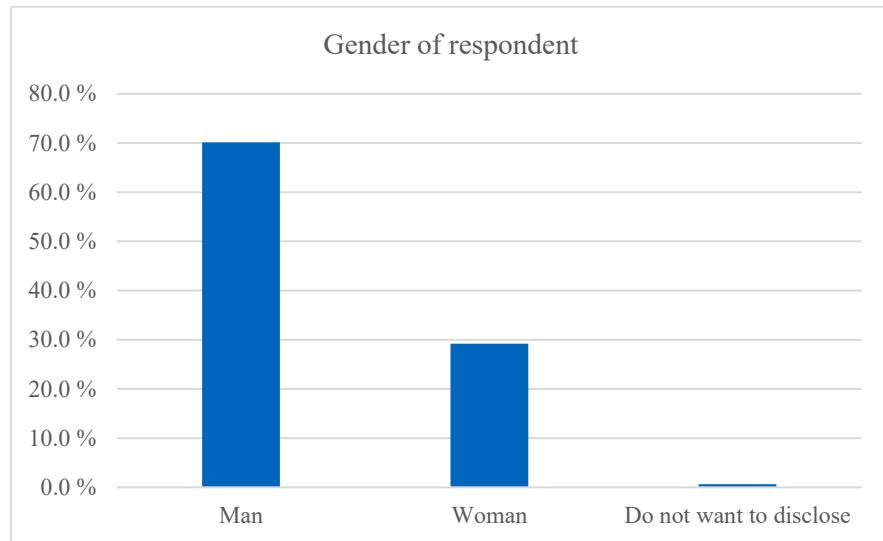
Figure 8. Gender of respondents
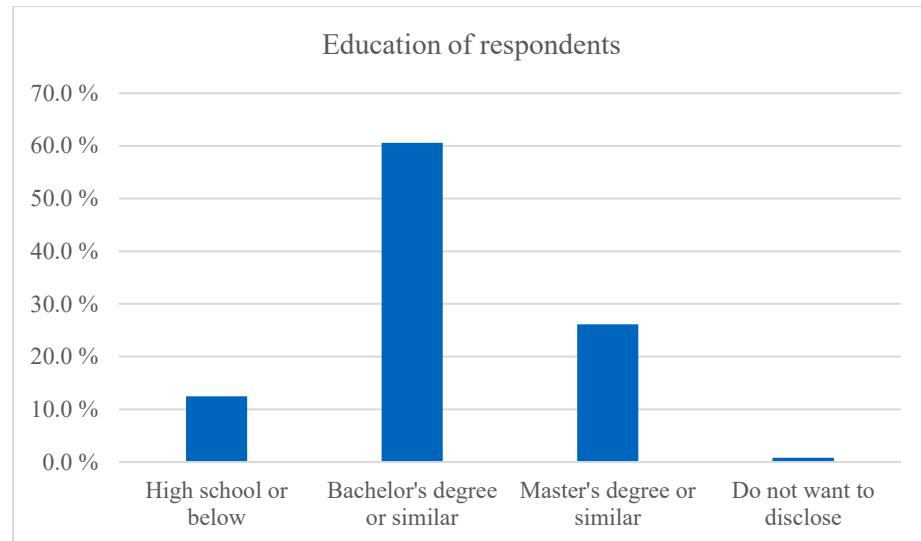
Figure 9. Education of respondents
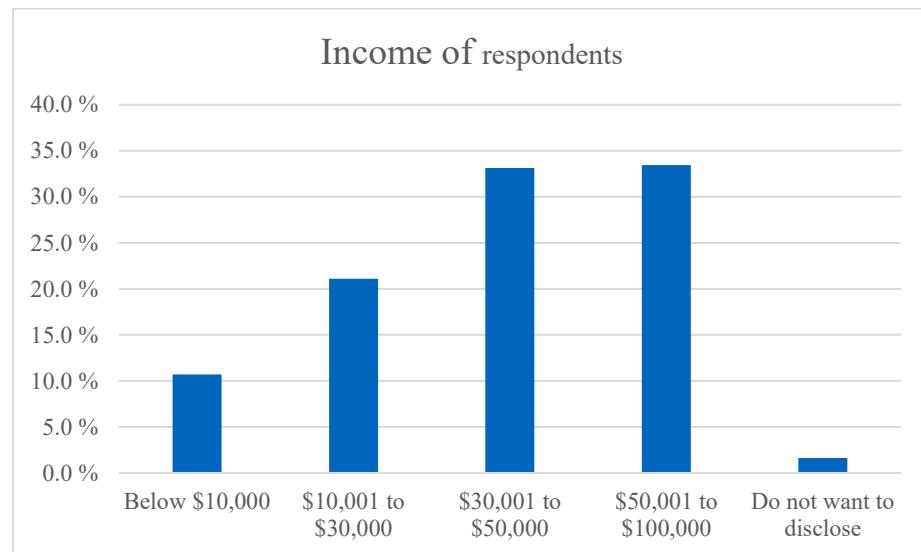
Figure 10. Income of respondents

4.3 Averages

The key metric measured was the average answer in numeric value to the dependent variable questions. The results have been divided into single nudge and combination nudge categories, as shown in this and the following sections.

4.3.1 Single nudges

As shown in Table 5,variant without any nudges results in lower customer response across the questions. As stated previously, this thesis expected the numeric differences to be small between the variants due to the answer scale and nudge design.

The results show reviews-nudge results in the highest customer response. The averages are above average or highest between all questions. Another high customer response nudge is low stock, where results are more positive with the exception of Q8 – Interest to buy. Shipping info nudge results are interesting as they vary the most between the dependent variable questions. However, across the questions, it still results in a higher customer response than no nudge variant.

Table 5: Averages – Single nudge

Dependent variable	No nudge	Review	Shipping info	Low stock
Q5. Would you be interested in finding more about the product you saw?	3,27	3,39	3,33	3,46
Q6. I would consider buying a 4K smart TV as my new TV set	5,59	5,79	5,53	5,84
Q7. I believe this product is of high quality	5,51	5,92	5,51	5,89
Q8. Are you interested in buying this product if you saw it in an online store?	3,23	3,47	3,30	3,29

Notes: Table 5 has been color-coded row-wise. Red = Low, Green = High

The results seem to indicate that it is better to include nudges on a product landing page than not to include, as no nudge variant receives the lowest averages to nearly all dependent variable questions. They also show that Review-nudge is an extremely strong nudge in producing a more positive customer response. Interestingly, low stock, which can be considered as too pushing, or even 'evil' with Lavi's (2018) definition, seems to positively affect the customer response to the product. Finally, shipping info seems to have little effect on any measured variable, as the results are very close to no nudge variant.

4.3.2   Combination nudges

Averages of nudge combinations also show interesting results. Here, the variants have a clear order: Review + low stock resulting in the highest customer response, followed by Review + Shipping info and no nudge variant. Shipping Info + Low stock clearly gets the lowest averages to the dependent variable questions, even when compared to no nudge variant.

These results are in line with the single nudge results. There it can be easily noted that the nudge variants, which had the highest averages across the questions, were review and low stock, respectively. Here, the combination that results in the highest customer response on average is a combination of those two.

Table 6: Averages – Combination nudges

Dependent variable	No nudge	Review + shipping info	Review + low stock	Shipping info + low stock
Q5. Would you be interested in finding more about the product you saw?	3,27	3,26	3,37	3,16
Q6. I would consider buying a 4K smart TV as my new TV set	5,59	5,60	5,70	5,49
Q7. I believe this product is of high quality	5,51	5,47	5,52	5,30
Q8. Are you interested in buying this product if you saw it in an online store?	3,23	3,26	3,40	3,11

Notes: Table 6 has been color-coded row-wise. Red = Low, Green = High

It can be noted that, while review + shipping info combination provides almost the same results as no nudge, shipping info + low stock combination results in the lowest averages. Where the single nudges showed that it is worthwhile to include nudges on a product page, the results of combination nudges show that it matters what nudges one has, as not all affect the results positively.

4.3.3 Individual nudges and combination nudges

When the results of individual and combination nudges are compared, few interesting findings can be noted. First, individual nudges review and low stock lead to more positive customer response than any nudge combination. Secondly, the combination nudge of shipping information and low stock clearly result in a less positive customer response than any other variation, including no nudge. Finally, summarized average results show an evident variation in the average results between all the variants.

Table 7: Summarized averages – all variants

Averages	No nudge	Review	Shipping info	Low stock	Review + shipping info	Review + low stock	Shipping info + low stock
Information interest + Willingness to purchase online (**Q5 + Q8**)	3.25	3.43	3.31	3.37	3.26	3.38	3.13
Perceived quality + Interest to purchase specifically 4K TV (**Q6 + Q7**)	5.55	5.86	5.52	5.86	5.54	5.61	5.39

Notes: Table 7 has been color-coded row-wise. Red = Low, Green = High

4.4 ANOVA and Tukey's test

Averages to dependent variable questions between nudge variants were the focus of this study. Thus, it was also important to examine the possible statistical significance of differences between these variants. To this end, two types of analyses were conducted:

Single-way ANOVA and Tukey's test. ANOVA was used to examine if a significant difference exists between groups, and Tukey's test was used to specify how customer responses are different across groups. A full dataset of Tukey's test results can be found in Appendix C.

4.4.1 ANOVA - Single nudges

Single-factor ANOVA results for single nudges show statistical significance with p<0.00.

We can also note the variance between dependent variables. Whereas Information interest (Q5) and interest to buy (Q8) have some difference in variance, would buy 4k (Q6) and perceived quality (Q7) have almost identical variance.

Table 8a: ANOVA – Single nudges

Groups	Count	Sum	Average	Variance
NO_NUDGE	616	103	0,167	0,139
NUDGE_REVIEWS	616	247	0,401	0,241
NUDGE_DELIVERY	616	263	0,427	0,245
NUDGE_LOWSTOCK	616	250	0,406	0,242
D_INFORMATION_INTEREST	616	2044	3,318	0,468
D_WOULD_BUY_4K	616	3481	5,651	1,603
D_PERCERIVED_QUALITY	616	3454	5,607	1,615
D_INTEREST_TO_BUY	616	2031	3,297	0,547

Table 8b: ANOVA – Single nudges

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	24241.31	7.00	3463.04	5432.84	0.000	2.011
Within Groups	3136.15	4920.00	0.64			
Total	27377.45	4927.00				

4.4.2 ANOVA - Combination nudges

Single-factor ANOVA results for combination nudges show statistical significance with p<0.00.

Table 9a: ANOVA – Combination nudges

Groups	Count	Sum	Average	Variance
NUDGE_REVIEWS+DELIVERY	616	84	0,136	0,118
NUDGE_REVIEWS+LOWSTOCK	616	73	0,119	0,105
NUDGE_DELIVERY+LOWSTOCK	616	90	0,146	0,125
D_INFORMATION_INTEREST	616	2044	3,318	0,468
D_WOULD_BUY_4K	616	3481	5,651	1,603
D_PERCERIVED_QUALITY	616	3454	5,607	1,615
D_INTEREST_TO_BUY	616	2031	3,297	0,547

Table 9b: ANOVA – Combination nudges

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	23162.33	6.00	3860.39	5899.73	0.000	2.10
Within Groups	2816.90	4305.00	0.65			
Total	25979.23	4311.00				

4.4.3 Tukey's test - (Q5) Information interest

Information interest shows that only one group combination of shipping info + low stock and just low stock are statistically significant on p<0.05.

Table 10: Tukey's test – Information interest – significant groups

Group 1	Group 2	Meandiff	P-adj	Lower	Upper	Reject
Shipping info + Low stock	Low stock	0.304	0.048	0.028	0.581	TRUE**

4.4.4 Tukey's test - (Q6) Would buy 4K

The answer to the question "I would consider buying a 4K smart TV as my new TV set" showed no statistically significant differences between groups.

4.4.5 Tukey's test - (Q7) Perceived quality

Perceived quality shows statistically significant group combinations: Review and Shipping info + Low stock and Shipping info + Low stock and low stock. These are both statistically significant with $p < 0.05$.

Table 11: Tukey's test – Perceived quality – significant groups

Group 1	Group 2	Meandiff	P-adj	Lower	Upper	Reject
Review	Shipping info + Low stock	-0.623	0.016	-1.129	-0.118	TRUE**
Shipping info + Low stock	Low stock	0.585	0.034	0.074	1.096	TRUE**

4.4.6 Tukey's test - (Q8) Interest to buy

Interest to buy shows one group combination with a statistically significant level of $p < 0.05$. That group combination was Review and Shipping info + low stock.

Table 12: Tukey's test – Interest to buy – significant groups

Group 1	Group 2	Meandiff	P-adj	Lower	Upper	Reject
Review	Shipping info + Low stock	-0.350	0.024	-0.646	-0.055	TRUE**

4.5 Correlations

Due to the already low variances across all dependent variable questions (Q5 – Q8), the expectation was that correlations between nudge variants and dependent variable questions would be low, and they were. Nevertheless, they show similar results to averages results.

In single nudges, review nudge received the highest positive correlation, while shipping info -nudge results in the most negative correlation across all dependent variable questions. No nudge and low stock variants have very similar results, being between the other two variants.

Correlation of combination nudges reflects again heavily to the average results, where review + low stock variant resulted in the highest positive correlation. As in the averages, so is here, the shipping info + low stock combination nudge results in the lowest correlation, with the correlations to dependent variable questions being clearly negative.

It is worth noting that correlations were calculated for the purpose of comparing the results between nudge variants. This means that they should not be interpreted as being either strong or not strong negative/positive correlations but rather look at the differences between the variants. The full dataset of correlation results can be found in Appendix D.

4.6 Comparing results to hypothesis

Below in Table 11 are presented all hypotheses outlined in chapter two. The table is followed by the explanation for the results.

Table 13: Hypothesis with results

	Hypothesis	**Results**
H1	The presence of **digital nudge** (i.e., reviews, shipping information, and low stock) leads to a more positive customer response than the presence of no nudge.	Partially supported
H2	The presence of **digital nudge combination** (i.e., reviews + shipping information, shipping information + low stock) leads to a more positive customer response than the presence of no nudge.	Not supported
H3	The combination nudges lead to more positive customer responses than the individual nudges.	Not supported
H4	Customers' responses to different nudge variants are different on a statistically significant level.	Partially supported

H1: Even though review and low stock nudges resulted in higher customer response than having no nudges at all, shipping info nudge resulted in the same customer response as having no nudge, so the hypothesis is partially supported for this group of nudges.

H2: The combination nudge of shipping information and low stock resulted in less positive customer response than having no nudges at all. Tukey's test also found significant differences between the combination nudge shipping information + low stock and multiple other groups, as shown in Table 9, 10, and 11. Thus, the hypothesis is not supported.

H3: The combination nudge that resulted in the highest customer response (review and low stock) had a very similar customer response to the single review nudge, and no statistically significant differences were found, so the hypothesis is not supported.

H4: Tukey's test showed some group averages to be statistically significant. However, most group comparison results were not statistically significant, so the hypothesis is partially supported.

4.7 Theoretical background to help explain the results

To help understand the high variation between nudge variant results, this study looked if other studies had been conducted into the possible reasons for the differences. One explaining factor might be personality. Korhonen (2020) studied personality and the effectiveness of digital nudges. They measured the responses with Big Five personality dimensions and found openness to experience to negatively correlate with to nudges, while high conscientiousness reduced the susceptibility to nudges. This study chose to not measure personality so comparisons are challenging to make.

Another explanation for the results might be the age of respondents. Esposito et al. (2017) find in their study that the effect on different nudges might vary depending on the age of a user. They note that there was an interaction effect between all nudges used in the study and age. Two nudges exacerbated the effect of age, while another mitigated it. For this study, over 80% of the respondents were aged 23 to 40, so it is possible that the differences between the nudge variants might have been influenced by age profile of this study's respondent's.

An important factor to consider when analyzing the results is that this thesis expected the numeric differences in the results to be relatively small. This can be explained through study by Hummel and Maedche (2019), which showed digital nudges to have a median effect of 21% and that only 62% of nudging experiments are statistically significant. This was true for this study as well, to a degree. This study found only four total nudge groups, which had statistically significant average differences on the four dependent variable questions, although the small sample sizes might have contributed to this. The small median effect was also noticeable within the results.

Similarities in results to other literature can still be found. The study by Luo et al. (2019) found that giving a scarcity message has a substantial effect on consumer purchases, especially in an early stage of shopping. This effect was not as substantial when the scarcity message was presented in the late stage of the shopping (checkout). This thesis focused on the product page, which is the early stage of the online shopping process. Looking at the

results, they are similar to Luo et al. (2019), as low stock nudge, comparable to the scarcity stimuli of Luo et al. (2019), individually resulted in one of the highest customer responses to all four measured variables.

In conclusion, theoretical background helps to explain the results to a certain degree. However, in order to fully understand the results, a deeper analysis variant by variant and by taking into account the respondent age and other above-mentioned factors would need to be made. In this study, it was not possible due to the relatively low response count per variant.

5 Discussion

This chapter will summarize the research questions outlined in the introduction of this thesis and shortly summarize answers to those questions. Then it will outline the theoretical and practical contributions of the study. Finally, this chapter will offer suggestions for future research and outline the limitations of this study.

5.1 Summary of research questions and answers

The thesis aimed to answer two main research questions:

Question 1: Which of the three chosen nudges (reviews, shipping information, and low stock) is the most effective in producing a positive customer response?

Question 2: Which *combination* of the three chosen nudges (reviews + shipping info, reviews + low stock, and shipping information + low stock) is most effective in producing positive customer response?

The results and following analysis chapter showed that the answer is review nudge for the first research question. Review's nudge, although close with low stock nudge, showed the highest customer response to all dependent variable questions. Averages between-group variants were found to be not statistically significant. However, based on the study of Hummel and Maedche (2019), only 61% of nudging elements are, so this was to be expected.

For combination nudges, the results were very logical following the single nudge results. The two highest customer response nudge variants, reviews, and low stock, together as a combination nudge, resulted in the highest customer response. Furthermore, the nudge combination of shipping information and low stock showed the same as the study by Schneider et al. (2020), which noted that digital nudging is a double-edged sword, where digital nudging can easily affect measured variables negatively. This nudge combination of shipping information and low stock in this study resulted in lower customer response than having no nudging to all four measured variables. In addition, most statistically significant group pairs through Tukey's test analysis included this nudge combination group, so the low customer response was statistically significant.

5.2 Theoretical contribution

As the theoretical background chapter showcased, previous literature with the same approach was not found at the time, and thus, comparison to previous literature is challenging. However, references can be made into studies, which found varying results with explicitly outlined nudge design.

For example, Schneider et al. (2020) found that nudging does not always lead to the desired outcome. This study and its results showed the same core principle; nudging is a double-edged sword. Done correctly, it can improve the customer response within digital environments, but when done badly, it can lead to less positive customer response compared to a situation where nudging was not done. This was the case with one particular nudge combination in this study: shipping information and low stock. This variant turned out to result in less positive customer response than no nudging at all. This was interesting also because the nudges individually produced higher customer response than as combinations.

Hummel & Maedche (2019) also found in their literature review of digital nudging studies that digital nudges have a median effect of 21%. If the no nudge results of this study are compared with the review nudge, it can be seen that the average effect in response was 5.5% across the four dependent variable questions. This differs from the median, but considering the approach to the nudge design in this study, this was not surprising.

Luo et al. (2019) studied digital nudging of ECT (e-commerce cart targeting), and they found the effect of scarcity to increase the probability of a purchase by 20%. In this thesis, the low nudge stock was hypothesized to trigger the effect of scarcity. Although this paper did not attempt to calculate the probability to purchase based on the nudge, it still found similar results consistent with Luo et al. (2019) that scarcity leads to more positive customer response, including interest to purchase the presented product online.

The present study found that positive reviews positively affect consumer perceptions of a product, echoing the study by Tan et al. (2018). Specifically, Tan et al. (2018) focused on the differences between positive and negative reviews, and found significant differences between these two categories. With lower or verbally negative reviews, the customer response had most likely lower than with no nudging at all based on the study of (ibid). Thus, it is likely the results of this study had most been different had the review nudge design been differently, with different number of reviews or different ratings used in the reviews.

Wang & Bae (2020) and Wu et al. (2021) studied the effect of free shipping and found it to be a strong driver of purchase intent; they note that it is based on the monetary value of

the incentive. This study also used shipping information as a nudge, but it was information rather than a monetary offer, so the results are very different. In this study, the presence of shipping information was found to have no statistical difference compared to having no nudging. Although here, the results may vary depending on the nudge design (i.e., the nudge text).

5.3 Practical contribution & managerial implications

The main contribution of the study was the choice of nudges. As the theoretical background chapter of this study previously presented, the primary motivation for the nudge choice was non-academic. The nudges were chosen mainly based on how widely that type of nudge is in use, both from the author's industrial experience and based on statistics provided by one of the world's biggest e-commerce platforms, namely Shopify. The results of these nudges provide interesting managerial implications to any e-commerce manager.

Although the numeric differences of nudge variants to dependent variables were low, they were still managerially significant. For example, the earlier mentioned positive effect of 5,5% of the review nudge compared to no nudging might seem like a low effect. However, in e-commerce users are often directed to product pages through marketing in the thousands, and as such, small percentages make a big difference in the long run.

5.3.1 Choose nudges carefully and test them

The results show that when the correct nudges are present, it positively impacts information interest, interest to purchase specifically the presented product, Perceived quality, and interest to purchase in an online setting. However, it also shows that when there is a 'wrong' combination of nudges, the results might not be positive.

Too much nudging and "pushing" provides negative results. In the low stock + shipping info, nudge combination results were negative across the measured variables. This thesis speculates that customers are smart, and they can sense when they are being pushed or marketed too hard. Other reasons for the results might be, that subliminally customers and users feel like they are missing something by not buying (fear of missing out). The shipping info nudge presents the user with a timeline for taking advantage of said nudge. To this end, the user might feel that they are missing out on the 'offer' as they have no concurrent need to purchase a television. In other words, pushing the user towards a purchase too much has

the opposite effect. Whatever the reason, it can be conducted that nudges should be tested and carefully chosen no matter the context.

5.3.2 You cannot go wrong with reviews

From the results of this thesis it can be detucted that with reviews, you cannot really go wrong. Part of the reason for this is most likely that 91% of users, on average, read the reviews of a product, and 84% trust them like a personal recommendation (Truitt, 2020). However, it is important to note that this case study used a review version where there was only one 5-star review, and as such, if this changes, the results might change as well. Nevertheless, the review nudge provided the highest customer response.

The data showed that not only is reviews-nudge the best individual nudge to use, but nudge combinations in which review was included performed better than other nudges and nudge combinations on average. So, the conclusion would be that reviews are good to have on an online shop, at least when you have positive reviews, even when those reviews contain no text.

5.3.3 Have at least some nudging on the product page

In all measured ways, this study showed that some nudging is almost always better than no nudging at all. Although some nudges, such as individual shipping information nudge and the combination of shipping info and low stock nudges, results in less positive customer response than having no nudges, most of the nudge variants and combinations provided higher customer response than having no nudges.

5.4 Suggestions for future research

There are many other elements on a product page than what was tested within this study, so possibilities for further research are endless. Here are some interesting elements that based on this study, might provide interesting experiment topics.

Product description
The product description is a universal element in any online shop. This study aimed to generalize that element by making it simple and informative. However, combining product

description and nudges so that the product description highlights other nudges that are present might provide interesting results. Product description can also be considered a nudge in itself, so testing different variations of it could be explored.

Product reviews

This study showed the importance of product reviews, as shown by the results and analysis sections. This presents questions as the review nudge can be presented in many ways. In this study, the review nudge had one 5-star review with no text. The results might and likely would be different with different nudge designs.

Product price

Product price and how it is presented are a big part of any product page. In this case study, the price was kept the same throughout the variants but researching the way price is presented is also an interesting topic. Combining the presentation of price with other nudges, such as product description that highlights the price, might see very different results in the dependent variables than what this study showed.

Be it the elements mentioned above or something else, it is a strong recommendation of this thesis that further research should be done on the topic. This topic is something that has been extensively studied from a non-academic point of view with various case studies of different online shops, but academic research utilizing nudge theory in the digital sphere is somewhat lacking, as also shown by Mirsch et al. (2017) and Weinmann et al. (2016).

E-commerce platforms such as Shopify and Magneto have thousands of apps that either knowingly or unknowingly utilize the core principles of nudge theory from heuristics to the latest nudge design principles. That makes this topic great for any academic.

5.5 Limitations of the study

The study was exploratory. There was no previous literature done in the same context of e-commerce product page and multiple nudges in the same study. Also, the number of responses per variant was relatively low, which might have influenced the low number of statistically significant findings. Furthermore, even though the differences between variants were relatively low, most of the findings showed a clear direction of the effect each nudge or combination of nudges had.

Measuring customer response is also challenging. In this study, an online mockup shop was shown to the respondents, and this, of course, is not optimal. However, it is one of the more practical ways to implement such as study. Customer responses were measured with four different variables, and as each variable had been designated only one question, the variable was not optimally measured. The results could have been more extensive, with additional questions added.

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Appendix A: Questionnaire - questions and answers

Question	Answer options	
Q1. What is your age?	i)	18-22
	ii)	23-30
	iii)	31-40
	iv)	41-50
	v)	51-60
	vi)	Over 60
	vii)	Do not want to disclose
Q2. What is the highest level of school you have completed or the highest degree you have received?	i)	High school or below
	ii)	Bachelor degree or similar
	iii)	Master degree or similar
	iv)	Do not want to disclose
Q3. What is your sex?	i)	Male
	ii)	Female
	iii)	Do not want to disclose
Q4. What is your annual income?	i)	Below $10,000
	ii)	$10,001 to $30,000
	iii)	$30,001 to $50,000
	iv)	$50,001 to $100,000
	v)	Do not want to disclose
Please examine the following image of a product page from an online shop, and evaluate the product. *See figures 1 to 7 to see the images*	1.	No nudge
	2.	Nudge – Reviews
	3.	Nudge – Shipping info
	4.	Nudge – Low stock
	5.	Nudges – Reviews + Shipping info
	6.	Nudges – Reviews + Low stock
	7.	Nudges – Shipping info + Low stock

Q5. Would you be interested in finding more about the product you saw?	i) Not at all interested ii) Not much interested iii) Somewhat interested iv) Very interested
Q6. I would consider buying a 4K smart TV as my new TV set	i) Strongly disagree ii) Disagree iii) Somewhat disagree iv) Neutral v) Somewhat agree vi) Agree vii) Strongly agree Agree viii) Strongly agree
Q7. I believe this product is of high quality	i) Strongly disagree ii) Disagree iii) Somewhat disagree iv) Neutral v) Somewhat agree vi) Agree vii) Strongly agree
Q8. Are you interested in buying this product if you saw it **in an online store?**	i) Not at all interested ii) Not much interested iii) Somewhat interested iv) Very interested
Q9. Do you own a TV?	i) Yes ii) No
Q10. How often do you watch something from TV?	i) Never ii) Rarely iii) Sometimes iv) Often v) Always
Q11. What are the most important attributes to you when buying a tv **from an online shop?**	i) Quality ii) Reviews iii) Delivery options and time

	iv) Price
	v) Availability
	Scale for each attribute:
	i) Not at all important
	ii) Low importance
	iii) Neutral
	iv) Important
	v) Very important

Appendix B: Combination nudges

Combination – Review + shipping info

Combination – Review + low stock

Combination – Shipping info + low stock

4K Smart TV

$299.00

🚚 Order within **4 hours and 9 minutes** to get your order delivered within **7 days**

Tax included.

ADD TO CART

only **1** left in stock!

Experience your favorite movies and shows on a vibrant, stunning 4K UHD screen, using the Universal Guide to surf smoothly and select content. Everything you watch is automatically upscale into 4K for stunningly vivid color and detail.

Technical details

- Crystal processor 4K: This ultra-fast processor transforms everything you watch into stunning 4K
- Multi voice: Smart TV with Alexa and Bixby
- Smart TV powered by Tizen: Go beyond Smart TV with next-gen apps, super easy control, and a host of enhancements that elevate the TV watching experience.
- HDR: Unveils shades of color you can't find on HDTV
- Crystal display: Experience crystal clear colors that are fine-tuned to deliver a naturally crisp and vivid picture
- Alexa built-in: Ask more from your TV. Just ask Alexa to open apps, change the channel, search for movies and shows, play music, control your smart home devices and more. To talk to Alexa, press and hold the mic button on your remote

Appendix C: Tukey's test

Information Interest (Q5)

Group 1	Group 2	Meandiff	P-adj	Lower	Upper	Reject
------	-----	---------	-------	--------	-------	-------
No nudge	Review	0.110	0.900	-0.155	0.375	FALSE
No nudge	Reviews + Shipping info	-0.001	0.900	-0.272	0.270	FALSE
No nudge	Reviews + Low stock	0.095	0.900	-0.187	0.377	FALSE
No nudge	Shipping info	0.051	0.900	-0.215	0.318	FALSE
No nudge	Shipping info + Low stock	-0.119	0.889	-0.385	0.147	FALSE
No nudge	Low stock	0.185	0.504	-0.083	0.454	FALSE
Review	Reviews + Shipping info	-0.111	0.900	-0.389	0.167	FALSE
Review	Reviews + Low stock	-0.015	0.900	-0.304	0.274	FALSE
Review	Shipping info	-0.059	0.900	-0.333	0.215	FALSE
Review	Shipping info + Low stock	-0.229	0.264	-0.502	0.044	FALSE
Review	Low stock	0.075	0.900	-0.201	0.351	FALSE
Reviews + Shipping info	Reviews + Low stock	0.096	0.900	-0.198	0.390	FALSE
Reviews + Shipping info	Shipping info	0.052	0.900	-0.228	0.332	FALSE
Reviews + Shipping info	Shipping info + Low stock	-0.118	0.900	-0.397	0.161	FALSE
Reviews + Shipping info	Low stock	0.186	0.551	-0.095	0.467	FALSE
Reviews + Low stock	Shipping info	-0.044	0.900	-0.334	0.246	FALSE
Reviews + Low stock	Shipping info + Low stock	-0.214	0.420	-0.504	0.075	FALSE
Reviews + Low stock	Low stock	0.090	0.900	-0.202	0.382	FALSE
Shipping info	Shipping info + Low stock	-0.170	0.616	-0.445	0.105	FALSE
Shipping info	Low stock	0.134	0.832	-0.143	0.411	FALSE
Shipping info + Low stock	Low stock	0.304	0.048	0.028	0.581	TRUE**

Would buy 4K (Q6)

Group 1	Group 2	Meandiff	P-adj	Lower	Upper	Reject
------	-----	---------	-------	--------	-------	-------
No nudge	Review	0.182	0.900	-0.311	0.675	FALSE
No nudge	Reviews + Shipping info	0.045	0.900	-0.459	0.549	FALSE
No nudge	Reviews + Low stock	0.101	0.900	-0.424	0.625	FALSE
No nudge	Shipping info	-0.070	0.900	-0.566	0.426	FALSE
No nudge	Shipping info + Low stock	-0.109	0.900	-0.604	0.385	FALSE
No nudge	Low stock	0.241	0.832	-0.258	0.740	FALSE
Review	Reviews + Shipping info	-0.137	0.900	-0.655	0.380	FALSE
Review	Reviews + Low stock	-0.082	0.900	-0.619	0.456	FALSE
Review	Shipping info	-0.252	0.814	-0.762	0.258	FALSE
Review	Shipping info + Low stock	-0.291	0.690	-0.800	0.217	FALSE
Review	Low stock	0.059	0.900	-0.454	0.572	FALSE
Reviews + Shipping info	Reviews + Low stock	0.056	0.900	-0.491	0.603	FALSE
Reviews + Shipping info	Shipping info	-0.115	0.900	-0.635	0.405	FALSE
Reviews + Shipping info	Shipping info + Low stock	-0.154	0.900	-0.673	0.365	FALSE
Reviews + Shipping info	Low stock	0.196	0.900	-0.327	0.719	FALSE
Reviews + Low stock	Shipping info	-0.171	0.900	-0.711	0.369	FALSE
Reviews + Low stock	Shipping info + Low stock	-0.210	0.900	-0.748	0.329	FALSE
Reviews + Low stock	Low stock	0.141	0.900	-0.402	0.683	FALSE
Shipping info	Shipping info + Low stock	-0.039	0.900	-0.550	0.472	FALSE
Shipping info	Low stock	0.311	0.642	-0.205	0.827	FALSE
Shipping info + Low stock	Low stock	0.350	0.519	-0.164	0.864	FALSE

Perceived quality (Q7)

Group 1	Group 2	Meandiff	P-adj	Lower	Upper	Reject
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No nudge	Review	0.413	0.258	-0.077	0.904	FALSE
No nudge	Reviews + Shipping info	0.097	0.900	-0.404	0.598	FALSE
No nudge	Reviews + Low stock	0.011	0.900	-0.511	0.532	FALSE
No nudge	Shipping info	-0.004	0.900	-0.497	0.489	FALSE
No nudge	Shipping info + Low stock	-0.210	0.900	-0.702	0.282	FALSE
No nudge	Low stock	0.375	0.391	-0.121	0.872	FALSE
Review	Reviews + Shipping info	-0.316	0.625	-0.830	0.199	FALSE
Review	Reviews + Low stock	-0.403	0.396	-0.937	0.132	FALSE
Review	Shipping info	-0.418	0.285	-0.924	0.090	FALSE
Review	Shipping info + Low stock	-0.623	0.016	-1.129	-0.118	TRUE*
Review	Low stock	-0.038	0.900	-0.548	0.472	FALSE
Reviews + Shipping info	Reviews + Low stock	-0.087	0.900	-0.631	0.458	FALSE
Reviews + Shipping info	Shipping info	-0.102	0.900	-0.619	0.416	FALSE
Reviews + Shipping info	Shipping info + Low stock	-0.307	0.655	-0.823	0.209	FALSE
Reviews + Shipping info	Low stock	0.278	0.751	-0.242	0.798	FALSE
Reviews + Low stock	Shipping info	-0.015	0.900	-0.552	0.522	FALSE
Reviews + Low stock	Shipping info + Low stock	-0.221	0.900	-0.756	0.315	FALSE
Reviews + Low stock	Low stock	0.365	0.528	-0.175	0.904	FALSE
Shipping info	Shipping info + Low stock	-0.206	0.900	-0.714	0.303	FALSE
Shipping info	Low stock	0.379	0.419	-0.133	0.892	FALSE
Shipping info + Low stock	Low stock	0.585	0.034	0.074	1.096	TRUE**

Interest to buy (Q8)

Group 1	Group 2	Meandiff	P-adj	Lower	Upper	Reject
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No nudge	Review	0.226	0.335	-0.060	0.513	FALSE
No nudge	Reviews + Shipping info	0.074	0.900	-0.219	0.367	FALSE
No nudge	Reviews + Low stock	0.162	0.755	-0.143	0.467	FALSE
No nudge	Shipping info	0.068	0.900	-0.220	0.356	FALSE
No nudge	Shipping info + Low stock	-0.124	0.900	-0.412	0.163	FALSE
No nudge	Low stock	0.052	0.900	-0.238	0.342	FALSE
Review	Reviews + Shipping info	-0.152	0.797	-0.453	0.149	FALSE
Review	Reviews + Low stock	-0.064	0.900	-0.377	0.248	FALSE
Review	Shipping info	-0.158	0.752	-0.454	0.138	FALSE
Review	Shipping info + Low stock	-0.350	0.024	-0.646	-0.055	TRUE**
Review	Low stock	-0.174	0.672	-0.472	0.124	FALSE
Reviews + Shipping info	Reviews + Low stock	0.088	0.900	-0.230	0.406	FALSE
Reviews + Shipping info	Shipping info	-0.006	0.900	-0.308	0.296	FALSE
Reviews + Shipping info	Shipping info + Low stock	-0.198	0.555	-0.500	0.103	FALSE
Reviews + Shipping info	Low stock	-0.022	0.900	-0.326	0.282	FALSE
Reviews + Low stock	Shipping info	-0.094	0.900	-0.408	0.220	FALSE
Reviews + Low stock	Shipping info + Low stock	-0.286	0.173	-0.599	0.027	FALSE
Reviews + Low stock	Low stock	-0.110	0.900	-0.425	0.206	FALSE
Shipping info	Shipping info + Low stock	-0.192	0.572	-0.489	0.105	FALSE
Shipping info	Low stock	-0.016	0.900	-0.316	0.284	FALSE
Shipping info + Low stock	Low stock	0.176	0.663	-0.123	0.475	FALSE

Appendix D: Correlations

Correlations – Single nudges

Dependent variable	No nudge	Review	Shipping info	Low stock
Q5. Would you be interested in finding more about the product you saw?	-0,030	0,031	-0,085	0,007
Q6. I would consider buying a 4K smart TV as my new TV set	-0,021	0,040	-0,068	0,014
Q7. I believe this product is of high quality	-0,033	0,057	-0,095	-0,025
Q8. Are you interested in buying this product if you saw it in an online store?	-0,039	0,106	-0,067	-0,046

Notes: Table 6 has been color-coded row-wise. Red = Low, Green = High

Correlations – Combination nudges

Correlations	No nudge	Review + shipping info	Review + low stock	Shipping info + low stock
Q5. Would you be interested in finding more about the product you saw?	-0,030	-0,026	0,028	-0,098
Q6. I would consider buying a 4K smart TV as my new TV set	-0,021	-0,003	0,014	-0,053
Q7. I believe this product is of high quality	-0,033	0,000	-0,025	-0,100
Q8. Are you interested in buying this product if you saw it in an online store?	-0,039	0,007	0,050	-0,104

Notes: Table 6 has been color-coded row-wise. Red = Low, Green = High

Correlations – All nudge variants

Correlations	No nudge	Review	Shipping info	Low stock	Review + shipping info	Review + low stock	Shipping info + low stock
Q5. Would you be interested in finding more about the product you saw?	-0.030	0.031	-0.085	0.007	-0.026	0.028	-0.098
Q6. I would consider buying a 4K smart TV as my new TV set	-0.021	0.040	-0.068	0.014	-0.003	0.014	-0.053
Q7. I believe this product is of high quality	-0.033	0.057	-0.095	-0.025	0.000	-0.025	-0.100
Q8. Are you interested in buying this product if you saw it in an online store?	-0.039	0.106	-0.067	-0.046	0.007	0.050	-0.104

Notes: Table 6 has been color-coded row-wise. Red = Low, Green = High