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Mobile or Computer: Does it Matter?

A quantitative study investigating the effect of device experience in an online store context, on perceived visual complexity and processing fluency

Alexandra Ridderbjelke (50376) and Linnea Törnvall (50297)

Abstract

E-commerce continues to transform the retail landscape at a fast pace, at the same time computer access to online stores has gained competition from mobile access. Consequently, the interest in how these devices and their inherent characteristics affect the consumers' perception of the content and behavioural intentions, has grown from both practitioners and academia. Given the current literature, there is an ambiguity regarding which device creates the most advantageous experience of the content. Building on processing fluency and environmental theory (SOR), this study investigates how online stores are perceived by consumers with the sole consideration of the device from which the content is experienced. It is proposed that the perceived visual complexity differs between a mobile experience and a computer experience, which in turn is assumed to generate a difference on processing fluency, perceived visual appeal, pleasure, attitude towards site and the subsequent behavioural intentions purchase intention and WOM intention.

A quantitative experimental study was conducted comprising 248 respondents. The findings revealed that the perceived visual complexity was lower for respondents viewing the online store as a mobile experience which resulted in higher purchase intention and WOM intention. The impact of the device experience on purchase intention and WOM intention was mediated through processing fluency, perceived visual appeal and attitude toward site. Pleasure was not affected by the devices, suggesting that pleasure is not always a necessary outcome in order to produce positive behavioural intentions.

Keywords: Visual complexity, Processing fluency, Device, Online store environment

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Definitions

Processing fluency	Processing fluency is defined as the ease with which people process information (Alter and Oppenheimer, 2009).
Objective visual complexity	The objective visual complexity is defined as the number and configuration of information cues in the stimulus itself (Nadkarni and Gupta, 2007).
Perceived visual complexity	The perceived visual complexity is based on the individual's perception of the stimulus, focuses on the person-stimulus interaction (Nadkarni and Gupta, 2007).
Device	Refers to internet enabled devices including a screen.
Computer	Refers to both desktop and laptop.
Mobile	Refers to mobile phones, specifically smartphones only.
Layout design	Layout design is defined as the arrangement of content and images on an online store website, as in Wu et al. (2013).
Mobile layout	Refers to the layout design, that is customized for a mobile device.
Computer layout	Refers to the layout design, that is customized for a computer device.
Product listing page	A product listing page is defined as a page on a typical e-commerce site where information on multiple products are displayed (Schmutz et al., 2010).
Device experience	In this specific study the term device experience is defined as the total effect of the online store environment, including (1) the visual layout of an online store that is customized for the device, (2) the physical environment in which the human-device interaction occur, which refers to both the surrounding environment and the actual interaction with the device.
Mobile experience	Same definition as device experience, but refers to the mobile environment only.
Computer experience	Same definition as device experience, but refers to the computer environment only.

1 Introduction

"People interact with their mobile phones very differently than they do with their PCs..."
(Kevin Systrom, co-founder of Instagram).

With this in mind, it is easy to understand why both academia and marketers have started to investigate the changes in consumer responses that the mobile is creating.

Businesses and consumers are adapting technology that make their life easier. Mobile development is becoming a priority as it is rapidly transforming business, in particular the world of e-commerce (OECD, 2019). According to the Euromonitor International, e-commerce is expected to become the largest retail channel in the world by 2021. It is evident that online shopping is changing every year and consumer trends are driving this development. One major change is the shift towards mobile shopping and Sweden is one of the countries in the world with the largest proportion of online mobile phone shoppers. As of today, 50 percent of the Swedish population shop online through their mobile phone every month (E-barometern Q3, 2019). Mobile shopping has dramatically increased in Sweden in just 3 years, in 2015, only 3 percent of Swedish consumers said their latest purchase were made through a mobile device (E-barometern Annual Report, 2018). As the Swedish psychiatrist and author, Anders Hansen, said earlier this year, "smartphones did not exist ten years ago, it's the greatest behavioural change human beings have ever experienced". Yet, we know little about the consequences the mobile device is causing.

As of today, consumers can choose freely from which device they visit an online store. A relevant and well discussed question is whether the consumer shopping experience differs depending on the device from which consumers interact with the online store. The two most common devices are mobile and computer. Given that e-commerce is growing at an unexpected rate, and that consumers are able to choose freely from which device they visit an online store, it is important for online retailers and consumers to understand the effects these devices are creating in an online store context. Yet, there is not much research regarding how these two devices affect consumer responses differently.

1.1 Problematization

In the past 5 years, mobile usage has surpassed computer usage in terms of internet access, from approx. 22 percent to 52 percent (StatCounter Global Stats, 2019). Mobile access to online stores is rapidly increasing, due to the technological advancements and consumer adoption. Online stores have developed separate sites for mobiles to optimize the user experience in relation to the opportunities and restrictions mobiles provide, creating competitiveness towards computer customized websites. Ever since the rise of internet enabled devices, it has been argued that the digital interface completely changes the experience of the content and consequently might affect consumer responses (Rokeby, 1998; Brasel and Gipbs, 2014). Given the mobile device takeover, the impact of the device on consumer behaviour has attracted researchers' attention in recent years. However, still much remain to be examined in this area.

Current research proposes that customers adopting to mobile devices for online shopping, order more and spend more in general, compared to computer devices (Wang et al., 2015; Huang et al., 2016). Furthermore, scholars suggest that consumers have different browsing behaviour patterns between the two dominant e-channels, mobile and computer (Ghose et al., 2013). Besides general differences, it is of interest to investigate effects caused by individual functional differences. Brasel and Gips (2014) found that touch navigation in comparison to mouse navigation increases the endowment effect. Furthermore, Söderlund et. al (2019) propose that a computer might induce more positive consumer response than mobiles, due to the difference in screen size. Söderlund et al. (2019) suggest a further investigation of how the individual functions and characteristics affect response, as well as their effect in relation to each other.

Given the digital environment of online stores in general (computer and mobile), researchers have investigated how the depiction of digital content affect consumer response based on the stimulus-organism-response (SOR) framework. Furthermore, scholars have also applied theory of processing fluency within the SOR framework, to better explain the processing of information in the online environment. Processing fluency is defined as the ease with which people process information (Alter and Oppenheimer, 2009). High processing fluency elicit positive emotions which affect judgements and consumer response. Visual complexity in different forms has been identified as an important aspect within the online environment and has also been found to be closely related to processing fluency (Nadkarni and Gubta, 2007; Sohn, 2017; Kolesova and Singh, 2019). Research shows that low complexity is generally more advantageous (ibid). Furthermore, there is a distinction between objective and perceived visual complexity where the objective refers to the actual complexity and the perceived complexity refers to perceptions caused by the human-stimulus interaction. Within complexity theory, it is argued that simultaneous sources of complexity produce a general level of perceived complexity (Nadkarni and Gupta, 2007).

Scholars seem to agree on that online layout design and online atmosphere are important factors in the online store environment. Lorenzo-Romero et al. (2011) even propose that atmospheric cues may have greater impact than other marketing inputs at the point of online purchase. The definition of the online store environment is complex as it is argued to be bridging two distinct environments, (1) the virtual online environment, and (2) the physical operator environment in which human-computer interaction occur (Sautter et al., 2004). Given the technological development, the human-computer interaction can also be referred to other devices such as mobiles.

As this was not the case earlier, the duality of the online environment has not yet received a lot of attention in literature. Instead literature focus has been mostly directed towards the impact of the online environment itself. Impact from human-computer versus human-mobile interaction on the total effect of the dual online environment is thus in many cases not yet studied by academia.

To conclude, there is great need to explain how different devices that have been gaining influence and importance in consumers' lives and, consequently, in retail contexts over the past decade, affect consumer responses. Existing research only provides a fragmented view of the relationships and fails to fully explain how and why devices influence the way in which consumers shop online. Therefore, this study aims to shed light on the yet poorly understood connections between differences in devices and consumer responses, by using the concept of processing fluency theory within the greater framework of SOR.

Building on previous research, we propose to investigate how an online store, customized for mobiles and accessed by mobiles, is perceived in terms om visual complexity, in comparison to how the same online store is perceived in terms of visual complexity through its computer version on a computer device.

The comparison between the two devices aims to take into account the variation in human-device interaction as well as the visual layout design, we have chosen to call this total effect 'device experience' in this specific study. Device experience will hereby be defined as the duality of (1) the visual layout of an online store that is customized for the device, (2) the physical environment in which the human-device interaction occurs, which refers to both the surrounding environment and the actual interaction with the device. Furthermore, mobile experience and computer experience refers to the individual device interactions.

1.2 Purpose and Research Question

The study aims to answer following research questions:

1. *Does the perceived visual complexity of an online store differ between a mobile experience and a computer experience?*

2. *If there is a difference in perceived visual complexity between the mobile experience and the computer experience, will this difference in complexity also affect processing fluency, perceived visual appeal, pleasure, attitude towards site, and consumer response in terms of purchase intention and WOM intention?*

3. *If there is a difference in perceived visual complexity, could this difference be explained by the perceived ease of text, the perceived ease of picture and the activity of scrolling?*

1.3 Expected Contribution

By answering the research questions, this study is expected to contribute to both research and practice in the area of online store environments. Theoretically, there is little knowledge of the effects on consumer response caused by the different devices mobile and computer, and their respective visual layout in an online context. Building on the current body of literature on processing fluency and environmental theory, this study aims to contribute to a complex and scarce field of research with specific findings related to the online store context.

The study is also expected to contribute to more general findings about the effects the different devices cause, that might affect other areas besides the online store layout context, e.g. the field of online data collection. As such, contributing to future quantitative research by investigating which device is perceived more visually complex, affecting respondents' attitude towards questionnaires. In addition to theoretical contributions, this study is expected to contribute practically with valid insights for e-commerce practitioners. Information about how consumers are affected by two varying device experiences, should be of interest for future e-commerce development. Potentially our results could also contribute to other contexts where the device has a central role, e.g. social media. Finally, we seek to inform consumers and policy makers of how they are affected by the different devices.

1.4 Delimitations

Due to limited time and resources, and in order to connect the visual differences to already established connections between organisms and response variables, the thesis has been delimited to be measured through behavioural intentions only. In terms of geographical limitation, Sweden was chosen since it is the home of the thesis authors and the questionnaires' respondents.

The area of how the two devices (mobile and computer) are affecting consumer responses differently, is still relatively unexplored, especially in an online store context. Therefore, an important delimitation is the use of the grocery industry. This industry account for the highest turnover of the Swedish retail industry, however it has been extremely untouched by e-commerce (Handeln i Sverige, 2019).

Conducting the study in an untouched online context is expected to limit potential effects caused by consumer's earlier online store experiences. Also, a fictive website was used to limit the effect of pre-existing relationships with online stores.

Moreover, the study aims to investigate how the device interaction as well as the visual layout affect information processing in an online context. However, there might be other factors that interplay, for example social factors or location characteristics. An online store consists of several pages, a product listing page was chosen as study object. The reason being that the online product display is important for retailers and consumers as it communicate information about the products and creates interest among the consumers (Benn et al. 2015). The visual layout of the product listing page is further limited as it represents an example of a product listing page, based on the most common grocery online stores.

1.5 Thesis Outline

This thesis consists of nine main sections: introduction, theory, method, results and analysis, discussion, conclusion, implications, limitations and suggestions for future research.

Firstly, an introduction will present the area of interest and a problem formulation will lead into the purpose and the aim of the study. The first section will also discuss limitations and expected contributions with the study. The second section describe the theoretical framework which the study is based upon, as well as goes through prior research needed to generate the hypotheses that will answer the research questions. The theory section is concluded by summarizing the hypotheses and presenting our chosen theoretical framework. The third section outlines the methodology behind the conducted study and motivates our topic, approach and choice of study objects. It further describes our preparatory work and main study in detail. The method chapter ends with a discussion regarding the quality of our collected data, including the study's reliability, validity and replicability. Chapter four presents the results and analysis of our conducted empirical study and hypotheses testing. In section five the results are discussed in relation to our theoretical framework and chapter six concludes the discussion by answering the research questions. The last three chapters discusses implications, limitations and future studies in relation to our conducted study.

2 Theory

In the following chapter, the theoretical approach is presented that will form the basis of the study. First, the two central theoretical models are presented; (1) the SOR framework and (2) processing fluency, which together will lay the foundation for the hypothesis generation. Furthermore, a literature review is outlined, highlighting empirical studies and propositions concerning the inherent functional and visual differences between computers and mobiles. Finally, the hypothesis generation will be presented, followed by our proposed conceptual model.

2.1 SOR Framework

The body of literature on retail environments, both physical and online is grounded in environmental psychology, more specifically the Stimulus-Organism-Response framework developed by Mehrabian and Russell (1974). The SOR framework posits that environments contain stimuli (S) which influences the emotional state of the organism (O) in terms of pleasure, arousal and dominance. Furthermore, the emotional state in turn, result in an either approaching or avoiding response (R) towards the stimulus. In conventional retailing the numerous components of the store layout and atmosphere (e.g. colour, lightning, music, fragrance) function as informational cues, that form the shopper's perception of the store and its quality which in turn evoke either positive or negative emotions. These emotions, in turn affects the shopper's attitudes and eventually also behavioural intentions such as purchase intention (Donovan and Rossiter, 1982). The same logic can be applied to the online store environment and atmosphere, which, instead, consists of the content and structure of the information (Wu et al., 2013).

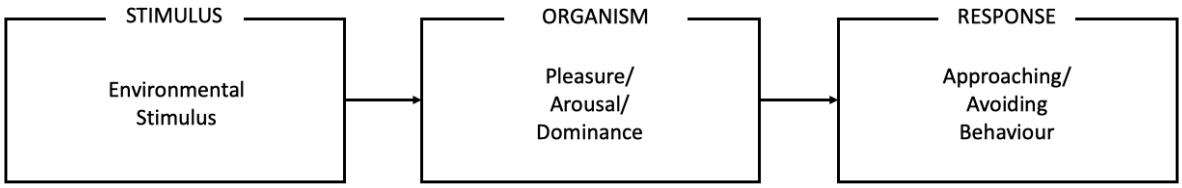

Figure 1 - Overview of SOR framework

2.2 Processing Fluency

The concept of processing fluency applied to the SOR framework has become a frequent approach in order to explain the impact of the online environment on consumer response. Applying processing fluency as a key tenant of the SOR framework is referred to as the processing fluency framework (Reber et al., 2004). In essence, the visual layout of a website can be interpreted as a construct of a set of visual cues only. Previous research indicates that creating an environment that generates high processing fluency, is necessary in order to create a positive retail experience (e.g. Orth and Wirtz, 2014).

Processing fluency is referred to as the ease or difficulty with which new information can be processed (Schwarz, 2004). High processing fluency refers to easy processing and low processing fluency refers to difficult processing (Reber et al., 2004). Processing fluency brings together the idea that when a consumer observes a stimulus, consumers metacognitively monitors the mental effort required to process the stimulus. The feeling of ease or difficulty is informative in its own right and consumers draw on them in forming judgments and making decisions (Schwarz, 2004). Research show that the formed judgements are independent of the actual content (Schwarz et al., 1991).

Thus, processing fluency can be viewed as a metacognitive cue that plays an important role in human judgement (Alter and Oppenheimer, 2009). From the consumer's point of view, processing fluency can be interpreted as a signal to previous experience, that indicates that the information/stimulus is benign (Winkielman et al., 2006). This previous experience does not per definition have to be actually experienced, but the brain perceives and interpret it as this is the case. This 'hedonic' signal, in turn produces positive affective reactions (e.g. pleasure) in the consumer and in turn evaluative judgements (Reber et al., 2004). The positive affect (e.g. pleasure) as an instant result of fluency builds on the affect-as-information model, which propose that positive affect mediates the impact of a stimulus on perceived attractiveness and subsequent positive judgements (Schwarz and Clore, 1983). In research literature of processing fluency, empirical findings indicate that processing fluency affects not only affective reactions but also evaluative judgments in terms of perceived effort, familiarity, truth, risk and beauty (Song and Schwarz, 2008; Song and Schwarz, 2009; Schwarz et al., 2007; Reber et al., 2004).

The processing fluency logic can be seen as an extension of the previous SOR framework, where processing fluency is at the heart of the organism (0), which then forms judgements (avoiding/approaching-behaviour) (Mosteller et al., 2014). An empirical example from the retail context is the depiction of product information as environmental stimulus. The information does not necessarily have to be perceived as it is verbally written, the perception can also solely be based on the visual depiction of the verbal information (Schwarz, 2004). The level of processing fluency might result in positive response to the product depicted in the picture/text (Mosteller et al., 2014).

2.2.1 Visual Complexity

Visual complexity has been identified as an important influencer of processing fluency. Visual complexity of an object, e.g. a webpage can be referred to as the number of elements and the level of detailed information concerning the elements (Wu et al., 2016). However, scholars have not yet agreed on a universal definition of visual complexity (ibid.). Nadkarni and Gupta, 2007 propose that perceived website complexity is central to the understanding of how information cues affect a user's experience of the website. Apart from the number of elements, empirical findings suggest that several visual components affect visual complexity, such as, readability of the text, color, contrast and clarity (Song and Schwarz, 2008; Reber et al., 2004; Mosteller et al., 2014; Sohn, 2017)

In addition to the strong interrelation between visual complexity and processing fluency, visual complexity has long been strongly associated with perceived attractiveness directly (Schwarz 2004). Perceived attractiveness plays a vital role in the retail context. The theory of attractiveness posits that what is perceived as attractive also is perceived as good, and consequently elicit liking towards the stimulus/object (Dion et al., 1972; Orth and Wirz, 2014). It is further suggested that the relation between complexity and attractiveness is U-shaped, meaning that complexity is beneficial to some extent, but if the complexity goes beyond that, a negative relation will occur instead (Berlyne, 1971). However, researchers have discovered that the effect of complexity on attractiveness is not direct, rather it is mediated through processing fluency (Schwarz et al., 2004).

2.2.2 Objective versus Perceived Visual Complexity

It is important to distinguish between actual complexity and perceived complexity. The actual complexity is based on the actual number and configuration of information cues, whilst the perceived visual complexity is based on the individual's perception of the stimulus, which is created through the person-stimulus interaction (Nadkarni and Gupta, 2007). Thus, the actual or objective complexity and the perceived complexity can differ.

Scholars that investigate the effects of visual complexity, controls for that the desired level of perceived complexity (high vs. low) is achieved. Consequently, they manipulate e.g. quantity and clarity in such ways that the perceived complexity is ensured. Complexity literature postulates that simultaneous sources of complexity from all the elements in a stimulus, are perceptually integrated, which result in a general level of complexity (Nadkarni and Gupta, 2007).

2.3 Literature Review of Device Qualities

In order to better understand how the individual visual layouts and the inherent functions of devices are perceptually integrated, the below sections outline what has been found in previous research. The four identified areas are, (1) screen size, (2) scrolling, (3) number of units and (4) screen orientation. In addition, findings of device effects are presented within the research field of online based data collection.

2.3.1 Screen Size

In recent years, academia has discovered the importance of devices' screen sizes. In general, the different screen sizes affect how the information or content presented on the screen is perceived. Research has found that if stimulus is viewed on a larger screen, it increases the consumers' affective responses (Meier et al., 2008). Furthermore, scholars indicate that a larger screen size positively influences human information processing (of the content presented) which in turn evokes higher emotions and arousal (Reeves et al., 1999). Research has also investigated whether the screen size could possibly affect consumer response. A product presented on a larger screen device generated higher levels of positive emotions and attractiveness perceptions than the same product presented on a small screen device (Söderlund et al., 2019). Furthermore, in the research field of human-computer interaction and online research method, it is suggested that information processing is lower on smaller screens, as small screens seem to evoke less correct choices (Jones et al., 1999; Parush and Yuviler-Gavish, 2004). In addition, research has shown how devices with smaller screens induce less information search than larger screens (e.g. computers) (Sweeney and Crestani, 2006). To conclude, research suggest that information processing is higher on a computer, in comparison to a mobile.

2.3.2 Scrolling

Due to the smaller screen size of a mobile, scrolling is a common necessity. How scrolling affects processing fluency is a relatively unexplored area. However, there are other established principles that could be applied to the scrolling behaviour. More specifically, previous research investigating the matter of scrolling have used the visibility principle to explain how it could affect the perceived amount of information (e.g. Redline and Dillman, 2002). This principle suggests that information visible to the individual without action is more likely to be read, rather than information that is only visible if the individual takes actions to see it (Norman, 2013). Since scrolling is more common on a mobile, this principle could indicate lower fluency on mobiles. In the field of online based data collection, research indicate that visible options in a web survey are more likely to be chosen (Couper et al. 2004). However, the same logic has not yet been confirmed for surveys completed on mobiles (Peytchev and Hill, 2009). Tourangeau et al. (2017) propose that scrolling in a web survey context could lead to more superficial processing. To conclude, research propose that scrolling lowers information processing, however there is weak empirical support. A computer could therefore be more advantageous than a mobile, as scrolling is not needed to the same extent.

2.3.3 Number of Units

Number of units is usually an important indicator of visual complexity. A common difference between physical and online stores is the number of units in a display. Online stores usually just display one item of a product, in contrast to the complete opposite of physical stores. Kolesova and Singh (2019) investigated whether an increase of units displayed in an online store could affect consumer response, drawing on visual complexity and processing fluency theory. Kolesova and Singh (2019) concludes that a higher number of elements in an online store is regarded as more visually complex, which in turn negatively influences the consumer's affective and cognitive state. Their study resulted in decreased behavioural intentions. Other research investigating visual complexity suggests that appreciation decreases with higher perceived complexity, where complexity is defined in terms of number of elements and variety (e.g. Nadal, 2010). As a consequence of the smaller screen size of a mobile, websites need to reallocate their information. The result is that the number of units presented simultaneously on a mobile website, is lower than the number of units presented simultaneously on a computer website. In order to see the same number of units that is presented on a computer screen simultaneously, the scrolling function on the mobile is needed. This observed difference in displays between mobile stores and computer stores, could potentially be associated with the same phenomenon investigated by Kolesova and Sing (2019). A mobile could therefore be perceived less visually complex, in comparison to a computer, as the number of products viewed simultaneously is lower.

2.3.4 Screen Orientation

Within research literature of screen orientation, two commonly used types are (1) portrait orientation, where the screen is vertically oriented and (2) landscape orientation, where the screen is horizontally oriented. Historically, television screens and computer screens have been and are still landscape orientated. However, smartphones are usually portrait oriented. Scholars suggest that portrait orientation, with a ratio of 2:3, is the ideal design and the consumers' preferred ratio (Nelson, 1991). Nonetheless, when the market leading IT-company IBM released its first standard PC in 1981 it was landscape oriented, a choice based by computer engineers who did not consider readability as a concern in the design (Fidler, 1995). It is suggested that the underlying preferences for portrait orientation, might be connected to the fact that most paper reports are portrait oriented (ibid). In addition, scholars indicate that portrait screen viewing is preferred when reading newspapers (Wearden et al., 1999). More recent research, investigating consumer preferences of either portrait or landscape orientation of car-integrated screens for playing music, no significant differences could be revealed (Kujala, 2012). In the field of online based data collection, research suggest that orientation has no effect on the means of scale items (Couper, 2008). It appears as if there is no recent research investigating which orientation consumers prefer. To conclude, portrait orientation is in many cases preferred, however there are weak empirical support, whether this is the case for various devices. Research still remain to investigate if the portrait orientation of the mobile is an advantage.

2.3.5 Online Based Data Collection

Apart from the retail perspective, the devices' impact on behaviour have been investigated by scholars within the field of online based research method and data quality. Research have found that there is a higher probability for errors in measurement and nonresponse for survey completion from a mobile device than for survey completion from a computer device. More specifically, research have shown that respondents answering from a computer have longer completion time, provide longer answers to open-ended questions and less straightlining behaviour (Buskirk and Andrus, 2014; Wells et al., 2014; Struminskaya et al., 2015; Tourangeau et al., 2017).

2.3.6 Evaluation of Device Qualities

The user's experience of the visual content on a computer versus a mobile device, is constituted by all inherent device specific qualities and functions. The visual layout of online content is a result of the respective device's opportunities and restrictions, e.g. the scrolling function. The interaction with the content is enabled through the device's specific functions which affect the perception of the content. Given the current body of literature that have investigated how the device affect the experience of the content, there is still an ambiguity in terms of which device experience is more advantageous in an online store context. Given the computer's bigger screen, computers could potentially be more advantageous in an online context (e.g. Söderlund et al., 2019). However, due to the restrictions of the mobiles smaller screen size, less amount of units can be shown simultaneously, this could potentially give an illusion of less objective complexity, which in turn would speak in favor of the mobile device in an online context. The portrait oriented screen of a mobile could be objectively preferred over the landscape oriented screen (e.g. Wearden et al., 1999), however there is a lack of empirical evidence in this area. Whether the activity of scrolling have a positive or negative effect on complexity and processing fluency is not yet investigated. However scholars propose that it could be negative, which speaks in favor of the computer device in an online store context (e.g. Couper et al., 2004).

Given that the perceived complexity is created through the interaction of simultaneous sources of complexity (e.g. screen size, orientation, etc. and their interrelated functions) it is reasonable to investigate the total perceived visual complexity of a mobile experience vs. a computer experience. Building on this, we propose that the perceived visual complexity of content displayed on a device screen is constituted by the simultaneous sources of complexity as well as the human-device interaction.

2.4 Hypothesis Generation

The foundation of the hypothesis generation is built on the processing fluency framework, rooted in the SOR model. The fundamental proposition is that the perceived visual complexity of an online store differs between a mobile experience and a computer experience. According to the conceptual model of fluency in an online store context, the perceived visual complexity is affecting processing fluency, which in turn affect the perceived attractiveness. The perceived fluency and attractiveness produce an instant positive affect which in turn forms consumer attitudes. These attitudes create the ground for subsequent behavioural intentions, where the most important one is purchase intention (Kolesova and Singh, 2019).

Given a difference in perceived visual complexity between the two device experiences, we propose that this will generate a difference in all subsequent variables in the conceptual model of processing fluency within the greater framework of SOR. In the following paragraphs we will present each individual variable, followed by hypotheses.

2.4.1 Organism Variables

Perceived Visual Complexity

Nadkarni and Gupta (2007) propose that perceived website complexity is central for user experience at the website. Within online store research, the perceived visual complexity of a site, has shown to affect processing fluency, attractiveness, positive affect and subsequently attitudes as well as behavioural intention.

Given the fact that the perceived visual complexity is a product of simultaneous sources of complexity and that devices have inherent qualities, we propose that the perceived visual complexity of an online store differs from a mobile experience and a computer experience. Hence, following hypothesis is articulated:

H1: The perceived visual complexity of an online store, differs between a mobile experience and a computer experience.

Processing Fluency

As previously outlined, visual complexity is an important driver of processing fluency in an online context (Orth and Wirz, 2014; Nadkarni and Gupta, 2007). The more complex stimulus the higher cognitive effort is needed in order for the human brain to process it, resulting in a lower level of processing fluency (Lindsay and Norman, 1977). Building on this and given that the perceived visual complexity differs between mobile experience and computer experience (as hypothesized above), following hypotheses are generated:

H2a: Processing fluency of an online store, differs between a mobile experience and a computer experience.

H2b: The impact of device experience on processing fluency, is mediated by perceived visual complexity.

Visual Appeal

Perceptions of beauty in marketing research have, for a long time, been referred to in terms of aesthetics, visual appeal and attractiveness. In the physical retail context, visual appeal has been found to be driven by the design, the perceived attractiveness and other beauty aspects in the context (Holbrook, 1994). In the online retail context, beauty is created by all the different aesthetics components, constituting the site (Vilnai-Yavetz and Rafaeli, 2006). Website aesthetics, defined as a conception of what is artistically valid or beautiful, is one of the key variables in explaining website appeal and design (Harris and Goode, 2010). As a result of the increased focus of online retail stores, a new definition has been developed by Cai et al. (2008). They define visual appeal as, the degree to which a consumer believes that the website is pleasing to the eye and stimulates the desire to explore.

Attractiveness is an accepted measure within marketing and works as an indicator for positive consumer response. It is based on the attractiveness theory which posits that what is attractive is good, which evoke liking towards the object, e.g. Kuroso and Kashimura (1995) discovered a correlation between the beauty of an ATM-machine and its perceived usefulness. Research has found that perceived attractiveness is related to the perceived visual complexity of a stimulus. Orth and Crouch (2014) show that a context that is perceived as less visually complex, enhances the perceived attractiveness of a product package. However, the effect of perceived visual complexity on the perceived attractiveness has been shown to be mediated by processing fluency (ibid.). Given this reasoning, with the addition that perceived visual complexity, as well as the processing fluency differs between mobile experience and computer experience (H1, H2a), we propose the following:

H3a: The perceived visual appeal of an online store, differs between a mobile experience and a computer experience.

H3b: The impact of device experience on the perceived visual appeal is mediated by processing fluency.

Pleasure

Pleasure is an emotional state and can be defined as, the degree to which a person feels good, joyful, or happy (Mehrabian and Russell, 1974). Pleasure is advocated as one of the key components in the SOR model. Consequently, pleasure has also been identified as an important aspect when explaining how consumers evaluate websites, and consequently the profitability of a website (De Wulf et al., 2006). Pleasure is often accompanied by another measure of emotion; arousal (Russell, 1980). However, pleasure alone has been widely used to explain consumer behaviour in online contexts. In the online context, pleasure can also be defined in terms of the extent to which the visitor perceives the website visit to be enjoyable and a prerequisite for a successful site (De Wulf et al., 2006). Previous research literature has also pointed out the importance of pleasure induced during computer-interaction (Hoffman and Novak, 1996).

Nonetheless, positive affect, i.e. pleasure, has been discovered to play an important role in fluency theory as well as attractiveness theory alone. However, what is common for both theories are that pleasure is an instant reaction of a high processing fluency experience or high perceived attractiveness. Even though it is difficult to investigate what exactly causes what and in what order, Orth and Wirtz (2014) suggest that a low complex stimulus increases processing fluency, which in turn enhance attractiveness, which then elicit a positive affect in terms of pleasure. Furthermore, given a support of H1, followed by H2a and H3a, the pleasure should as well differ between a mobile and a computer experience. Hence, following hypotheses are articulated:

H4a: The level of pleasure after having seen an online store, differs between a mobile experience and a computer experience.

H4b: The impact of device experience on pleasure is mediated by perceived visual appeal.

2.4.2 Response Variables

Given the logic of SOR and the processing fluency framework, the product of positive affect (i.e pleasure) and perceived visual appeal, build the foundation of consumer response formation. In the retail environmental context, this model has been widely used, explaining the effects on various brand evaluations such as consumer moods, perceptions, attitudes and purchase intentions (e.g. Donovan and Rossiter, 1982; Bitner, 1990). However, there is research suggesting that the online layout design alone, influences brand evaluations and consumer behaviour directly through attitude, in particular it is suggested that positive affect is not a necessary outcome in order to form advantageous responses (Wu et al., 2013). Given that the device experiences differ, in terms of perceived complexity, it is proposed that this difference could possibly result in a difference in consumer responses as well. In addition, previous research demonstrates that visual differences in online stores affect consumer response in terms of both behavioural intentions and brand evaluations (directly), through e.g. the 'atmosphere' (Eroglu et al. 2001) and touch-navigation (Brasel and Gipbs, 2014). Söderlund et al., (2019) propose that screen size could possibly result in consumer responses as well.

Consequently, this study will investigate the possibility of a difference in perceived visual complexity between device experience and how this proposed difference is able to mediate the effect in subsequent stages resulting in consumer responses. Therefore, three of the most relevant response variables have been selected within the online context, in order to investigate the accuracy of the proposal, (1) attitude towards site, (2) purchase intention, and (3) word-of-mouth intention.

Attitude Towards Site

In the great body of literature in marketing research, it has been argued that the power of a brand is derived from the consumers' associations of that brand (Janiszewski and van Osselaer 2000; Keller, 2009). Brand attitude is a popular consumer association (Keller, 1993; Low and Lamb Jr, 2000). Attitude towards a specific brand has for quite some time been regarded as the foundation for consumer behaviour (Keller, 1993). In online shopping contexts, attitude towards a website refers to the overall evaluation of purchasing experience through a specific website (Phan and Pilík, 2018). Therefore, the variable has in recent years been widely studied in online shopping contexts (e.g. Kolesova and Singh, 2019; Cyr et al., 2010). Within both the SOR and processing fluency framework, it is proposed that attitudes are driven by perceived attractiveness, i.e. visual appeal as well as pleasure (Till and Busler, 2000; Wu et al., 2013). Given this logic as well as support of H1, followed by H2a, H3a and H4a, the attitude toward site should differ between a mobile and a computer experience. Hence, following hypotheses are formed:

H5a: Attitude towards site, differs between a mobile experience and a computer experience.

H5b: The impact of device experience on attitude towards site is mediated by perceived visual appeal.

H5c: The impact of device experience on attitude towards site is mediated by pleasure.

Purchase Intention

Attitudes are closely related with consumers' behavioural intentions (e.g. Ajzen and Fishbein, 1973; Keller 1993). Research have demonstrated how the environment of online stores, affect consumers' purchase intention (Kolesova and Singh, 2019; van der Heijden, 2003). Furthermore, van der Heijden (2003) found that the online shoppers' processing fluency affected the purchase intention. Tractinsky and Lowengart (2007) found that consumers' perception of the websites visual appearance, affected their emotional state which in turn affected their attitude towards the website and thereby their purchase intention. The SOR model proposes that positive affect induces approaching or avoiding behaviour, such as purchase intention (Baker et al., 1992; Fiore et al., 2005). However, when it comes to behavioural intentions, attitude is seen as an intermediary between positive affect and behaviour intentions. Given this logic, as well as the proposed difference in perceived complexity between a mobile experience and a computer experience, the following hypotheses are articulated:

H6a: Purchase intention of an online store, differs between a mobile experience and a computer experience.

H6b: The impact of device experience on purchase intention is mediated by attitude towards site.

WOM Intention

Previous research have investigated how online visual layout affect consumer responses in terms of attitude towards site and purchase intention (Wu et al., 2013; Kolesova and Singh, 2019). However, there are fewer studies investigating how online visual differences affect the consumer response, word-of-mouth-intention (hereafter referred to as WOM intention) (Casaló et al., 2008; Ha and Im, 2012). Nonetheless, research has discovered that WOM intention is an important influencer of a company's wealth and profitability (Dichter, 1966; Söderlund, 2001). Given its importance, it has been investigated comprehensively in other contexts, e.g. in the service literature (e.g. Söderlund and Rosengren, 2007). This study refers to the definition used by Söderlund (1998, p. 172), the extent to which a customer informs friends, relatives and colleagues about an event that has created a certain level of satisfaction.

There are two general forms of WOM, a positive- and a negative one (Söderlund and Rosengren, 2007). It is suggested that positive WOM diminishes the need of marketing and increases company profits through new customers (Reichheld and Sasser, 1990). There is also a distinction between research focusing on WOM as behaviour or WOM as intentions. According to the SOR framework, WOM intention has been found to be influenced by positive affect (e.g. Westbrook, 1987; Derbaix and Vanhamme, 2003; White and Yu, 2005). Notably, Derbaix and Vanhamme (2003) showed how both negative and positive emotions affect WOM intention. Furthermore, it has been found that attitude toward website influences purchase activities, leading to the spread of WOM (Wu et al., 2014). Given this logic and the proposed difference in perceived visual complexity between devices, the following hypotheses are articulated:

H7a: WOM intention of an online store, differs between a mobile experience and a computer experience.

H7b: The impact of device experience on WOM intention is mediated by attitude towards site.

2.4.3 Mediators of Visual Complexity

Research has demonstrated several visual components that affect visual complexity, e.g. readability of text, color, contrast and clarity (Song and Schwarz 2008; Reber et al., 2004; Mosteller et al., 2014; Sohn, 2017). Following this, we propose that the perceived ease of text (readability) and the perceived ease of picture (size and clarity) is partly mediating the effect of device experience on the perceived visual complexity. Furthermore, it is proposed by research that people rather take actions on what they see, rather than what is hidden, thus the activity of scrolling might induce complexity (e.g. Norman, 2013). We therefore propose that the the activity of scrolling is mediating the effect of device experience on perceived visual complexity. The following hypotheses are proposed:

H8a: The impact of device experience on the perceived visual complexity is mediated by perceived ease of text.

H8b: The impact of device experience on the perceived visual complexity is mediated by perceived ease of picture.

H8c: The impact of device experience on the perceived visual complexity is mediated by activity of scrolling.

2.5 Proposed Conceptual Model

The proposed conceptual model is presented below. The dotted arrows indicate our suggested addition to the theoretical model. This framework will guide the analysis of the study with the aim to answer our research questions. The model is also the foundation of our developed hypotheses that will lead the empirical analysis.

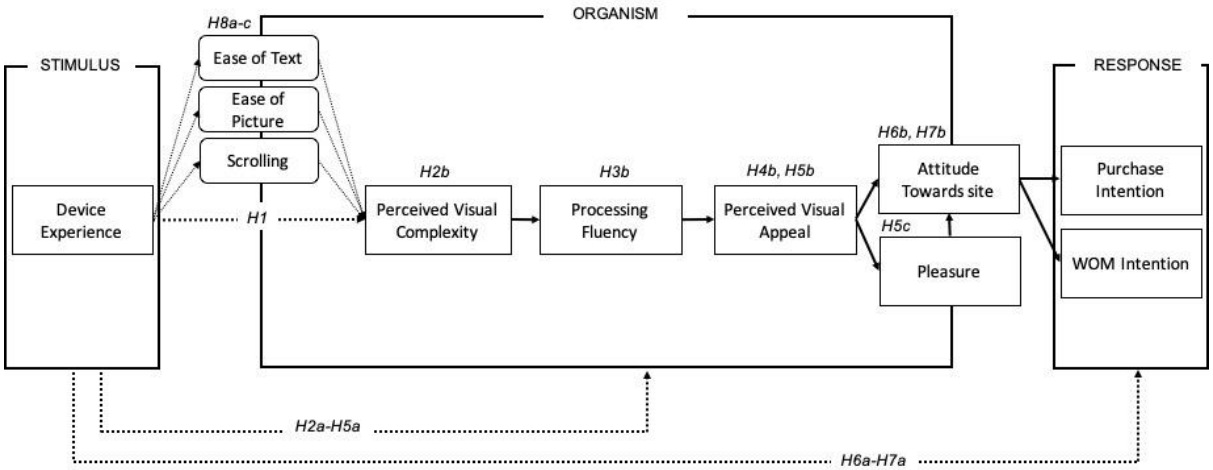

Figure 2 - Conceptual model.

2.6 Summary of Hypotheses

Effects on organism variables
H1: The perceived visual complexity of an online store, differs between a mobile experience and a computer experience.
H2a: Processing fluency of an online store, differs between a mobile experience and a computer experience.
H2b: The impact of device experience on processing fluency, is mediated by perceived visual complexity.
H3a: The perceived visual appeal of an online store, differs between a mobile experience and a computer experience.
H3b: The impact of device experience on the perceived visual appeal is mediated by processing fluency.
H4a: The level of pleasure after having seen an online store, differs between a mobile experience and a computer experience.
H4b: The impact of device experience on pleasure is mediated by perceived visual appeal.
Effects on response variables
H5a: Attitude towards site, differs between a mobile experience and a computer experience.
H5b: The impact of device experience on attitude towards site is mediated by perceived visual appeal.
H5c: The impact of device experience on attitude towards site is mediated by pleasure.
H6a: Purchase intention of an online store, differs between a mobile experience and a computer experience.
H6b: The impact of device experience on purchase intention is mediated by attitude towards site.
H7a: WOM intention of an online store, differs between a mobile experience and a computer experience.
H7b: The impact of device experience on WOM intention is mediated by attitude towards site.
Layout components: Mediators of visual complexity
H8a: The impact of device experience on the perceived visual complexity is mediated by perceived ease of text.
H8b: The impact of device experience on the perceived visual complexity is mediated by perceived ease of picture.
H8c: The impact of device experience on the perceived visual complexity is mediated by activity of scrolling.

Table 1 - Summary of hypotheses.

3 Methodology

This section aims to outline and motivate the methodological approach used for this empirical study. To begin with, the reasoning behind the choice of topic and research method will be presented. Further, the preparatory work will be reviewed, followed by the main study. At last, the quality of data is discussed, including the study's reliability, validity and replicability.

3.1 Purpose and Choice of Topic

Online shopping is growing at an unexpected rate and affecting the development of business', and especially, the retail industry. Given our earlier studies in retail management we are interested in drivers of e-commerce growth and strategies for the adoption of e-commerce. The choice to focus on effects caused by differences in devices, was proposed by Magnus Söderlund, due to his research in the topic in recent years.

It is important that businesses adapt towards the consumer trends driving the growth of e-commerce. One such trend is online shopping from mobiles and the fact is that it is expected that by 2021 mobiles will surpass computers as the most common device for online shopping (Forbes, 2018). As of today, there is little research on how visual and functional differences between the devices affect consumer response. Given the importance of online store strategy and design for e-commerce actors, we believe better understanding for those effects would be of value for both practitioners and academia in the field.

3.2 Scientific Research Approach

Our study is based on quantitative data with an experimental design. A quantitative research method increases the generalizability of the results (Malhotra, 1999). Additionally, our experimental design allowed us to expose respondents to two varying device experiences, randomized across product categories. Our study is based on a deductive approach, where our hypotheses are derived from existing theory within marketing and other fields (Bryman and Bell, 2015). A deductive approach was chosen since it is expected that existing theory will help interpret our findings (Wilson, 2014). The aim is that this interpretation will contribute to a better understanding of today's reality where consumers shop online from devices that offer varying experiences. An inductive approach could potentially have contributed with new relevant perspectives to the somewhat unexplored area of research concerning mobile devices (O'shaughnessy and Holbrook, 1989). However, a deductive approach appeared advantageous, especially since the purpose is to investigate potential causal relationships using the SOR model (Bryman and Bell, 2015).

Additionally, with regards to a limited timeframe and resources, a deductive approach is preferred in order to avoid risks (Dudovskiy, 2016). Finally, our chosen method was considered favourable in the chosen setting where consumers might be unaware of how much they are influenced (Rosengren and Dahlén, 2013).

3.3 Choice of Study Objects

Product Listing Page

In order to investigate how visual and functional differences affect users' perception of information shown in an online store, the product listing page of an online store was chosen as study object. This was also due to the impossibility to study all the varying pages and differences of an e-commerce site. A product listing page has been defined as a page on a typical e-commerce site where information on multiple products are displayed (Schmutz et al., 2010). The choice was based on the idea of Schmutz el al. (2010), suggesting that this page is a crucial part on an online store's website as they affect consumer decisions.

Based on a number of Swedish online grocery stores and how they generally visualize product listing pages on a computer and mobile respectively, a fictive example was constructed under the fictive brand name 'Matonline.se'. This was done, in order to create as realistic an example as possible. The usage of unknown brands diminishes the risk that earlier already established brand associations affect the consumer responses. Therefore, using a fictive website could be regarded favourable in terms of legitimacy and to limit confounding effects (Colliander and Dahlén, 2011).

Due the vital difference in screen size and orientation between the devices, the content included in the study design, and thereby shown on a computer screen, needed to be adjusted in size and rearranged on the mobile screen, in order to fit the smaller screen size. It was decided that the two visual layouts would have three explicit components, scrolling/no scrolling activity, text and pictures. The aim is to understand how the perception of these might explain the difference in perceived visual complexity between the two device experiences.

Devices

In accordance with similar research it was chosen to only investigate differences between computer and mobile devices (Söderlund et al., 2019), excluding for other internet enabled devices such as tablets. The choice was based on research suggesting that mobiles, rather than tablets, are a greater challenge for designers due to their smaller screen size, indicating that our chosen devices are of more use to practitioners such as e-commerce actors (Katz et al., 2017). Additionally, computers and mobile phones stand for 46 percent and 52 percent respectively of all internet access, whilst tablets are just standing for 2% (StatCounter Global Stats, 2019).

Product Categories

The choice to study grocery products was based on their 'generic' nature. Food was chosen as it is regarded a neutral object and therefore commonly used in in marketing research and online settings (Bradley and Lang, 1999). Four product categories were chosen in order to strengthen the generalizability of the study across several grocery product categories. Furthermore, there is a possibility that product information may be more or less important for different product categories, e.g. it might be more important with information within the 'Meat' category than in the 'Fruit' category, when making a purchase decision. In order to further strengthen the generalizability, this aspect was considered, thus two of the four products were chosen to represent low-information products and two to represent high-information products.

The choice of the four categories was based on a pre-study. By including four different product categories in the study, we believe our result will be more generalizable.

Device Experience

When developing the stimulus, it was important to capture the two defined environments of an online store, i.e. the device experience consisting of (1) the visual layout and the (2) human-device interaction. In terms of the human-device interaction, the device itself is the important stimulus and it is therefore crucial that the correct layout is presented on the respective device. In terms of the visual layout, the idea behind the stimulus and the study design was to capture the most significant differences between an online store's computer version layout and its corresponding mobile version layout.

3.4 Preparatory Work

3.4.1 Pre-study 1

Purpose

In order to strengthen the internal reliability, a pre-study was conducted to qualify the choices of the study objects presented above. Firstly, the pre-study aimed to assure that the developed layout design version for computer and mobile respectively were perceived as designed for their specific devices. Secondly, it aimed to identify four product categories, out of which two are perceived to have a greater information need and two a lower. Lastly, the pre-study aimed to ensure that the fictive online grocery store 'Matonline.se' was perceived as realistic, and that the attitude towards it was not distinctly negative.

Design and Sample

A quantitative study was carried out, using online self-completion questionnaire. The questionnaire was created, using the online survey tool Qualtrics. A convenience sample was utilized (Bryman and Bell, 2015) and the data was collected between October 21st - 25th. The survey was distributed online via Facebook and email and it was sent out and completed by a total of 60 respondents. Out of the total sample, 37 were women and 23 men, average age was 30 and median 25.

In order investigate how realistic the respective layout designs were perceived, 30 respondents completed the survey on their mobile phone and 30 respondents completed the survey on their computer. The product category presented in the respective layout designs was 'Fruit'. A setting that sensed from which device the respondent opened the survey on was used in Qualtrics, in order to assure that each respondent received the correct layout design. In addition, the respondent was also asked at the beginning, from which device they responded from. Initially the respondents were presented a description of 'Matonline.se' and informed that the presented picture, depicted a product listing page of 'Fruit'. Afterwards, the respondent was asked a set of questions.

In order to assure that the layout stimulus was perceived as adapted for mobile or computer, the respondents were asked to consider the following statement; "This layout seem to be adopted for a....mobile/computer". The question was measures on a 10-point semantic scale.

The pre-study also aimed to decide four product categories that would be included in the main study. 10 different product types were investigated, and all were of the type where particular brand information is not as important for the consumer. Since these products are suggested to evoke lower brand preferences towards the products among consumers (Bettman, 1973).

Two questions were asked in order to investigate information need of different product categories; "How important is it with information about the product when you shop the following product online…". Secondly, the respondents were asked to state how "easy" or "complex" they considered the shopping experience of the different product categories, this was measured on a 10-point likert scale.

In order to ensure that the fictive grocery retailer 'Matonline.se' was perceived as realistic, respondents were asked, "To what extent is it likely that Matonline.se would exist", measured on a 10-point likert scale. In order to assure that the perceived attitude towards 'Matonline.se' was neutral/positive and not strictly negative, a four item index, developed from Dolbec and Chebat (2013) was used; negative / positive, bad / good, unfavourable / advantageous and dislike / dislike. The items were measured on a 10-point semantic scale, Cronbach's alpha α = 0.96.

Results

The results of the pre-study confirmed that the layout designs were perceived as designed for mobile and computer respectively,$M_{ME} = 3{,}0$, $M_{CE} = 6{,}97$ $(p < .001)$.[1]

Furthermore, the categories 'Fruit' and 'Vegetables' were chosen as low-information-categories and 'Meat' and 'Fish' were chosen as high-information-categories. The perceived importance of information differed between the categories, $(M_{Low-information} = 7.52,\ M_{High-information} = 8.83, p < .001)$, as well as the perceived ease to shop, $(M_{Low-information} = 3{,}74,\ M_{High-information} = 5.67, p < .001)$.[2]

	Importance of information	Standard Deviation	Ease to shop	Standard Deviation	Sig.
Fruit	7.46	2.30	3.61	2.70	0.000***
Vegetables	7.58	2.44	3.80	2.67	0.000***
Fish	8.68	1.54	5.63	2.60	0.000***
Meat	8.97	1.71	5.70	2.61	0.000***

Table 2 - Test of product categories. *Significant at p < .05; ** Significant at p < .01

[1] Tested using Independent sample t-test

[2] Tested using One sample t-test

Lastly, the results of the pre-study confirmed that the fictive site Matonline.se was considered realistic, ($M_{Realistic} = 7.51, p < .001$). The attitude towards Matonline.se also indicated a neutral/positive level, as desired, ($M_{Attitude} = 6.00, p < .001$). Pre- study 1, confirmed the choices of study objects, i.e. the credibility of the layout designs, the credibility of the fictive site, and the choice of product categories.

3.4.2 Pre-study 2

Purpose

The aim of pre-study 2 was to investigate the perception of the visual complexity between the mobile experience and the computer experience. This was important, as a difference in perceived visual complexity creates the prerequisites for the rest of the proposed conceptual model and hence also the conditions for performing the main study.

Design and Sample

Pre-study 2 was carried out in the same manner as pre-study 1. The study followed a quantitative design, using an online self-completion questionnaire, via the survey tool Qualtrics. A convenience sampling method was also utilized. The survey link was published at Matpriskollen's Facebook page on 29th of October. Matpriskollen is a Swedish company that provides an online platform that collects weekly offers from most grocery stores in Sweden. The main argument for choosing this sampling method was that it contributed with many answers in a short period of time. The access to the Facebook page was given as the authors had been in contact with Matpriskollen in an earlier group project during their master's degree. The sample was a non-probability sample and a total of 276 respondents were qualified in the analysis ($N_C = 106, N_M = 170$).

In order to investigate if the perceived visual complexity differs between a mobile experience and a computer experience, perceived visual complexity was measured, using a four items index on a 10-point likert scale, earlier used by Kolesova and Singh (2019). The respondents were asked to consider the following statement; "The picture in the product flow was…" with the left end-point "Do not agree at all" and the right end-point as "Completely agree". The items were: "easy to view, well organized, overloaded, and is visually rich". An index was created with the Cronbach's alpha of 0.60.[3]

Results

The results of pre-study 2 showed a significant difference in perceived visual complexity between the device experiences, $M_{ME} = 4, vs. M_{CE} = 5{,}01\ p < .001$)[4]. The results strengthened our confidence to carry out the main study. However, the hypotheses remained as neutral wording, as we did not want to base hypotheses on this sole empirical pre-study, but rather, in accordance with theory indicating contradicting directions.

[3] The items were recoded so that 10 indicated high complexity and 1 low complexity for all items, before indexed.
[4] Tested using independen-sample t-test

3.5 Main Study

In accordance with the preparatory work, the main study was designed. A self-completion questionnaire was selected as research instrument, as it is a suitable method for quantitative research (Bryman and Bell 2015). The survey was administered online exclusively, as the use of an internet device is the main purpose of the specific study. Moreover, it has been concluded by definition, conducting an online survey, refers to surveys conducted from both mobiles and computers (Link et al., 2014).

The respondents were randomly assigned to one of four stimuli, depending on the device by which the respondent opened the survey (see appendix 2 – Stimulus design). Consequently, this resulted in eight different groups, visualized in below table. Except for the exposed stimulus, all respondents received the same questionnaire.

PRODUCT TYPE	LOW INFORMATION		HIGH INFORMATION	
PRODUCT CATEGORIES	FRUIT	VEGETABLES	FISH	MEAT
DEVICE Experience	ME/CE	ME/CE	ME/CE	ME/CE

Table 3 – Stimulus. CE= Computer experience, ME= Mobile experience

3.5.1 Survey Design

In order to ensure that the questionnaire was comprehensible and that the structure, questions and scales were interpreted in the correct way, the questionnaire was sent to six selected persons that provided feedback. The questionnaire was also reviewed and discussed with our supervisor, Professor Magnus Söderlund (Malhotra, 2014; Saunders and Lewis, 2009).

The layout design was shown only one time at the beginning of the survey and the respondent was not able to return to the picture. This structure could result in respondents forgetting what they saw, however, repeating the stimulus would increase the perceived familiarity of the stimulus and thus interfere with processing fluency, according to the mere exposure effect (Zajonc, 1968). As processing fluency is of vital interest in the study, the risk of influencing it was tried to be minimized at all costs. Thus, the accuracy of the processing fluency measurement was prioritized. Also, questions concerning the main focus of the study, processing fluency and visual complexity were placed early in the questionnaire. Questions concerning attitudes were also placed early in the questionnaire, behavioural intentions were placed later in the survey flow and demographics were placed at the end. This order was chosen to limit the risk for earlier questions to influence the answers of later questions (Bradburn et al., 2004).

Prior to the exposed stimulus, the respondent was put in the context by using a describing text. The respondent was told about the imaginary e-commerce site, 'Matonline.se', and that the respondent was on their website. Further, the respondent was informed that they had clicked on a specific product category, showing a "product listing page". Finally, the respondent was told to carefully study the "product listing page", with the intention of choosing a product that they would like to buy. This instruction was given as it was important that the respondent really intended to study the picture, the product images and also read the product information.

The questionnaire was constructed, using the online survey tool Qualtrics. Every question had forced answer, meaning that the respondent had to answer all questions in order to complete the survey. As all respondents answering the questionnaire were Swedish, it was decided to translate all questions from English into Swedish. As far as possible, multi-item questions were utilized as it is suggested to increase predictive validity (Diamantopoulos et al., 2012). The mean completion time of the survey was 8 minutes, hence following the suggestion by Cooper and Schindler (2011) to keep surveys under 10 minutes. The questions were measured on a 10-point likert scale, as employed since it has been suggested favourable by Dahlén et al. (2014). Moreover, we chose to place negative phrasings to the left, e.g. (dislike) and positive phrasings to the right (e.g. like), as suggested by Söderlund (2005).

3.5.2 Sampling and Sample

Convenience sampling was utilized as sampling method. Even though this method restricts the generalizability of the study, it is a common and accepted method within consumer behaviour research (Bryman and Bell, 2015). The respondents came from the authors own network with vicinity as well as students at the Stockholm School of Economics.

As previously mentioned, the product categories were randomly assigned to the individual respondents, using a randomization setting in Qualtrics. Thus, the probability was equal for all respondents to receive one of the four product categories respectively. Randomization of the exposed manipulated pictures enables individual differences to even out among groups (Söderlund, 2010). Due to our inability to randomly allocate the type of device, the respondents completed the survey on the device which they used to open the survey. This allocation could result in respondents answering from their preferred device, however it was not considered a problem since the method has been used in earlier studies (e.g. Söderlundet et al., 2019). In addition, one can argue that this allocation better reflects the reality of online shopping, as people always chose themselves what device to use.

The data was collected between 30th of October and 4th of November. Firstly, a questionnaire link was sent out to the authors network via a link invitation to Facebook-friends and email contacts. Secondly, a total 120 students were asked at the stockholm school of Economics. Every student got a piece of paper with the link embedded in a QR-code and a small message, the students were then asked to answer whenever they had time. In addition, the students were given an incentive in terms of a small candy piece. However, this was not considered to affect the results as they received it regardless of their choice to answer or not (Bryman and Bell, 2015). Consequently, the sample was a non-probability sample, resulting in the possibility of missing out of relevant groups in the population. Thus, the generalizability with the entire population cannot be certain (Jacobsen, 2002). The choice of sampling method was mainly due to restrictions in resources and time-constraints. In total 266 respondents were collected.

3.5.3 Manipulation Check

Ensuring that respondents were exposed to the correct layout design in relation to the device, was crucial in this study. In order to do that, a setting was used in Qualtrics that sensed which device the respondent was using. In order to further ensure that this setting worked, respondents were asked at the very beginning of the survey, to state which device they responded from. Additionally, the actual screen size was controlled for at the very end of the survey, asking what model their individual device had. This question was placed at the end, in order to avoid priming the respondent too much with the device type itself. It was also important to ensure that the respondent had actually seen the stimulus and noticed the specific product category. Thus, the last question of the survey asked the respondent explicitly what product category the respondent had been exposed to at the beginning. In order to ensure a realistic setting, the respective layouts were intended to be perceived as designed exclusively for the respective devices, which could be confirmed in pre-study 1.

O´Keefe (2003) argues that manipulation checks are unnecessary if the variation in a message is defined in terms of intrinsic features. Considering the design of this study, the variation of the manipulations is considered as intrinsic. As the overall aim is to investigate if and how a computer layout and a mobile layout are perceived differently, it is just the organization of the content that differs between the layouts and not the content itself. It is not intended that the different layouts should be perceived in a certain way. However, this is what we are interested to investigate. We are interested in the respondents' subjective perception of what they think about the respective layouts, and are open for a variation in perceptions.

When the variation in a manipulation is intrinsic, O'Keefe (2003), argues that similar measures as manipulation checks can be understood and analysed as assessments of potential mediating states. Therefore, the respondents' perceptions about the visual layout was controlled for in terms its three layout components, (1) Text (2) Picture and (3) Scrolling activity. The perceived ease of text is defined as how easy it was to read the text in the picture, and the perceived ease of pictures is defined as how large and clear the product pictures were perceived. There were no "correct" perceptions to these for the respective layouts, but they are measured in order to potentially investigate mediation to the perceived visual complexity. Additionally, the scrolling activity was controlled for. In order to see the whole layout and be able to move on to the questionnaire on the mobile experience, the respondent had to scroll on the screen. This was not the case for the computer experience. Scrolling was controlled for in order to check the awareness of the scrolling activity, to possibly investigate mediation to the perceived visual complexity.

3.5.4 Respondent Quality Check

It has been found that online surveys have inherent challenges concerning fraudulent and inattentive respondents who pose a threat to data validity. In particular, inattentive respondents are proposed to produce the greatest biasing of data. There are several developed techniques to identify poor respondents, although there exists no definitive foundation to establish that respondents are acting irrationally or violating the contract of a survey (Jones et al, 2015). The use of "trap questions" is one of the methods that indirectly indicates data quality. Trap questions are simple embedded directives where the respondent is asked to select a specific answer or complete a direct task (Jones et al, 2015). Trap questions are inherently effective against inattention, "straight-lining" and randomly selected answers, although one should be aware that they cannot fully ensure against such behaviour.

Thus, two trap questions were embedded in the survey. The respondent was requested to mark the number 3 and 6 respectively out of 10. Respondents that answered incorrectly to those questions, were completely eliminated from the data, as they constituted clear "violations" of rules (Jones et al, 2015).

3.5.5 Data Quality Check

As far as possible the dataset was cleaned from respondents that were considered likely to be subject of violating the data quality. Firstly, incomplete answers were removed. Secondly, inattentive and fraudulent respondents were indicated by the trap questions embedded in the survey as well as the control question of the exposed product category at the end of the survey. Respondents with incorrect answers to these questions, were completely eliminated from the data set. Thirdly, it was ensured that the respondent was exposed to the correct layout connected to the respective device. Therefore, the stimulus shown was matched with the device type that the respondent stated that they answered from, if it did not match, the respondent was eliminated. Lastly, respondents were controlled for "speeding" where respondents that reported abnormally fast completion times[5], were excluded. After the careful cleansing of the data from "undesirable" respondents, 248 remained, resulting in a 93% response rate, indicating an acceptable level according to Bryman and Bell (2015).

3.5.6 Measures and Scales

The questionnaire consisted of several questions and the majority were based on earlier used batteries of questions. As the area is relatively unexplored, a few new questions were composed by the authors. See appendix 1 for used question batteries and their respective Cronbach's alpha for all indexes.

Organism Variables

As outlined in the theory section it has been proposed that the perceived visual complexity of a site differs between a mobile experience and a computer experience. The same measure was utilized as in pre-study 2, earlier used in similar studies e.g. Kolesova and Singh (2019).

According to the conceptual model of processing fluency in an online store context, the perceived visual complexity is affecting processing fluency. To measure processing fluency, a measure developed by Graf et al., (2017) was used. The four items were; "difficult to easy", "unclear to clear", "effortful to effortless", "incomprehensible to comprehensible". The item "fluent/disfluent" was excluded from the original measure as it was considered confusing for respondents how the question would be interpreted (based on a discussion with a few Swedish speaking persons).

Moreover, it has been suggested that differences in perceived visual complexity, and processing fluency, will generate a difference in the perceived visual appeal. A measurement for visual appeal, especially created to suit an online context, called the (EVS) scale developed by Mathwick et al. (2001) was used in the study. The respondents were asked the following questions; "The way Matonline.se displays its products is attractive", "Matonline.se's internet site it aesthetically appealing", "I like the way Matonline.se site looks".

[5] <6 minutes

Within online store research, the perceived visual complexity of a site, has shown to affect processing fluency, and in turn, positive affect. To measure positive affect, pleasure was used as an indicator. The measurement of pleasure adapted from an index created by Mehrabian and Russell (1974) and it has been widely used in relation to the framework this study is based on, the SOR framework (Mosteller et al., 2014). It was chosen only to include the measurement of pleasure, a choice based on its earlier common existence in similar studies.

Processing fluency and attractiveness produce an instant positive affect which in turn forms attitudes. It was chosen to include a measure of attitude towards website, as attitude towards a specific brand has for quite some time been regarded as the foundation for consumer behaviour (Keller, 1993).

Response Variables

Attitudes are closely related with consumers' behavioural intentions (Ajzen and Fishbein, 1973; Keller 1993). Based on earlier research and in accordance with Magnus Söderlund, a professor of marketing at Stockholm School of Economics, two variables for behavioural intentions were chosen. Purchase intention and WOM intention, as they are two of the most commonly used response variables in marketing studies.

Visual Components

To understand how the device experiences are perceived differently in terms of visual complexity. Questions regarding the perception of the three visual components were included in the questionnaire. Three self-composed statements were measured on a 10-point semantic differential scale. Firstly, in order to measure how the text was perceived differently between the devices, even though the sizes did not actually differ, three items were chosen and considered reasonable in the studied context, representing a measure called "ease of text". The statement question was; "the text in the picture was…", and the items being; "small/large", "easy to read/difficult to read", "uncomfortable for the eyes/comfortable for the eyes". A similar measure was composed to measure the "ease of picture". Thirdly, a measure called "activity of scrolling" was controlled for. These three measures are expected to be important when consumers form overall perceptions about the visual stimulus of the product listing page, being; ease of text, ease of picture, and the activity of scrolling.

Control Measures and Demographics

To assure a balanced and representative sample, a final section in the questionnaire consisted of questions regarding demographics and relevant control measures. Following demographic factors were controlled for; age, gender and city of residence. Moreover, control measures were included to assure for a balanced sample in terms of; e-commerce maturity, hunger, technical expertise, and emotions towards device.

3.6 Analytical Tools

In order to analysing the collected data, IBM SPSS Statistics version 25 was used as analytical tool. The data was transformed into variables in SPSS and question batteries were combined to indexes. The internal consistency was controlled for in question batteries consisting of two items or more using Cronbach's alpha, accepted on a level at Cronbach's alpha >0.6 (Bagozzi and Edwards, 1998).

However, all measurements except of perceived visual complexity were accepted at the higher level of >0.7 (Westergaard et al., 1989). Furthermore, hypotheses were accepted at a 95% level of significance (Fischer, 1926).

3.7 Critical Review of Data Quality

In order to establish the quality of this study, the imperative concepts in research, reliability and validity, will be examined for and discussed in below sections (Bryman and Bell, 2015).

3.7.1 Reliability

Reliability refers to the possibility that the study and data collection would give similar results if repeated (Bryman and Bell, 2015). Reliability conditions were fulfilled in several ways. Firstly, pre-studies were conducted to strengthen the internal reliability, by confirming the credibility of the layout designs and the credibility of the fictive site. Secondly, the questionnaire was sent to selected persons that provided feedback and it was also reviewed and discussed with our supervisor, Professor Magnus Söderlund (Malhotra, 2014; Saunders et al., 2009).

Thirdly, our chosen theoretical framework, the SOR model have been widely used in similar studies and this was controlled for by assuring that these studies have been cited by other researchers. Moreover, to the largest extent possible, the measurements have been adapted from earlier studies (Bryman and Bell, 2015). The construct reliability of all factors was tested and accepted with the established method Cronbach's alpha to ensure reliability of a study (Söderlund, 2010).

3.7.2 Validity

Statistical inference validity refers to the fact that differences between analysed groups are not caused by chance (Lynn and Lynn, 2003). The study is considered valid, in terms of the the four controls for validity explained by Bryman and Bell (2015); internal validity, measurement validity, external validity and ecological validity (Bryman and Bell, 2015).

Firstly, previous research has established several of the causal relationships our study is based on, increasing the internal validity. However, a limitation is the fact that the respondents were not able to navigate freely on the website, decreasing the internal validity (Olsson and Sörensen, 2011). Nonetheless, distributing the survey online was suitable for our chosen e-commerce context, possibly creating a more realistic feeling of the survey.

Moreover, the measurements are considered valid since the questionnaire was revised before it was sent out to assure that the question batteries did indeed measure what they were supposed to measure. This is further strengthened by the fact that indexes were controlled for using Cronbach's alpha (see appendix 1 - Batteries of questions).

In order to reach a high external validity, stimulus sampling was applied, where four product categories were chosen based on a pre-study, increasing the generalizability of the results across product categories. In terms of ecological validity, the choice of using a quantitative questionnaire could be unfavourable (Bryman and Bell, 2015).

The reason being that our constructed online store could possibly appear unnatural to some respondents, being presented through a survey. However, a pre-study assured that the fictive website did indeed appear realistic for the respective device.

3.7.3 Replicability

The replicability of the study is enhanced by the thorough and detailed description of the procedures, including theoretical, methodological and empirical. In addition, most of the measurements were well established in the research area and have been evaluated in terms of validity and reliability. Thus, the conditions are good for replicating the study in the future. (Bryman and Bell, 2011).

4 Results and Analysis

In the following chapter the empirical results of the collected data from the main study is presented. To begin with, a description of the groups is presented followed by the result of the manipulation. Furthermore, the results of the articulated hypotheses are presented, divided into three sections, (1) results of H1 and all a-hypotheses of H2-H7, (2) results of all b-hypotheses of H2-H7 and H5c and (3) results of H8a-c. Finally, a summary of supported and unsupported hypotheses will be presented. Rejected hypotheses will be critically presented in the chapter in accordance with Preece (1990). This is done in order to avoid a distorted presentation of causal effects to the academia (Söderlund, 2010).

4.1 Description of Groups

In the table below, a description of the groups, out of the total sample of 248 respondents, is presented. The different product types did not show any interaction effect on device experience, allowing for all product categories to be aggregated when comparing the results of the two device types[1]. Out of the total sample, 64% are women and 36% are men. The average age of the sample is 29 and the median is 25. The individual groups follow the age and gender distribution of the entire sample. The groups consist of at least 30 respondents[2], allowing justification of statistical tests (Söderlund, 2010). In total, 124 respondents answered from a computer device and 124 from a mobile device.

DEVICE EXPERIENCE		**COMPUTER EXPERIENCE**				**MOBILE EXPERIENCE**			
PRODUCT CATEGORIES		FRUIT	VEGETABLES	FISH	MEAT	FRUIT	VEGETABLES	FISH	MEAT
	N	124				124			
AGE	MEAN	31				28			
	MEDIAN	26				25			
GENDER	WOMEN	61%				66%			
	MEN	39%				34%			

Table 4 - Description of groups.

4.2 Manipulation Check

Assuring that the respondents received the correct layout according to the device they responded from was controlled for (see section 3.5 Main study). Therefore, the stimuli, i.e. the device experience, was considered qualified. Furthermore, the perception of the layouts as customized for mobile and computer respectively was controlled for in pre-study 1.

[1] Two-way ANOVA test indicated no significant interaction between product type and device experience.

[2] This also applies to the individual product categories within mobile experience and computer experience

4.3 Hypothesis Testing

Following section will present the results of the hypotheses testing. First, the results of H1 and all a-hypothesis (H2-H7) are presented. Independent sample t-tests were used to assess whether the independent variable device experience caused a significant main effect on each of the dependent variables (organism and response variables). Furthermore, the results of all b-hypotheses (H2-H7) will be presented. Preacher-Hayes mediation approach, model 4 and 6 by Preacher and Hayes (2008) was used to investigate if a potential main effect caused by the device experience on the response variables were mediated by the organism variables. A significance level of p<.05 has been applied in order to interpret the results (Fischer, 1926).

4.3.1 Part 1: Main Effect of Device Experience on Dependent Variables

Independent sample t-test is advocated as the preferred statistical test when comparing the same variable between two different groups (Newbold et al., 2012). The accompanied Levene's test was used to indicate if the variances of the groups are equal or unequal, p>0,05 indicate equal variances (Cohen, 1988).

4.3.1.1 Organism Variables

Perceived Visual Complexity

H1 predict that the perceived visual complexity, of an online store layout, differs between a mobile experience and a computer experience. Levene's test indicate equal variances (p>0,05). Furthermore, the results revealed a significant difference between the groups, $(F = 2.703, M_{ME} = 4.83\ vs. M_{CE} = 5.79, p < 0.001)$. Respondents who viewed the site as a mobile experience perceived lower visual complexity of the site than respondents who viewed the site as a computer experience. Consequently, H1 can be supported.

Variable	Device exp.	N	Mean	Std. deviation	MeanΔ	t	p
Perceived visual complexity	ME	124	4.83	1.63	-0.96	-4.870	0.000***
	CE	124	5.79	1.45			

Table 5 - Independent sample t-test, p<0.05, p<0.01**, p<0.001***, n.s – non-significant.*
ME – Mobile experience, CE – Computer experience.

H1: The perceived visual complexity of an online store, differs between a mobile experience and a computer experience.

Supported

Processing Fluency

H2a state that the information processing of an online store, differs between a mobile device experience and a computer device experience. Levene's test indicate equal variances (p>.05). Furthermore, the results indicate a significant difference between the groups, $(F = 0.042, M_{ME} = 6.30\ vs. M_{CE} = 5.63, p < .01)$. The processing fluency was higher for the respondents who viewed the site as a mobile experience compared to the respondents who viewed the site as a computer experience. The results of H2a can be supported.

Variable	Device exp.	N	Mean	Std. deviation	MeanΔ	t	p
Processing fluency	ME	124	6.30	1.83	0.67	2.888	0.004***
	CE	124	5.63	1.84			

Table 6 - Independent sample t-test, p<0.05, p<0.01**, p<.001***, n.s – non-significant.*
ME – Mobile experience, CE – Computer experience.

H2a: Processing fluency of an online store, differs between a mobile experience and a computer experience.

Supported

Perceived Visual Appeal

H3a predicts that the perceived visual appeal of an online store, differs between a mobile experience and a computer experience. Levene's test indicate equal variance between the groups (p>0.05). The test results reveal a significant main effect of device experience, $(F = 2.396, M_{ME} = 4.87\ vs. M_{CE} = 3.80, p < .001)$. The perceived visual appeal of the site, was higher for the respondents who viewed the site as a mobile experience than for respondents who viewed the site as a computer experience. Thus, H3a can be supported.

Variable	Device exp.	N	Mean	Std. deviation	MeanΔ	t	p
Perceived visual appeal	ME	124	4.87	2.23	1.08	4.053	0.000***
	CE	124	3.80	1.94			

Table 7 - Independent sample t-test, p<0.05, p<0.01**, p<0.001***, n.s – non-significant.*
ME – Mobile experience, CE – Computer experience.

H3a: The perceived visual appeal of an online store, differs between a mobile experience and a computer experience.

Supported

Pleasure

H4a state that the level of pleasure, after having seen an online store, differs between a mobile layout and a computer layout. Levene's test indicate unequal variance between the groups (p<.05). Furthermore, the test results indicate a non-existing main effect of the device experience, $(F = 12.269, M_{ME} = 5.63\ vs.\ M_{CE} = 5.81, p > .05)$. Consequently, we found no support for H4a.

Variable	Device exp.	N	Mean	Std. deviation	MeanΔ	t	p
Pleasure	ME	124	5.63	1.95	-0.19	-0.884	0.378 n.s
	CE	124	5.81	1.28			

Table 8 - Independent sample t-test, p<0.05, p<0.01**, p<0.001***, n.s – non-significant.*
ME – Mobile experience, CE – Computer experience.

H4a: The level of pleasure after having seen an online store, differs between a mobile experience and a computer experience.

Not supported

Attitude Towards Site

H5a state that the attitude towards the site, after having seen an online store, differs between a mobile experience and a computer experience. Levene's test indicate unequal variance between the groups (p<0.05). Furthermore, the test results show a significant main effect of the device experience, $(F = 5.169, M_{ME} = 6.16\ vs.\ M_{CE} = 5.45, p > .01)$. The attitude towards site was higher for the respondents who viewed the site as a mobile experience than for respondents who viewed the site as a computer experience. Thus, results indicate support of H5a.

Variable	Device exp.	N	Mean	Std. deviation	MeanΔ	t	p
Attitude towards site	ME	124	6.16	1.95	0.72	3.030	0,003**
	CE	124	5.45	1.75			

Table 9 - Independent sample t-test, p<0.05, p<0.01**, p<0.001***, n.s – non-significant.*
ME – Mobile experience, CE – Computer experience.

H5a: Attitude towards the online store, differs between a mobile experience and a computer experience.

Supported

4.3.1.2 Response Variables

Purchase Intention

H6a state that the purchase intention, after having seen an online store, differs between a mobile experience and a computer experience. Levene's test indicate equal variance between the groups (p>0.05). The test results show a significant main effect of device experience, $(F = 1.388, M_{ME} = 5.65\ vs. M_{CE} = 4.87, p > .05)$. The purchase intention was higher for the respondents who viewed the site as a mobile experience, in comparison to respondents who viewed the site as a computer experience. Consequently, H6a is supported.

Variable	Device exp.	N	Mean	Std. deviation	MeanΔ	t	p
Purchase intention	ME	124	5.65	2.43	0.78	2.589	0.010*
	CE	124	4.87	2.27			

Table 10. Independent sample t-test, p<0.05, p<0.01**, p<0.001***, n.s – non-significant.*
ME – Mobile experience, CE – Computer experience

H6a: Purchase intention of an online store, differs between a mobile experience and a computer experience.

Supported

WOM Intention

H7a state that the WOM intention, after having seen an online store, differs between a mobile experience and a computer experience. Levene's test indicate unequal variance between the groups (p<0.05). The test results show a significant main effect of device experience, $(F = 6.459, M_{ME} = 4.48\ vs. M_{CE} = 3.74, p > .05)$. The WOM intention was higher for the respondents who viewed the site as a mobile experience than for respondents who viewed the site as a computer experience. Hence, results indicate support of H7a.

Variable	Device exp.	N	Mean	Std. deviation	MeanΔ	t	p
WOM intention	ME	124	4.48	2.25	0.74	2.831	0.005**
	CE	124	3.74	1.86			

Table 11. Independent sample t-test, p<0.05, p<0.01**, p<0.001***, n.s – non-significant.*
ME – Mobile experience, CE – Computer experience.

H7a: WOM intention of an online store, differs between a mobile experience and a computer experience.

Supported

4.3.2 Part 2: Organism Variables as Mediators

In order to assess H2b, H3b, H4b, H5b, H5c, H6b and H7b, more specifically whether a present main effect of device experience on purchase intention and WOM intention is mediated by the organism variables, a mediation analysis was conducted, using Hayes (2018) PROCESS tool in SPSS. As there was no main effect of device experience on level of pleasure (p>0,05), the variable was excluded from the analysis. Therefore, Hypothesis H4b and H5c was excluded from the mediation analysis and thereby not tested. Each hypothesis, H2b-H3b and H5b-H7b, predicts a simple mediation between each stage in the conceptual model (see Figure 3). Furthermore, all together predict a serial mediation through the entire series. The exclusion of pleasure (H4 and H5c) will interrupt the suggested serial mediation model, however this will be disregarded in the test, in order to explore the empirical relation. Simple and serial mediation was tested through Hayes' Model 4 and Hayes' Model 6 respectively. All bootstrapping analysis included 5000 samples at p<0.05. In order to ensure the possibility for serial mediation (Hayes, 2018), the correlation between the serial mediators was tested through Pearson's Correlation test, which indicate approved levels of significance (p<.05). The model below, visualizes the mediation stages.

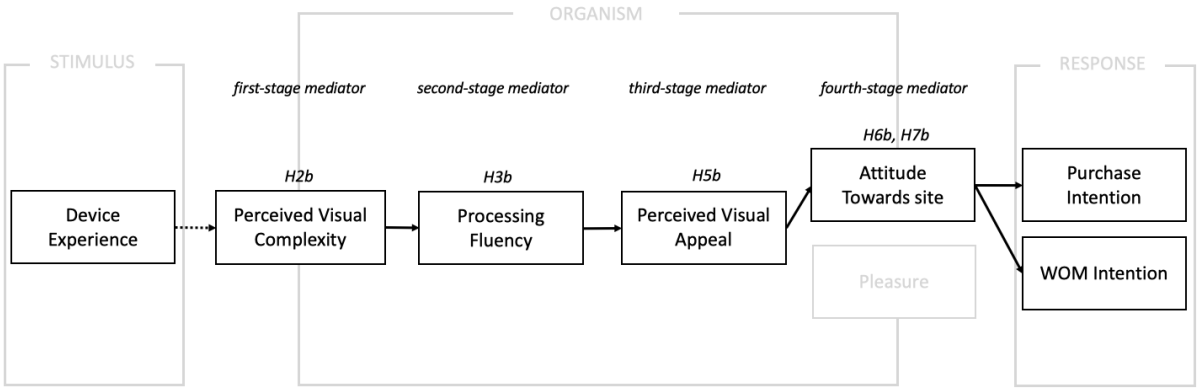

Figure 3 - Empirical Mediation Model 1.

The independent variable device experience was coded as a dummy variable, were computer experience was coded as "0" and mobile experience as "1". Thus, mobile experience is interpreted as the treatment condition and computer experience as the control condition. Consequently, the coefficient (effect) is only applied when the device experience is a mobile experience. When the device experience is a computer experience, the mean equals the intercept.

Processing Fluency

The mediation analysis revealed that the total effect of device experience on processing fluency was fully mediated by the indirect effect of the perceived visual complexity $(.6874, CI[.4022, .9742)]$. Consequently, H2b is supported.

H2b: The impact of device experience on processing fluency, is mediated by the perceived visual complexity.

Supported

Visual Appeal

The total effect of device experience on the perceived visual appeal was partially mediated by the indirect effect caused by the processing fluency $(.5413, CI[.2317, .8644)]$. Thus, results indicate a support for H3b.

H3b: The impact of device experience on the perceived visual appeal is mediated by processing fluency.

Partly supported

Attitude Towards Site

The total effect of device experience on attitude towards site was fully mediated by the indirect effect of the perceived visual appeal $(.5815, CI[.2839, .8950)]$. Consequently, H5b is supported.

H5b: The impact of device experience on attitude towards site is mediated by the perceived visual appeal.

Supported

Purchase Intention

The analysis indicates that the total effect of device experience on purchase intention was fully mediated by the indirect effect of attitude towards site $(.4978, CI[.1658, .8421)]$. Therefore, H6b is supported.

H6b: The impact of device experience on purchase intention is mediated by attitude towards site.

Supported

WOM Intention

The total effect of device experience on WOM intention was fully mediated by the indirect effect caused by attitude towards the site $(.5512, CI[.1842, .9198)]$. Consequently, H7b is supported.

H7b: The impact of device experience on WOM intention is mediated by attitude towards site.

Supported

Furthermore, the mediation analysis indicates full mediation of the total effects of device experience on purchase intention and WOM intention respectively, via the full series of perceived visual complexity, processing fluency, perceived visual appeal and attitude towards site $((.6912, CI[.3249, 1.0634)] resp. (.7123, CI[.3247, 1.0974])$.

					Indirect effect		
			Total Effect	Direct Effect	Effect	LLCI	ULCI
H2b	DE → PVC	→ PF	.6774***	-.100 n.s	.6874*	.4022	.9742
H3b	DE → PF	→ Visual Appeal	1.0735***	.5340*	.5413*	.2317	.8644
H5b	DE → Visual Appeal	→ Attitude Site	.7173**	.1322 n.s	.5815*	.2839	.8950
H6b	DE → Attitude Site	→ Purchase Intention	.7722*	.2744 n.s	.4978*	.1658	.8421
H7b	DE → PVC	→ WOM Intention	.7419**	.1908 n.s	.5512*	.1842	.9198
	DE → PVC	→ PF → Visual Appeal	1.0735***	.1903 n.s	.8849*	.5189	1.2633
	DE → PVC	→ PF → Visual Appeal → Attitude Site	.7173**	.0438 n.s	.6699*	.3740	.9995
	DE → PVC	→ PF → Visual Appeal → Attitude Site → Purchase intention	.7722*	.0810 n.s	.6912*	.3249	1.0634
	DE → PVC	→ PF → Visual Appeal → Attitude Site → WOM intention	.7419**	.0297 n.s	.7123*	.3247	1.0974

Table 12 – Mediation analysis 1. Bootstrap sample = 5000, 95% significance level.
DE = Device experience, S = supported, variables have been abbreviated to fit into table.

4.3.3 Part 3: Mediators of Visual Complexity

Given the significant difference in perceived complexity between the two device experiences, a mediation analysis was conducted in order to investigate how the perception of the three explicit layout components in the stimulus, scrolling, text and pictures mediated the perceived visual complexity. Initially, the perceived difference of the three individual components between the device experiences was assured, using independent sample t-test, of which results are presented below. This is followed by the results of the mediation analysis, using Hayes' PROCESS tool in SPSS.

Text and Pictures

The results reveal that respondents who viewed the site from a mobile experience, perceived a higher ease of text and higher ease of picture, than respondents who viewed the site from a computer experience, $(M_{ME} = 5.73\ vs. M_{CE} = 4.40, p < 0.000)$ resp.

Variable	Device exp.	N	Mean	Std. deviation	MeanΔ	t	p
Ease of text	ME	124	5.73	1.89	1.33	5.811	0.000***
	CE	124	4.40	1.70			
Ease of picture	ME	124	6.70	2.27	1.09	3.839	0.000***
	CE	124	5.60	2.21			

Table 13 - Independent sample t-test, p<0.05, p<0.01**, p<0.001***, n.s – non-significant.*
ME – Mobile experience, CE – Computer experience.

Activity of Scrolling

The mobile layout had a specific characteristic, namely that the respondent had to scroll in order to see the whole picture of the site. In the computer layout, there was no need to scroll. This was controlled for, in order to examine the awareness of the scrolling activity on the mobile layout, as it was impossible not to scroll in order to move on to the questionnaire. The control question confirmed that the respondents viewing the mobile-layout did scroll when they studied the stimulus and they were also aware of it, compared to the respondents viewing the computer-layout, ($M_{ME} = 9.19$ vs. $M_{CE} = 3.89$ p< .001).

Variable	Device exp.	N	Mean	Std. deviation	MeanΔ	t	p
Activity of scrolling	ME	124	9.19	2.17	5.3	13.583	0.000***
	CE	124	3.89	3.77			

Table 14 - Independent sample t-test, p<0.05, p<0.01**, p<0.001***, n.s – non-significant.*
ME – Mobile experience, CE – Computer experience.

Mediation Analysis

Given the significant differences in perception of the three components between the two device experiences, a mediation analysis was conducted. Simple mediation assessed the individual components as mediators of the total effect of device experience on the perceived visual complexity. A parallel mediation tested the effect of the three components together. Simple and parallel mediation were tested using Hayes' model 4. Lastly, a serial mediation of the entire series in the conceptual model was tested, using Hayes' model 6. All bootstrapping analysis included 5000 samples at p<.05, in accordance with previous mediation analysis. The model below, visualizes the mediation stages.

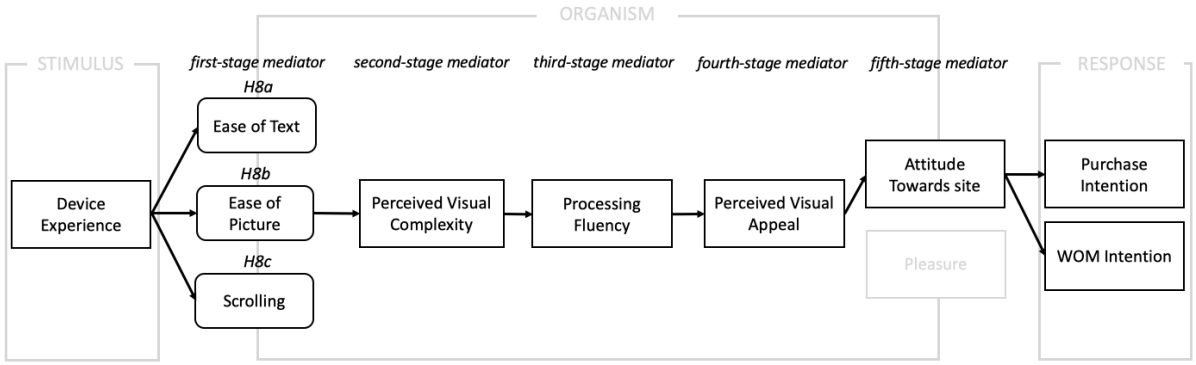

Figure 4 - Empirical Mediation Model 2.

The simple mediation analysis revealed that the perceived ease of text, fully mediated the total effect of device experience on the perceived visual complexity, $(-.6179, CI[-.8615, -.4026)]$. The perceived ease of picture, partially mediated the total effect of device experience on perceived visual complexity, $(-.4435, CI[-.7027, -.2154)]$. Furthermore, the scrolling activity, also partially

mediated the total effect of device experience on the perceived visual complexity, however, the effect size was small, $(-.0084, CI[-.1870, -.1697)]$.
The parallel mediation including all three components revealed a non-significant result of the indirect effect of the scrolling activity, it was therefore excluded in the final model. The justified model including only perceived ease of text and perceived ease of picture revealed a significant total indirect effect and was fully mediated $(-.6999, CI[-.9876, -.4433)]$. The inclusion of the perceived ease of text and the perceived ease of picture as mediators of the total effect of device experience on perceived visual complexity, increased the coefficient of determination from 0.0879, to 0.4807.

Furthermore, the impact of device experience on both purchase intention and WOM intention individually, were both mediated through the entire series, including for the perceived ease of text and the perceived ease of picture (see table 15).

								Indirect effect			
								Total Effect	**Direct Effect**	Effect	Total effect	LLCI	ULCI
H8	DE →	Ease of text	→ PVC					-.9556***	-.3378 n.s		-.6179*	-.8615	-.4026
	DE →	Ease of picture	→ PVC					-.9556***	-.5122**		-.4435*	-.7027	-.2154
	DE →	Scrolling activiy	→ PVC					-.9556***	-.9421***		-.0084*	-.1870	-.1697
	DE →	Ease of text	→ PVC							-,3797*		-.5666	-.2195
		Ease of picture								-,3202*		-.5445	-.1411
								-.9556***	-.2558 n.s	-,6999*		-.9876	-.4433
	DE →	Ease of text	→ PVC →	PF	→Visual Appeal	→ Attitude Site	→ Purchase intention	.7722*	.1333 n.s		.6389*	.2513	1.0302
		Ease of picture					→ WOM intention	.7419**	.0520 n.s		.6900*	.2867	1.1022

Table 15 – Mediation analysis 2. Bootstrap sample = 5000, 95% significance level.
DE = Device experience, S = supported, variables have been abbreviated to fit into table.

H8a: The impact of device experience on the perceived visual complexity is mediated by perceived ease of text.

Supported

H8b: The impact of device experience on the perceived visual complexity is mediated by perceived ease of picture.

Partly supported

H8c: The impact of device experience on the perceived visual complexity is mediated by activity of scrolling.

Not supported

4.4 Summary of Findings

Effects of organism variables	
H1: The perceived visual complexity of an online store, differs between a mobile experience and a computer experience.	**Supported**
H2a: Processing fluency of a an online store, differs between a mobile experience and a computer experience.	**Supported**
H2b: The impact of device experience on processing fluency, is mediated by perceived visual complexity.	**Supported**
H3a: The perceived visual appeal of an online store, differs between a mobile experience and a computer experience.	**Supported**
H3b: The impact of device experience on the perceived visual appeal is mediated by processing fluency.	**Supported**
H4a: The level of pleasure after having seen an online store, differs between a mobile experience and a computer experience.	**Not supported**
H4b: The impact of device experience on pleasure is mediated by perceived visual appeal.	**N/A**
Effects of response variables	
H5a: Attitude towards site, differs between a mobile experience and a computer experience.	**Supported**
H5b: The impact of device experience on attitude towards site is mediated by perceived visual appeal.	**Supported**
H5c: The impact of device experience on attitude towards site is mediated by pleasure.	**N/A**
H6a: Purchase intention of an online store, differs between a mobile experience and a computer experience.	**Supported**
H6b: The impact of device experience on purchase intention is mediated by attitude towards site.	**Supported**
H7a: WOM intention of an online store, differs between a mobile experience and a computer experience.	**Supported**
H7b: The impact of device experience on WOM intention is mediated by attitude towards site.	**Supported**
Layout components: Mediators of visual complexity	
H8a: The impact of device experience on the perceived visual complexity is mediated by perceived ease of text.	**Supported**
H8b: The impact of device experience on the perceived visual complexity is mediated by perceived ease of picture.	**Partly supported**
H8c: The impact of device experience on the perceived visual complexity is mediated by activity of scrolling.	**Not supported**

Table 16 - Summary of findings.

5 Discussion

In this chapter, the results from the empirical study will be discussed, the discussion will be rooted in the theoretical framework. Non-significant results will be discussed as well (Preece 1990), in order to contribute to future research (Söderlund, 2010).

5.1 Discussion of Results

Perceived Visual Complexity

The main question in this study was to investigate the perceived visual complexity between a mobile experience and a computer experience, as this was crucial for the proposed conceptual model. Given the support of H1, the results of the empirical study revealed a significant difference in perceived visual complexity between the two device experiences. More specifically, respondents who viewed the online store as a mobile experience, perceived the content as less visually complex, than respondents viewing the online store as a computer experience. Considering that the content was exactly the same in both cases, the difference in perception can then be attributed to how the information was organized and how the content was perceived through the device. The result supports the theorizing that perceived visual complexity is constituted by simultaneous sources of complexity (Nadkarni and Gupta, 2007), as it could be argued that respondents' perceptions of the content in our study deviated from the actual content.

Processing Fluency

The results indicate a significant difference in processing fluency between the device experiences, supporting H2a. Processing fluency was higher for respondents viewing the online store as a mobile experience, than for respondents viewing the online store as a computer experience. Furthermore, the meditation analysis revealed that the impact of device experience on processing fluency was mediated through the perceived visual complexity (H2b). Thus, the empirical findings support research indicating that visual complexity is a driver of processing fluency and the more complex stimulus the lower level of processing fluency (Orth and Wirz, 2014; Nadkarni and Gupta, 2007; Lindsay and Norman, 1977).

Perceived Visual Appeal

The perceived visual appeal of the online store differed between respondents perceiving it from a mobile experience and respondents perceiving it from a computer experience (H3a). Following the previous findings, the perceived visual appeal was higher for the mobile experience than for the computer experience. Based on the mediation analysis, the impact of device experience was partly mediated by processing fluency (H3b). The demonstrated findings support results of Orth and Crouch (2014), indicating that low visual complexity enhances the perceived visual appeal and is mediated by processing fluency. Attractiveness, i.e. visual appeal, is a popular measurement to indicate consumer response.

Pleasure

Orth and Wirtz (2014) propose that low complex stimulus increase processing fluency, which in turn enhances attractiveness, which elicit positive affect in terms of pleasure. Pleasure is often seen as a key component in the SOR model and processing fluency framework. However, our empirical findings did not support a difference in pleasure between the mobile experience and the computer experience,

as H4a was rejected. As our choice of products, as stimuli were common groceries, known to not generate strong positive valence (Bradely and Lange, 1999), this might have affected our results.

Attitude Towards Site

The empirical findings indicate a significant difference in attitude towards site between the mobile experience and the computer experience, as H5a was supported. More specifically attitude towards site was higher through the mobile experience than through the computer experience. The mediation analysis indicated that the effect of device experience on attitude towards site was mediated through the perceived visual appeal (H5b). This result support findings by Till and Busler (2000), indicating that attractiveness induce attitude.

Purchase Intention

The purchase intention differed between respondents who viewed the online store as a mobile experience and respondents who viewed the online store as a computer experience, resulting in a support of (H6a). The purchase intention was higher for the mobile experience than for the computer experience. Furthermore, the mediation analysis revealed that the impact of device experience on purchase intention was mediated by attitude towards site (H6b). These results support Wu et. al. (2013), suggesting that purchase intention is mediated by attitude only, thus, pleasure was not a necessary outcome.

WOM Intention

WOM intention also differed between respondents viewing the online store as a mobile experience and respondents viewing the online store as a computer experience, as H7a was supported. Specifically, WOM intention was higher for the mobile experience than for the computer experience. The mediation analysis indicated that the impact of device experience on WOM intention was mediated by attitude towards site (H7b). The results are in line with Wu et al., (2013), indicating that attitudes evoke WOM intentions.

5.1.1 Mediators of Perceived Visual Complexity

Results from the mediation analysis revealed that the effect of device experience on perceived visual complexity was fully mediated by the perceived ease of text (H8a) and partly mediated by the perceived ease of picture (H8b). These results confirm research showing that these components affect the perceived complexity (Song and Schwarz 2008; Reber et al., 2004; Mosteller et al., 2014; Sohn, 2017). The coefficient of determination indicated that perceived ease of text and perceived ease of picture could predict the variance in perceived visual complexity between the two device experiences at a level of 0.48. This number indicate that other variables also influenced the perceived visual complexity of the online store. However, the activity of scrolling did not mediate the effect of device experience on the perceived visual complexity (when ease of text and ease of picture were taken into account as well) (H8c). Thus, the proposed theorizing that the activity of scrolling might have a negative effect (e.g. Norman, 2013), was not supported in this study.

5.2 Discussion of Perceived Complexity Between Devices

The empirical findings indicate that the perceived visual complexity was lower through the mobile experience, resulting in higher processing fluency, perceived visual appeal and subsequent positive behavioural intentions, in terms of purchase intention and WOM intention. The mediation analysis revealed that the direct effect of device experience on behavioural intentions was mediated through all stages, except for pleasure. As mentioned, this difference in perceived visual complexity between the device experiences can be attributed to the presentation and organization of the information and the human-device interaction. However, what exactly caused the perceived lower complexity in the mobile experience is unknown (e.g. screen size etc.). What can be ascertained is that the total effect of the device experience (including the device itself and the content presentation), resulted in a lower perceived visual complexity for the mobile. Previous studies indicate that larger screen size alone, is more advantageous, however our study indicate that the total effect of the mobile experience overcompensate for its smaller screen.

Koleskova and Singh (2019), suggested that lower complexity in terms of fewer items presented is more advantageous in an online store. As the mobile screen is smaller the content on the page had to be reorganized in our study, resulting in that respondents had to scroll in order to see all items. Thus, the layout varied in terms of items presented simultaneous, respondents viewing the online store as a computer experience saw all 18 products simultaneously, whereas the respondents who viewed the online store as a computer experience viewed only four items simultaneously. Regardless of device experience, the same number of items were viewed at the end. Number of items has been considered as one of the most crucial aspect influencing perceived complexity (Nadal, 2010; Berlyne et al., 1968). In addition, it is proposed that the perceived complexity is constituted by simultaneous sources of complexity that generate a general level of complexity (Nadkarni and Gupta, 2007). Drawing on these two reasonings, the findings of this study could propose that the mobile experience gave an illusion of presenting fewer items, as only 4 could be viewed the same time.

5.3 General Discussion Related to the Technological Development of Devices

In recent years, screen sizes of mobiles have become larger and the mobile devices themselves have become more user-friendly. Websites and online stores have improved their layouts to better suit the inherent conditions of mobiles and computers. Today it is rather a rule than the exception to have two separate versions of a website, each customized for the respective device. Given this development of the online store market, in terms of technology and consumer adoption, our study indicates that there are differences in consumer response between different devices. However, the area is complex and further research is needed in order to better understand consumer behaviour in relation to devices.

6 Conclusion

The following section will present the conclusions of the study by answering our addressed research questions.

The results of the empirical study, reveals that respondents who viewed the online store layout as a mobile experience, perceived less visual complexity of the content, than respondents viewing the online store layout as a computer experience. Consequently, responding to our research question one:

1. *Does the perceived visual complexity of an online store differ between a mobile experience and a computer experience?*

Furthermore, the results indicated a significant difference in processing fluency, perceived visual appeal, attitude towards site, purchase intention and WOM intention. The result did not support a difference in pleasure between the two device experiences. The result supports the proposed conceptual model including the mediation mechanism between each stage, but with the exception of pleasure. This indicates that pleasure is not a necessary outcome, in order to generate positive behavioural intentions, supporting findings from Wu et al., (2013). Thus, responding to research question two:

2. *If there is a difference in perceived visual complexity between the mobile experience and the computer experience, will this difference in complexity also affect processing fluency, perceived visual appeal, pleasure, attitude towards site, and consumer response in terms of purchase intention and WOM intention?*

Lastly, the result revealed that the perceived visual complexity, as an effect of the device experience, was partly mediated by the perceived ease of text and the perceived ease of pictures. However, if the respondents had to scroll or not, did not affect the perceived complexity of the layout content. Thus, responding to research question three:

3. *If there is a difference in perceived visual complexity, could this difference be explained by the perceived ease of text, the perceived ease of picture and the activity of scrolling?*

7 Implications

The following section will highlight the implications of the study. The implications are organized after (1) theoretical, (2) managerial and (3) societal, and it will be addressed to whom the research findings would apply, as well as why they would benefit of the findings.

Given the rapid increase of mobile shopping, during the past years, the results of this empirical study provide important contribution to both the academia, practitioners as well as the society.

7.1 Theoretical Implications

First of all, our research contributes to the academia and the research field of online store environments, indicating that the device is an important part in understanding the online environment and its influence on consumer response. This study integrates environmental psychology theory (SOR) and fluency theory in the perspective of the mobile vs. computer interaction. Our empirical model suggests that the device experience, i.e. the visual content and the interaction with the device, is able to affect the consumer's perception of the content as well as behavioural intentions (regardless of the actual content). Furthermore, our research support current literature, indicating the causal relationships between visual complexity and processing fluency as well as the subsequent stages, visual appeal, attitude and behavioural intentions. However, it suggests that pleasure is not always a necessary outcome, in order to generate positive behavioural intentions in terms of purchase intention and WOM intention.

This study provide insight into how several aspects of computers and mobiles individually, create a general level that either enhances or complicates processing fluency. Furthermore, our study suggests that device qualities such as screen size need to be considered in relation to other qualities as well, as the total effect could possibly differ from the individual functions' effects. Thus, this is an aspect to consider in the field of online based data collection as well.

7.2 Managerial Implications

Given the shift in e-commerce, from computer- to mobile access, it is important for practitioners to understand how the device itself affect the consumer in terms of e.g. behavioural intentions. Our study indicate that consumers seem to respond differently to the same content, in terms of behavioural intentions, depending if the content is experienced through a mobile or through a computer. More specifically, when comparing a product listing page of an online grocery store, it is experienced more advantageous through a mobile, evoking higher purchase intention and WOM intention. Based on our findings, we propose four recommendations to practitioners:

Recommendation 1: It is important to provide a customized mobile store for customers

In order not to miss sales, it is crucial for retailers to also provide a custom mobile website in addition to the computer site. It could also be argued that having a mobile site is more important than a computer site. However, this is not news, but given the understanding of the benefits, there are no excuses for not having it.

Recommendation 2: Treat mobile and computer as two separate e-channels
As behaviour seem to differ between mobiles and computers, the importance of following up on the individual e-channels separately, for all important sales KPIs, is supported and also advocated. Retailers should treat them as individual channels and work to optimize the consumer experience in each device channel.

Recommendation 3: Do not overrate the bigger screen of a computer
It is important for retailers and developers to investigate why the computer is rated as inferior to the mobile, despite its objective benefits of a larger screen size. How can computer interaction develop in order to keep up with the competition from mobiles?

Recommendation 4: Grocery online retailers should communicate to consumers through mobiles
Given that we in this study, specifically used groceries as stimuli and the fact that the online environment reflected the reality of product listing pages as of today - our study recommends online grocery retailers to focus more on the mobile website in order to possibly increase sales. They can also try to communicate with their customers through the mobile in order to steer them to the mobile online store.

7.3 Societal Implications

Consumers
Our results can also benefit the consumer in terms of awareness of how the device affects their perceptions of the content, unconsciously. The awareness gives the consumer the opportunity to think one more time when viewing products on online stores, and reflect on what they actually think about the products.

Legislators and Policy-makers
Given the discrepancy in how the same information is experienced depending on which device it is experienced from, retailers could possible take advantage from the consumers' unconsciously influenced actions. Therefore, the results could potentially be of use for legislators and policy-makers, such as the Swedish Consumer Agency. We suggest that the results of our research could be of use for people responsible of policies concerning e-commerce. These persons could benefit by being informed about potential consumer effects caused by the choice of a mobile- or a computer device. Especially for policy makers watching over the e-commerce market developments and identifying relevant consumer problems.

Educational Systems
Lastly, we also believe that our research findings could be of use for educational systems. Even though we have been studying retail management (3 years) and business management (2 years), we have not heard about the importance of the interrelation effects of devices in the online store context. We suggest that educational systems, to a larger extent, strive to incorporate articles and theories that explain how new technology affect consumer responses. For example, marketing and innovation courses could incorporate articles in the course literature that are related to this area.

8 Limitations and Criticism of the Study

In this chapter, limitations and critique to the study will be addressed and discussed.

Our research has highlighted important findings regarding the device experience's effect on consumer response in the online store context. However, when interpreting the results, it is important to consider the study's addressed limitations and criticism.

Methodological Approach

The study follows an experimental design, and is limited to only measure intentions of behaviour and not actual behaviour. This was a deliberate choice as it was desirable to be able to generalize the results to a greater extent. However, actual behaviour does not always mirror the intentions of behaviours (Hoyer and McInns, 2008), which should be taken into account regarding the managerial implications. Furthermore, as the stimulus was a picture of a site and not an actual site, we did not measure the experience of actually using the site.

Experimental Design

A limitation to the study is that we only investigated the devices' effect in the context of a product listing page. An online store consists of several pages, e.g. start page, payment page etc., which together create a full online shopping experience. On other types of pages, the total effect of the device experience might differ, as their content is organized differently. Furthermore, the product choice limits the study to online grocery stores. The standard of online stores and product listing pages are however, similar across industries. Nevertheless, higher valence products might have generated other results.

Another possible limitation is the non-randomization in allocation of devices. Being able to choose between a mobile device and a computer device might have led to consumers answering from their preferred device. However, we argue that the chosen allocation is closer to the actual reality, as consumers are able to choose the device from which they access an online store in real life.

Measurements

All standardized questions were translated from English to Swedish, however, this was controlled for by having a few dedicated persons to review the questionnaire before it was sent out. The internal consistency was also controlled for, testing reasonable level of Cronbach's Alpha.

Data Collection

A final limitation with the study is its geographical spread of the respondents answering the questionnaire. A vast majority are between 20 and 30 years old and live in the Stockholm region. This is a limitation as we could not analyse how demographic factors might have affected our results.

9 Future Research

This chapter will discuss questions raised by the study and describe suggestions for future studies.

Our research findings have contributed to, and extended the research investigating the interrelationships of the online store environment. Specifically, we have investigated the perceived visual complexity and processing fluency, in an online store context focusing on the device's effect. Our study opens up for further research on the subject by raising significant questions. We encourage others to replicate our study to see if our result will hold. Furthermore, it is of interest to explore the effect on different product categories, products that have a stronger positive valence might generate other results.

Mobiles and computers differ in many ways and it is difficult to isolate these differences in order to investigate their individual effects, as they are interrelated. Our study demonstrated how several simultaneous differences created a total effect. We suggest to investigate other contexts with other combinations of visual content and features, e.g. other types of pages of an online store, as the payment page.

Furthermore, the mobile has become an important device in people's lives, and people interact with their phones more often than they do with their computers. This difference might also affect the way people perceive information, as it could be argued that they are more familiar with their mobiles than with their computers, which is closely connected with processing fluency. As most people bring their mobiles with them all the time, the effect of the physical environment on the consumer's information processing is also an area for further research.

Moreover, our research investigated a limited set of variables. In terms of response variables, our study investigated two of the most common response variables in marketing studies. However, future studies could include other responses variables, e.g. eWOM (electronic WOM). In terms of antecedents for the consumers responses, other factors could be investigated in future research, notably, as the device did not affect the variable for pleasure.

Given our results showing that the choice of device affects consumer response of the content, it would be interesting to extend this research by investigating how the effects are enhanced or muted. Future studies could investigate if and how shopping motivation affect the results, as Orth and Wirz (2014) have shown that the relationship between complexity and processing fluency could be affected by 'shopping motivation' (i.e., hedonic vs. utilitarian shopping goals). Another factor to consider is the consumer attitude to the device itself. It would also be interesting to investigate if our demonstrated effects from the device, affect consumer responses in other online contexts, for example social media.

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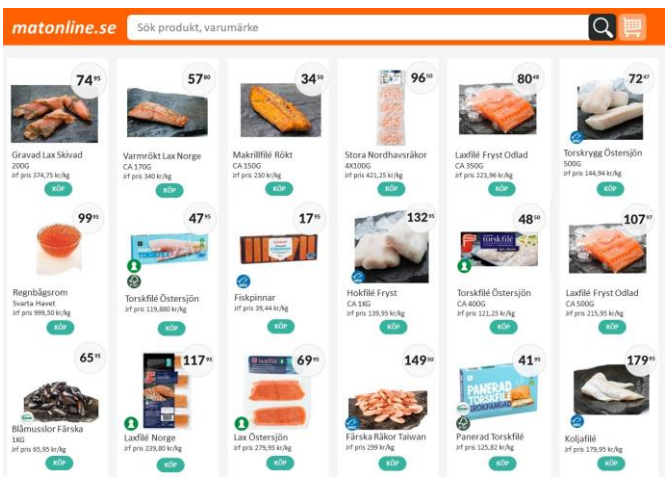
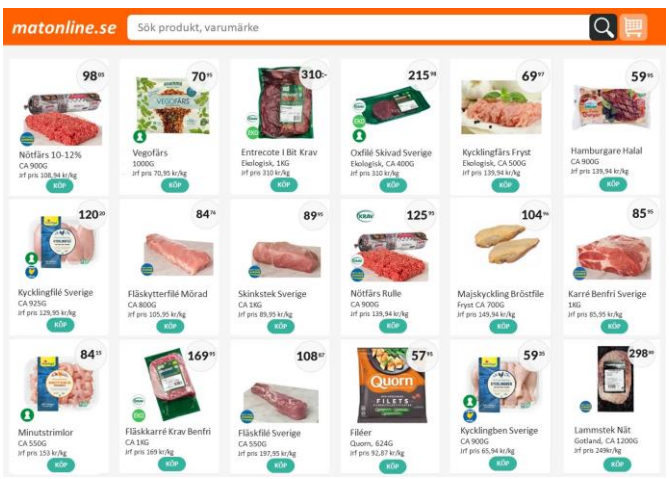
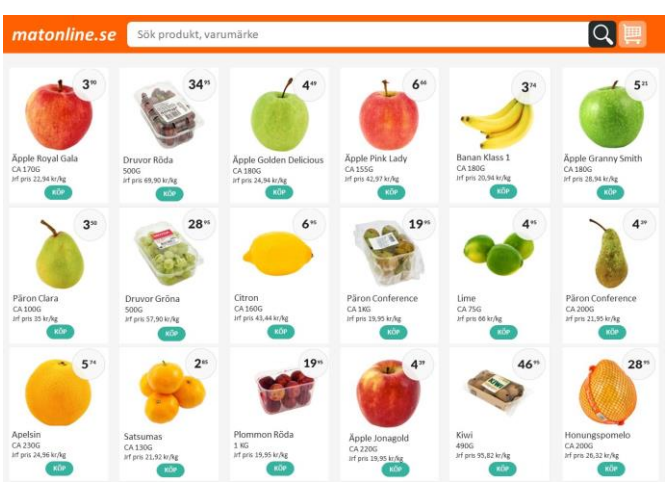
Appendix 1 - Batteries of Questions and Cronbach's Alpha Values

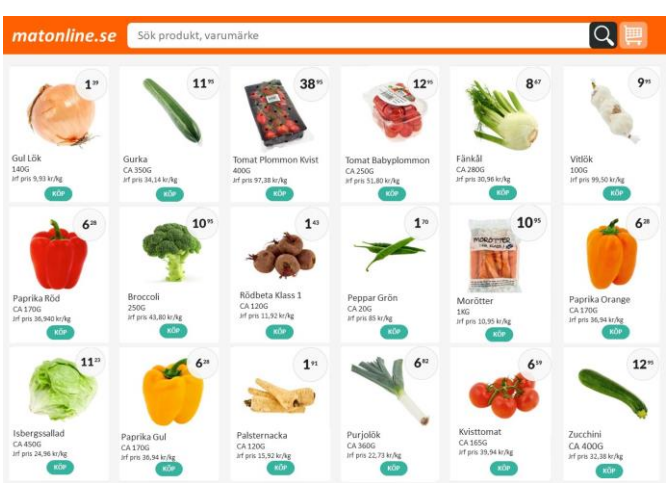
Name of measure	**Statement**	**Cronbach's alpha** (N=248 for all)	**Source**
Visual Complexity	The picture of the product listing page was… (Do not agree at all/completely agree) ● Easy to view ● Well organized ● Overloaded ● Visually rich	α 0.60	Kolesova and Singh (2019)
Processing Fluency	Studying the picture and reading the information about the products was… ● Difficult/easy ● Unclear/clear ● Effortful/effortless ● Incomprehensible/comprehensible	α 0.94	Graf et al. (2017)
Visual Appeal	● The way matonline.se displays its products is attractive ● Matonline.se's internet site it aesthetically appealing ● I like the way matonline.se site looks. (Do not agree at all/completely agree)	α 0.93	Mathwick, Malhotra and Rijdon (2001)
Pleasure	After having viewed the product listing page, how did you feel? • Unsatisfied/satisfied • Annoyed/pleased • Depressed/contented • Despairing/hopeful • Unhappy/happy • Bored/relaxed	α 0.93	Mehrabian and Russell (1974)
Attitude towards site	What is your attitude towards the site Matsonline.se? • Negative/positive • Bad/good • Unfavourable/favourable • Dislike/like	α 0.98	Dolbec and Chebat (2013)
Purchase intention	• How probable is it that you would buy any of the products? (Not probable/probable) • I would consider buying the product at the prices given (Do not agree at all/totally agree) • How probable is it that you would consider buying any of the products? (Not probable/probable) • My willingness to buy any of the product is… (Very low/very high)	α 0.94	Dodds et al. (1991)
WOM intention	• To what extent is it likely that you say positive things about the company to others in person? • To what extent is it likely that you encourage friends and relatives to buy the company's products in person? • To what extent is it likely that you recommend the company to others in person?	α 0.97	Eisingerich et al. (2014)
Ease of text	The text in the picture was… • Small/large • Difficult to read/easy to read • Uncomfortable for the eyes/comfortable for the eyes	α 0.92	Self-composed
Ease of picture	The pictures were… ● Small/large ● Unclear/clear	α 0.87	Self-composed

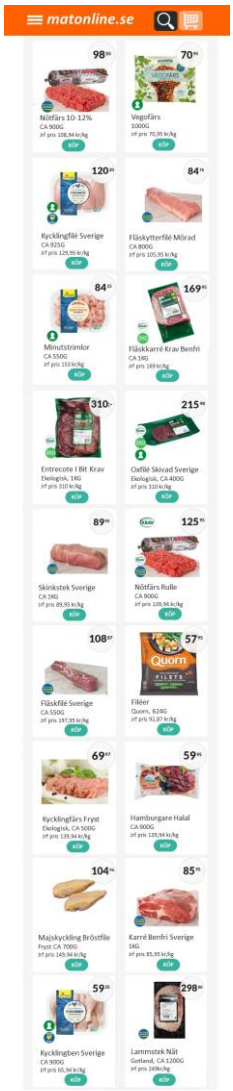
Appendix 2 - Stimulus Design: All Groups

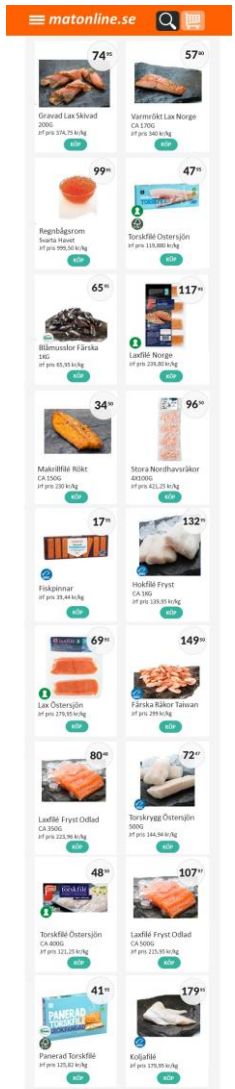


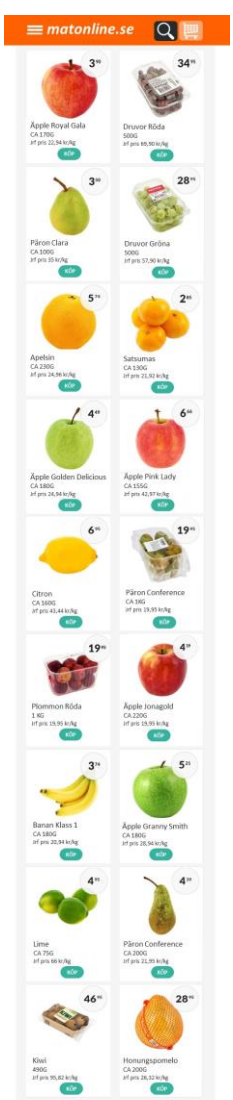


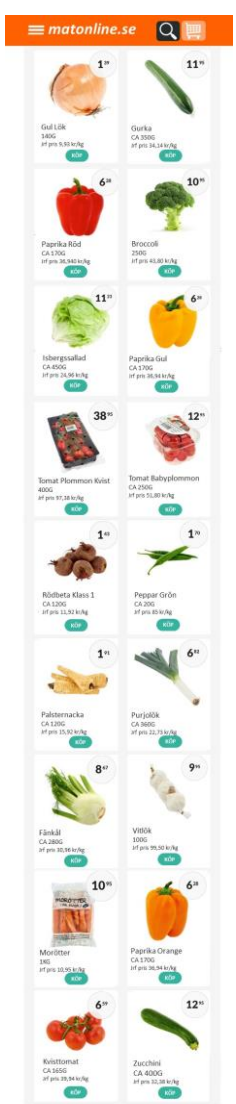





matonline.se
Nötfärs 10-12%
Vegofärs
Kycklingfilé Sverige
Fläskytterfilé Mörad
Minutstrimlor
Fläskkarré Krav Benfri
Entrecote I Bit Krav
Oxfilé Skivad Sverige
Skinkstek Sverige
Nötfärs Rulle
Fläskfilé Sverige
Fileer
Kycklingfärs Fryst
Hamburgare Halal
Majskycklling Bröstfile
Karré Benfri Sverige
Kycklingben Sverige
Lammstek Nät


matonline.se
Gravad Lax Skivad
Varmrökt Lax Norge
Regnbågsrom
Torskfilé Östersjön
Blåmusslor Färska
Laxfilé Norge
Makrillfilé Rökt
Stora Nordhavsräkor
Fiskpinnar
Hokfilé Fryst
Lax Östersjön
Färska Räkor Taiwan
Laxfilé Fryst Odlad
Torskrygg Östersjön
Torskfilé Östersjön
Laxfilé Fryst Odlad
Panerad Torskfilé
Kolja filé


matonline.se
Äpple Royal Gala
Druvor Röda
Päron Clara
Druvor Gröna
Apelsin
Satsumas
Äpple Golden Delicious
Äpple Pink Lady
Citron
Päron Conference
Plommon Röda
Äpple Jonagold
Banan Klass 1
Äpple Granny Smith
Lime
Päron Conference
Kiwi
Honungspomelo


matonline.se
Gul Lök
Gurka
Paprika Röd
Broccoli
Isbergssallad
Paprika Gul
Tomat Plommon Kvist
Tomat Babyplommon
Rödbeta Klass 1
Peppar Grön
Palsternacka
Purjolök
Fänkål
Vitlök
Morötter
Paprika Orange
Kvisttomat
Zucchini

Appendix 3 - Stimulus Design: Close Up