Aalto University
School of Business

PERSONALITY AND THE EFFECTIVITY OF DIGITAL NUDGES

An empirical study

Master's Thesis
Mika Korhonen
Aalto University School of Business
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Aalto-yliopisto
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Aalto-yliopisto, PL 11000, 00076 AALTO
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Tiivistelmä

Ihmisten päätöksenteko ei aina ole rationaalista ja faktoihin perustuvaa, vaan monelta osin myös intuitiivista ja erilaisiin heuristiikkoihin nojaavaa. Tähän ajatukseen perustuu niin sanottu nudge-teoria. Nudgejen, suomeksi tuuppausten, tarkoitus on heuristiikkoja ja vinoumia hyödyntäen ohjata ihmiset tekemään haluttuja päätöksiä.

Tässä tutkimuksessa tutkin kahta digitaalista tuuppausta puhelimia myyvän verkkokaupan kontekstissa ja sitä, miten kohdehenkilön persoonallisuus vaikuttaa niiden tehokkuuteen. Toinen tuuppaus, rajoitetun ajan voimassa oleva tarjoushinta, perustui niin sanottuun tappiokammoon. Toinen taas oli käyttäjien antama arvosana ja se perustui ihmisten taipumukseen seurata muiden mielipiteitä. Tutkimusaineistonani oli verkossa toteutettu testi, johon osallistui 237 ihmistä. Mittasin vastaajien persoonallisuuttaa Big Five -persoonallisuuspiirretestillä ja heidän ostokäyttäytymistään conjoint-analyysillä.

Saamani tulokset ovat monelta osin johdonmukaisia aikaisemman persoonallisuutta käsittelevän tutkimuksen kanssa ja lisäävät myös ymmärrystä yksilöllisistä eroista tuuppaamisen tehokkuudessa. Korkea avoimuus korreloi negatiivisesti molempien tuuppausten vaikutuksen kanssa. Lisäksi korkea tunnollisuus vähentää muiden ihmisten mielipiteisiin perustuvan tuuppauksen tehokkuutta. Myös muita korrelaatioita persoonallisuustyyppien ja tuuppaamisen tehokkuuden välillä havaittiin, mutta nämä tulokset eivät olleet tilastollisesti merkitseviä, luultavasti pienestä otoskoosta johtuen. Silti, ne ovat lupauksia herättäviä tulevien tutkimusten kannalta.

Avainsanat tuuppaaminen, persoonallisuus, verkkokauppa, käyttäytymispsykologia

Aalto University
School of Business

Aalto University, P.O. BOX 11000, 00076 AALTO
www.aalto.fi

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Author Mika Korhonen

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Abstract

Decision making isn't always rational and fact-based. Instead, it's often intuitive and stems from heuristics. So-called nudge theory is based on this idea. Nudges are meant to influence behaviour with the use of these heuristics and biases. In this research I study two digital nudges in a context of an online store and examine how consumer's personality affects their effectivity. The other nudge is a discounted price with limited availability and it is based on loss aversion bias. The other one is a rating given by other customers. It is based on conformity bias. The data I use is from a web survey with a sample size of 237. In the survey, I measured respondents' personality with Big Five personality dimensions and their behaviour with a choice-based conjoint analysis.

The findings of this study are in many ways consistent with a previous literature and the results also give new insights on the individual differences in the effectivity of nudging. Openness to Experience was negatively correlated with the susceptibility to both nudges. High Conscientiousness, on the other hand, reduced susceptibility to the nudge that utilizes the conformity bias. In addition, other correlations between personality and the effectivity of the nudges were found, but those findings were not statistically significant, probably due to small sample size. Still, the results are promising for further research.

Keywords nudging, personality, e-commerce, behavioural psychology

Acknowledgements

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Otaniemi, 29 December 2019

Mika Korhonen

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1. Introduction

I go to bed late every evening and regret it every morning. I still remember that was the name of one of the first Facebook pages I ever liked back in 2009. Ten years ago I was 14 years old kid, Nokia was the biggest mobile phone manufacturer in the world and Donald Trump was known for being a host of *The Apprentice*. A decade later, plenty of thing have changed but some haven't. Here I am, writing this chapter in the middle of a night, knowing that my alarm is ringing, without any mercy, in six and half hours and I will deeply regret not going to sleep earlier.

How does me staying up too long have anything to do with a master's thesis? Let me explain. This little story does tell something universal about all of us. People are people, not robots. We do things that are not rational. Going to bed earlier and being fully awake in work next morning would be wise, and I know it. If I could script my day beforehand, I would most definitely be sleeping at 23:00. Still, there's something that makes us to neglect our future selves and live in the moment. In academic terms it's called hyperbolic discounting. It means that people are prone to choose the smaller immediate gains over larger gains in the future. This is just one of multitude of biases that we humans have and that affect our behavior. And this is where nudges – the topic of this thesis - come to picture. In short, nudges are small tricks, designed with those cognitive limitations in mind, that steer us to behave in a certain way.

A classic example of a situation where hyperbolic discounting has a strong effect is saving. Most people agree that they should be saving more but doing that in practice is another story. However, there are ways to *nudge* people to save more. An example of this is so called Save More Tomorrow pension program created by Richard Thaler and Shlomo Bernatzi (2004). The idea is that people who take part in the program, commit well in advance to increase their saving rate every time they get a pay rise. This is a simple yet effective way to design the program for a few reasons. First, it dodges hyperbolic discounting bias by making the savings start in the future, not right now. Second reason is related to another bias, called loss aversion. Loss aversion means that people hate losing something they feel they possess already. When the saving rate goes up in sync with the pay rise – and slightly less than it – they never see their paycheck go down. And, unfortunately, some nudge us the other way around by exploiting these biases. That's how credit card companies make money: get the goods now, worry about

paying later. Another example of nudging. Imagine you are going to grab a coffee from Starbucks. There are three sizes available, Tall, Grande and Venti. Did you choose Grande? You are being nudged by utilizing the middle option bias. When there are three options, we do not want to have the smallest one but not the biggest one either. Instead, it's easiest to choose the middle one, no matter what the absolute sizes are.

People have used nudges forever. The term nudge and a theory related to them, however, is relatively new. The concept was introduced and popularized in 2008 by two American academics, Richard H. Thaler and Cass R. Sunstein in their book about nudges. Nudging theory has roots in psychology and research about decision making (Marchiori et al. 2017). Thaler and Sunstein took learnings from those fields and created a concept they call nudging. Since the release of Thaler and Sunstein's book, the theory has been applied to various domains both in public and private sector and it has gained vast amount of interest in academia.

I have studied marketing and this thesis is written from a marketing point of view. Interestingly enough, nudging hasn't been studied much in our field. It seems counterintuitive as many of the everyday applications of nudging are works of marketing departments or at least could be seen as a part of marketing tactics. A reason for this could be that traditionally the focus of nudging literature has been on nudges that benefit the person being nudged. Save More Tomorrow program is an example of that. Studying how flight ticket company nudges its customers to finalize the purchase doesn't sound as good. Another reason may be, that the research on similar topics in the marketing has scattered across different theories from persuasion to classic advertising. However, I believe that nudging theory can be valuable in the world of marketing research too. It can be a useful and insightful framework for both academics and practitioners who want to understand consumer behavior better. At least, these few months I have spent with the topic have opened my eyes on many interesting truths about how people think and act.

More specifically, the goal of this study is to understand how personality influences the effectivity of nudges in e-commerce. Both personality and e-commerce are topics that I find really interesting and relevant, already now but especially in the future. Digital marketing has given us tools to really embrace targeted marketing and personality is one of the fields that has a huge effect on our behavior. E-commerce, on the other hand, is obviously already turning many traditional industries around and will do so even more in the future.

2. Theoretical Background

In this chapter I'm going to discuss the nudging in general and the philosophical and psychological foundations the nudge theory has been built on. I will also examine nudging from a point of view of marketing research. Later in the chapter, I will write about personality and how it has been researched related to nudging. Finally, this chapter presents a research gap and the research question of this thesis.

2.1 Background

Before diving into the concept itself, let's take a short look on the backgrounds and the history of nudging. The nudging literature started just 11 years ago when Thaler and Sunstein published their book *Nudge: Improving Decisions About Health, Wealth, and Happiness* (2008). As the name suggests, the book is mainly dealing with applications of nudging in healthcare and personal finance. In addition, many of the suggestions Thaler and Sunstein make are for government policy makers and not necessarily for individuals or companies.

It's not an overstatement to say that the book started a movement. Thaler and Sunstein's book became a best-seller and the authors rock stars of their field. The book won the best book of the year award from The Economist and The Financial Times and it has sold over 1 500 000 copies (Penguin Random House 2019) which is quite an achievement for book that's essentially talking about government policies. The success story of Thaler and Sunstein didn't end there. President Barack Obama appointed Sunstein - who also happened to be his old friend - as a head of Office of Information and Regulatory Affairs in 2009 to apply the theory of nudging in U.S. federal government. Thaler didn't do any worse. In 2017 he won the Nobel Prize in Economics for his work on the effect of limited rationality, social preferences and lack of self-control to individual decisions and market outcomes (Appelbaum 2017).

The nudge theory itself won popularity as well. In addition to being put in service by Obama's administration, it was received well on the other side of the Atlantic too. In 2010 British prime minister David Cameron set up the Behavioral Insights Team, also known as Nudge Unit, to apply nudges in various government departments. Many other countries have followed the example of US and Great Britain. Furthermore, it isn't just governments that have applied

nudging. The same ideas have been used in many other areas too. Google is said to be utilizing nudge management (Ebert and Freibichler 2017), nudges are being used in education (Damgaard and Nielsen 2018) and, self-evidently, there's a lot of ways marketers use nudges (Thompson 2013, Dholakia 2016). Nudging became a popular topic in academia too (Hansen 2016, Szaszi et al. 2017). As can be seen from the Figure 1, the research on the topic hasn't been slowing down during the last few years. Instead, there are more and more domains where the idea of nudging is being used.

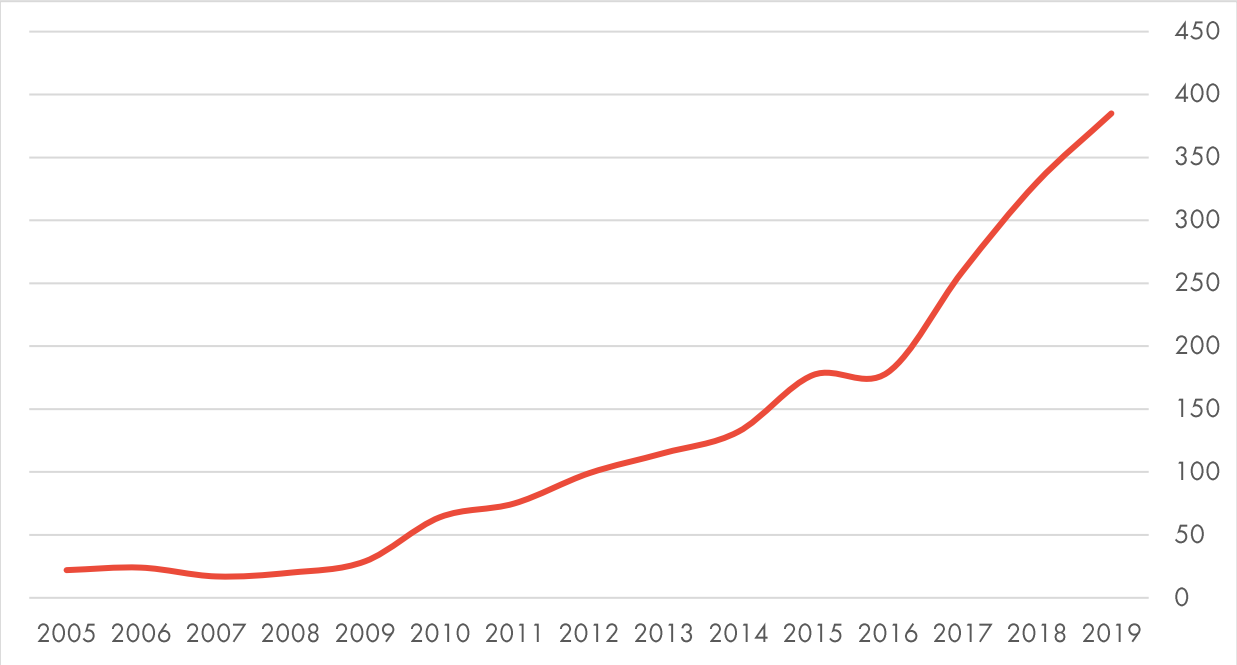

Figure 1 Number of articles with "nudge" in title, abstract or keywords. The search was done in Scopus article database.

2.2 What is a nudge?

2.2.1 Definitions

Cambridge Dictionary (2019) tells that 'nudge' means to "*push something or someone gently*". This definition tells a lot about the nature of the nudges I will discuss in this thesis. Nudging is a subtle way to make people to act in a desired way.

Thaler and Sunstein (2008) define nudges in the introduction of their book the following way. *"A nudge, as we will use the term, is any aspect of the choice architecture that alters people's*

behavior in a predictable way without forbidding any options or significantly changing their economic incentives. To count as a mere nudge, the intervention must be cheap and easy to avoid. Nudges are not mandates. Putting fruit at eye level [hoping that people then choose fruit over unhealthy alternatives] counts as a nudge. Banning junk food does not." This definition is the foundation for their book. It's also nothing less than a starting point for the nudge literature as a whole. The keywords here are *'choice architecture'* and *'altering people's behavior'*. In practice, nudges are often deliberately planned design choices that affect the situations where people make decisions. Thaler and Sunstein call this *choice architecture* and nudging can be seen as choice architecture interventions. A person is a choice architect if he in any way affects his or her customer's choices. Besides that, nudged are used purposefully to alter behavior. Another key aspect is the fact that nudges always leave the people with a choice. This is what differentiates nudges from, for example, fines or penalties (Selinger and Whyte 2011).

Some scholars have criticized the concept of nudge of being too vague and including too many different interventions or being fuzzy about what counts as a nudge. For example Selinger and Whyte (2011) criticize Thaler and Sunstein's work for this. This kind of criticism has a valid point. Thaler and Sunstein's definition doesn't include one critical part of nudging, even though their work is very clear about it later in the book. This part is the use of cognitive biases. The later definitions take the use of biases into consideration.

Saghai (2013) builds on Thaler and Sunstein's writings to create more technical definition of a nudge. He writes that nudging means that *"A makes it more likely that B will φ, primarily by triggering B's shallow cognitive processes, while A's influence preserves B's choice-set and is substantially noncontrolling."* This definition is rather straightforward and unambiguous except the term *'shallow cognitive processes*. Saghai defines them as cognitive processes that are fast, consume few resources and produce responses that are not the result of thorough consideration. These cognitive processes could also be called biases or heuristics.

Another important addition to the definitions of nudging is one proposed by Hansen (2016): "*A nudge is a function of (I) [sic] any attempt at influencing people's judgment, choice or behaviour in a predictable way, that is (1) made possible because of cognitive boundaries, biases, routines, and habits in individual and social decision-making posing barriers for people to perform rationally in their own self-declared interests, and which (2) works by making use*

of those boundaries, biases, routines, and habits as integral parts of such attempts." This definition is close to the one by Saghai (2013) but it further clarifies the way nudges affect people's behavior, namely utilizing the cognitive shortcuts that affect decision making.

Finally, Machiori et al. (2016) propose the following definition for nudging. *Nudging is an umbrella term for deliberate and predictable methods of changing people's behavior by modifying the cues in the physical and/or social context in which they act. It uses these cues to activate nonconscious thought processes involved in human decision-making. Nudging implies that none of the choices should be difficult to avoid, made mandatory, incentivized economically or socially, and made significantly more costly in terms of time or trouble.*

2.2.2 Two modes of thought

As Saghai (2013) and Hansen (2016) explicitly write in their definitions for nudging and Thaler and Sunstein (2018) as well as many other scholars imply, nudging utilizes human biases and heuristics. All this is based on the idea of two modes of thinking. This idea is present in so called dual-process theories that play a central role in the contemporary social psychology. Dual-process theories are a class of theories holding that there are two distinct processes or systems for cognitive tasks. The first is fast, intuitive, automatic and belief-based. The second is slow, deliberative, analytical and logic-based. Nudging theory leans strongly on the first system - just as the latest definitions clearly demonstrate.

The roots of the dual-process theories lie deep in the history of psychology. Classical philosophers from Plato to Descartes have written about the different modes of thinking (Frankish and Evans 2009). Probably the most notable pre-modern scholar writing about two cognitive systems was Sigmund Freud. Freud's theory was based on the idea that humans have conscious and unconscious processes. However, the differences between Freud's Unconscious mind and System 1 of the modern dual-process theory are significant. In Freud's theories the unconscious is largely made of repressed memories and impulses and it seeks to simply maximize pleasure (Frankish 2010). This is not the case with the modern dual-process theories.

More recently, Israeli scholar and Nobel Prize winner Daniel Kahneman has been one of the pioneers in contemporary decision-making literature. Kahneman's longtime collaborator was

another Israeli scholar, Amos Tversky, and their work been enormously influential in the field. More recently Kahneman (2003) has developed a generalized dual-process theory. This theory was popularized in his international bestseller Thinking Fast and Slow (2011). Thaler and Sunstein (2008) refer to Kahneman's work on two modes of thought as a major theoretical foundation of their theory of nudging. Thaler and Sunstein were not just inspired by Kahneman - and Tversky too - but they have collaborated with them (Thaler and Sunstein 2016). Thaler used to work with Kahneman and Tversky in the late 1970s and Sunstein too has written several papers with Kahneman.

2.2.3 Libertarian paternalism

Libertarian paternalism is a term that needs some attention when we are talking about nudging. It's a brainchild of Thaler and Sunstein's just as nudging itself and traces back to their article in The American Economic Review from 2003. Libertarian paternalism is an ideology or philosophy that promotes the idea that private and public institutions should steer people in directions that are good for their wellbeing while preserving their freedom to choose. The actual theory and book about nudges (Thaler and Sunstein 2008) is closely related to the idea of libertarian paternalism and many of the examples portrayed in the book follow the rules of this philosophy. However, it's not just them, but in the following academic literature the two often go hand in hand - to an extent that the two concepts often get blend together (Hansen 2016). Most of the nudging literature has focused on nudging from a libertarian paternalistic point of view, meaning that the most studies are about nudges that are not planned to benefit the company or government but the individual person who is being nudged.

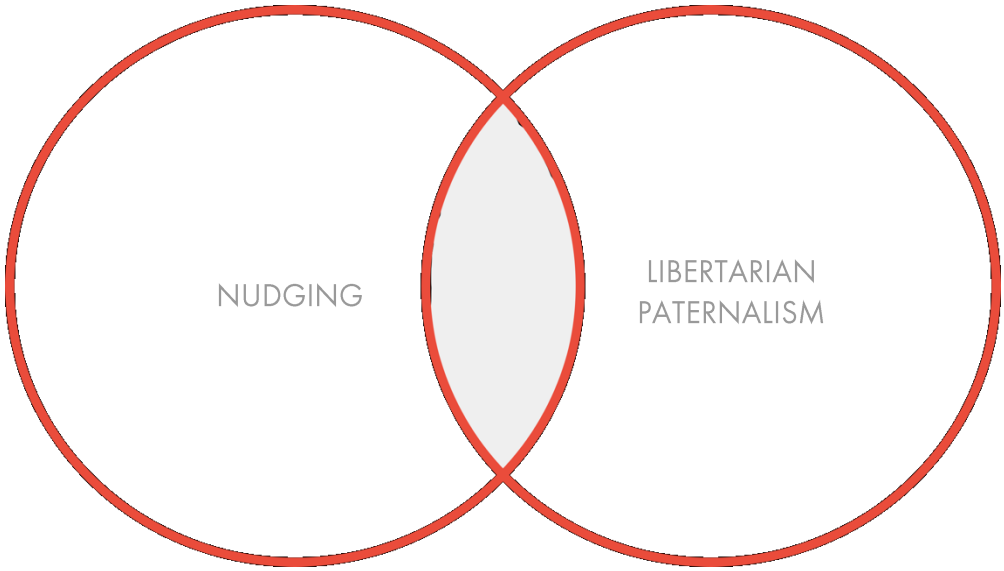

Figure 2

It's important to note that Thaler and Sunstein's (2008), Saghai's (2012) and Machiori et al. (2016) definitions of nudge do not take a stand on the issue of who is beneficing of the nudge: the nudger or the nudgee (Saghai 2012). It is libertarian paternalistic nudging that - by its defining - has to be benefiting the object of the nudge. This relationship is portrayed in the figure 1: nudging and libertarian paternalism do overlap but all nudging is not libertarian paternalistic (Hausman and Welch 2012). Hansen (2016) also came to this conclusion in his article that discusses the definition of nudges. In other words, when the car rental company tries to steer its customer to buy an overpriced extra insurance by setting that as a default option, it is nudging, it just doesn't follow the rules of libertarian paternalism. Is it ethical, is a completely different story and there is a whole branch of nudging literature that studies the ethics of nudging.

Even though some scholars have called for more comprehensive ethical restrictions on what can be called nudging (e.g. Lembecke et al. 2019), the only ethical restriction that is built within most of the definitions of nudge is the condition that nudge should be noncontrolling. As mentioned, in practice liberal paternalistic viewpoint - in other words stricter ethical requirements - are taken for granted in nudging literature. This can be seen from the topics and contexts discussed in scientific articles about nudging. Mirsch et al. (2015) write that most of them have been about nudges that promote healthy and environmentally friendly behavior. Thaler and Sunstein (2008) also write a lot about promoting behavior that increase saving rates. There are strikingly few articles that discuss nudging that's not libertarian paternalistic even though that's what companies do all the time. It's understandable given the traditionally close relationship between the two concepts. However, this has created a gap between academic literature and the reality outside of it.

2.2.4 Nudging as a form of marketing

As I wrote earlier, there isn't much academic marketing literature about nudging and the position of nudges in the spectrum of marketing activities is somewhat unclear. Indeed, if nudging can be almost anything that slightly pushes customers into any desired direction and the motive for it doesn't matter, isn't then nearly all marketing nudging? Why call it nudging if there's actually nothing new? Does it make any sense to research nudging without tying

yourself strictly the libertarian paternalistic framework? These are important questions that need addressing. Next, I'm going to examine the definition of nudging from the marketing perspective.

The literature on nudging often mentions that we are being nudged every day and almost all the time. It may seem like nearly any forms of marketing could be called nudging - after all, affecting consumer's choices is what marketing is largely dealing with. If that would be the case, studying the topic would be impossible. However, I argue that nudging can be studied also in the marketing context by pointing out a few important aspects that define and narrow it down into a manageable entity.

To understand, what makes nudging different from all the other ways marketers can pursue consumers attention and affect their choices, we need to go back to the definitions of nudging. The secret lies in the words "choice architecture" and "bias". First, nudging is targeted at the moments of decision making, when consumer has different options in front of him or her and they need to make a choice. It is done by the tools of choice architecture. Just informing consumers or raising awareness isn't a nudge as it's not related to choice architecture. This is why traditional advertising, for example a sign on the side of a highway, isn't nudging. Additionally, nudges are designed to affect the fast side of thinking, utilizing heuristics and biases humans have. If it doesn't do that but triggers rational thinking, it's not nudging.
To connect nudging into existing marketing literature, I use a classic marketing theory, Hierarchy-of-effects model (Lavidge and Steiner 1961). The basic idea is that customer journey has certain steps that precede the actual purchase. There are lots of models with the similar logic, probably the most famous one is AIDA model (Strong 1925). In Lavidge's and Steiner's model the steps are awareness, knowledge, liking, preference, conviction and purchase and the model can be seen as a funnel. The meaning of the six stages is quite straightforward and self-evident. The idea is that in the normal situation the customer passes through them before making a purchase and the goal of marketing is to move them through the funnel. The number of customers reduces in each step; there are lots of people who are aware of the existence of certain product, but just some of them actually purchase it. These steps can be still divided into three stages: cognitive stage, affective stage and behavior stage as the Figure 3 shows. (Kotler and Armstrong 2010).

Nudging isn't used on all levels of this funnel and it's not meant to affect all aspects of consumers thinking and behaving. Instead, nudges are used in the preference, conviction and purchase stages of the customer's journey. This is in line with the definition of nudging and the fact that nudges are used to influence the situations where customers need to make a choice. For example, Hansen (2016) writes that the objective of nudging is to influence people's judgement, choice or behavior. In the Hierarchy-of-effects model the steps from awareness to liking don't include a choice between options. However, the next three steps do. Preferencing an offering over other offerings is a choice. Also, conviction to go and buy it is a choice. Last stage, purchase, means the concrete behavior of making the purchase. It also requires a decision. This time a decision to do whatever action is needed to complete the purchase. On the other hand, the fact that nudging is targeted at the automatic system of our thinking, helps to crop out the cognitive stages.

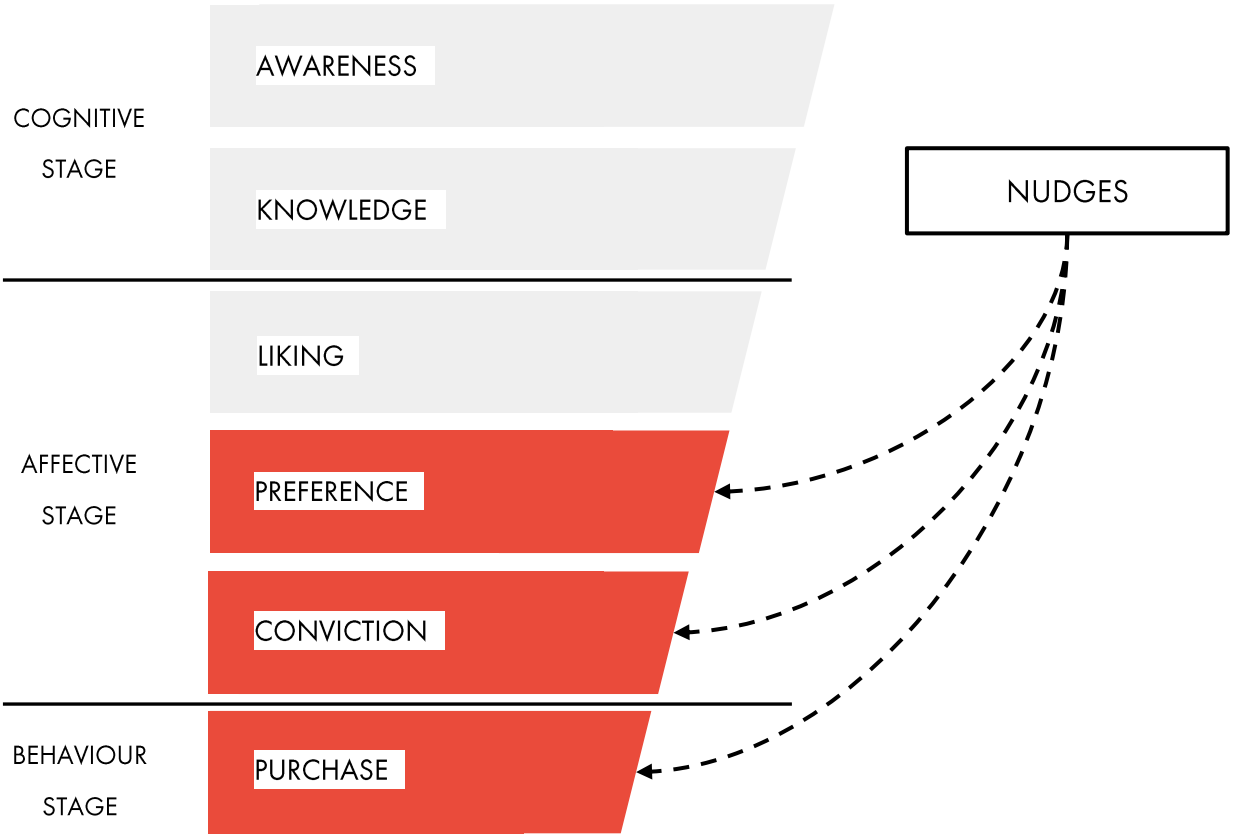

Figure 3

2.2.5 What is a digital nudge?

In my thesis I'll be focusing on digital nudges and specifically the use of digital nudges in e-commerce. Nudging has been studied mostly in offline context (e.g. Weinmann et al 2016), however, as vast and constantly growing number of decisions are made on screen and nudging is by no means restricted to offline world, this topic is an important field for research.

Essentially, digital nudges are nudges just as non-digital nudges and they fit the definitions of Thaler and Sunstein's (2008) and Saghai's (2012). As the term suggests, they appear on screen and typically in internet. Weinmann et al (2016) defines digital nudging as *"use of user-interface design elements to guide people's behavior in digital choice environments"* where the digital choice environments are user interfaces that require people make decisions. This can happen for example on websites or mobile applications. Weinmann's definition is the most cited definition for digital nudging. Still, Weinmann's definition is rather broad and can include a wide array of digital interventions (Lembecke et al. 2019). Further, Meske and Potthoff (2017) point out two important problems with this definition. First, digital nudges are not merely user-interface design because also form and content of information can be a nudge. Secondly, and even more importantly, Weinmann's definition doesn't include the choice preserving nature of nudges. This aspect has been central in nudging literature ever since the first pages Thaler and Sunstein's *Nudge* (2008). For these reasons, Meske and Potthoff propose an alternative definition for digital nudges and call digital nudging *"subtle form of using design, information and interaction elements to guide user behavior in digital environments, without restricting the individual's freedom of choice."* Neither this nor Weinmann's definition restrict nudging to actions that are meant to affect the automatic thinking, even though both papers clearly indicate elsewhere that it is an important feature of nudging. It could be argued that digital nudges could be defined similarly as nudges in general, just noticing that they appear on digitally screen.

Digital nudges, as Weinmann (2016) or Meske and Potthoff (2017) define them, are common in everyday life. Think about a visit on an e-commerce site selling sports equipment. On the landing page, there are certain products that are lifted up and showed in the list of featured products. That's a nudge. You open a product page of football shoes and notice a five-star rating from another customer. A nudge. When you finally add the shiny yellow boots to shopping cart, the site tells you that people who buy football shoes, usually also buy shin pads and football

socks. Again, you are being nudged – the page tries to guide its customers' behavior into the desired direction.

Regardless of the fact that we are being digitally nudged practically every day, the research on digital nudging has been relatively scare, instead, most studies related to nudging have discussed offline cases (Weinmann et al 2016). Also, the articles suggesting guidelines for effective nudging have been mostly related to non-digital environments (Schneider et al 2018). Even though nudging research has also touched on nudges that we would call digital nudges, in many of those cases the focus hasn't been in the digital nature of those particular nudges. As a consequence, there's a need for research that is expressly exploring digital nudging. As Lembecke (2019) writes, context affects the choice architecture and people's behavior. It's not obvious that the findings from offline nudging can be straightforwardly extended to digital world. These concerns have been noticed, however, and digital nudging is an emerging area of research and the number of studies on digital nudges is growing, as Hummel et al (2018) note.

The online environment could actually be even more fruitful field for nudging (Mirsch et al 2015) than more traditional contexts. Scholars have pointed out a few aspects that make especially digital nudges an area to focus on. First, digital environments are often a well fitted for the underlying mechanisms of nudging. Namely, the decisions made on-screen are to remarkable extent automated and fast. On the other hand, implementing and testing online nudges is fast, effective and easy. Indeed, in the managerial world, the importance of testing has been noted. In practice, this can mean for example A/B testing, where practitioners compare the effectivity of two different types of web layouts in the real-world situation.

It is also worth noticing that in the field of information systems and computer science there has been research on persuasion, and it is in many areas closely related to digital nudging (Meske and Potthoff 2017). For example, Fogg (2003) defines persuasive technology as *"any interactive computing system designed to change people's attitudes or behaviors."* This definition is very close to the definition of nudging by Thaler and Sunstein (2008) but as Meske and Potthoff write, the theory of persuasion goes beyond theory of nudging in some areas and in others the other way around. I chose to do this thesis from the point of view of nudging literature, but other kind of approach would have been equally justifiable.

2.3 Classifying nudges

2.3.1 Classifying nudges based on the underlying heuristics

There are various ways to classify nudges. Most categorizations are based on either the underlying heuristics and other cognitive processes or the type of intervention (Szaszi et al 2018). This applies to digital nudging as well as nudging literature more generally. In this thesis, I'm going to continue using the former one: taking the underlying heuristics and categorize nudges based on them. Using the underlying psychological phenomenon as a foundation for categorization helps to better tie this work to the existing literature on psychology of decision making. The challenge in this approach is that actual nudges are not usually utilizing just one heuristic, instead, they often work together.

Thaler and Sunstein (2008) refer to "three original biases" that Daniel Kahneman and Amos Tversky, pioneers of research on dual process theory, identified in 1974. Those heuristics are anchoring, availability and representativeness. They continue naming four other biases: optimism and overconfidence, loss aversion, status quo bias and framing. In addition to these seven biases, the authors write about humans' tendency to do what others do. They call this bias conformity and list various examples of how so-called social nudges can help shift behavior.

After Thaler and Sunstein's book, nudging literature has identified even more biases. Dolan et al. (2012) listed "nine most robust effects that influence our behavior" targeted at the automatic side of our thinking. Their list is a mnemonic and called MINDSPACE after the first letters of the effects and it's clearly designed to be also a helpful tool for practitioners who apply nudges. One of the most comprehensive lists is presented in the article by Mirsch et al (2015). They identified 20 psychological effects that have been discussed in the nudging literature by analyzing 65 relevant articles that were found in a systematic literature review. Out of these twenty effects, they chose nine most common ones (framing, status quo bias, social norms, loss aversion, anchoring & adjustment, hyperbolic discounting, decoupling, priming and availability heuristic) and examined how they could be applied in the digital context.

An example of a categorization that is based on the actual nudging technique instead of the underlying cognitive processes is a taxonomy introduced by Münscher et al. (2015). They divided nudges into three main categories that, according to the authors, reflect three different streams of judgement and decision-making literature. These categories are decision information, decision structure and decision assistance, and each of them has more specific intervention techniques inside them, making a total of nine techniques. Obviously, it isn't a comprehensive list of all possible nudges and that's a major problem with categorizing nudges based on the technique.

Kahneman & Tversky (2008)	Thaler & Sunstein (2008)	Dolan et al. (2012)	Mirsch et al. (2015)
Anchoring	Anchoring	Messenger	Framing
Availability	Availability	Incentives	Status Quo Bias
Representativeness	Representativeness	Norms	Social Norms
	Optimism & overconfidence	Defaults	Loss Aversion
	Loss aversion	Salience	Anchoring & Adjustment
	Status quo bias	Priming	Hyperbolic Discounting
	Framing	Affect	Decoupling
	Conformity	Commitment	Priming
		Ego	Availability Heuristic
			Commitment
			Mental Accounting
			Optimism & Overconfidence
			Attentional Collapse
			Messenger Effect
			Image Motivation
			Intertemporal Choice
			Representativeness & Stereotypes
			Endowment Effect
			Spotlight Effect

Table 1 Nudge types classified by the underlying mechanism

In this thesis, I'm following the same logic as many scholars who categorize nudges based on their psychological effect. Due to limited scope a master's thesis can have, I'm going to focus on two nudge types: conformity - or social norms as Misrch et al. (2015) call it - and loss aversion. These two are among the top five most studied psychological effects (Mirsch et al 2015) and both are included in Thaler and Sunstein's (2008) book about nudging. These two nudge categories are also very popular in e-commerce. In the following pages there are screenshots from some of the most popular online stores in the world, showing how these nudges are used in practice.

2.3.2 Conformity

People tend to value other people's opinions and follow the herd in more or less irrational ways. In addition, there are lots of norms, rules and standards that guide human behavior. This bias is called conformity, people conform to their surroundings. This bias seems to be something deeply natural to human beings. A powerful example Thaler and Sunstein (2008) write about is research conducted by Solomon Asch (1955). Respondents were given an easy test to answer. When they couldn't see what others are doing, they answered correctly nearly every time. However, when they saw others giving an incorrect answer, they erred more than one-third of the time. These experiments have been replicated in over hundred researches and in 17 countries and the results don't vary much (Sunstein 2003).

Figure 4 Conformity nudges on Amazon.com (2019)

For choice architects this means that if they want people to behave a certain way, a good trick is to let people know others are doing so too. In e-commerce, social nudges are a common way to do this. Classic examples of this are nudges that indicate the popularity of certain products.

It can be a tag showing that the product is popular, number of likes or average rating. Another very often used nudge is to show what else others, who bought a certain product, did buy. Each of these nudges are targeted to utilize the conformity bias. Below are examples of the use of conformity nudges in actual online stores. The figure 4 shows a product page of a book on Amazon.com online store. The screenshot is just a small part of the whole page but it's already packed with digital nudges. There are two conformity nudges, the sign indicating that the book has been on the best-seller charts this week and the ratings by other users. The figure 4 is a screenshot from Walmart.com and it features another classic conformity nudge, a section that shows products that other customers have considered.

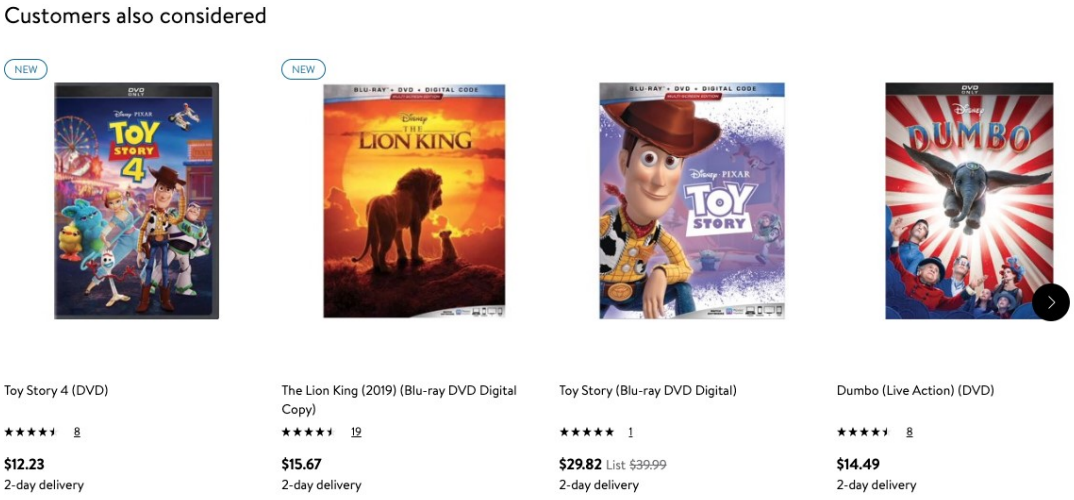

Figure 5 Conformity nudges on Walmart.com (2019)

2.3.3 Loss aversion

Loss aversion is another well known and studied bias. Loss aversion bias means that humans hate losing something they possess. Often they do so more than they enjoy gaining the same thing. There are various ways e-commerce sites utilize loss aversion. One nudging tactic - arguably quite unethical one - that utilizes this effect is drip pricing (Balz 2010). Drip pricing means that the price shown initially is just a base price and it is followed by a pile of extra fees. However, as customer has already chosen the product, they start to feel almost as if they already owned it and then giving it up feels like a loss. Another way e-commerce utilizes loss aversion is creating a sense of urgency and scarcity (Misrch et al. 2015, Schneider et al 2018). That's why most e-commerce offers seem to be accompanied with information about the limited availability. It's not just the low price that encourages people to make the purchase decision,

it’s also the fear of losing the deal if the decision is not made quickly. The figures 6, 7 and 8 are again screenshots from actual online stores and they all indicate the limited availability and the danger of losing the deal in one way or another.

Figure 6 Loss aversion nudge on Rakuten Global Market (2019)

Figure 7 Loss aversion nudge on Ebay.com

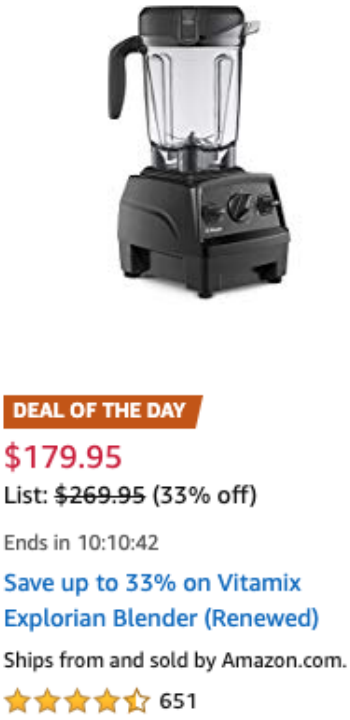

Figure 8 Loss aversion nudge on Amazon.com

2.3.4 Other ways to classify nudges

Taking into consideration the rather broad definition of nudges by some authors (most importantly Thaler and Sunstein 2008), classifying them solely based on the underlying heuristics can be misleading, as all nudges are not necessarily heuristic-triggering (Sunstein 2015). Barton and Grüne-Yanoff (2015) distinguish two other types of nudges in addition to heuristics-triggering ones: heuristics-blocking and informing. Heuristic-blocking nudges are designed to counteract the heuristics people would use in certain situations. Informing nudges are designed to affect people's behavior by simply giving them more information - for example a sign warning people of a slippery floor. However, more strict definitions of nudges that emphasize the use of heuristics (Saghai 2015 and Hansen 2016) cut these interventions outside of the concept of nudging.

Nudges can also differ in their objective. Kosters and van der Heijden (2015) write about type 1 nudges that are planned to benefit the person being nudged and type 2 nudges that are planned

to steer behavior that is beneficial for society. An example of type 1 nudge goal is promoting sufficient retirement saving plans. Nudge that is designed to reduce littering on the other hand is a type-2 nudge. However, this classification doesn't take into account nudges that are meant to simply benefit the actor that does the nudging. Nudges in e-commerce often fall into this category - they are simply meant to generate more sales and benefit the company. Therefore, there could be a third category in this classification: nudges that benefit the company, organization or other actor that sets up the nudge.

2.4 Effectivity of nudges

Effectivity of nudges has been studied relatively lot. Thaler and Sunstein (2008) listed a lot of real-life examples where using nudges has had a significant effect on real life situations. The evidence the two professors had for their case isn't just stories but a large amount of scientific studies from various fields. As mentioned earlier, even though *Nudge* popularized and conceptualized the idea of nudging and was an important work in the sense that it combined the previous literature on the similar themes, it didn't start the research on nudges. There had been various studies researching the effectivity of choice architectural tools. However, after *Nudge* there has been a growing academic interest to study the effectivity of different nudges based on Thaler and Sunstein's framework (Szaszi 2018).

There has been a few systematic attempts to review the research situation regarding the effectivity of nudging. Probably the most important one is the literature review done by Szaszi et al (2018). They reviewed 422 cases of nudging in 156 empirical studies and reported how those studies are distributed across categories of intervention, domains and countries among other things. The results were mainly positive, 93% of the studies contained at least one successful nudging intervention and only 18% of the reported interventions were not successful. In addition, they found 47 variables that moderate the effectiveness of the nudges.

One of the fundamental questions regarding the effectivity of nudges is that does nudging have lasting effect on the behavior or is it a trick that can be used once before it's effectivity fades. For example Yiling et al. (2017) write that it's an area that requires more research. A few attempts exist. Venema et al. (2017) studied the longitudinal effectivity of default nudges in a research about the stand-up working rates in an office and there were indeed positive results.

Similarly, Van Gestel et al. (2017) did an experiment about nudging at the checkout counter and replaced unhealthy snacks with healthy options. Their results also showed that the effect on consumer behavior stays.

All in all, the results of the effectivity of nudging are promising and the literature suggests that nudging really is a useful and effective tool to affect consumers actions. Number of authors have found positive results from various contexts with many different types of nudges. Still, there's a need for more research on the moderating role of the object of the nudge. There are a few studies about the influence of basic demographic variables, such as gender or country. A recent example of this is a study by Mohr et al. (2019) about the influence of sex on efficacy of nudges that are used in fast food order process aiming to decrease the calorie intake. However, the influence of some other variables, such as personality seems to still be totally unknown. As will be discussed in more detail later, this is what this research is aiming to study.

2.5 Personal characteristics

As is stated in the title of this thesis, I'm going to study the role of personality and personal characteristics on the effectivity of digital nudges. Personality is described by American Psychology Association as the "individual differences in characteristic patterns of thinking, feeling and behaving" (2019). Study of personality has gained interest from other fields, marketing being one of them (Mulyanegara et al. 2007). The relationship between personality and consumer behavior has been studied for decades but nowadays it's possibly more topical than ever. As marketing in general has moved from the era of mass-marketing to segment marketing and finally to personalized marketing, the need for deeper understanding of the individual level differences has become real not only in academia but in the everyday life of professionals who plan marketing activities.

2.5.1 Five Big Personality Traits

Five Big Personality Traits is the most widely used taxonomy of personality traits (e.g. DeYoung et al. 2007, Laverdière et al. 2013). It has been proved to be reliable and generalizable way to measure personality across different cultures and different research settings (e.g. Mulyanegara et al. 2007) and they are related to a wide array of different outcomes (Ozer and

Benet-Martinez 2006). These qualities make Big Five model a useful and interesting theoretical framework for this study.

The five traits of this taxonomy are (1) Neuroticism, (2) Extraversion, (3) Openness to Experience, (4) Agreeableness and (5) Conscientiousness. Person can score either high or low in each of the dimensions. Beneath the first level of this hierarchy, two distinct aspects or facets can be found within each of the five domains (DeYoung et al. 2007). These facets further explain the main traits. The five main traits and their subdomains are introduced in the table 2.

Table 2 Descriptions of the Big Five personality traits

Trait	Description	Facets (DeYoung et al. 2007)	Examples of consequential outcomes (Ozer and Benet-Martinez 2016)[1]
Extraversion	Evaluates qualities such as optimism and being socially active and talkative.	Enthusiasm Assertiveness	Happiness (+) Status (+) Volunteerism (+)
Openness to Experience	Evaluates qualities such as curiosity, creativity and appreciation of art and adventures.	Intellect Openness	Existential concerns (+) Artistic interests (+) Liberalism (+)
Agreeableness	Evaluates qualities such as kindness, generosity, willingness to compromise, and level of optimism towards other people.	Compassion Politeness	Peer's acceptance (+) Humor (+) Religious beliefs (+)
Neuroticism	Evaluates qualities such as emotional instability and tendency to experience negative feelings.	Volatility Withdrawal	Depression (+) Family satisfaction (-) Financial security (-)
Conscientiousness	Evaluates qualities such as efficiency, self-discipline, level of organization and archive-orientation.	Industriousness Orderliness	Conservatism (+) Occupational success (+) Criminal behavior (-)

[1] (+) refers to positive relation between high scores in the particular trait and the outcome and (-) refers to negative relation.

2.6 Personality and nudges

2.6.1 Personality and consumer behavior in general

Perhaps a little surprisingly the results on the significance of personality in consumer behavior are mixed. One of the most important early works on this topic was the literature review by Kassarjian (1971) and it represents more negative attitude towards the importance of personality. This and other works that showed the challenges in the connecting personality psychology and marketing lead to decrease in the interest towards the area for a few decades. However, after that the field of marketing research has again taken the bull by the horns (Foxal and Goldsmith 1988, Albanese 1993) and indeed, there are also studies that have shown more positive results (Fraj and Martinez 2006) suggesting that personality, after all, does play a role in consumers' decision making. It seems that it's hard to draw all-encompassing conclusions on the effect, but the effects are dependent on the context.

There has been some studies about the effect of personality on online shopping. For example, Bosnjak et al. (2007) showed that three of the Big Five factors, Neuroticism, Openness to Experience and Agreeableness have a positive effect on intention to buy online. Wang and Yang (2008) studied the relationship between online shopping passion and personality traits and concluded that Openness to Experience, Agreeableness and Conscientiousness were positively correlated with tendency to develop passion for online shopping.

2.6.2 Personality and effectivity of nudges

The relationship between the Big Five and the effectivity of nudges hasn't been studied practically at all. That seems to be simply because nudging in general is still relatively new topic. However, if the scope of review is widened a bit, there are some researches that are not expressly studying how nudges work but are related to the underlying psychological phenomena and can therefore give useful insight for this topic.

Oyibo and Vassileva (2019) discuss the relationship between Big Five personality traits and susceptibility to social influence, which is closely related to conformity nudges this research

investigates. The results of their questionnaire show that high Neuroticism is the most consistent predictor of susceptibility to social influence. The authors studied three forms of social influence: social learning, social proof and social comparison. Social proof is the type of social influence conformity nudges in e-commerce are designed to affect. Oybo and Vassileva write that low Openness to Experience and low Conscientiousness increase susceptibility to social proof. There are also some interesting results from the research about the values and personality. Roccas et al. (2002) studied the relationship between conformity values and Big Five personality traits. Their study found that conformity is negatively correlated with Openness to Experience and positively correlated with Agreeableness, Conscientiousness and Neuroticism. Haslam et al. (2009) also write that Agreeableness and Conscientiousness are positively correlated with conformity values.

Relevant literature on loss aversion bias is even more scarce. Still, a few interesting articles can be found. Bibby and Ferguson (2011) write that loss aversion is positively correlated with Extraversion. Loss aversion bias is also closely related to willingness to take risks and Openness to Experience has been proven to be associated with higher risk tolerance (e.g. Dohmen 2010).

2.7 Summary of the literature review

2.7.1 Research gap and research question

Despite more and more articles about nudging are been published all the time, there are still distinctly unresearched areas. I have identified two important gaps in research that I'm going to address in this thesis.

There are lots of studies proving the effectiveness of different kind of nudging techniques as well as the existence of various cognitive biases. However, the literature on nudging is still in quite an early stage. As Johnson et al. (2012) point out, many nudging attempts have failed because one nudge can have various effects based on the objective of the nudge. A nudge utilizing loss aversion bias may backfire with people thrilled to gamble but work exceptionally well with people who try to avoid risks. Instead of trying to create one-size-fits-all solutions, nudging should be designed with target audience in mind (Schneider et al. 2018). As a consequence, one specific aspect that needs more research is if and how the personal

characteristics of the nudgee - the person being nudged - influence the effectiveness of the nudge (e.g. Mirsch et al. 2015, Mohr et al. 2019). This may be particularly interesting topic for digital nudging, as online world allows accurate targeting. The experimental part of this topic will be conducted with digital nudges.

This is the main gap I'm going to address with this research. More specifically, I'm going to study the influence of personality, using the Big Five personality traits, on the effectivity of nudges. Based on a search on Scopus article database[2], there hasn't been any relevant scientific articles studying the effect of those traits on the effectivity of nudges. Studying all kinds of nudges would not be possible, so I chose to focus on two types of nudges, conformity and loss aversion nudges.

Oyibo and Vassileva's study (2019) and a few other studies, that were discussed previously, don't explicitly mention nudging, but they have interesting insights about the relationship between the loss aversion or conformity and Big Five traits and there definitely seems to be a link between them. However, to get a deeper understanding of the issue, there's a need for an empirical study where participants behavior is measured in a real or hypothetical choice situation (see literature review by Szaszi et al. 2017).

Hence, the research question this study is aiming to address is the following.

> *Does consumer's personality affect their susceptibility to conformity and loss aversion nudges in an e-commerce context?*

The results of this reserach could potentially make an important contribution to academic research on nudging. This research is aiming to participate in the research by linking the literature about nudges to the personality research in the context of digital marketing and e-commerce. It's a fruitful theme for research as the effectivity of nudging and its relationship with consumer's personality is also highly valuable theme for the practitioners. Online marketing is progressing at a ferocious pace and the tools digital marketers have to produce personalized and effective content to their customers seem almost endless. Not only are these

[2] The search was done using key terms "nudge" and "big five", combined with boolean term "AND". There was one result, but the article was not relevant as it discussed the Big Five traits as a moderator of people's attitudes towards privacy.

things possible, the importance of doing so has been noted by people working in the field of marketing. In a survey conducted by Harvard Business Review (2018) 54% of the respondents said that investing in personalization is important in their strategy. Besides that, no less than 81% estimated that it will be an important driver of their revenues in 2020. It's evident that this topic is compelling and there are lots of possibilities. However, to fully utilize them, reliable research on the underlying mechanisms and factors that affect the effectivity of nudging is needed.

2.7.2 Hypothesis development

I have formed 7 hypotheses based on the descriptions of Big Five dimensions and the previous research results discussed earlier in this chapter.

Personality and the conformity nudges

The first set of hypotheses is related to effectivity of conformity nudges and personality. Even though there's virtually no research about the role of personality in the effectivity nudges that are based on conformity bias, there are other studies that imply that there might be a relationship between the two. Both Oybo and Vassileva (2019) and Roccas et al (2012) write that Openness to Experience is negatively correlated to conformity and the importance of other's opinions. These results are the foundation for the first hypothesis.

H1a: High Openness to Experience decreases susceptibility to conformity nudges.

Roccas et al. (2012) and Haslam et al. (2009) also write that Agreeableness is positively correlated with conformity. Agreeableness is related to optimism towards other people, which also supports this view.

H1b: High Agreeableness increases susceptibility to conformity nudges.

Roccas et al. (2012) state that Neuroticism is also positively correlated with the conformity values. Also, the results of Oyibo and Vassileva imply the same.

H1c: High Neuroticism increases susceptibility to conformity nudges.

There are conflicting results about the relationship between Conscientiousness and conformity or vulnerability to social influence. Oyibo and Vassileva (2019) write that low Conscientiousness increases the susceptibility to social proof, for example in form of product reviews written by other users. On the other hand, Haslam et al. (2009) and Roccas et al. (2012) both write that Conscientiousness is positively correlated with conformity values. However, since Oyibo and Vassileva's focus more specifically in the conformity nudge type of influence and the other two articles are more generally about values, the following hypothesis is based on their research.

H1d: High Conscientiousness decreases susceptibility to conformity nudges.

Personality and the loss aversion nudges

The literature on personality's effect on loss aversion was even more scarce than on the previous nudge category. However, the study by Bibby and Ferguson (2011) implies that loss aversion is positively correlated with Extraversion.

H2a: High Extraversion increases susceptibility to loss aversion nudges.

I also hypothesize that people with high Openness to Experience are less prone to loss aversion, in this case in the form of limited time offers. The reasoning behind this hypothesis is that loss aversion is closely related to willingness to take risk. Openness to Experience, in turn, has been proven to be associated with higher risk tolerance (e.g. Dohmen 2010).

H2b: High Openness to Experience decreases susceptibility to loss aversion nudges.

As these hypotheses and the research questions show, the purpose of this study is not to show the magnitude of the effect. Instead, the goal is to test whether there is any relationship between the personal characteristics and the effectivity of the nudges.

3. Research design and methods

3.1 Research approach

The purpose of this study is to gather empirical data of the customer behavior and choices in e-commerce situations and the effect of personality. The research was conducted as a quantitative research using choice based conjoint analysis. The respondents were presented a fictitious smartphone online store where they had to make purchase decisions.

3.2 Data collection method

3.2.1 Web survey

A web-based survey tool specialized in conjoint studies, Sawtooth Software SSI Web, was used to collect data. As the research studies behavior in an online environment, doing the study on-screen was an obvious choice. In addition, web surveys are efficient and easy to share, they make it possible for respondents doing the study at their convenience without being in the same physical place with the researcher. Lastly, the data is easier to handle when it's in digital form from the beginning.

The study consisted of two parts. The first part was a questionnaire that was used to evaluate respondents' personal characteristics. This part had two pages. The first page was used to gather background information. The respondents were asked to tell their age and sex. In addition, they were asked to evaluate their familiarity with the smartphone market on a scale from 1 to 10. They were also asked to evaluate the price range of their next phone out of four options ranging from "Budget phone" to "Flagship phone". The next page was a mini-IPIP questionnaire that is a widely used method to measure Big Five personality types. This part will be discussed in more detail later in this chapter. The second part was a choice-based conjoint analysis to evaluate respondents' preferences when choosing a smartphone. Again, I will write more about conjoint analysis later.

3.2.2 Measuring Big Five personality traits

The main aim of this study is to investigate how personality affects the effectivity of digital nudges. I chose Big Five personality traits as the taxonomy to be used to measure personality. Researchers have created various measures of Big Five, varying from really short ones that include just one item per trait to longer questionnaires with a couple of hundred items. Short measures have some self-evident practical reasons supporting their use. They reduce the likelihood of negative participant reactions. However, as one might guess, the reliability of very short measures is more uncertain (Crede et al. 2012). As a compromise, in my study, I decided to use a 20-item scale developed by Donellan et al. (2006). The measure is called mini-IPIP, since it is based on longer 50-item International Personality Item Pool - Five-Factor Model measure by Goldberg (1999). Mini-IPIP measure is widely used and it has been cited over 600 times.

Each respondent answered the twenty mini-IPIP questions and their Big Five trait scores were derived from these answers. There are four questions related to each of five Big personality dimensions. The questions are statements (i.e. "I am relaxed most of time") and the respondents had to choose if they agree with it or not on a five-point Likert-scale ranging from 1 = *very inaccurate* to 5 = *very accurate*. Respondent's score on each dimension was simply the average score of the four questions. A common mistake made with Big Five is to reduce the quality of data by categorizing people with easy-to-comprehend labels, such as "high Neuroticism", "normal Extraversion" or "low Conscientiousness". This can be avoided by using the original scores in the data analysis as was done in this research.

The internal consistency of the used Big Five inventory was tested by calculating Cronbach's alpha for the five dimensions. The score describes, how well the different items related to one Big Five dimension measure the same thing (Bland and Altman 1997). The commonly used cut-off level for Cronbach's alpha is 0.7 and sometimes the value of 0.6 is also seen as acceptable (Taber 2018). All of the five dimensions had Cronbach's alpha greater than 0.6 and all but Conscientiousness also exceeded 0.7.

Table 3 Cronbach's alphas of the Big Five dimensions

	No of Items	Mean score	St.Dev	Cronbach's alpha
Extraversion	4	2,92	0,97	0,84
Agreeableness	4	3,91	0,71	0,75
Conscientiousness	4	3,47	0,80	0,69
Neuroticism	4	2,76	0,78	0,70
Openness to Experience	4	3,84	0,74	0,73

3.2.3 Sample

The respondents were gathered using convenience sampling. A link to the survey was shared in various social media channels and in Aalto University student groups. People were nudged to participate by giving away two movie tickets for respondents who finished the study and gave their email address. The survey was open for a two-week period in late Fall 2019. Total number of respondents was 365. 129 of them didn't complete the survey so the total sample size 236 respondents. The Table 4 shows statistics about the sample.

Table 4 Sample structure

Sample size	
Completed	236
Incomplete	129
Sex	
Male	62 %
Female	38 %
Age	
15-24	45 %
25-34	45 %
35-44	6 %
45+	4 %
Median	25
Familiarity with the smartphone market	
Very familiar (8-10)	32 %
Moderately Familiar (4-7)	51 %
Not familiar at all (1-3)	17 %
Price-category of the next phone	
Flagship phone (more than 700€)	14 %
High-end phone (500€-700€)	24 %
Mid-range phone (300-500€)	37 %
Budget phone (less than 300€)	25 %

3.2.4 Conjoint analysis

Conjoint analysis is a group of research methods that help to understand consumers' preferences by revealing how people value different product characteristics. Conjoint analysis is based on the assumption that consumers evaluation of total value of a product or service is a combination of the values of individual product attributes. When we know the value of the different kinds of products in relation to each other, we can derive the values of individual attributes.

The history of conjoint analysis starts from the work of mathematical psychologists and statisticians Luce and Tukey (1964) and their ideas were brought to the field of marketing a few years later (Green and Rao 1971). Today, conjoint analysis is widely used tool in market

research both in academia and among practitioners (Vriens 1994). It's particularly popular in product development.

Choice-based conjoint analysis a form of conjoint analysis study where the respondents choose their preferred option from a set of alternatives - as opposed to ranking or rating the alternatives. The alternatives consist of attributes and their levels. Based on respondent's choices, part-worth utilities for each attribute level and importances for each attribute are calculated. The sum of part-worth utilities of the selected levels tells the total utility of a certain option. Importances tell how much difference each attribute makes in the total utility equation. Choice-based conjoint analysis has become the most popular type of conjoint analysis. One of the main reasons is that choosing the preferred option is closer to real-life situations than the task to rate or rank the alternatives. Also, the part-worth utilities reflect the impact on product or service choice (DeSarbo et al. 1995).

Choice-based conjoint analysis was chosen as a main research tool because the part-worth utilities combined with info about consumers personality gives answers to the research question this study aims to fill.

3.2.5 Research setting

In my study, the respondents were given a task to choose their preferred option among three different mobile phones in a fictitious online store. The phones had four attributes: design, rating, specs and discount. The rating attribute refers to user-given rating of the product, and it's one of the two nudges this research studies. The rating had four color coded levels ranging from 3.0 to 4.6. The discount attribute on the other hand is a form of a loss aversion nudge and it informs the respondent about the limited availability of a discounted price. Design attribute was portrayed simply by showing an image of a smartphone. These images were images of actual smartphones. Images were edited so that all references to brand of the phone were removed in order to remove the impact of brand preferences. The specs attribute consists of the name of the product, a tagline and information about the display, RAM and rear camera. The product names were fictitious but taglines were taken from actual smartphones' web pages.

In addition to three normal attributes, there was one conditional attribute, price, that depended on the specs and discount attributes. If there was a discount, the price was 6% lower than normal price. Relatively small discount rate was used to emphasize the importance of the loss aversion nudge over the actual change in price. The attributes, their levels and effect on the price are portrayed in the table below.

Design					
Review	3.0/5	3.6/5	4.1/5	4.6/5	
Specs	**Phone Y+** *Created with premium quality in mind.* 6.3” AMOLED display 8 GB RAM 28 MP triple camera — +360€	**NY 8.2** *Designed to amaze, engineered to perform.* 6.21” PureHD+ display 6 GB RAM 24 MP double camera — +320€	**H70 Plus** *Quality you can feel in every detail.* 6.0” FullHD+ display 4 GB RAM 18 MP double camera — +270€	**C5** *Get ahead with the latest innovations.* 5.9” Full HD display 4 GB RAM 13 MP double camera — +230€	
Discount	Deal of the day — 94%	None — 100%			

Figure 9 Choice-based conjoint analysis attributes and levels

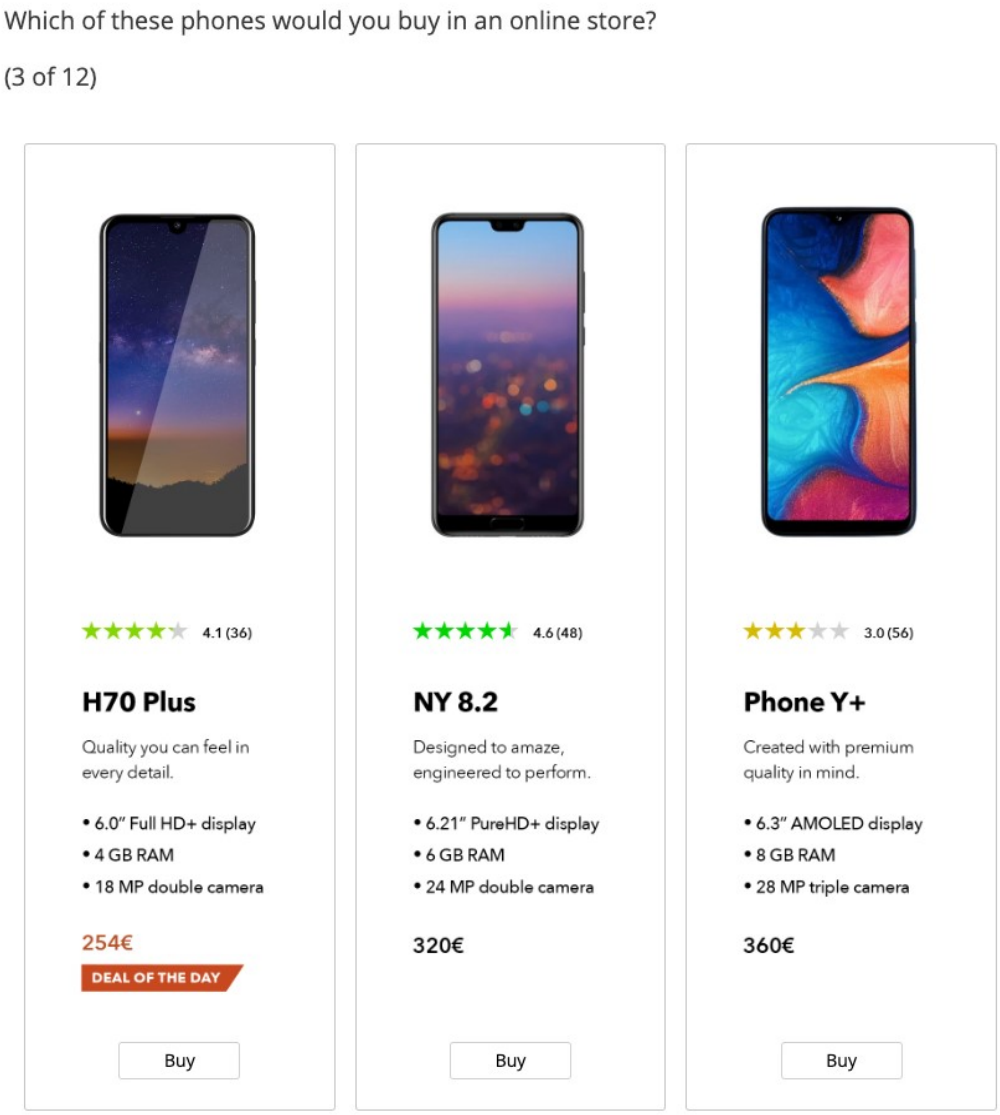

Figure 10 Screenshot of the actual survey

3.2.6 Limitations of the data

The sample size of 236 was in the low-end of acceptable size. In many cases in the data analysis phase, the p-values were just slightly above the threshold of 0.05, indicating that a bigger sample size could have been beneficial to get more statistically significant results.

Convenience sampling brings some problems, too. The networks of the author of this thesis consists largely of students and that affects the representativeness of the sample. Needless to say that the level of education among the respondents was high compared to actual population.

Secondly, the age distribution leans to the younger end of the spectrum and the mean age was relatively low, 26.4. Just 5% of the respondents were over 40 years old. These limitations need to be taken into account, as both education level and age affect the way online nudges are being perceived. For example a study by Gretzel and Yoo (2008) showed that online reviews are more important to younger than older travelers when choosing where to stay.

3.3 Data analysis

The data from the conjoint-analysis, data about Big Five traits and the relationship between the two were studied using correlation analysis and regression analysis. Both of the methods will be discussed in detail later in this chapter. Based on a search on Scopus database, this methodology hasn't been used often. In reality, there were just four results using the search terms "big five" and "conjoint" and only one of them (Benlian and Hess 2010) actually used the similar data analysis approach.

3.3.1 Computing the part-worth utilities and importances

As mentioned earlier in this chapter, choice based conjoint analysis is used to compute part-worth utilities for each attribute level per respondent and importances for each attribute per respondent. These calculations were done using Sawtooth Software's Lighthouse Studio and then combined with respondent's background information using SPSS and Excel. The part worth utilities and importances were used in data analysis as dependent variables.

Table 5 Variables used in the data analysis

Independent variables	Age Sex Familiarity with the smartphone market The price-range of the next phone Extraversion Agreeableness Conscientiousness Neuroticism Openness to Experience
Dependent variables	*Zero-centered utilities* Rating (best) Rating (good) Rating (ok) Rating (bad) Deal of the day No deal *Importances* Design Rating Specs Discount

3.3.2 Correlation analysis

The first step in the data analysis was analyzing the association between the variables. This was done using the Pearson correlation. In correlation analysis, the correlation coefficient varies between -1 and 1. Values close to -1 and 1 indicate strong negative or positive correlation. In addition to correlation itself, a 2-tailed significance for each pair was calculated. The correlations were calculated for the variables shown in Table 3 and the results are reported later in the Results and Discussion chapter.

3.3.3 Regression analysis

The next step in the analysis was the multiple regression analysis. It was used to further study the relationship between the correlating variables by taking into account the moderating effect of sex, age and familiarity with the topic. Multiple regression analysis is used to investigate the relationship between several independent variables and one dependent variable. This is the benefit of using regression analysis instead of simply looking at the correlations - it shows how the independent variables work together. Independent variables can be continuous or

categorical. Nominal variables need to be coded into dummy variables that have just two scores. Regression analysis produces a regression equation shown below.

$$Y_i = \beta_0 + \beta_1 X_i + \varepsilon_i$$

There are also some assumptions that need to be met when using regression analysis. These are examined next.

According to Hair et al. (2013) the sample size should be at least 50 and preferably more than 100 in most research situations meaning that regression analysis can be done with relatively small sample sizes. Besides that, the minimum preferred ratio of observations to variables is from 15:1 to 20:1. In this study the number of respondents met both of these criteria - sample size was 236 and observations to variables ratio was at smallest 40:1. Secondly, there must be a linear relationship between the independent variables and the dependent variable. The independent variables should also have little or no correlation. This assumption is tested with Variance Inflation Factor in SPSS. Lastly, the variables should be normally distributed (multivariate normality) and the variance of error terms should be the same across the values of the independent variable (homoscedasticity).

4. Results and discussion

4.1 Empirical findings

4.1.1 Results of the correlation analysis

The Table 3 shows the Pearson Correlations between the Big Five dimensions and utilities of the levels of the Discount and Rating attributes. The table 4 includes correlations between the dimensions and the importances of the Discount, Rating and Specs attributes.

Just two of the Big Five dimensions had significant correlations with any of the utility and importance variables at the 0.05 level. Those dimensions were Conscientiousness and Openness to Experience. Both Conscientiousness and Openness to Experience were positively correlated with the importance of the specs attribute. This means that the technical specifications of the phone mattered more for people with higher scores on those two dimensions. In turn, the relative importance of the other attributes is smaller. In addition to that, Conscientiousness was negatively correlated with the importance of the rating attribute. Openness to Experience was too, but it narrowly failed to be statistically significant.

Openness to Experience also correlates positively with the utility of good rating (4.0/5.0 stars) and negatively with the utility of the deal of the day feature. This, of course, doesn't mean that people with higher Openness to Experience would avoid getting the deal, they just aren't as much tempted by them. There was also a positive correlation between this personality dimension and the average rating (3.6/5.0 stars), though the correlation wasn't significant at the 0.05 level.

Despite the lack of statistical significance, the results related to Neuroticism were interesting. The results imply that Neuroticism is positively correlated with increased utility of the discount and also the utility of the highest rating.

Table 6 Correlations between Big Five dimensions and utilities of Discount and Rating nudges

	Discount		Rating			
	Discount	Normal price	Best	Good	Ok	Bad
Extraversion	-.06	-.02	-.04	.01	.01	-.06
Agreeablenesss	-.03	-.05	-.01	.02	.01	.01
Conscientiousness	-.01	.02	-.03	.01	.01	-.01
Neuroticsm	.10	-.07	.11	-.03	-.09	-.03
Openness to Experience	**-.15***	.03	-.10	**.16***	.12	-.04

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Table 7 Correlations between Big Five dimensions and importances of Rating, Specs and Discount attributes

	Importance		
	Rating	Specs	Discount
Extraversion	.04	-.03	-.09
Agreeablenesss	-.04	.09	-.10
Conscientiousness	**-.17****	**.16***	-.10
Neuroticsm	.04	-.05	.02
Openness to Experience	-.13	**.15***	-.11

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

The previous tables showed the correlations between the variables related to Big Five and variables related to the nudges. The conducted survey gathered other information about the respondents too. Table 5 and Table 6 show the correlations between these results and the importances and the utilities. The variables shown in the next figures were used in the next step, regression analysis, as moderator variables. The strongest correlation, not surprisingly, was a positive correlation between the price range of the next phone and the importance of discount

attribute. As the price ranges were ranked in the decreasing order, this means that people who were interested in cheaper phones paid more attention to discounts. Age had also statistically significant effect in the importances. On the other hand, sex didn't have statistically significant influence on any of the utilities or importances. Familiarity with the topic was negatively correlated with the utility of the worst rating, but otherwise its influence was relatively small.

Table 8 Correlations between background information and utilities of Discount and Rating nudges

	Discount		Rating			
	Discount	Normal price	Best	Good	Ok	Bad
Sex	.05	-.03	.01	-.08	-.05	.12
Age	.09	-.04	-.01	-.11	-.09	-.07
Familiriaty †	-.02	.04	-.03	-.02	-.01	**-.14***
Next phone ‡	-.05	.00	-.04	.05	.05	.04

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).
† Familiarity with the topic was measured on a scale from 1 to 10, where 1 was "not familiar at all" and 10 "very familiar"
‡ Price-category of the next phone had four groups that were in decreasing price order ranging from "Flagship phone" (1) to "Budget phone" (4).

Table 9 Correlations between background information and importance of Rating, Specs and Discount attributes

	Importance		
	Rating	Specs	Discount
Sex	.00	.02	-.06
Age	**-.13***	**.13***	-.08
Familiarity	-.04	.05	-.07
Next phone	.00	-.08	**.25****

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

4.1.2 Results of the regression analysis

Regression analysis was used to further investigate how the independent variables work together and especially the moderating effect of other personal characteristics. The statistically significant results of the correlation analysis were studied using regression analysis so that sex, age and familiarity with the topic, were added as additional independent variables. The results from these tests are shown below. The results confirm the significant effect of Openness to Experience and Conscientiousness on utilities of discount and good rating as well as importance of rating, even though the p-value of Openness to Experience is slightly over 0.05 in the last model. Relatively strong effect of age is also worth noticing in the Table 8. However, it needs to also be noted that the age distribution of this thesis was limited and just 10% of the respondents were over 35 years old.

Table 10 Regression analyses on utilities of discount and good rating

	Utility of discount		Utility of the good rating (4.0/5.0)	
	Standardized Coefficients		*Standardized Coefficients*	
Variable	Beta	Sig.	Beta	Sig.
(Constant)		.32		.80
Openness to Experience	-.15	**.03***	.15	**.02***
Sex	.04	.54	-.09	.18
Age	.09	.19	-.11	.10
Familiarity	-.05	.49	-.01	.90
Next phone	-.05	.50	.02	.73
F-statistic	1.65		2.09	
Significance	.15		.07	
R^2	.04		.05	
Adjusted R^2	.01		.02	

**. Significant at the 0.01 level (2-tailed).
*. Significant at the 0.05 level (2-tailed).

Table 11 Regression analysis on importance of rating

	Importance of rating	
	Standardized Coefficients	
Variable	Beta	Sig.
(Constant)		.00
Openness to Experience	-.13	.06
Conscientiousness	-.15	**.03***
Sex	-.01	.85
Age	-.13	.06
Familiarity	-.01	.91
Next phone	-.01	.92
F-statistic	2.31	
Significance	**.04***	
R^2	.06	
Adjusted R^2	.03	

**. Significant at the 0.01 level (2-tailed).
*. Significant at the 0.05 level (2-tailed).

4.1.3 Hypothesis testing

✓ **H1a:** High Openness to Experience decreases susceptibility to conformity nudges.

✗ **H1b:** High Agreeableness increases susceptibility to conformity nudges.

✗ **H1c:** High Neuroticism increases susceptibility to conformity nudges.

✓ **H1d:** High Conscientiousness decreases susceptibility to conformity nudges.

The first set of hypotheses was related to the relationship between the Big Five personality traits and susceptibility to conformity nudges. In the research setting the conformity nudge was a user rating that had four levels: 3.0, 3.6, 4.0 and 4.6 out of 5. Hypothesis 1a and 1d are supported by the results. Openness to Experience was positively and statistically significantly correlated with the utility of the good (4.0/5.0) rating. The correlation with the utility of the best rating (4.6/5.0) on the other hand was negative. Further, Openness to Experience was negatively correlated with the importance of rating. Even though the latter two result wasn't statistically significant, p=0.115 and p=0.058, respectively, these results imply that Hypothesis 1a indeed holds true

and higher Openness to Experience is related to lower susceptibility to nudges that utilize conformity effect. The negative correlation between Conscientiousness and the importance of the reviews was one of the strongest effects this study showed, thus confirming the hypothesis 1d. Both hypotheses 1a and 1d held true also when the moderating effect of sex, age and familiarity with the topic were used in the regression analyses.

The hypotheses 1b and 1c couldn't be confirmed with this study. The relationship between Agreeableness and the reviews was very indistinct. The correlation between the importance of rating and Agreeableness was actually negative, though the significance was very low making the result unreliable. The results imply that there might be a positive correlation between Neuroticism and the most positive reviews. This result would support the hypothesis but the statistical significance of the correlation wasn't good enough.

✗ **H2a:** High Extraversion increases susceptibility to loss aversion nudges.

✓ **H2b:** High Openness to Experience decreases susceptibility to loss aversion nudges.

Hypotheses 2a and 2b were related to personality and its effect on the effectivity of loss aversion nudges. In this study the nudge was a price discount with limited time. The hypothesis 2a is rejected as there wasn't any significant correlation between this dimension of personality and the importance of the discount or the utilities of either option (discount or normal price). The second hypothesis is supported by the results. Openness to Experience is negatively correlated with the utility of the discount option, meaning that the higher the person's score on Openness is, the lower utility the discount offers. There was also a negative correlation between the importance of the discount attribute and Openness to Experience but the p-value was over 0.05.

4.2 Conclusions

4.2.1 Main findings and theoretical contribution

The main theoretical contribution this thesis and its empirical study make, is adding a new aspect to current literature on the effectivity of nudging by exploring how Big Five personality traits affect it. To my knowledge and based on a literature review, this particular topic hasn't

been studied before. Overall, the results of this study provide evidence for Big Five being a useful framework for predicting consumer's susceptibility to certain types of nudges. Thus, the report brings new perspective to continually developing research on nudges and opens new avenues for further research on how personality and nudges interact. The results are consistent with a wide array of other studies proving the contribution of Big Five personality traits to consumer behavior in other types of situations.

There is also another important theoretical contribution this research achieves. Namely, connecting the nudging literature to classical marketing literature. In contrary to most of existing literature, this research discussed the nudging in a commercial context where the nudge is used as a marketing tool to make the customer to make a desired decision. In the experimental study part it was a purchase in an online store. As the vast majority of previous literature examines nudges from a different perspective, the relationship between nudges and other forms of marketing activities and marketing theories has remained somewhat unclear. In the literature review part of this thesis I point out that nudges used only in the preference, conviction and purchase stages of the customer's journey if we use the classic Hierarchy-of-effects model (Lavidge and Steiner 1961). Further work is needed to define more accurately what nudging is and isn't as form of marketing and how it's possibly overlapping with other marketing theories, but this work offers one way to approach the issue.

The experimental part of this study tested two nudge types in an online store that sells phones. The first nudge was a rating given by other users and it's classified as a conformity nudge based on the heuristic or bias it utilizes. The second nudge was a label that stated that the product has a discounted price for just one day. This nudge is a loss aversion nudge. Our findings indicate that Openness to Experience and Conscientiousness are related to consumer's susceptibility to these two types of nudges. The main conclusion of this study is that both are negatively correlated with the effectivity of conformity nudges. In addition, Openness to Experience is negatively correlated with the effectivity of loss aversion nudge. In other words, people with high scores on those personality traits are less likely to be affected by nudges that utilize conformity or loss aversion biases. Also vice versa. Low scores on those two traits increase the susceptibility. These results were expected, and they are consistent with what has been found previously by other researchers, for example Oybo and Vassileva (2019) and Dohmen (2010), as discussed in the literature review part of this thesis.

The literature on personality does give us some hints on why these relationships exist. First, as the name of the trait suggests, high Openness to Experience seems to be related to willingness to try new things and being innovative (e.g. Marcati et al. 2008). In practice it often means doing things others haven't done yet. Conformity nudges, on the other hand, are designed to exploit people's tendency to do what others do. For high Openness to Experience people that tendency probably isn't then as strong. That would possibly explain the negative correlation between Openness to Experience and susceptibility to conformity nudges. The reason why high Conscientiousness has negative effect on the effectivity conformity nudges, may lie in the fact that the trait is related to self-discipline and control of impulses (Weisberg et al. 2011). Nudges are by definition meant to cause impulses that effect automatic thinking and it seems that high Conscientiousness people might be more resistant to them.

The other three personality traits didn't have significant influence on the respondent's sensitivity to two studied nudges. There were some correlations, but the statistical significance of those results was not sufficient for reliable conclusions. However, this problem could have been solved with a larger sample size and the possibility of significant effects can't be ruled out. Still, these results raise a question: is there a more general reason why it was just Openness to Experience and Conscientiousness that had a significant effect. Is Openness to Experience and possibly Conscientiousness too some sort of antidote to consumers' susceptibility to being nudged? It seems, indeed, that this might be the case and the fundamental factor could be the individual differences in the cognitive styles. One interesting aspect is a concept called need for cognition, which is a personality variable that reflects individual's tendency to engage in and enjoy cognitive activities (Cacioppo and Petty 1982). Need for cognition has been shown to be related to heuristic processing and high scores on that variable are negatively correlated with the use of heuristics (Shiloh et al. 2002). As nudges are designed to make use of heuristics, it would seem that need for cognition could then be a general factor that predicts susceptibility to nudging. Going further, Openness to Experience and Conscientiousness are positively correlated with need for cognition (Sadowski and Cogburn 1997). The results of this study fit into the picture.

The research question of this study was "*Does consumer's personality affect their susceptibility to conformity and loss aversion nudges in an e-commerce context?".* All in all, the results demonstrate that the answer to this question is positive: personality does have an effect.

The research took into account also other personal characteristics than personality. Based on the results, it seems that age correlates negatively with the importance of reviews and therefore effectivity of conformity nudges. However, the representativeness of the sample in terms of age was inadequate and 90% of respondents were under 35 years old so this result has to be considered with caution.

4.2.2 Managerial implications

From a managerial point of view, this study offers interesting insights on how personality affects the power of nudges in e-commerce. Marketers have for a long time known that the marketing messages need to be personalized in order to achieve maximum results. However, the question is how to do that? What kind of message is effective for which audiences? The results of this experiment should shed some additional light on that question and prove that personality indeed is one aspect that should be taken into account. There are lots of possibilities and ways to cash in on the results. Dynamic and personalized content is already up and running and there are many forms of it, for example geotargeting, content personalization based on customer life cycle and recommendations based on customer profile. As there is evidence on the importance of personality traits, why not add it to the list as one of the determinants of what kind of content is shown to customer.

How to utilize the results of this study in practice? Let's start with the online stores, the context of the survey. First, rather straightforward answer is that online stores could utilize discounts more often with people with lower Openness to Experience as they are more prone to make the purchase decision if there is a price reduction. I have identified three ways to do that. First option is personalized pricing. This means that the price being shown is not static but it depends on the customer. In this case some customers would get the discount while others wouldn't. Since discounts cost money for the seller, they could be used less often for customers with high Openness to Experience – and vice versa. Personalized pricing has some obvious challenges, such as ethical concerns and negative response from the customers, but it also has lots of potential for both customers and companies (Wallheimer 2018, Unglesbee 2019). And even though personalized pricing may sound futuristic, in some forms it's actually more common than we may think. 10% student discount at Espresso House at Aalto University metro station is personalized pricing. Implementing it online and based on personality is, of course, more

demanding task and might not work in all types of online stores. Still, it's worth considering. Another solution could be simply be emphasizing discounts with web design solutions that depend on the customer who visits the page. The landing page banners might be personalized to highlight discounts both with the design and the copy if the customer has low Openness to Experience. The discounted products list or banners that link to outlet pages of the online store could also be shown on the top of the page, just to name a few ideas. The third proposal is that the results could be utilized in the targeted advertising for the online stores. Online advertising is already quite well targeted based on the customer profile, so this wouldn't be a huge change to current ways of working.

Another practical way to apply these results would be to highlight ratings for customers who score low on Conscientiousness and Openness to Experience. Again, there are various ways to do this, but one possibility would be to emphasize the ratings with the web design. There's a lot of good research about visual perception on web pages that could be applied there. For example, the users usually scan the page in an F-shaped pattern (Pernice 2017) and if the rating is something we want to make sure the customer noticed, then it should be placed with this in mind.

Email marketing could also be a fruitful field for personality-based nudging. The email marketing tools are already quite sophisticated for targeting messages based on the customer profile. Adding personality as a new data field alongside with sex, age and location should be a quick task. The subject lines, copy, images and order of different blocks are easy to change to point out most important things based on the reader. For example, when promoting a phone, there could be two subject lines depending on the customers' score on Conscientiousness and Openness to Experience. If the scores on those traits are low, the subject line could tell that the phone has gained rave reviews and if the scores are high, the subject line could focus on fancy specifications of the phone. Email marketing tools also often offer A/B testing possibilities, so the hypotheses can be easily tested and the messages refined to be more effective.

Even though this study shows that taking personality into account when designing choice architectures and nudges can make the nudging more effective, marketing professionals shouldn't be seeing nudges as a completely independent issue. Nudges don't operate in a vacuum. Instead, I suggest taking a step back and looking things from a wider perspective. In practice, this could mean paying attention to personality when designing complete customer

journeys and touchpoints it is made of. Purchase and other stages where nudges are used are just a small portion of the journey. Customer experience is holistic in nature (Lemon and Verhoef 2016) and nudges are part of it. Therefore, taking a holistic approach when personalizing the touchpoints – and the nudges - makes sense. The optimal solution probably isn't to fill up each step of the journey with all sort of nudges that are proven to be effective but deliberately deciding what the customer sees, hears and feels along the way. A well-placed nudge may get the customer to purchase the product you are selling. But does it increase loyalty and make the customer return? Does it maximize the customer lifetime value? The results of this study give some interesting ideas and empirical evidence but understanding the overall effect definitely requires more research, expertise and an eye for the game from the managers responsible for implementing the nudges.

The practical question, of course, is how people working in digital marketing can measure and collect data about consumers' personality traits. Asking everyone who enters the website to fill a 20-item Big Five questionnaire isn't an option. This is may be most challenging part of utilizing personality in nudging, but I believe it isn't insurmountable. And actually this question has been solved already. Remember Cambridge Analytica? Their business was based on making a Big Five profiles based on behavior in Facebook. With just 150 likes they could evaluate person better than his or her parents. The score on Extraversion scores can be predicted by the number of profile pictures and how quickly we move (yes, it's measured too) tells a lot about the level of Neuroticism (Grassegger and Krogerus 2017). Arguably, well-targeted digital marketing that was done utilizing this kind of information was crucial in turning tide for Donald Trump in the American presidential elections in 2016. Like the result or not, it seems evident that personality can be utilized in marketing efficiently. How to do that ethically and valuing consumers' privacy is another question and something that definitely needs to be addressed in both academia and business.

Even if personalizing offerings and content specifically based on Big Five traits sounds unrealistic, these results supports the more general idea of moving towards personalized marketing and personalized nudging too. This research is another evidence for the fact that people with different personalities react differently to messages marketers send them. In particular, when digital nudges are in use, professionals responsible for digital marketing planning should acknowledge and, if possible, utilize it. It's also a good idea to simply start testing different hypotheses with the data that happens to be available. The situation where

marketers have fully accurate personality profiles of each customer hopefully isn't happening in a near future.

Although the empirical part of this study is focusing on commercial use of nudges and digital retail context, these results could possibly be generalized to other fields with some caution. After all, the underlying psychological effects, conformity and loss aversion are not context specific and there are lots of research suggesting those heuristics are powerful in other environments too. Likewise, personality is isn't really a context-specific variable, it's part of us all the time. Traditionally literature about nudging has been mostly about how to nudge people towards better decisions for themselves or society and often it's the government or other policy maker that does the nudging there. Most likely, the learnings of this study could be effectively utilized in those situations too. However, the ethical and political challenges are real may become an actual obstacle, even more than in the commercial world. We are used to the fact that Google and companies know a lot about us and use that in marketing. However, if the government started to gather data about personality traits and sent us personalized messages based on that, it might be too much – even if the objective would be to benefit us.

4.2.3 Limitations and suggestions for further research

The most evident limitation of this study was the sample in terms of size and quality, as was discussed already in the earlier chapters. The sample size was 236. The limit of the university's Sawtooth Software license was 250 respondents, so for practical reasons the sample size couldn't have been boosted much more. However, if it had been larger, there would have probably been a few more statistically significant results, thus making the conclusions of this study more extensive. Another issue related to the sample was the selection bias: I used convenience sampling by inviting my friends, relatives and other students to participate in the study. Therefore, the representativeness of the sample is weak. This can be seen from the statistics: just 10% of the respondents were over 35 years old. Also, it's possible the personalities of the respondents were not representative, as the university students - of whom a remarkable part of the sample consists of - may on average get higher scores on some personality traits than others do.

Secondly, even though this study was an experimental study and the research setting was made visually as realistic as possible, respondents didn't actually have to buy a phone. The generalizability of these results to real-life situations is not certain. Especially the loss aversion bias and nudge, could potentially be more effective, when the consumers have actual money to spend - or lose.

The third limitation is related to research setting. The choice situation was made rather simplistic with just three products and a limited number of variables, for example, the phones didn't have a brand. Doing this made it possible to use choice-based conjoint analysis and was therefore the only option. However, it also made the scenario less realistic as the actual customer journey includes a lot of other phases too, even if we only look at the steps taken in the online store. This, again, might affect the way different nudges work for different people. This and the previous limitation could be tackled by conducting a similar survey in an actual online store.

This thesis was focused solely on conformity and loss aversion biases but the positive results about the role of Big Five personality factors raises a question about other nudge types. Openness to Experience in particular was negatively correlated with effectivity of both nudges. Future studies should examine if similar results can be found with other types of nudges making Openness to Experience some kind of antidote to consumers' susceptibility to being nudged. As mentioned, there is indeed some evidence for that. Additionally, future could study the role of other moderating variables, such as level of education or intelligence.

Another possible theme for further research is the role of Conscientiousness. Interestingly, this Big Five dimensions is said to be related to conformity values but both Oyibo and Vassileva's (2019) and my research suggest that actually this dimension is negatively correlated with susceptibility nudges. This contradiction could be examined in more detail. Additionally, it would be interesting to see if the type of the product influences the results of this kind of study. In my study I used smartphones, which are a high-involvement products and the decision to buy one often takes some time and effort. If the decision-making situation would be more ordinary, such as buying groceries, the nudges might work differently.

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6. Appendices

Appendix A

Mini-IPIP

7 point Likert-Scale ranging from (1= Very Inaccurate, 7=Very Accurate)

1. I am the life of the party
2. I sympathize with others' feelings
3. I get chores done right away
4. I have frequent mood swings
5. I have a vivid imagination
6. I don't talk a lot
7. I am not interested in other people's problems
8. I often forget to put things back in their proper place
9. I am relaxed most of the time
10. I am not interested in abstract ideas
11. I talk to a lot of different people at parties
12. I feel others' emotions
13. I like order
14. I get upset easily
15. I have difficulty understanding abstract ideas
16. I keep in the background
17. I am not really interested in others
18. I make a mess of things
19. I seldom feel blue
20. I do not have a good imagination