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#### MASTER'S THESIS IN MARKETING ANALYTICS AND METRICS

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# WHEN LESS IS MORE:

# THE ROLE OF VISUAL COMPLEXITY IN SHAPING PERCEIVED RISK AND ONLINE PURCHASING BEHAVIOR.

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### **Management Summary**

The advent of the Internet, with its low start-up costs and easy access to a large audience, has created favorable conditions for growing competition among online retailers. Indeed, one of the problems online retailers face nowadays is convincing consumers to buy from their e-commerce and not switching to other retailers' websites. To achieve such a result, retailers should go out of their way to retain consumers and make a good first impression. Specifically, they should be able to minimize the risk perceived by customers while they are browsing their websites. To this end, retailers can choose to implement a trust-building strategy such as displaying third-party certification seals on their websites. However, such a strategy can be not enough to minimize the perceived risk and to retain the consumer. Previous studies have demonstrated how the design of a retailer's homepage plays a crucial role in shaping consumers' first impression and perception of risk about that e-commerce. Among the different elements of web design, visual complexity seems to have significance in revealing consumers' attitudes towards a particular retailer, and thus, can be of relevance to give useful insights to retailers and web designers.

The aim of this study was to shed light on the concept of visual complexity and its effect on online purchase intention. Additionally, I was interested in discovering if this relationship could be explained by consumers' perceived risk associated with that purchase. Finally, the effect of trust promoting seals on the relationship between visual complexity and online purchase intention was assessed, to test if the presence of a trust mark could have potentially altered the above-mentioned relation. In an online experiment with 193 participants, I manipulated both the visual complexity level displayed on a retailers' homepage as well as the presence of trust promoting seals to investigate the relationships between Visual Complexity and Product Risk Perception (moderated by the presence or absence of trust promoting seals), as well as the effect of Product Risk Perception on Online Purchase Intention. The data were analyzed through the analysis of variance (ANOVA), and Macro Process Model 4 developed by Hayes (2013).

Results showed that Product Risk Perception fully mediates the relationship between Visual Complexity and Online Purchase Intention. However, the moderation role of Trust Promoting Seals was found not to be significant. To illustrate, findings revealed that the higher the level of visual complexity displayed on a retailer's homepage, the higher the perceived risk, and thus, the lower consumers' online purchase intention, regardless of whether the trust mark was shown or not. In sum, this research demonstrated that when it comes to visual complexity, the less is more.

# Preface

This thesis represents the conclusion of my Double Degree studies in Marketing Analytics both at LUISS Guido Carli and Tilburg University. This work is the result of everything I have learned during these two years of study and the passion I have developed for marketing.

First, I would like to thank my supervisor Professor Simona Romani her important feedbacks and all helpful advices she provided which aided me to improve the quality of my work. I would also thank my second reader, Professor Marco Francesco Mazzù, for the time he dedicated to my work. This thesis would not be in the way it is without their suggestions and expertise.

Moreover, I would like to thank my family and friends, who supported me throughout all my studies and during the writing of this thesis, which represents the final chapter of my Marketing Analytics Master at LUISS University. A special mention goes to my father, who is always by my side and who is the person I admire most in the world. Nothing of this would have been possible without him.

Finally, I would like to thank all the professors I met during my studies; they were exceptional both from the human and the academical side.

I hope you will enjoy reading this thesis.

Sophie Castagna

# **1. Introduction**

#### 1.1 Business Problem: Background

The last decade has seen an exponential increase in online shopping that has been accompanied by a huge rise in the number of online retailers, which has resulted in an extremely competitive online environment (McKinsey, 2020). Indeed, the ease and immediacy with which a website can be created by any retailer has led to an exponential growth of online competition, resulting in many companies failing to make themselves known to consumers (Casado-Aranda, Dimoka, & Sánchez-Fernández, 2019). Based on previous research, 90% of new e-commerce stores fail within the first 120 days after the launch (Patel, 2015). Hence, to have a better chance of being noticed by consumers, an 'unknown' retailer should have as it is primary purpose to convey a good first impression and convince consumers that its store is legitimate and trustworthy, reducing consumers' risk perception (Chang, Waiman, & Mincong, 2013). Specifically, this should be communicated through the retailer's homepage, which creates the initial impression of the retailer itself (Singh & Dalal, 1999).

Earlier research has shown that consumers usually base their first impression and judgment of a website on the information processed in the first 50 milliseconds of interaction with the website itself (Lindgaard, Fernandes, Dudek & Brown, 2006). In addition, it has been proven that if the retailer manages to give a good strong first impression, users may overlook other issues such as usability or timing problems (Lindgaard & Dudek, 2002). This long-term effect of the first impression is often referred to as 'confirmation bias' that typically occurs when people tend to give more value to what confirms their initial assumptions (Mynatt, Doherty, & Tweney, 1977; Nisbett & Ross, 1980). Thus, if users held a very positive first impression of a retailer's websites, they would then disregard negative issues and the other way around (Campbell & Pisterman, 1996). Furthermore, since consumers have no experience with and cannot assess the real trustworthiness of an 'unknown' retailer, the first impression they have of the retailer can influence the degree of trust and risk that they perceive, and thus, have an effect on their purchase intention (Darke, Brady, Benedicktus & Wilson, 2016; Melis, Campo, Breugelmans, & Lamey, 2015; Schlosser, White, & Lloyd, 2006).

The challenge faced by retailers is even more relevant when taking into consideration that in 2019, 4.2 million scam websites have been identified across more than 100 industries, 27% more than in the previous year (Bolster, 2019). Furthermore, the proliferation of this type of

website has a huge economic impact. According to the FBI's 2019 Internet Crime Report (FBI, 2019), the total losses that can be attributed to the phenomenon of scam websites in America amounted to \$3.5 billion. Hence, the presence of scam websites is harmful to both retailers and consumers. Although familiar, established retailers can at least try to overcome the problem of online risk perception by enhancing brand awareness or establishing a store location offline, these strategies are less likely to be adopted by 'unknown', less familiar retailers (Benedicktus, Brady, Darkev& Voorhees, 2010; Darke *et al.*, 2016). As shown in previous studies, it is paramount for those retailers to find a way to effectively convey, in the first few moments of interaction with consumers, a lower level of risk and thus, to communicate that their website is trustworthy (Chang, Waiman, & Mincong, 2013; KPMG, 2017). Therefore, since first impressions seem to influence mid- and long-term consumer behavior, it is particularly relevant to understand what factors are responsible for shaping users' first impression of a retailer website (Rabin & Schrag, 1999).

Several studies about first impressions have demonstrated that the visual design of a webpage is crucial in shaping consumers' earlier judgments about retailers and products (Tractinsky, Cokhavi, Kirschenbaum & Sharfi, 2006; Tractinsky, Katz & Ikar, 2000). Specifically, *visual complexity* seems to play a key role in influencing users' first impressions (Tuch, Bargas-Avila, Opwis & Wilhelm, 2009). Researchers have developed several definitions of visual complexity in the field of marketing and design. For example, Song and Schwartz (2009) referred to visual complexity predominantly in terms of text and readability, while Wu *et al.* (2016) conceptualized visual complexity as a product-background contrast in the advertising context. In a broader sense, Nadal, Munar, Marty, & Cela-Conde (2010) stated that visual complexity refers to the amount and variety of displayed elements in a specific webpage. Drawing from this last definition, the present study will specifically focus on visual complexity as to the *number and variety of products shown on a retailer's home page*.

To better explain the meaning of visual complexity addressed in this work, consider the following images in Figure 1:

<section-header><complex-block>

Image B - AliExpressImage B - AliExpressIma

Figure 1: Amazon and AliExpress homepages

The first image (A) shows the homepage of 'Amazon', while the second image (B) shows the homepage of 'AliExpress'. Although both retailers have a wide range of products, the homepages have two completely different designs. The homepage of 'Amazon' shows only part of the available products of its assortment. Specifically, 5 different product categories (variety) are presented on the homepage. Image B, on the other hand, shows a homepage with a high number and variety of products displayed. In detail, 36 different products are shown, all from different categories. Hence, according to the definition of visual complexity given for the purpose of this research, the 'AliExpress' website represents an example of a visually complex homepage.

There are different levels of visual complexity that an online retailer can display on its website that can evoke different emotions in consumers. It has been proven that one of the main effects that visual complexity has on consumers is to elicit negative emotions (Eroglu and Harrell, 1986; Eroglu & Machleit, 1990; Hui & Bateson, 1991). For example, previous findings have demonstrated that high levels of visual complexity are strongly correlated to the phenomenon of online crowding which is one of the strongest causes of stress among consumers while shopping (Eroglu & Machleit, 1990; Nadal, Munar, Marty, & Cela-Conde, 2010). In particular, the feeling of crowding has proven to be experienced when the environment is judged as *dys*-functionally dense, resulting in a sense of confusion and anxiety for consumers (Eroglu & Harrell, 1986).

Furthermore, when first evaluating a retailer website, one of the biggest barriers to the finalization of the purchase is represented by the *perceived risk* associated with online shopping (Forsythe & Shi, 2003; Benedicktus, Brady, Darke, & Voorhees, 2010). Previous research has shown that while shopping online, consumers tend to perceive a higher level of risk associated with the purchase (for example for the inability to judge product's quality) and the retailer itself compared to physical stores (KPMG, 2017).

According to previous studies, the aesthetic of a webpage can be used by consumers as an important cue to evaluate trustworthiness, and thus risks associated with the purchase from a specific retailer (Baker, Grewal & Parasuraman, 1994). This makes the design of the online channel a critical part in the success of a less known retailer's website (Kim & Lennon, 2008). Indeed, it has been pointed out that aesthetically pleasing websites are believed to be more reliable and trustworthy (Robins & Holmes, 2008) and that a typical characteristic of a pleasing website's design is a moderate level of visual complexity (Berlyne, 1974). Hence, visual complexity can play a major role in shaping consumers' first impressions and in communicating retailer's reliability.

Finally, novel retailers can also communicate trustworthiness to their consumers by displaying on their website a *trust promoting seal*, that is, a logo indicating the trustworthiness of a retailer provided by a third party (Petty & Cacioppo, 1986). Indeed, trust promoting seals can have a moderating effect on the relationship between visual complexity and perceived risk because even if the website design is unpleasant for consumers, it may be that the presence of trust promoting seals can reduce the risk perceived by consumers, resulting in an increase of the online purchase intention. Hence, retailers should identify the most effective strategy (or evaluate the combination of multiple strategies) to communicate their trustworthiness and lower the perceived risk.

In sum, the purpose of this research is to understand the role of visual complexity in a fully online environment and its effect on perceived risk, which in turn can decrease purchase intention. Furthermore, the moderating role of trust promoting seals will be investigated to understand whether the relationship between visual complexity and perceived risk changes according to their presence or not.

#### **1.2 Problem Statement**

The aim of this research can be summarized in the following central problem statement:

To what extent does perceived risk mediate the effect of various levels of visual complexity (low, medium, and high) on purchase intention, and do trust promoting seals moderate this relationship?

#### **1.3 Research Questions**

Based on those aspects, I developed the following research questions:

- To what extent do different degrees of visual complexity affect purchase intention, in an online retail environment?
- To what extent do different degrees of visual complexity affect customers' perceived risks in an online retail context?
- Does customers' perceived risk mediate the effect of different degrees of visual complexity on purchase intention?
- Does the presence of trust promoting seals moderate the relationship between visual complexity, perceived risk, and online purchase intention?

#### **1.4 Relevance**

#### 1.4.1 Academic relevance

This research contributes to the existent literature in different ways. First of all, this study enriches current literature on visual complexity. Indeed, previous studies have shown contradictory results in predicting the optimum degree of visual complexity that should be applied when designing a website (Mai, Hoffmann, Schwarz, Niemand, & Seidel, 2014). In this sense, the current research aims to investigate in depth how different degrees of visual complexity correspond to different consumers' reactions. Furthermore, previous research focused mainly on perceptions of visual complexity related to advertising, readability of a text, colors, and links shown in websites (Deng & Poole, 2012; Liqiong & Poole, 2010; Geissler *et al.*, 2006; Putrevu, Tan & Lord, 2004; Sohn, Seegebarth, & Moritz, 2017; Tuch, Bargas-Avila, Opwis & Wilhelm, 2009). In the present study, instead, the concept of *visual complexity* is used to refer to the number and variety of products shown on the homepage of a website. Thus, the

present study will enrich the existing field of research and provide insights for future investigations.

Second, enhancing the findings of Eroglu, Machleit, & Davis (2001), who found that the atmospheric cues of an online shopping environment can influence consumers' shopping behavior, further contributions are made to the stream of literature about online store design, with the purpose of further exploring consumers' behavioral reactions to online stores perceived as crowded. Indeed, additional research is needed to fully understand the impact of this phenomenon on consumers' behavioral intentions (Eroglu, Machleit, & Davis, 2001; Machleit, Kellaris & Eroglu, 1994). Research to date mainly focused on the impact of physical stores crowding on consumers emotions and behavior. For example, Eroglu & Machleit (1990) found that the higher the level of crowdedness perceived, the lower the satisfaction with the shopping experience. In the same vein, Pons & Laroche (2007) found that the perception of a service environment as crowded, has a negative effect on consumers' satisfaction with the service itself. However, little research has been done about the perceived crowdedness of a fully online environment (Eroglu, Machleit, & Davis, 2001; Levi, 2008; Machleit, Kellaris & Eroglu, 1994). Messer and Leischnig (2015) were the first to assess the negative effects of spatial crowding in an online environment. Drawing from their results, Sohn, Seegebarth, & Moritz (2017) showed the negative effect of spatial crowding on consumers' satisfaction with the shopping experience when browsing an online store through a smartphone. The present study and its findings aim to shed light on the problem of crowding in a fully online environment by narrowing down the research field and specifically, this research aims to understand the effect of visual complexity on the specific consumer behavior of online purchase intention.

Finally, this research contributes to the current literature on process fluency, which is referred to as the ease of processing information related to a stimulus (Alter & Oppenheimer, 2009). According to previous research, the higher the degree of process fluency experienced, the higher the likelihood of consumers' positive behavioral intention (Kolesova & Singh, 2019; Reber, Wurtz, & Zimmermann, 2004). Visual Complexity has been recognized as a major driver of process fluency, increasing the difficulty of evaluating stimuli and thus, leading to a less favorable behavior (Orth & Crouch, 2014). Previous studies widely investigated the relationship between process fluency and consumers' trust or judgments about the product or the retailers but there is still a lack of literature on risk perception related to this process. Indeed, apart from Song & Schwartz (2008) who investigate fluency effects related to risk perception and familiarity of a stimulus, fluency literature has focused almost exclusively on trust,

familiarity, and prototypicality, with unclear relevance for risk perception. Thus, the present research aims to address this gap and enrich the existing literature on the topic.

#### 1.4.2 Managerial Relevance

This study is also relevant from a managerial perspective. First of all, this research provides important tactical insights for both web designers and managers. When designing their websites, online retailers should be aware and control for the degree of visual complexity shown on their homepage to encourage consumers to purchase their products. Specifically, since the aim of an online store is to sell retailer's products, this study provides relevant considerations about the number and the variety of products to be displayed on the homepage. Thus, the present research aims to provide evidence about the optimal level of complexity to use in a website to foster positive behavioral outcomes.

Second, this research might be particularly relevant for retailers who are not well known in the market. Indeed, these retailers may find it difficult to lower the level of risk perceived by customers and therefore to engage them in the process of buying the product from e-commerce (McKnight, Choudhury, & Kacmar, 2002). That is why for these retailers the first impression is a crucial part of the online interaction with the customer. Since consumers often rely on the aesthetics of a website to develop their initial judgments about products and/or retailers, retailers should control the visual design of their homepage to convey enough trust and to succeed in lowering consumers' risk perception (Tractinsky, Cokhavi, Kirschenbaum & Sharfi, 2006; Tractinsky, Katz & Ikar, 2000).

Nevertheless, since visual complexity contributes to the visual aesthetics of a website, the present research provides interesting suggestions about how complexity (and eventually fluency) manipulation may have a role in the management of perceived risk. Furthermore, the introduction of trust promoting seals as a moderator of the relationship between visual complexity and product risk perception, provides further insights for those retailers who struggle in conveying trust to their consumers. Indeed, the present research has the aim of interpreting whether the presence of a sign of assurance of the reliability of the retailer can make a difference in consumers' perception of risk.

#### **1.5 Research Design**

To answer the problem statement and its research questions, a literature review and an experiment were performed. The literature review was conducted with the aim of giving a theoretical overview of the main variables of this study and of their relationship. To test the conceptual model, empirical quantitative research was done via an online experiment to investigate the relationships between the variables, answer the research questions and demonstrate the proposed hypotheses. The online experiment has been based on a 3 by 2 between-subjects design in which visual complexity (*High vs. Medium vs. Low*), as well as Trust Promoting Seals (*Presence vs. Absence*), were manipulated resulting in six experimental conditions. Participants were randomly assigned to one of the six conditions and presented with a picture of a visually complex website's homepage with or without showing the trust promoting seal. Once the data were gathered, the entire model was tested for moderation and mediation effects.

#### **1.6** Structure of the Thesis

This thesis is organized into five chapters. In the next chapter, a literature review will be carried out and then the theoretical concepts relevant to the present study will be defined and discussed. Furthermore, I will discuss the relationships between the different variables and then formulate the main hypotheses related to this study. In chapter three, I will explain the research method and discuss the experimental design. After gathering data, the results of the research will be presented in chapter four. Finally, in chapter five, the conclusion, recommendations, and limitations of this study will be discussed as well as the possible directions for future research.

# 2. Theoretical Framework

In this chapter, a theoretical overview of the present study will be provided. The main variables of this research, namely *Visual Complexity, Online Risk Perception, Online Purchase Intention,* and *Trust Promoting Seals* will be discussed as well as the interrelations between them, to develop the research hypotheses which will be tested later in the thesis.

#### 2.1 Visual Complexity

Although previous literature has already investigated the concept of visual complexity, finding a common definition shared by authors is a difficult task. However, almost all studies that have addressed the concept of visual complexity draw on Berlyne's definition of complexity. According to Berlyne (1960, p.38), complexity can be referred to as "the amount of variety or diversity in a stimulus pattern". Specifically, the author highlighted that complexity increases with the dissimilarities between elements or with the degree of perceptual grouping as well as with increasing numbers of different stimuli (Berlyne, 1960). Particularly referring to the online environment, Wu *et al.* (2016) stated that visual complexity of a web page is linked to the number of inputs and the number of information provided. On the same line of thought, Nadal, Munar, Marty, & Cela-Conde (2010) stated that complexity refers to the amount and variety of displayed elements in a specific webpage. Drawing from these definitions of visual complexity, the present study focuses on visual complexity as the number and variety of products displayed on a retailer's homepage.

When trying to find a common definition of visual complexity, some scholars have merged the meaning of visual complexity with the word "clutter" or "density" (Cox & Cox, 2002; Pieters, Wedel, & Zhang, 2007). For example, Mai *et al.* (2014) stated that the visual complexity of a website is the result of the presence of cluttered elements such as graphics, intricate textures, high-resolution images, or animations. Additionally, previous literature highlighted that a high degree of density can lead to a crowding feeling for consumers during online purchases (Eroglu & Machleit, 1990). In detail, the feeling of crowding is proven to be experienced when the environment is judged as *dys*-functionally dense, resulting in a sense of stress and anxiety for consumers (Eroglu & Harrell, 1986). Thus, the density of the product

displayed on the website seems to have a role in consumers' evaluation of the retailer and in shaping consumers' behaviors such as purchase intention (Park, Lennon & Stoel 2005).

Since visual complexity can be perceived after only a few seconds of interaction (Sohn, Seegebarth, & Moritz, 2017), it plays a crucial role in eliciting consumers' emotions and shaping their first impression of an online retailer (Tuch, Presslaber, Stocklin, Opwis, & Bargas-Avila, 2012). This is true particularly concerning the feelings of pleasure and arousal (Tuch, Bargas-Avila, Opwis, & Wilhelm, 2009). According to Berlyne's (1974) aesthetic theory, the relationship between visual complexity and pleasantness is believed to be represented by an inverted U-shaped curve. Specifically, Berlyne proposed that people tend to prefer a moderate level of complexity since a too complex stimulus can be perceived as unpleasant whereas a less complex stimulus can be perceived as boring (Berlyne, 1974).

Several studies support the above-mentioned theory. For example, Geissler *et al.* (2006) found that homepages of moderate complexity led to better communication effectiveness and result in a more favorable attitude and purchase intention from the consumers' side. In the same vein, Michailidou *et al.* (2008), in an experiment involving the presentation of 30 screenshots of web pages to consumers, found that higher levels of visual complexity negatively influence consumers' first impressions and aesthetic judgments. However, some researchers and theories have defined the relationship between visual complexity and pleasantness in a different way, such as linear or even quadratic (see Martindale, Moore, & Borkum, 1990 for a review), suggesting that even a little amount of complexity can lead to unfavorable attitudes. Thus, a debate remains open on the appropriate degree of visual complexity to be used in an online retailing environment and the present study aims to enrich the existing literature on this topic.

As a final point, it may be argued that visual complexity may recall the concept of choice overload, but the two notions are different. Although the two concepts both refer to the number of products, their intrinsic meaning makes them different. Indeed, choice overload or overchoice refers to the difficulty of consumers to decide when faced with a large number of total products offered by the retailer (Poynor & Diehl, 2007; Gourville & Soman, 2005; Mick, Broniarczyk, & Haidt, 2004), while, as for this study, visual complexity is intended as the number and variety of products shown on the homepage of a retailer and not as the entire online assortment provided. In fact, on the home page of a retailer's website, not all products are ever shown, but only a subset of them. Moreover, this research does not focus on the retailer's optimal assortment size. This study aims to analyze the impact of the design of an online retailer's home page, as assessed by customers through the amount and variety of products displayed, its impact on perceived risks, and its effects on potential customer behavior.

#### 2.1.1 Process Fluency

The underlying theory driving the effects of visual complexity is known as process fluency. This concept refers to the ease of processing information in respect of a particular stimulus (Alter & Oppenheimer, 2009). Process fluency theory argues that people tend to monitor the degree of effort required to process a specific stimulus (Novemsky, Dhar, Schwarz, & Simonson, 2007). The easier a stimulus is to perceive, the higher the degree of process fluency experienced by the individual (Janiszewski & Meyvis, 2001; Reber, Schwarz, & Winkielman, 2004; Reber, Wurtz, & Zimmermann, 2004). According to the existent literature, stimuli with specific characteristics such as simplicity, symmetry and clarity can increase the degree of perceived fluency (Reber & Schwarz, 2006; Reber, Schwarz, & Winkielman, 2004), and an increased level of fluency leads to a higher liking of the stimulus that will result in more positive behavioral intentions (Cabooter, Millet, Weijters, & Pandelaere, 2016; Kolesova & Singh, 2019; Lee & Labroo 2004; Novemsky, *et al.*, 2007; Schwarz, 2004). For example, Novemsky, *et al.* (2007) demonstrated that when consumers were faced with a difficult to read text (i.e., low degree of process fluency), the likelihood of the purchase significantly decreased.

According to Lee (2002), processing fluency has two meta-cognitive dimensions, namely conceptual and perceptual fluency. Conceptual fluency is often referred to as the process of recognizing the meaning of a stimulus with respect to the existing individual's knowledge structure (Lee & Labroo, 2004). Previous works that have dealt with this kind of fluency are often related to sentence manipulation and consumers' cognitive response (Lee & Labroo, 2004; Topolinski & Strack, 2009). Besides, perceptual fluency pertains to the processing of physical characteristics of a stimulus (Reber *et al.*, 2004). Studies about perceptual fluency mainly focus on visual and aesthetic elements of web stores such as font, size, color, product presentation and complexity (Reber, Winkielman, & Schwarz, 1998; Reber *et al.*, 2004; Graf, Mayer & Landwehr, 2018; Landwehr, Labroo, & Herrmann, 2011). Although this clear distinction has been made by previous literature, the two types of processes "result in a similar signal of fluency" (Winkielman, Schwarz, Fazendeiro & Reber, 2003, p.201) leading Winkielman *et al.* (2003) to use the term 'processing fluency' to capture both perceptual and conceptual fluency.

Visual complexity represents a key driver of process fluency. Specifically, previous research found that there is a negative linear relationship between the level of visual complexity and process fluency: the higher the former the lower the latter (Orth & Crouch, 2014; Reber *et* 

*al.*, 2004). Indeed, several studies have shown that stimuli lower in complexity are easier to process for consumers since those are characterized by a higher level of fluency and thus, the effort required to process the stimulus is lower (Janiszewski & Meyvis 2001; Reber *et al.*, 2004). Meanwhile, as the amount of complexity of certain stimuli increases, the cognitive effort required to elaborate the information increases too, leading to lower processing fluency and thus, to a negative behavioral intention. Hence, visual complexity needs to be taken into account when designing a retailer's website.

#### 2.2 Online Purchase Intention

According to the theory of planned behavior (TPB) (Azjen, 1991), consumers' actions can be predicted by their intentions. The present study aims to adopt online purchase intention as the main dependent variable to accurately predict consumers' online behavior. Previous research defined online purchase intention as the likelihood that a consumer will engage in a particular purchase behavior in an online environment (Close & KukarKinney, 2010; Salisbury, Pearson, Pearson, & Miller, 2001). In other words, online purchase intention can be referred to as a construct that gives the strength of a customer's intention to purchase online (Salisbury *et al.*, 2001).

Several studies focused on showing the influence of complexity and fluency on consumers' intention to purchase. For example, empirical findings demonstrate that when consumers experience high levels of process fluency (i.e., a low visual complexity degree), they are more likely to have a stronger purchase intention (Hsieh, Hsieh, Chiu, & Yang, 2014). In another study, Orth and Crouch (2014) stated that less complex stimuli, which require less cognitive effort (i.e., has a higher level of perceptual fluency), positively affect consumers' purchase intention. Additionally, Im, Lennon & Stoel (2010) demonstrated that when browsing a commercial website perceived as fluent, consumers' purchase intention increases. Finally, Wang, Ma, Chen, Ye, & Xu (2020), found that a moderate background complexity of a product image positively influences consumers' intention to purchase. These studies collectively suggest that in an online context, the less complex and effortless consumers perceive the website to be, the higher their purchase intention.

Drawing upon past research, I posit that lower levels of processing fluency, and thus, higher levels of visual complexity, will negatively influence consumers' purchase intention. Putting this formally: H1: A high (vs. medium vs. low) level of visual complexity decreases consumers' online purchase intention.

#### 2.3 The Mediating Role of Online Risk Perception

Perceived risk has been defined as "the expected negative utility associated with the purchase of a particular brand or product" (Dunn, Murphy, & Skelly, 1986, p.205). In the retail environment, perceived risk is considered one of the biggest barriers to shopping behavior as it is believed to be a key driver of consumers' anxiety and stress (Forsythe and Shi, 2003; Taylor, 1974). Indeed, consumers may be concerned about several aspects of purchasing. In particular, six components of purchase risk have been identified, namely physical, social, product, convenience, financial, and psychological risks (Jacoby & Kaplan, 1972; Peter & Tarpey, 1975). However, these six types of risks are rarely studied simultaneously.

Considering a fully online environment, as the current study does, what consumers are most concerned about is that they will incur in hidden costs during the purchase or that their expectations of the product will be disappointed once they get it (Kim *et al.*, 2008; Lu, Hsu, & Hsu, 2005). Hence, product and financial risks seem to be the most relevant risks to evaluate in an online shopping environment (Kim *et al.*, 2008; Lu, Hsu, & Hsu, 2005). Furthermore, the difficulty of judging the product quality due to its intangibility enhances the possibility of being disappointed by the product itself and makes product risk of greater importance than financial risk (Bhatnagar and Ghose, 2004; Dai, 2007; Garbarino & Strahilevitz, 2004). Thus, the present study will focus on perceived product risk.

Product risk has been referred to as the presumption that the product performance will not meet one's expectations (Kim *et al.*, 2008). According to Sweeney *et al.* (1999, p.81), "When making a purchase decision, consumers are always faced with some concern over the performance of the product since perfect information regarding future performance is never known". Indeed, in physical stores, consumers can try, check, and feel the product before buying it, while during online shopping, consumers can only rely on the information provided by the retailer (such as images, sizes, and description of the product) to evaluate the quality of products and retailer trustworthiness, a process that raises several doubts in consumers' minds and leads to a higher perception of risk associated with the purchase (Forsythe *et al.* 2006).

Previous research has concluded that the visual design of the webpage plays a key role in influencing the trustworthiness of an online retailer, and thus consumers' perceived risk. Indeed, some scholars pointed out that the aesthetic of a website is the most important cue on which consumers base their first impression about the product and the reliability of the retailer (Fogg *et al.*, 2003; Jarvenpaa & Tractinsky, 1999; Van der Heijden *et al.*, 2003). For instance, Fogg *et al.* (2003) found out that when assessing the reliability of a web page, 46.1% of the time consumers based their judgment on the design look of the website. In the same vein, Wang and Emurian (2005) claimed that perceived trust in an online retailer can be influenced by the visual interface of the website and thus, by its design elements. Finally, according to Park and Stoel (2005) website and online product presentation play a crucial role in consumers' evaluative process by reducing perceptions of risk and uncertainty associated with purchasing online, increasing trust in the retailer, and consequently, enhancing consumers' purchase intention.

Drawing from these findings, other authors found a relationship between visual complexity (or process fluency) and perceived risk. According to Kim & Lennon (2000), the lower the degree of processing fluency (i.e., high degree of complexity) perceived by consumers, the higher the degree of perceived risk involved in the purchase. In the same vein, Song and Schwartz (2009) found that process fluency, in terms of complexity, has an important role in the evaluation of risks. In their research, they focused on the complexity of word pronunciation and demonstrated that hard-to-pronounce words lead to an increase in consumers' risk perception. In line with their studies, this research aims to investigate the relationship between visual complexity and purchase intention, and the role that perceived product risk has in this relationship. Indeed, although there is no research directly linking the degree of visual complexity with the perceived risk associated with online purchasing, it seems reasonable to investigate the existence and nature of this bond.

Hence, the following hypothesis has been formulated:

# H2: A high (vs. medium, vs. low) level of visual complexity increases consumers' perceived risks.

Additionally, past literature has amply demonstrated that perception toward risk is prominent in determining consumers' purchasing behaviors (Ko, Jung, Kim & Shim, 2004). Earlier studies have proven how a higher degree of perceived product risk corresponds to a lower intention to purchase online (Akhlaq and Ahmed, 2015; Choi and Lee, 2003; Kim and

Lennon, 2013; Lee and Tan, 2003). For instance, Lee and Tan (2003) have shown how consumers who perceive higher level risk are less likely to complete online purchases. Furthermore, Park *et al.* (2005) argued that purchase intention will increase in environments where perceived risks are reduced through website design. In the same vein, Choi and Lee (2003) have shown that purchase intention increases when users perceive a lower degree of purchase risk and Jarvenpaa and Tractinsky (1999) argued that this happens even if the consumer attitude toward the store is not favorable. Moreover, Han and Kim (2017) stated that product risk negatively influences consumer purchase intention. Thus, prior findings validate perceived risk as a key predictor of online purchase intention.

Based on the above discussion, the following hypothesis has been stated:

H3: A high (vs. medium, vs. low) level of visual complexity decreases consumers' purchase intention, due to increased perceived risk.

#### 2.4 The Moderating Role of Trust Promoting Seals

As stated before, it is crucial for lesser-known retailers to effectively signal reliability on their website to attract more customers (Ba and Pavlou, 2002; Riegelsberger, Sasse, & McCarthy, 2005). Although there are several ways for retailers to communicate and promote their reliability, a recent neuromarketing study has shown that trust seals are the most efficient tools for increasing trust and lowering the degree of perceived consumer risk while purchasing online (Casado-Aranda *et al.*, 2019).

A trust promoting seal (or trust mark) is a logo provided by an independent third party, which is generally displayed on the e-tailer website and that certifies a retailer's reliability (Casado-Aranda *et al.*, 2019; Özpolat and Jank, 2015). According to Laric and Sarel (1981), trust promoting seals can be divided into three major categories, namely Factual, Warranty, and Evaluative seals. Factual marks certify the presence of a given characteristic of the product: examples of these types of marks are the indication of a geographical area or a specific ingredient of a product. Warranty marks refer to the assurance of a (partial or total) refund by the certifier in case of problems with the retailer. Finally, Evaluative seals are those marks that certify the quality and the reliability of a given retailer. Examples of the latter are TRUSTe, Norton, and Trustedshops seal, which will be taken into consideration further in this study.

Previous literature has investigated the role of trust promoting seals in reducing risk and enhancing trust in online retailers. Findings indicated that consumers' initial trust in an online retailer was positively influenced by the presence of a trust mark on the website (Gefen, Karahanna, & Straub, 2003; McKnight, Choudhury, & Kacmar, 2004). According to Kim & Benbasat (2003), when a retailer makes use of a trust promoting seal, consumers' perceived uncertainty and risk associated with online shopping are likely to be reduced. Additionally, Kerkhof and van Noort (2010) demonstrated that consumers perceive lower risk levels and more favorable attitudes toward a website when presented with trust cues such as third-party certifications (i.e., trust promoting seals). To better explain the role of trust seals in building consumers' trust in online vendors, Luo (2002, p.115) stated that trust promoting seals "can balance the power and provide the needed trust between the e-vendor and customers".

In the present research, I propose that the presence of a trust promoting seal on a retailer's webpage can mitigate the effect of visual complexity on consumers' risk perception. Specifically, trust promoting seals are expected to act as risk relievers, weakening the relationship between visual complexity and perceived product risk.

Putting this formally:

H4: The presence (vs. absence) of trust promoting seals will moderate the relationship between the different degrees of visual complexity (high vs. medium vs. low) and perceived product risk. Specifically, when the degree of visual complexity is higher, the perceived risk will be lower if trust promoting seals are displayed on the retailer's home page.

#### 2.5 Conceptual model

Considering the above-described relationships, the following conceptual model has been developed:



### **3. Research Methodology**

#### 3.1 Experiment Overview

The present study aims to measure the effect that different levels of *Visual Complexity* have on consumers' *Purchase Intention* and to assess the mediating role of *Perceived Product Risk* in an online environment. Besides, this work aims to discover to what extent the presence of *Trust Promoting Seals* moderates the relationship between *Visual Complexity* and *Perceived Product Risk*.

The present research adopted an online experimental design to answer the problem statement and its research questions. This kind of design is now considered a standard practice because of the vast number of people that can be reached in a relatively short time and because of the lower costs involved, compared to laboratory and field experiments (Birnbaum, 2004; Hair *et al.*, 2010; Reips, 2000). Besides, one of the disadvantages of this experimental design is that it does not allow plenty of control of the process (for example, the same subject can participate more than one time to the experiment, by opening the link by different devices). To minimize this problem, in the present study two countermeasures were adopted: first, a pretest was conducted, then, the randomized allocation of participants to only one condition of the main experiment was adopted (Reips, 2000).

The key purpose of the pretest was to validate the stimuli (*Visual Complexity* and *Trust Promoting Seals*) used in the main study, while the purpose of the main study was to test the hypotheses developed in Chapter 2.

The main study employed a **3** (*Visual complexity: high vs. medium vs. low*) **x 2** (*Trust Promoting Seals: presence vs. absence*) between-subjects design, where each respondent was exposed to only one treatment (Charness, Gneezy, & Kuhn, 2012). In this way, the carryover effects were avoided, since respondents would not have the opportunity to use what has been learned from one condition in the subsequent one (Charness *et al.*, 2012). Furthermore, with randomization, potential biases were avoided and the chance of being exposed to any treatment was equal for each participant.

#### 3.2 Pretest

The main purpose of the pretest was to identify the stimuli to be used in the main study. Three out of five stimuli that vary in visual complexity perception were selected from the pretest, as well as one of three different trust promoting seals.

In order to have consistent findings, at least 40 people were required to participate in the pretest (Deng & Poole, 2010). The pretest has been assessed by administering an online questionnaire made on Qualtrics. The sample was a nonprobability one, specifically, the so-called "convenience sample" and participants were reached mostly through the main social networks (Facebook, Instagram, and WhatsApp) from the author's personal network.

#### 3.2.1 Pretest Design

Similar to previous research, different versions of the same retailer homepage have been created to check the validity of the stimuli and to choose those to be used in the main experiment (Deng & Poole, 2010). For this research, five versions of a generic retailer's homepage have been created (See Appendix A). Drawing from Deng and Poole (2010) pretest experiment, participants were exposed to the homepage of a generic *fictitious* retailer ("EverythingYouNeed.com") rather than to an existing one, since participants might have held existing attitudes toward the already existing retailer and its brand that could have distorted their responses. Each homepage showed differed from the other only in the number and variety of products displayed to consumers, representing different levels of visual complexity. In choosing product images, only product pictures with a white background were selected, to reduce the possible interference effect of figure-background contrast. Other components such as links, colors, and fonts have not been varied between the different scenarios and have been kept at a base level so as not to affect the results of the experiment. Furthermore, participants were not provided with the prices of the different products to avoid other possible biases related to their income.

As explained in Chapter 2, the concept of visual complexity intended as number and variety of products is different from the notion of choice overload. However, to avoid confusion about these concepts among participants, three countermeasures were implemented. As for the design part, below each product, the words "See More" were inserted. This expedient should remind the consumer that the products shown did not represent the online retailer's entire assortment.

In addition, the instructions of the questionnaire pointed out that the screens the participant would have seen represented the homepage of an online store. Furthermore, drawing from Diehl & Poynor (2010), a manipulation check with which choice overload was measured using a multi-item scale was included. Specifically, participants indicated the extent to which they felt overwhelmed and disorientated in viewing the homepage, as well as how difficult it was to understand the number of choices available.

Additionally, the pretest aimed to test the reliability of different trust promoting seals. Participants were asked to rate the trustworthiness of three existing trust marks so that the one with the highest score was chosen to be used in the main study. For the pilot study, three trust marks were selected, namely, *Norton Secured (VeriSign), Trustedshops* and *TRUSTe* because, according to Kool et. *al* (2012) who carried out a study for and published by the European Commission, those trust marks are the most influential of their type. Each of the three logos shown to the participants had a white background to make it as simple as possible and avoid potential biases that could have interfered with the present study (see Appendix B).

After reading the instructions, participants were presented with the five stimuli (each one with a different level of visual complexity) in a randomized order, to avoid the carryout bias. The simplest stimulus showed six products belonging to only one category (lower level of visual complexity considered in this study). The number of products showed in each image grew in an arithmetic progression with a common difference of four, from six up to twenty-two products in the most complex picture (highest level of visual complexity considered in this study). The same reasoning applied to the variety of products in terms of categories. In the most basic image, only one category was showed, which increased by four in subsequent images until seventeen categories were shown in the most complex image (see Appendix C).

First, participants were asked to rate each question from the four-item Visual Complexity Scale, then those from the three item Choice Overload scale. After that, participants were asked to assess the trustworthiness of the three trust promoting seals. At the end of the survey, demographic questions were asked to learn more about the sample (See Appendix D for the full survey).

#### 3.2.2 Scale and Measurements

*Visual Complexity, Choice Overload* and trustworthiness of *Trust Promoting Seals* were measured in the pre-test. An outline of the scales and the corresponding scale items will follow shortly (see Appendix E for full measurement scales).

- Visual Complexity: In order to select a valuable measurement tool for Visual Complexity to be used in the pretest of this study, the scale used by Geissler *et al.* (2006) was adopted, as their study was similar to the present research in that they also investigated the perception of visual complexity of stores' homepage. To assess Visual Complexity levels, they employed a four-item, 7-point Likert scale (1="Strongly Disagree", 7="Strongly Agree").
- Choice Overload: Drawing from previous research, (cf. Diehl & Poynor, 2010), the level of choice overload experienced by participants was assessed on a three-item, nine-point Likert scale (1 = "Not at all," and 9 = "Very much").
- **Trustworthiness of Trust Promoting Seals:** To assess the trustworthiness of the trust marks, the *Trust in Seal Provider scale* developed by West (2015) was adapted to this study and assessed on a seven-point Likert scale (1 = "Not at all," and 9 = "Very much").

#### 3.2.3 Pretest Results

In total, 45 respondents participated in the pretest (n=45), of which 29 were female, 15 were male, and 1 non-binary/third gender. Most participants (75%) belonged to the age group between 18 and 24 years old.

*Visual Complexity*. A one-way repeated measures ANOVA was conducted to determine if and how the perception of visual complexity changed between the five different stimuli created. Because the assumption of sphericity was violated by Mauchly's test, W = .288,  $\chi^2 = 52.74$ , p = .000, the degrees of freedom were corrected using Greenhouse-Geisser estimates of sphericity ( $\varepsilon = 0.585$ ). The results showed that there was a significant difference between the five visually complex conditions F(2.34, 102.91) = 108.23, p = .000. These findings suggested that one or some conditions were significantly perceived as more visually complex ( $M_{first_vc} = 2.95$ ,  $SD_{first_vc} = 1.29$ ;  $M_{second_vc} = 3.92$ ,  $SD_{second_vc} = 1.13$ ;  $M_{third_vc} = 4.97$ ,  $SD_{third_vc} = 0.88$ ;  $M_{fourth_vc} =$  5.29,  $SD_{fourth_vc} = 1.04$ ;  $M_{fifth_vc} = 6.78$ ,  $SD_{fifth_vc} = 0.59$ ). The post hoc test using the Bonferroni correction revealed that almost each mean was significantly different from the others apart from the third and the fourth condition pairwise means, that were not significantly different from each other.

One of the aims of the pretest was to select three out of five stimuli, respectively associated with a low, medium, and high level of visual complexity. Since the first and fifth conditions had the lowest and the highest score on visual complexity ( $M_{first} = 2.95$ , SD = 1,29;  $M_{fifth} = 6.78$ , SD = .59), they were chosen respectively as the low and high visual complexity conditions to be used in the main study. To select the medium visual complexity stimulus, the mean of the first and fifth stimuli score was computed ( $\frac{Mfirst + Mfifth}{2} = 4.87$ ) and compared with the mean of the remaining conditions. As the mean of the third stimulus was the closest to this new average value ( $M_{third} = 4.97$ , SD = .88), it was selected to be used in the main experiment together with the first and fifth stimuli (See Appendix F.A for the one-way repeated ANOVA results on visual complexity).

*Choice Overload*. Similarly, the extent to which participants felt overwhelmed by the number of choices displayed on the retailer's homepage was tested. Because the assumption of sphericity was violated by Mauchly's test, W = .660,  $\chi^2 = 17.64$ , p = .040, the degrees of freedom were corrected using Huynh-Feldt estimates of sphericity ( $\varepsilon = 0.920$ ). The Huynh-Feldt correction determined that the choice overload means differed significantly over the five conditions F (3.68, 161.96) = 3.70, p = .008 ( $M_{first\_co} = 4.39$ ,  $SD_{first\_co} = 1.07$ ;  $M_{second\_co} = 4.48$ ,  $SD_{second\_co} = .99$ ;  $M_{third\_co} = 4.87$ ,  $SD_{third\_co} = 1.19$ ;  $M_{fourth\_co} = 4.92$ ,  $SD_{fourth\_co} = 1.28$ ;  $M_{fifth\_co} = 5.03$ ,  $SD_{fifth\_co} = .98$ ). However, the post hoc tests using the Bonferroni correction indicate that almost none of the means was significantly different from the others. Indeed, apart from the mean difference between the first and the fifth stimuli (p=0.05), which was found to be slightly significant, the other means did not significantly differ. Such a result must be considered while discussing the conclusion of this study. (See Appendix F.B for the one-way repeated ANOVA results on choice overload).

*Trust Promoting Seals.* A one-way repeated measures ANOVA was conducted to determine what Trust Promoting Seal was considered more trustworthy by the sample. In this case, the assumption of sphericity was met by Mauchly's test, W = .881,  $\chi^2 = 5.45$ , p = .065. The results show that there was a significant effect of which seal was perceived as more trustworthy, F(2, 88) = 4.93, p = .009. The ANOVA analysis showed that participants considered the Norton trust mark more reliable ( $M_{Norton} = 4.82$ , SD = 1.51) compared to the

Trusted shop mark ( $M_{TrustedShop} = 3.91$ , SD = 1.39). However, neither condition significantly differed from participants' perceived trustworthiness of the TRUSTe seal ( $M_{TRUSTe} = 4.44$ ; SD = 1.73). As the Norton seal had the highest score in trustworthiness, it was selected to be used in the main study (See Appendix F.C for the one-way repeated ANOVA results on Trust Promoting Seals).

#### 3.3 Main Study

The goal of the main study was to gain an understanding of the effects of visual complexity on perceived product risk and online purchase intention. The experiment of this study also shed light on the moderation effect of trust promoting seals on the relationship between visual complexity and perceived product risk. In the following paragraph the sample, the measures, and the design of the main experiment will be outlined.

#### 3.3.1 Population and Sample

The population of this study consisted of Europeans of any age. The absence of any age limit is because e-commerce is used by people of any age. To determine the sample size, Sawyer and Ball's (1981) rule of thumb was used. According to their study, at least 30 participants are needed per experimental condition. Thus, since the main experiment of this work consisted of six conditions, at least 180 participants were required.

Subjects for the main experiment were reached through convenience sampling from the researcher's network. This method allowed for lower data collection costs, greater efficiency, and ease of use (Sekaran & Bougie, 2016). Invitations to take part in the experiment were sent to the participants via the main social networks namely, WhatsApp, Instagram, and Facebook, just as for the pretest.

However, in order to avoid possible bias and interference with the research results, it was made sure that the participants involved in the pretest did not also take part in the main study. To achieve this result, before starting the experiment, the participants were asked whether they had participated in the pilot study. In the event of an affirmative answer, the questionnaire would have ended and, therefore, the participant would not have had access to the main experiment.

#### 3.3.2 Design

The main experiment consisted of an online study where participants were asked to fill in a survey. To the aim of this research, two variables were manipulated: Visual Complexity (*high vs. medium vs. low*) and Trust Promoting Seals (*presence vs. absence*).

As a result of the pretest, the different levels of visual complexity belonging to the different images shown have been defined. For this study, the images with *low - medium - high* visual complexity scores have been selected and used as the main conditions.

Furthermore, the pretest allowed for the identification of the trust mark to be used in the main study. In three of the six visual complexity conditions (*high vs. medium vs. low*) the trust mark was applied. To avoid possible biases, the logo was applied in the same position in each of the conditions: specifically, in the top left corner (See Appendix G). The other three visual complexity conditions (*high vs. medium vs. low*) have been left at their basic level, meaning that the space previously occupied by the trust promoting seal has been left blank.

After reading the instructions, participants were randomized in one of the six conditions created. The conditions were: *low* visual complexity - *no* trust promoting seal; *low* visual complexity – trust promoting seal; *medium* visual complexity - *no* trust promoting seal; *medium* visual complexity - *no* trust promoting seal; *high* visual complexity - *no* trust p

#### 3.3.3 Scale and Measurements

Perceived Risk and Online Purchase Intention were measured with the aid of existing scales used in previous studies. An outline of the scales and the corresponding scale items will follow shortly (See Appendix I)

• **Perceived Product Risk:** Drawing on Grewal, Gotlieb, & Marmorstein (1994), Perceived Product Risk was measured with a three-item, 7-point Likert scale. The first item was measured on a scale that was measured on a scale that went from 1= "Very confident" to 7 = "Not confident at all". The second item was assessed with a scale that went from 1 = "Certain" to 7 = "Uncertain". The last item was measured on a scale from 1 = "Do feel sure" to 7 = "Do not feel sure". In this way, higher levels of the scale corresponded to higher levels of Perceived Product Risk.

• Purchase Intention: At the end of the questionnaire, before answering control and demographics questions, participants were asked to rate their purchase intention from the website shown. The scale used for measuring online purchase intention is the three-item, 7-point Likert scale used by Wang, Minor, & Wei (2011). The first item was measured on a scale from 1= "Strongly Disagree" to 7 = "Strongly Agree". The second item was measured on a scale that went from 1 = "Extremely unlikely" to 7 = "Extremely likely". The last item was measured on a scale that went from 1 = "Not Possible" to 7 = "Possible".

#### 3.3.4 Control Variable and Demographic Questions

At the end of the questionnaire, participants were asked to answer some closing questions. One question being whether the participant is used to buying online to control if this could be a confounding variable. Indeed, if the answer was not, consumers' perception of the homepage's complexity could be biased by their buying habits, rather than by the degree of visual complexity perceived. Finally, socio-demographic questions were asked to all participants (See Appendix J for the full survey). These variables were not the focus of my study, but to get a better test for my hypotheses, there is a need to control for their effects (Greene 2000).

#### 4. Results

In this chapter, the results of the analysis will be presented. First, I cleaned and organized the raw dataset, checked for the reliability of the variables' measurement scales, and then assessed the success of the randomization. Then, I performed the main analysis and provided the key findings.

#### 4.1 Data Preparation

Initially, 304 respondents participated in the main study (n = 304). After a first screening of the data, I found that 75 participants did not complete the full questionnaire, so their partial responses were dropped, which resulted in 229 useful responses. Additionally, a priori it was decided that the sample of this study should have been composed by European subjects, so I removed responses from three participants with non-European origins. Furthermore, to avoid possible bias, those subjects who had taken part in the pretest were not allowed to take part in the main study, resulting in the discarding of 33 additional answers. Therefore, the final sample size after the data inspection resulted in 193 (n=193) useful responses.

The structure of the sample was composed for the 47.2% of male respondents (n = 91), for the 51.3% of female subjects (n=99), for the 1% of people who preferred not to say their gender (n = 2), and finally for the .5% of people who belonged to a non-binary or third gender (n=1). As for the age, the analysis showed that 56% of the participants belonged to the age group between 18 and 24 years (n=108), 25% to the age group between 25 and 34 years old (n=50), and 11.9% belonged to the group between 35 and 44 years old (n=23).

In sum, the demographic factors showed that the participants of the study were both male and female predominantly of 18 up to 25 years old, which could be due to the fact that subjects of the study were recruited by means of convenience sampling. For a more detailed overview of the sample structure, please refer to Appendix K.A.

#### 4.1.1 Reliability analysis

To assess the internal consistency of the measurement scales, a reliability analysis was performed. According to George & Mallery (2018), to be considered reliable a scale should

have a Cronbach's Alpha of at least  $\alpha = 0.70$ . Results from the analysis showed that both the Product Risk Perception and the Online Purchase Intention provided an excellent internal consistency (Product risk perception:  $\alpha = 0.937$ ; Online Purchase Intention:  $\alpha = 0.936$ ), thus, were considered highly reliable (See Appendix K.B).

#### 4.1.2 Randomization check

To test whether all participants were equally randomized across the six conditions used in the main experiment, a randomization check was done. At first, a one-way ANOVA analysis on age was performed, from which it could be concluded that there were no significant differences between the age groups (F(5,187) = .699, p = .625;  $M_{first\_cond} = 3.00$ ,  $SD_{first\_cond} = 1.45$ ;  $M_{second\_cond} = 2.77$ ,  $SD_{second\_cond} = 1.45$ ;  $M_{third\_cond} = 2.72$ ,  $SD_{third\_cond} = .974$ ;  $M_{fourth\_cond} = 2.50$ ,  $SD_{fourth\_cond} = .655$ ;  $M_{fifth\_cond} = 2.67$ ,  $SD_{fifth\_cond} = .894$ ;  $M_{sixth\_cond} = 2.85$ ,  $SD_{sixth\_cond} = 1.13$ ). Then, a one-way ANOVA on gender was performed, which, again, revealed no significant differences between the groups (F(5,187) = .692, p = .630;  $M_{first\_cond} = 1.60$ ,  $SD_{first\_cond} = .503$ ;  $M_{second\_cond} = 1.69$ ,  $SD_{second\_cond} = .736$ ;  $M_{third\_cond} = 1.61$ ,  $SD_{third\_cond} = .494$ ;  $M_{fourth\_cond} = 1.50$ ,  $SD_{fourth\_cond} = .507$ ;  $M_{fifth\_cond} = 1.53$ ,  $SD_{fifth\_cond} = .506$ ;  $M_{sixth\_cond} = 1.46$ ,  $SD_{sixth\_cond} = .643$ ). The results from the ANOVA analysis are provided in Appendix K.C and K.D. Moreover, differences in familiarity with online shopping were checked through a chi-squared test. The analysis showed that there were no differences between the groups in terms of familiarity with online shopping ( $\chi^2(5) = 6.923$ , p = .226), meaning that this variable cannot confound the responses. In sum, all participants were randomized equally and successfully (See Appendix K.E).

#### 4.2 Main Analysis

To perform the main analysis, first, I examined the relationship between variables through two-way ANOVA. Then, the model was tested with a Preacher-Hayes bootstraps test (Macro Process Model 4) developed by Hayes (2013).

#### 4.2.1 Visual Complexity - Product Risk Perception

A two-way ANOVA with Product Risk Perception as the dependent variable and Visual Complexity, Trust Promoting Seals and their interaction as the independent variables revealed a significant main effect of Visual Complexity on Product Risk Perception (F(2, 187) = 41.33; p = .000) which indicates that consumers' Perceived Product Risk varied depending on the level of Visual Complexity showed on the homepage. In line with what was hypothesized in

Complex condition perceived a lower degree of Product Risk compared to those assigned to the medium or the high Visually Complex condition ( $M_{low\_vc} = 2.99$ ;  $SD_{low\_vc} = 1.71$  vs.  $M_{med\_vc} = 3.70$ ;  $SD_{med\_vc} = 1.11$  vs.  $M_{high\_vc} = 5.38$ ;  $SD_{high\_vc} = 1.39$ ). Specifically, results pointed out that Product Risk Perception varied between the low and the medium level of Visual Complexity ( $MD_{lowvs.med} = -1.47$ ; SE = .26; p = .000), between the

H2, consumers who were assigned to the low Visually



Figure 3: Product Risk Perception Measurement for Visual Complexity Levels and Trust Promoting Seals

low and high level of Visual Complexity ( $MD_{lowvs.high} = -2.39$ ; SE = .26; p = .000), and finally between the medium and high level of Visual Complexity ( $MD_{medvs.high} = -.93$ ; SE = .23; p = .000). In sum, these results revealed that higher levels of Visual Complexity, correspond to higher levels of Product Risk Perception.

In addition, a significant main effect of Trust promoting Seals on Product Risk Perception was observed (F(1,187) = 5.056; p = .026). As expected, results revealed that those who have seen the Trust Promoting Seal on the retailer's homepage, perceived less risk associated with the product than those exposed to the condition without trust promoting seal ( $M_{TPS\_present} = 4.04$ ;  $SD_{TPS\_present} = 1.48$  vs.  $M_{TPS\_absent} = 4.50$ ;  $SD_{TPS\_absent} = 1.33$ ). Finally, the interaction between Visual Complexity and Trust Promoting Seals was found to be not significant (F(2,187) = .233; p = .792). This result is inconsistent with the hypothesis H4, which stated that the relationship between Visual Complexity and Perceived Product Risk would have been mitigated by the presence of Trust Promoting Seals. In sum, findings revealed that the higher the level of Visual Complexity, the higher the level of consumers' Product Risk Perception and that the presence of Trust Promoting Seals does not affect this relationship. (See Appendix K.F).

#### 4.2.2 Visual Complexity - Online Purchase intention

A two-way ANOVA analysis with Online Purchase Intention as the dependent variable Visual Complexity, Trust Promoting Seals, and their interaction as the independent variables revealed a significant main effect of Visual Complexity (F(2,187) = 10.331, p = .000), and of Trust Promoting Seals (F(1,187) = 27.852, p = .000) on Online Purchase Intention. Results

from the analysis showed that consumers from the high Visual Complexity condition had a lower Intention to Purchase Online compared to those from the medium or low Visual Complexity condition ( $M_{low_vc} = 4.07$ ;  $SD_{low_vc}$ = 1.67 vs.  $M_{med_vc} = 3.33$ ;  $SD_{med_vc} = 1.37$  vs.  $M_{high_vc} = 2.82$ ;  $SD_{high_vc} = 1.31$ ), confirming hypothesis H1. More specifically, Online Purchase Intention significantly varied between the low and the medium level of Visual Complexity ( $MD_{lowvs.med} = .833$ ; SE = 0.28; p =



Figure 4: Online Purchase Intention Measurement for Visual Complexity Levels and Trust Promoting Seals

.009), and between the low and high level of Visual Complexity ( $MD_{lowvs.high} = 1.32$ ; SE = .28; p = .000). However, the mean difference between the medium and high level of Visual Complexity ( $MD_{medvs.high} = .48$ ; SE = 0.24 p = .116) was found not to be significant. Moreover, results revealed that those subjects exposed to the Trust Promoting Seal reported a higher Online Purchase Intention ( $M_{TPS\_present} = 3.98$ ;  $SD_{TPS\_present} = 1.73 vs. M_{TPS\_absent} = 2.83$ ;  $SD_{TPS\_absent} = 1.17$ ), as expected. However, no significant interaction between Visual complexity and Trust Promoting Seals was observed (F(2,187) = 2.31, p = .102).

In sum, these findings lent support to H1 as a higher level of Visual Complexity led to a lower Online Purchase Intention compared to a moderate or low level of Visual Complexity presented on the retailer's homepage. (See Appendix K.G).

#### 4.2.3 Mediation Analysis (MACRO PROCESS 4)

Since no significant interaction effect between Visual Complexity and Trust Promoting Seals was found, I proceeded with a simple mediation analysis by means of Macro Process Model 4 developed by Hayes (2013). However, before conducting the analysis, it was necessary to ensure that the assumptions for conducting it were verified (See Appendix K.H). First, through a linear regression analysis, it was checked whether the residuals of the regression followed a normal distribution. By means of this analysis, it could be concluded that the normality assumption was met. Secondly, the homoscedasticity assumption was checked. From the scatterplot, it could be concluded that the homoscedasticity assumption has not been violated. Finally, it was checked whether the absence of multicollinearity assumption was met. As for this requirement, the VIF values were below ten, indicating that also this assumption was met. Since all the requirements for the mediation analysis were met, I proceeded with the mediation analysis by means of Macro Process Model 4 by Hayes (2013). The analysis was conducted by setting Visual Complexity as the independent variable, Online Purchase intention as the dependent variable, and Product Risk Perception as the mediator.

Results from the analysis showed a significant positive effect of Visual Complexity (both for the medium and the high levels) on Product Risk Perception ( $b_{vc\_med} = 1.44$ , t = 5.46, p =.000;  $b_{vc\_high} = 2.38$ , t = 9.09, p = .000), suggesting that the higher the level of Visual Complexity, the higher the Perceived Risk associated with that purchase. By means of these findings it could be concluded that the hypothesis H2 is confirmed.

Furthermore, it has been found that Product Risk Perception was negatively related to Online Purchase Intention (b = -.668, t = -10,09, p = .000), meaning that when consumers perceive higher level of risk associated with the online purchase, their intention to buy decreases significantly. Additionally, results showed that Visual Complexity was a significant predictor of Online Purchase Intention ( $b_{vc\_med} = -.79$ , t = -7.64, p = .008;  $b_{vc\_high} = -1.26$ , t = -4.26, p = .000), which implies that by increasing the number of products and their variety (e.g., Visual Complexity), consumers' Online Purchase Intention significantly decreases. These results were in line with hypothesis H1, which therefore was accepted. As for the direct effect of Visual Complexity on Purchase Intention through Perceived Product Risk (c'-path), results revealed this relationship to be not significant ( $b_{vc\_med} = .17$ , t = .68, p = .50;  $b_{vc\_high} = .33$ , t = 1.16, p = .25). The indirect effect of Visual Complexity on Online Purchase Intention through Perceived Product Risk (c'-path), results revealed Risk Perception (ab-path) was found significant, ( $b_{vc\_med} = .58$ , 95% C.I. = -1.38, -.54;  $b_{vc\_high} = .96$ ,
95% C.I. = -2.13, -1,07), confirming the hypothesis H3. In sum these results showed the existence of full mediation (See Appendix K.I).

Finally, by means of additional Macro Process Model 4 mediation analyses, I also checked whether the relationship between Visual Complexity, Perceived Product Risk and Online Purchase Intention changed when controlling for age, gender, or familiarity with online shopping. As for gender, it was proven to not have a significant effect on Product Risk Perception (b = .09, t = .51, p = .61), neither on Online Purchase Intention (b = .03, t = .17, p = .86). The same results were shown for age; indeed, it did not affect Product Risk Perception (b = .05, t = .53, p = .59) nor Online Purchase Intention (b = .12, t = 1.38, p = .17). Additionally, the effect of familiarity with online shopping on Product Risk Perception was not significant (b = -.83, t = -1.01, p = .31), and the same result was revealed for Online Purchase Intention (b = -0.05, t = -0.06, p = .95) (See Appendix K.J, K.K, and K.L).

# 5. Discussion, Recommendation, Limitations, and Future Research

In this last chapter, the findings of the main study will be presented and discussed. A dissertation of the practical and theoretical implications will then follow, to finally end with the limitations of the study and future research suggestions.

#### **5.1 Discussion**

The present study examined the effect of different levels of visual complexity on consumers' online behavior. Specifically, I was interested in understanding whether there was a direct relationship between visual complexity and online purchase intention and to what extent this relationship could be explained by consumers' perceived product risk. In addition, I was also interested in determining the role of a trust promoting seal in this relationship. In sum, the main goal of this study was summarized in the following problem statement: *To what extent does perceived risk mediate the effect of various levels of visual complexity (low, medium, and high) on purchase intention, and do trust promoting seals moderate this relationship?* 

In this research, six versions of a retailer's homepage showing a high (with or without trust promoting seal), medium (with or without trust promoting seal) level of Visual Complexity have been realized and consumers' Online Purchase Intention was measured for each condition. Overall, the main study provided support for H1, which stated that a high level of Visual Complexity decreases consumers' Intention to Purchase Online. However, results are in contrast with Berlyne's aesthetic theory (1974), showing that the relationship between Visual Complexity and Online Purchase Intention was not described by an inverted U-shaped curve. To illustrate, drawing from Berlyne's theory, I expected that a high or a low level of Visual Complexity would have reduced consumers' Online Purchase Intention compared to a medium Visual Complexity level. By contrast, the present research found that consumers' intention to buy online is higher when they are faced with a low degree of Visual Complexity. However, it must be considered that the high Visual Complexity condition was found to be marginally significantly different compared to low Visual Complexity condition in terms of Choice Overload (p=0.05). This means that when consumers

were presented with the high Visual Complexity condition, they felt overwhelmed and found it hard to make a decision compared to the low Visual Complexity condition.

Furthermore, I checked for the effect of Visual Complexity on Product Risk Perception: in previous chapters, it was hypothesized that a higher level of Visual Complexity corresponds to a higher level of Product Risk Perception. As expected, a significant effect of Visual Complexity on Product Risk Perception was revealed, meaning that a higher level of Visual Complexity corresponds to higher degrees of Product Perceived Risk, supporting the hypothesis H2. Additionally, I tested if the relationship between Visual Complexity and Product Risk Perception was negatively moderated by the presence of a Trust Promoting Seal. The analysis has demonstrated that the presence of a trust mark does not weaken (nor strengthen) the relationship between Visual Complexity and Perceived Product Risk. In other words, the Trust Promoting Seal does not play a key role in shaping people's perception of the risk associated with a product when consumers are faced with a high visually complex retailer's website. This result may be related to the fact that most of the sample belongs to an age group between 18 and 30 years old. Indeed, it has been shown that older people typically tend to rely more on mechanisms that promote trustworthiness, such as trust promoting seals (Dychtwald & Gable, 1990; Lumpkin, Caballero & Chanko, 1989).

Finally, it was hypothesized and confirmed by the analysis that the relationship between Visual Complexity and Online Purchase Intention was explained by consumers' Product Risk Perception. Specifically, results have shown that the relationship between Visual Complexity and Online Purchase Intention was mediated by consumers' Perceived Risk associated with the purchase. Thus, results lead support to hypothesis H3.

In sum, all the hypotheses that have been made were verified.

#### **5.2 Theoretical and Practical Implications**

Theoretically, this study has several implications. First, the present research enriches current literature on visual complexity and its behavioral implications. Previous studies focused on online visual complexity perception based on elements such as links, colors, text readability, and advertising, while the current research identifies different stimuli designs that are associated with visual complexity. Specifically, the definition of visual complexity taken in consideration for this study refers to the number and variety of products shown in a retailer's homepage. Furthermore, the present research does not support Berlyne's aesthetic theory (1974) which

describes the relationship between visual complexity and pleasantness as an inverted U-shaped curve. Indeed, findings of this study suggest that the less visually complex the homepage, the less consumers' perception of product risk and thus, the higher the intention to buy from that website. Moreover, enhancing the study from Song and Schwarz (2008), the present work enriches the current literature on process fluency and perceived risk. Indeed, apart from Song and Schwarz (2008) study, none of the previous research have investigated the relationship between process fluency and risk perception, which instead was one of the main focuses of the present work. In line with their study, results showed that when faced with visually complex stimulus, perceived as dysfluent, consumers' online purchase intention decreased significantly. Besides, this study contributes to the stream of literature on online store environments, retailers' web stores and consumers' behavioral outcomes, enhancing Eroglu, Machleit, and Davis (2003), Wu *et al.* (2016) and Orth and Crouch (2014) studies, by demonstrating how a higher degree visual complexity negative influences online purchase intention.

This study also generates some practical implications. First, the results show the importance of a simple design in shaping consumers' risk perception and intention to buy from an online retailer. Indeed, it is paramount for retailers to make a good first impression, and thus to minimize consumers' risk perception, to retain them on their webpages, increasing the chance of buying from the online store. Findings showed how an increasing number and variety of products significantly increases consumers' perception of risk related to that specific product, making consumers avoid the purchase. Additionally, I tested whether the presence of a trust mark on a retailer's website could influence the perception of risk caused by the level of visual complexity shown on a homepage. However, results showed that despite the presence of a trust promoting seal on the retailer's webstore, the perception of risk associated with the degree of visual complexity displayed was unaffected. Thus, it could be concluded that showing a trust promoting seal is not an effective way for retailers to control consumers' perceived product risk caused by an overly complex web page. In sum, retailers should pay regard to the design of their homepages, ensuring that all the elements displayed on the homepage are effective in minimizing the risk perceived by customers, only in this way they can increase the likelihood that consumers will buy from their website.

#### **5.3 Limitations and Avenues for Further Research**

This research has some limitations which firstly arise from the sample. Indeed, subjects for the main experiment were reached through convenience sampling from the researcher's personal network, which resulted in an overrepresentation of young adults. Thus, future research can try to reach a number of subjects where each age group is represented by a comparable number of participants.

Secondly, this research has considered only variety and number of products as factors influencing perception of home page complexity, while other features that may affect the visual complexity perception of a homepage, such as background complexity, background colors, screen size, use of animations, and links, were omitted from this study. Future research should investigate whether adding one or more of these stimuli to those used for this study leads to different conclusions.

Thirdly, the present work contemplated the role of only one type of perceived risk, namely Product Risk Perception. Further research might instead look into other types of online relevant risk (such as financial risk) as potential mediators of the relationship between Visual Complexity and Online Purchase Intention. Indeed, additional research is necessary to explore the effects of risk on consumers' shopping behavior.

Finally, although this research did not find a significant interaction effect between Visual Complexity and Trust Promoting Seals, future research should investigate other potential moderators. Indeed, the usage of third-party certifications is not the only trust-building strategy that retailers can use to convey reliability to their customers. For example, it can be investigated if satisfied customers reviews play a role in the described relationship.

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### **Appendix A: Stimulus Material for the Pretest**



#### Figure A.1 6 Products - 1 Category

#### Figure A.2 10 Products - 5 Categories



VISA 🚺 📷

	EverythingYouNeed.com					P	Ĵ∰.
=	HOME	BEST SELLERS	PRODUCTS	CATEGORIES	ABOUT US	CONTACTS	:
		Everything	you need	, just a click a	way.		
		Get 20%	off on your	first purchase!		start shopping	
	9					Series and the series of the s	
	See more	SER. HORE	SEP. INCP	See more See more	<u>540.000</u>	500 MMP	
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V/SA							

### Figure A.3 14 Products - 9 Categories

Figure A.4 18 Products - 13 Categories



VISA 🔘 🚟

#### Figure A.5 22 Products - 17 Categories

Ever	rythingYoi	Meed.com							٩	) jiii
=		HOME	BEST SE	ELLERS PRO	ODUCTS C	ATEGORIES	F	BOUT US CON	NTACTS	1
			Every	thing yo	ou need,	just a cli	ck away.			
			Get	20% off i	on your fi	irst purcha	se!	start s	shopping	
	9	M				L.			j	Ŵ
500 7000	589.000	524.00B	500.000	SEE. INVE	Set more	see more	SPE. MOR	See more	see more	500 1000
×	J	1	1	32	<b>B</b>		m		-J-	
SPR TIOP	<u>990 IIII0</u>	528. MOR	<u>988 0009</u>	SZE INDE	582.0002	See mar	See more	STA HOP	<u>200 800</u>	2 520 1002
VISA 🖤 📰										

### **Appendix B: Trust Promoting Seals**

#### Figure B.1

• Norton Secured



#### Figure B.2

• Trustedshops



#### Figure B.3

• TRUSTe



	TA	ABLE B.1	
Condition	Number of Products	Number of Categories	Categories
First	6	1	Household Appliances
Second	10	5	Apparel Baby Beauty Fitness Household Appliances
Third	14	9	Apparel Baby Beauty Books Fitness Household Appliances Pet Supplies Travel Gear Video Games & PC
Fourth	18	13	Apparel Art & Craft Baby Beauty Books Fitness Home & Garden Household Appliances Jewelry Pet Supplies Tools and Home Improvement Travel Gear Video Games & PC
Fifth	22	17	Apparel Art & Craft Automotive Baby Beauty Books Fitness Healt Supplies Home & Garden Household Appliances Jewelry Kitchen Movies and Television Pet Supplies Tools & Home Improvement Travel Gear Video Games & PC

# **Appendix C: List Of Categories**

### **Appendix D: Pretest Questionnaire**

#### Introduction

Dear respondent,

Thank you for agreeing to take part in this research. I'm a Marketing Analytics student at Tilburg University, and I am currently writing my Master's Thesis.

Your answers to this research will be only used for academic purposes, and will be kept completely **anonymous**.

Please answer as **<u>openly</u>** and **<u>truthfully</u>** as you can - there are no <u>**right**</u> or <u>**wrong**</u> answers! It will take you less than 5 minutes to complete this survey.

Thank you again for your time and effort.

If you have any questions or comments, feel free to contact me at s.castagna@tilburguniversity.edu or +39 3400625221

#### **Instructions**

In the following screens, you will see five different pictures.

Please look at them <u>carefully</u>, and answer the questions that will be displayed below each picture.

Keep in mind that these pictures represent a generic retailer's homepage.

#### Exposure to five scenarios (Randomized Order)

Please, look carefully at the following image and indicate on a scale from 1 (Strongly Disagree) to 7 (Strongly Agree) to what extent do you agree or disagree with the given statements.

EverythingYou	Need.com					Ĵ⊞.
	HOME	BEST SELLERS	PRODUCTS	CATEGORIES	ABOUT US CONTACTS	2
		Everything y	ou need, ju	st a click aw	vay.	
		Get 20% of	'f on your firs	t purchase!	start shopping	
		St ne	20.000	NE NE		
		 	SPLECE	К. М.		
/ISA 🚺 📷						

Note: this is an example. Each participant was shown all five conditions (See APPENDIX A)

#### 1st Set of Questions (Visual Complexity Questions)

The homepage shown is:

	Strongl y disagree	Disagre e	Somewha t disagree	Neither agree nor disagree	Somewha t agree	Agre e	Strongly agree
Complex	0	$\bigcirc$	$\bigcirc$	$\bigcirc$	$\bigcirc$	$\bigcirc$	$\bigcirc$
Dense	0	$\bigcirc$	0	$\bigcirc$	0	0	$\bigcirc$
Interactiv e	0	0	0	0	0	$\bigcirc$	$\bigcirc$

Has Much	$\bigcirc$						
Variety							

Note: This set of questions was showed for each of the five scenarios (See APPENDIX A)

#### 2nd Set of Questions (Socio-Demographics Questions)

Please, select your gender:

OMale

OFemale

O Non-binary / third gender

OPrefer not to say

Please, select your age:

O Under 18

0 18 - 24

0 25 - 34

0 35 - 44

#### 0 45 - 54

55 - 64
65 - 74
75 - 84
85 or older

#### End of the questionnaire

Thank you for your participation, now please press the button below on your right to submit your answers. If you do not, your answers will not be saved.

		TABLE E.1		
Variable	Number of Items	Measurement	Items	Source
Visual Complexity	4	7-point Likert Scale	<b>The homepage shown is:</b> Complex Dense Interactive Has Much Variety	Geissler et al. (2006)
Choice Overload	ŝ	9-point Likert Scale	Please answer the following questions solely with regard to how the previous image made you feel. While reviewing the retailer homepage, to what extent did you feel overwhelmed? How confused did you feel while viewing this homepage? How difficult was it to understand the number of choices available?	Diehl & Poynor (2010)
Trustworthiness Of Trust Promoting Seal		7-point Likert Scale	To what extent does seeing this logo attached to a business give you a reason to trust that business more?	West (2015)

# **Appendix E: Pretest Measurement Scales**

### **Appendix F: Pretest Results**

### A. Visual Complexity

	Mean	Std. Deviation	Ν
VC1	2,9500	1,28982	45
VC2	3,9167	1,13192	45
VC3	4,9722	0,87941	45
VC4	5,2944	1,04077	45
VC5	6,7778	0,58684	45

#### **Descriptive Statistics**

#### Mauchly's Test of Sphericity<sup>a</sup>

Measure: Visual\_Complexity

					Epsilon <sup>b</sup>		
Effect	Mauchly's	Approx. Chi-	df	Sig.	Greenhouse	Huynh- Feldt	Lower-
	vv	Square			Geissei	reiut	bound
condition	0,288	52,739	9	0,000	0,585	0,620	0,250

Measure:	Visual_Com	plexity		-			
Source		Type III Sum of Squares	đf	Mean Square	F	Sig.	Partial Eta Squared
conditio ns	Sphericity Assumed	377,412	4	94,353	108,227	0,000	0,711
	Greenhou se-Geisser	377,412	2,339	161,369	108,227	0,000	0,711
	Huynh- Feldt	377,412	2,478	152,290	108,227	0,000	0,711
	Lower- bound	377,412	1,000	377,412	108,227	0,000	0,711
Error(co ndition)	Sphericity Assumed	153,438	176	0,872			
	Greenhou se-Geisser	153,438	102,908	1,491			
	Huynh- Feldt	153,438	109,043	1,407			
	Lower- bound	153,438	44,000	3,487			

#### Tests of Within-Subjects Effects

Meas	sure Visual_Co	mplexity				
					95% Con	fidence
					Interval for I	Difference
cond	litio	Mean Difference	Std Feror	e:_b	Lower	Upper
n	S	(I-J)	Ad. Lifei	oig.	Bound	Bound
1	2	-,967*	0,120	0,000	-1,322	-0,611
	3	-2,022*	0,211	0,000	-2,645	-1,399
	4	-2,344*	0,251	0,000	-3,086	-1,603
	5	-3,828*	0,246	0,000	-4,553	-3,102
2	1	<b>,9</b> 67 <sup>*</sup>	0,120	0,000	0,611	1,322
	3	-1,056*	0,175	0,000	-1,572	-0,540
	4	-1,378*	0,230	0,000	-2,059	-0,697
	5	-2,861*	0,214	0,000	-3,493	-2,229
3	1	2,022*	0,211	0,000	1,399	2,645
	2	1,056*	0,175	0,000	0,540	1,572
	4	-0,322	0,160	0,505	-0,796	0,151
	5	-1,806*	0,153	0,000	-2,257	-1,354
4	1	2,344*	0,251	0,000	1,603	3,086
	2	1,378*	0,230	0,000	0,697	2,059
	3	0,322	0,160	0,505	-0,151	0,796
	5	-1,483*	0,164	0,000	-1,969	-0,997
5	1	3,828*	0,246	0,000	3,102	4,553
	2	2,861*	0,214	0,000	2,229	3,493
	3	1,806*	0,153	0,000	1,354	2,257
	4	1,483*	0,164	0,000	0,997	1,969

#### **Pairwise Comparisons**


### **B.** Choice Overload

	Mean	Std. Deviation	Ν
CO1	4,3926	1,07612	45
CO2	4,4815	0,98871	45
CO3	4,8667	1,19426	45
CO4	4,9185	1,27951	45
CO5	5,0296	0,97913	45

### **Descriptive Statistics**

### Mauchly's Test of Sphericity<sup>a</sup>

Measure:	Choice Ov	verload					
						Epsilon	
Effect	Mauchly' s W	Approx. Chi- Square	đf	Sig.	Greenhouse- Geisser	Huynh- Feldt	Lower- bound
Trust Promoting Seals	0,660	17,640	9	0,040	0,842	0,920	0,250

### Tests of Within-Subjects Effects

Measure:	Choice_Overloa	ađ		•			
Source		Type III Sum of Squares	đf	Mean Square	F	Sig.	Partial Eta Squared
condition	Sphericity	14 269	4	3 502	3 702	0.006	0.079
S	Assumed	14,508	7	3,392	3,702	0,000	0,078
	Greenhouse-	14 269	2 269	4 266	3 702	0.010	0.079
	Geisser	14,508	5,508	4,200	3,702	0,010	0,078
	Huynh-Feldt	14,368	3,681	3,903	3,702	0,008	0,078
	Lower-bound	14,368	1,000	14,368	3,702	0,061	0,078
Error(co	Sphericity	170 707	176	0.070			
nditions)	Assumed	1/0,/8/	170	0,970			
	Greenhouse-	170 707	149 104	1 150			
	Geisser	1/0,/8/	148,194	1,152			
	Huynh-Feldt	170,787	161,960	1,055			
	Lower-bound	170,787	44,000	3,882			

### **Pairwise Comparisons**

Measure: Choice\_Overload

					95% Confidence Intervation for Difference <sup>a</sup>	
conditions		Mean Differen ce (I-J)	Std. Error	Sig.ª	Lower Bound	Upper Bound
1	2	-0,089	0,221	1,000	-0,741	0,563
	3	-0,474	0,230	0,450	-1,153	0,205
	4	-0,526	0,256	0,458	-1,282	0,230
	5	-0,637	0,218	0,054	-1,280	0,006
2	1	0,089	0,221	1,000	-0,563	0,741
	3	-0,385	0,141	0,092	-0,803	0,033
	4	-0,437	0,192	0,281	-1,006	0,132
	5	-0,548	0,206	0,108	-1,157	0,061
3	1	0,474	0,230	0,450	-0,205	1,153
	2	0,385	0,141	0,092	-0,033	0,803
	4	-0,052	0,183	1,000	-0,593	0,490
	5	-0,163	0,193	1,000	-0,733	0,407
4	1	0,526	0,256	0,458	-0,230	1,282
	2	0,437	0,192	0,281	-0,132	1,006
	3	0,052	0,183	1,000	-0,490	0,593
	5	-0,111	0,216	1,000	-0,751	0,528
5	1	0,637	0,218	0,054	-0,006	1,280
	2	0,548	0,206	0,108	-0,061	1,157
	3	0,163	0,193	1,000	-0,407	0,733
	4	0.111	0.216	1,000	-0.528	0.751



### C. Trust Promoting Seals

Descriptive	Statistics
-------------	------------

	Mean	Std. Deviation	N
Norton	4,82	1,512	45
Trusted Shop	3,91	1,395	45
TRUSTe	4,44	1,726	45

### Mauchly's Test of Sphericity<sup>a</sup>

Measure:	Trustworthin	_					
						Epsilon	
Effect	Mauchly's W	Approx. Chi- Square	df	Sig.	Greenhouse- Geisser	Huynh- Feldt	Lower- bound
Trust Promoting Seals	0,881	5,453	2	0,065	0,894	0,929	0,500

Measure:	Trustworthi	ness					
Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Trust_Promoting_Se als	Sphericity Assumed	18,859	2	9,430	4,925	0,009	0,101
	Greenhous e-Geisser	18,859	1,787	10,553	4,925	0,012	0,101
	Huynh- Feldt	18,859	1,858	10,152	4,925	0,011	0,101
	Lower- bound	18,859	1,000	18,859	4,925	0,032	0,101
Error(Trust_Promoting_Seals)	Sphericity Assumed	168,474	88	1,914			
	Greenhous e-Geisser	168,474	78,634	2,143			
	Huynh- Feldt	168,474	81,741	2,061			
	Lower- bound	168,474	44,000	3,829			

### Tests of Within-Subjects Effects

### Pairwise Comparisons

Trustworthiness

Measure:

					95% Conf for I	fidence Interval Difference
Trust_Promoti ng_Seals		Mean Difference (I-J)	Std. Error	Sig.	Lower Bound	Upper Bound
1	2	,911 <sup>*</sup>	0,279	0,006	0,218	1,604
	3	0,378	0,337	0,804	-0,460	1,216
2	1	-,911 <sup>*</sup>	0,279	0,006	-1,604	-0,218
	3	-0,533	0,253	0,123	-1,164	0,098
3	1	-0,378	0,337	0,804	-1,216	0,460
	2	0,533	0,253	0,123	-0,098	1,164



### **Appendix G: Stimuli With Trust Promoting Seal**

### Figure G.1

EverythingYour	leed.com				
=	HOME	BEST SELLERS	PRODUCTS	CATEGORIE	S ABOUT US CONTACTS
Norton SECURED powered by VeriSign		Everything	you need, j	ust a click	away.
		Get 20% o	ff on your fi	ist purchase.	start shopping
		C.M.	LE DE COMPANY	A DEC	>

VISA 🔘 🖬

### Figure G.2



VISA 🚺 📷

### Figure G.3





### **Appendix H: Main Study Stimuli**

		TABLE I.1		
Variable	Number of Items	Measurement	Items	Source
Perceived Product Risk	ς.	7-point Likert Scale	How confident are you that the product displayed will perform well? How certain are you that the displayed products will work satisfactorily?	Grewal, Gotlieb, & Marmorstein (1994)
			Do you feel that the displayed products will correctly perform their functions?	
			After browsing the website, I intend to purchase from the website immediately	
Online Purchase Intention	e	7-point Likert Scale	After browsing the website, the likelihood of me purchasing from the website immediately is:	Wang, Minor, & Wei (2011)
			I rate my chances of purchasing from the website immediately as:	

### Appendix I: Main Study Measurement Scales

### **Appendix J: Final Questionnaire**

### Introduction

Dear respondent,

Thank you for agreeing to take part in this research. I'm a Marketing Analytics student at Tilburg University, and I am currently writing my Master's Thesis.

Your answers to this research will be only used for academic purposes, and will be kept completely **anonymous**.

Please answer as **openly** and **truthfully** as you can - there are no **right** or **wrong** answers! It will take you less than 5 minutes to complete this survey.

Thank you again for your time and effort. Low If you have any questions or comments, feel free to contact me at <u>s.castagna@tilburguniversity.edu</u> or +39 3400625221

### Participation to the pretest

Before starting the survey, I am interested in whether you participated in the pretest of this study.

The pretest for this study was administered in the period from the 6th to the 10th of April.

In the pretest, participants had to answer several questions concerning five different screens of

retailerhomepagestowhichtheyhadbeenexposed.In addition, participants were asked to evaluate three logos belonging to different providers.

Did you participate in the pretest of this study?

 $\bigcirc$  Yes

 $\bigcirc$  No

Please note: if yes, the survey ends.

### **Instructions**

On the next screen you will see a retailer's homepage.

Please look at the image carefully, as several questions will be asked afterward.

### Exposure to one of the six scenarios (Randomized Order)

Please look carefully at the following retailer's homepage:

EverythingYouN	leed.com					ĥ
=	HOME	BEST SELLERS	PRODUCTS	CATEGORIES	S ABOUT US CONTACTS	:
Norton SECURED powered by VenSign		Everything	you need, j	just a click	away.	
		Get 20% .	off on your fi	irst purchase.	start shopping	
		Se line	JA ARE	See and	>	
		 	SELINE	U. DE		

VISA 🚺 📷

1st Set of Questions (Perceived Risk Questions)

How confident are you that the product displayed will perform well?

- $\bigcirc$  Not confident at all
- Moderately not confident
- Slightly not confident
- Neither confident nor not confident
- Slightly confident
- Moderately confident
- Very confident

How certain are you that the displayed products will work satisfactorily?

- Uncertain
- Moderately uncertain
- Slightly uncertain
- Neither certain not uncertain
- Slightly certain
- Moderately certain
- Certain

Do you feel that the displayed products will correctly perform their functions?

- $\bigcirc$  Do not feel sure
- $\bigcirc$  Moderately unsure
- Slightly unsure
- $\bigcirc$  I feel neither sure nor unsure

- Slightly sure
- Moderately sure
- $\bigcirc$  Do feel sure

### 2nd Set of Questions (Online Purchase Intention Questions)

After browsing the website, I intend to purchase from the website immediately.

- Strongly disagree
- Disagree
- Somewhat disagree
- $\bigcirc$  Neither agree nor disagree
- $\bigcirc$  Somewhat agree
- Agree
- Strongly agree

After browsing the website, the likelihood of me purchasing from the website immediately is:

- Extremely unlikely
- $\bigcirc$  Moderately unlikely
- Slightly unlikely
- $\bigcirc$  Neither likely nor unlikely
- Slightly likely
- Moderately likely
- Extremely likely

I rate my chances of purchasing from the website immediately as:

- $\bigcirc$  Not possible
- $\bigcirc$  Moderately not possible
- $\bigcirc$  Slightly not possible
- $\bigcirc$  Neither possible nor not possible
- $\bigcirc$  Slightly possible
- Moderately possible
- O Possible

### 3rd Set of Questions (Confounder Question)

Are you familiar with online shopping?

- Yes
- $\bigcirc$  No

### 4th Set of Questions (Socio-Demographic Questions)

Please, select your gender:

- Male
- Female
- Non-binary / third gender
- $\bigcirc$  Prefer not to say

Please, select your age:

- O Under 18
- 0 18 24
- 0 25 34
- 0 35 44
- 0 45 54
- 0 55 64
- 0 65 74
- 0 75 84
- $\bigcirc$  85 or older

Please, select your current location:

- O Central America
- $\bigcirc$  South America
- $\bigcirc$  North America
- $\bigcirc$  Pacific Islands
- Africa
- Australia
- $\bigcirc$  Caribbean Islands
- Europe
- 🔿 Asia
- Other

### End of the questionnaire

Thank you for your participation, now please press the button below on your right to submit your answers. If you do not, your answers will not be saved.

### **Appendix K: Main Analysis**

### A. Sample Structure

		Sample S	Structure		
	Gena	ler		Age	,
	Frequency	Percent		Frequency	Percent
Male	91	47,2	18 - 24	108	56,0
Female	99	51,3	25 - 34	50	25 <b>,9</b>
Non-binary / th	1	0,5	35 - 44	23	11,9
Prefer not to sa	2	1	45 - 54	6	3,1
Total	193	100	55 - 64	5	2,6
			85 or older	1	0,5
			Total	193	100,0

### **B.** Reliability of Measurement Scales

Overview of Cronbach's Alpha for Multi-Item Measurement Scales

Product Risk Perception	Online Purchase Intention
3 item scale	3 item scale
α = 0.937	α = 0.936

C. Age (ANOVA)

ANOVA	(Condition	-	Age)	
-------	------------	---	------	--

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	4,075	5	0,815	0,699	0,625
Within Groups	217,915	187	1,165		
Total	221,990	192			

Dises				Descriptives				
Please,	, select your age:				95% Confident Me	ce Interval for can		
	N	Mean	Std. Deviatio n	Std. Error	Lower Bound	Upper Bound	Minimum	Maximum
1	20	3,00	1,451	0,324	2,32	3,68	2	6
2	26	2,77	1,451	0,285	2,18	3,36	2	9
3	36	2,72	0,974	0,162	2,39	3,05	2	6
4	36	2,50	0,655	0,109	2,28	2,72	2	4
5	36	2,67	0,894	0,149	2,36	2,97	2	5
6	39	2,85	1,136	0,182	2,48	3,21	2	6
Total	193	2,73	1,075	0,077	2,58	2,88	2	9

### **D.** Gender (ANOVA)

### ANOVA (Condition - Gender)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1,120	5	0,224	0,692	0,630
Within Groups	60,559	187	0,324		
Total	61,679	192			

				Descriptives				
Please, select your ger	nder:							
					95% Confiden Me	ce Interval for an		
	N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	Minimum	Maximum
1	20	1,60	0,503	0,112	1,36	1,84	1	2
2	26	1,69	0,736	0,144	1,40	1,99	1	4
3	36	1,61	0,494	0,082	1,44	1,78	1	2
4	36	1,50	0,507	0,085	1,33	1,67	1	2
5	36	1,53	0,506	0,084	1,36	1,70	1	2
6	39	1,46	0,643	0,103	1,25	1,67	1	4
Total	193	1,55	0,567	0,041	1,47	1,63	1	4

E. Familiarity with online shopping (Chi-Square Tests for Familiarity and Conditions)

	Value	df	Asymptotic Significance (2- sided)
Pearson Chi-Square	6,923	5	0,226
Likelihood Ratio Linear-by-Linear	7,220	5	0,205
Linear-by-Linear Association	0,300	1	0,584
N of Valid Cases	193		

### Chi-Square Tests

### **F.** ANOVA (Visual Complexity → Product Risk Perception)

Dependent Variable:					PPR			
Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power <sup>b</sup>
	_	-						
Corrected Model	175,683ª	5	35,137	18,112	0,000	0,326	90,562	1,000
Intercept	2532,759	1	2532,759	1305,597	0,000	0,875	1305,597	1,000
TPS	9,808	1	9,808	5,056	0,026	0,026	5,056	0,609
VC	160,365	2	80,182	41,333	0,000	0,307	82,666	1,000
TPS * VC	0,905	2	0,452	0,233	0,792	0,002	0,466	0,086
Error	362,766	187	1,940					
Total	2969,667	193						
Corrected Total	538,449	192						

### Tests of Between-Subjects Effects

a. R Squared = ,326 (Adjusted R Squared = ,308)

b. Computed using alpha = ,05

### **Multiple Comparisons**

D :		Mean Std Em	CAL E	<b>C</b> :	95% Confidence Interval		
Pairs		Difference	Sta. Error	51g. –	Lower	Upper	
Low_Vc	Med_Vc	1,4688	0,26290	0,00	0,84770	2,0899	
	High_Vc	2,3979	0,26084	0,00	1,78163	3,0141	
Med_Vc	Low_Vc	-1,4688	0,26290	0,00	-2,08991	-0,8477	
	High_Vc	,9291 <sup>°</sup>	0,22980	0,00	0,38616	1,4720	
High_Vc	Low_Vc	-2,3979*	0,26084	0,00	-3,01412	-1,7816	
	Med Vc	-,9291°	0,22980	0,00	-1,47199	-0,3862	

### G. ANOVA (Visual Complexity → Online Purchase Intention)

Courses	Type III Sum of	æ	Mean	F	Si-	Partial Eta
Source	Squares	a a	Square	г	51g.	Squared
Corrected Model	120,001ª	5	24,000	11,097	0,000	0,229
Intercept	2119,408	1	2119,408	979,988	0,000	0,840
Trust Promoting Seals	60,236	1	60,236	27,852	0,000	0,130
Vc_level	44,687	2	22,344	10,331	0,000	0,100
Trust Promoting Seals*Vc_level	9,996	2	4,998	2,311	0,102	0,024
Error	404,422	187	2,163			
Total	2682,222	193				
Corrected Total	524,424	192				

### Tests of Between-Subjects Effects (Online Purchase Intention)

R Squared = ,229 (Adjusted R Squared = ,208)

Datas		Mean	Std.	C:-	95% Confide	ence
Pairs		Difference	Error	Sig.	Lower Bound	Up
Low_Vc	Med_Vc	, <mark>8333</mark> *	0,27758	0,009	0,1775	
	High_Vc	1,3178	0,27541	0,000	0,6671	
Med_Vc	Low_Vc	-,8333*	0,27758	0,009	-1,4891	
	High_Vc	0,4844	0,24264	0,116	-0,0888	
High_Vc	Low_Vc	-1,3178	0,27541	0,000	-1,9684	
	Med_Vc	-0,4844	0,24264	0,116	-1,0577	

**Multiple Comparisons** 

### H. Assumptions for Mediation Analysis

a) Normality Assumption



Normal P-P Plot of Regression Standardized Residual

b) Homoscedasticity Assumption (Dependent Variable: Purchase Intention)



c) Absence of Multicollinearity Assumption

				Coefficie	ents <sup>a</sup>			
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Product Risk Perception		-0,659	0,066	-0,668	-9,997	0,000	0,701	1,426
VC_Level		0,131	0,142	0,062	0,926	0,356	0,701	1,426

### I. Mediation Analysis – Macro Process Model 4

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### J. Mediation Analysis – Control Variable: gender

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### K. Mediation Analysis – Control Variable: age

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### L. Mediation Analysis – Control Variable: familiarity with online shopping

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### Summary

### Introduction

The last decade has seen an exponential increase in online shopping that has been accompanied by a huge rise in the number of online retailers, which has resulted in an extremely competitive online environment (McKinsey, 2020). Indeed, the ease and immediacy with which a website can be created by any retailer has led to an exponential growth of online competition, resulting in many companies failing to make themselves known to consumers (Casado-Aranda, Dimoka, & Sánchez-Fernández, 2019). Based on previous research, 90% of new e-commerce stores fail within the first 120 days after the launch (Patel, 2015). Hence, to have a better chance of being noticed by consumers, an 'unknown' retailer should have as it is primary purpose to convey a good first impression and convince consumers that its store is legitimate and trustworthy, reducing consumers' risk perception (Chang, Waiman, & Mincong, 2013). Specifically, this should be communicated through the retailer's homepage, which creates the initial impression of the retailer itself (Singh & Dalal, 1999).

Earlier research has shown that consumers usually base their first impression and judgment of a website on the information processed in the first 50 milliseconds of interaction with the website itself (Lindgaard, Fernandes, Dudek & Brown, 2006). In addition, it has been proven that if the retailer manages to give a good strong first impression, users may overlook other issues such as usability or timing problems (Lindgaard & Dudek, 2002). This long-term effect of the first impression is often referred to as 'confirmation bias' that typically occurs when people tend to give more value to what confirms their initial assumptions (Mynatt, Doherty, & Tweney, 1977; Nisbett & Ross, 1980). Thus, if users held a very positive first impression of a retailer's websites, they would then disregard negative issues and the other way around (Campbell & Pisterman, 1996). Furthermore, since consumers have no experience with and cannot assess the real trustworthiness of an 'unknown' retailer, the first impression they have of the retailer can influence the degree of trust and risk that they perceive, and thus, have an effect on their purchase intention (Darke, Brady, Benedicktus & Wilson, 2016; Melis, Campo, Breugelmans, & Lamey, 2015; Schlosser, White, & Lloyd, 2006).

The challenge faced by retailers is even more relevant when taking into consideration that in 2019, 4.2 million scam websites have been identified across more than 100 industries, 27% more than in the previous year (Bolster, 2019). Furthermore, the proliferation of this type of

website has a huge economic impact. According to the FBI's 2019 Internet Crime Report (FBI, 2019), the total losses that can be attributed to the phenomenon of scam websites in America amounted to \$3.5 billion. Hence, the presence of scam websites is harmful to both retailers and consumers. Although familiar, established retailers can at least try to overcome the problem of online risk perception by enhancing brand awareness or establishing a store location offline, these strategies are less likely to be adopted by 'unknown', less familiar retailers (Benedicktus, Brady, Darkev& Voorhees, 2010; Darke *et al.*, 2016). As shown in previous studies, it is paramount for those retailers to find a way to effectively convey, in the first few moments of interaction with consumers, a lower level of risk and thus, to communicate that their website is trustworthy (Chang, Waiman, & Mincong, 2013; KPMG, 2017). Therefore, since first impressions seem to influence mid- and long-term consumer behavior, it is particularly relevant to understand what factors are responsible for shaping users' first impression of a retailer website (Rabin & Schrag, 1999).

Several studies about first impressions have demonstrated that the visual design of a webpage is crucial in shaping consumers' earlier judgments about retailers and products (Tractinsky, Cokhavi, Kirschenbaum & Sharfi, 2006; Tractinsky, Katz & Ikar, 2000). Specifically, *visual complexity* seems to play a key role in influencing users' first impressions (Tuch, Bargas-Avila, Opwis & Wilhelm, 2009). Researchers have developed several definitions of visual complexity in the field of marketing and design. For example, Song and Schwartz (2009) referred to visual complexity predominantly in terms of text and readability, while Wu *et al.* (2016) conceptualized visual complexity as a product-background contrast in the advertising context. In a broader sense, Nadal, Munar, Marty, & Cela-Conde (2010) stated that visual complexity refers to the amount and variety of displayed elements in a specific webpage. Drawing from this last definition, the present study will specifically focus on visual complexity as to the *number and variety of products shown on a retailer's home page*.

There are different levels of visual complexity that an online retailer can display on its website that can evoke different emotions in consumers. It has been proven that one of the main effects that visual complexity has on consumers is to elicit negative emotions (Eroglu and Harrell, 1986; Eroglu & Machleit, 1990; Hui & Bateson, 1991). For example, previous findings have demonstrated that high levels of visual complexity are strongly correlated to the phenomenon of online crowding which is one of the strongest causes of stress among consumers while shopping (Eroglu & Machleit, 1990; Nadal, Munar, Marty, & Cela-Conde, 2010). In particular, the feeling of crowding has proven to be experienced when the environment is

judged as *dys*-functionally dense, resulting in a sense of confusion and anxiety for consumers (Eroglu & Harrell, 1986).

Furthermore, when first evaluating a retailer website, one of the biggest barriers to the finalization of the purchase is represented by the *perceived risk* associated with online shopping (Forsythe & Shi, 2003; Benedicktus, Brady, Darke, & Voorhees, 2010). Previous research has shown that while shopping online, consumers tend to perceive a higher level of risk associated with the purchase (for example for the inability to judge product's quality) and the retailer itself compared to physical stores (KPMG, 2017).

According to previous studies, the aesthetic of a webpage can be used by consumers as an important cue to evaluate trustworthiness, and thus risks associated with the purchase from a specific retailer (Baker, Grewal & Parasuraman, 1994). This makes the design of the online channel a critical part in the success of a less known retailer's website (Kim & Lennon, 2008). Indeed, it has been pointed out that aesthetically pleasing websites are believed to be more reliable and trustworthy (Robins & Holmes, 2008) and that a typical characteristic of a pleasing website's design is a moderate level of visual complexity (Berlyne, 1974). Hence, visual complexity can play a major role in shaping consumers' first impressions and in communicating retailer's reliability.

Finally, novel retailers can also communicate trustworthiness to their consumers by displaying on their website a *trust promoting seal*, that is, a logo indicating the trustworthiness of a retailer provided by a third party (Petty & Cacioppo, 1986). Indeed, trust promoting seals can have a moderating effect on the relationship between visual complexity and perceived risk because even if the website design is unpleasant for consumers, it may be that the presence of trust promoting seals can reduce the risk perceived by consumers, resulting in an increase of the online purchase intention. Hence, retailers should identify the most effective strategy (or evaluate the combination of multiple strategies) to communicate their trustworthiness and lower the perceived risk.

In sum, the aim of this research can be summarized in the following central problem statement:

To what extent does perceived risk mediate the effect of various levels of visual complexity (low, medium, and high) on purchase intention, and do trust promoting seals moderate this relationship?

### **Theoretical Framework**

### Visual Complexity

Although previous literature has already investigated the concept of visual complexity, finding a common definition shared by authors is a difficult task. However, almost all studies that have addressed the concept of visual complexity draw on Berlyne's definition of complexity. According to Berlyne (1960, p.38), complexity can be referred to as "the amount of variety or diversity in a stimulus pattern". Specifically, the author highlighted that complexity increases with the dissimilarities between elements or with the degree of perceptual grouping as well as with increasing numbers of different stimuli (Berlyne, 1960). Particularly referring to the online environment, Wu *et al.* (2016) stated that visual complexity of a web page is linked to the number of inputs and the number of information provided. On the same line of thought, Nadal, Munar, Marty, & Cela-Conde (2010) stated that complexity refers to the amount and variety of displayed elements in a specific webpage. Drawing from these definitions of visual complexity, *the present study focuses on visual complexity as the number and variety of products displayed on a retailer's homepage*.

When trying to find a common definition of visual complexity, some scholars have merged the meaning of visual complexity with the word "clutter" or "density" (Cox & Cox, 2002; Pieters, Wedel, & Zhang, 2007). For example, Mai *et al.* (2014) stated that the visual complexity of a website is the result of the presence of cluttered elements such as graphics, intricate textures, high-resolution images, or animations. Additionally, previous literature highlighted that a high degree of density can lead to a crowding feeling for consumers during online purchases (Eroglu & Machleit, 1990). In detail, the feeling of crowding is proven to be experienced when the environment is judged as *dys*-functionally dense, resulting in a sense of stress and anxiety for consumers (Eroglu & Harrell, 1986). Thus, the density of the product displayed on the website seems to have a role in consumers' evaluation of the retailer and in shaping consumers' behaviors such as purchase intention (Park, Lennon & Stoel 2005).

Since visual complexity can be perceived after only a few seconds of interaction (Sohn, Seegebarth, & Moritz, 2017), it plays a crucial role in eliciting consumers' emotions and shaping their first impression of an online retailer (Tuch, Presslaber, Stocklin, Opwis, & Bargas-Avila, 2012). This is true particularly concerning the feelings of pleasure and arousal (Tuch, Bargas-Avila, Opwis, & Wilhelm, 2009). According to Berlyne's (1974) aesthetic theory, the relationship between visual complexity and pleasantness is believed to be represented by an inverted U-shaped curve. Specifically, Berlyne proposed that people tend to

prefer a moderate level of complexity since a too complex stimulus can be perceived as unpleasant whereas a less complex stimulus can be perceived as boring (Berlyne, 1974).

Several studies support the above-mentioned theory. For example, Geissler *et al.* (2006) found that homepages of moderate complexity led to better communication effectiveness and result in a more favorable attitude and purchase intention from the consumers' side. However, some researchers and theories have defined the relationship between visual complexity and pleasantness in a different way, such as linear or even quadratic (see Martindale, Moore, & Borkum, 1990 for a review), suggesting that even a little amount of complexity can lead to unfavorable attitudes. Thus, a debate remains open on the appropriate degree of visual complexity to be used in an online retailing environment and the present study aims to enrich the existing literature on this topic.

As a final point, it may be argued that visual complexity may recall the concept of choice overload, but the two notions are different. Although the two concepts both refer to the number of products, their intrinsic meaning makes them different. Indeed, choice overload or overchoice refers to the difficulty of consumers to decide when faced with a large number of total products offered by the retailer (Poynor & Diehl, 2007; Gourville & Soman, 2005; Mick, Broniarczyk, & Haidt, 2004), while, as for this study, visual complexity is intended as the number and variety of products shown on the homepage of a retailer and not as the entire online assortment provided.

### **Process Fluency**

The underlying theory driving the effects of visual complexity is known as process fluency. This concept refers to the ease of processing information in respect of a particular stimulus (Alter & Oppenheimer, 2009). Process fluency theory argues that people tend to monitor the degree of effort required to process a specific stimulus (Novemsky, Dhar, Schwarz, & Simonson, 2007). The easier a stimulus is to perceive, the higher the degree of process fluency experienced by the individual (Janiszewski & Meyvis, 2001; Reber, Schwarz, & Winkielman, 2004; Reber, Wurtz, & Zimmermann, 2004).

Visual complexity represents a key driver of process fluency. Specifically, previous research found that there is a negative linear relationship between the level of visual complexity and process fluency: the higher the former the lower the latter (Orth & Crouch, 2014; Reber *et al.*, 2004). Indeed, several studies have shown that stimuli lower in complexity are easier to process for consumers since those are characterized by a higher level of fluency and thus, the

effort required to process the stimulus is lower (Janiszewski & Meyvis 2001; Reber *et al.*, 2004). Meanwhile, as the amount of complexity of certain stimuli increases, the cognitive effort required to elaborate the information increases too, leading to lower processing fluency and thus, to a negative behavioral intention. Hence, visual complexity needs to be taken into account when designing a retailer's website.

### **Online Purchase Intention**

According to the theory of planned behavior (TPB) (Azjen, 1991), consumers' actions can be predicted by their intentions. The present study aims to adopt online purchase intention as the main dependent variable to accurately predict consumers' online behavior. Previous research defined online purchase intention as the likelihood that a consumer will engage in a particular purchase behavior in an online environment (Close & KukarKinney, 2010; Salisbury, Pearson, Pearson, & Miller, 2001). In other words, online purchase intention can be referred to as a construct that gives the strength of a customer's intention to purchase online (Salisbury *et al.*, 2001).

Several studies focused on showing the influence of complexity and fluency on consumers' intention to purchase. For example, empirical findings demonstrate that when consumers experience high levels of process fluency (i.e., a low visual complexity degree), they are more likely to have a stronger purchase intention (Hsieh, Hsieh, Chiu, & Yang, 2014). In another study, Orth and Crouch (2014) stated that less complex stimuli, which require less cognitive effort (i.e., has a higher level of perceptual fluency), positively affect consumers' purchase intention. Additionally, Im, Lennon & Stoel (2010) demonstrated that when browsing a commercial website perceived as fluent, consumers' purchase intention increases. Finally, Wang, Ma, Chen, Ye, & Xu (2020), found that a moderate background complexity of a product image positively influences consumers' intention to purchase. These studies collectively suggest that in an online context, the less complex and effortless consumers perceive the website to be, the higher their purchase intention.

Drawing upon past research, I posit that lower levels of processing fluency, and thus, higher levels of visual complexity, will negatively influence consumers' purchase intention. Putting this formally:

H1: A high (vs. medium vs. low) level of visual complexity decreases consumers' online purchase intention.
#### The Mediating Role of Online Risk Perception

Considering a fully online environment, as the current study does, what consumers are most concerned about is that they will incur in hidden costs during the purchase or that their expectations of the product will be disappointed once they get it (Kim *et al.*, 2008; Lu, Hsu, & Hsu, 2005). Hence, product and financial risks seem to be the most relevant risks to evaluate in an online shopping environment (Kim *et al.*, 2008; Lu, Hsu, & Hsu, 2005). Furthermore, the difficulty of judging the product quality due to its intangibility enhances the possibility of being disappointed by the product itself and makes product risk of greater importance than financial risk (Bhatnagar and Ghose, 2004; Dai, 2007; Garbarino & Strahilevitz, 2004). Thus, the present study will focus on perceived product risk.

Product risk has been referred to as the presumption that the product performance will not meet one's expectations (Kim *et al.*, 2008). According to Sweeney *et al.* (1999, p.81), "When making a purchase decision, consumers are always faced with some concern over the performance of the product since perfect information regarding future performance is never known". Indeed, in physical stores, consumers can try, check, and feel the product before buying it, while during online shopping, consumers can only rely on the information provided by the retailer (such as images, sizes, and description of the product) to evaluate the quality of products and retailer trustworthiness, a process that raises several doubts in consumers' minds and leads to a higher perception of risk associated with the purchase (Forsythe *et al.* 2006).

Previous research found a relationship between visual complexity (or process fluency) and perceived risk. For example, according to Kim & Lennon (2000), the lower the degree of processing fluency (i.e., high degree of complexity) perceived by consumers, the higher the degree of perceived risk involved in the purchase. In the same vein, Song and Schwartz (2009) found that process fluency, in terms of complexity, has an important role in the evaluation of risks. In their research, they focused on the complexity of word pronunciation and demonstrated that hard-to-pronounce words lead to an increase in consumers' risk perception. In line with their studies, this research aims to investigate the relationship between visual complexity and purchase intention, and the role that perceived product risk has in this relationship. Indeed, although there is no research directly linking the degree of visual complexity with the perceived risk associated with online purchasing, it seems reasonable to investigate the existence and nature of this bond.

Hence, the following hypothesis has been formulated:

H2: A high (vs. medium, vs. low) level of visual complexity increases consumers' perceived risks.

Additionally, past literature has amply demonstrated that perception toward risk is prominent in determining consumers' purchasing behaviors (Ko, Jung, Kim & Shim, 2004). Earlier studies have proven how a higher degree of perceived product risk corresponds to a lower intention to purchase online (Akhlaq and Ahmed, 2015; Choi and Lee, 2003; Kim and Lennon, 2013; Lee and Tan, 2003). For instance, Park *et al.* (2005) argued that purchase intention will increase in environments where perceived risks are reduced through website design. In the same vein, Choi and Lee (2003) have shown that purchase intention increases when users perceive a lower degree of purchase risk and Jarvenpaa and Tractinsky (1999) argued that this happens even if the consumer attitude toward the store is not favorable. Thus, prior findings validate perceived risk as a key predictor of online purchase intention.

Based on the above discussion, the following hypothesis has been stated:

# H3: A high (vs. medium, vs. low) level of visual complexity decreases consumers' purchase intention, due to increased perceived risk.

#### The Moderating Role of Trust Promoting Seals

As stated before, it is crucial for lesser-known retailers to effectively signal reliability on their website to attract more customers (Ba and Pavlou, 2002; Riegelsberger, Sasse, & McCarthy, 2005). Although there are several ways for retailers to communicate and promote their reliability, a recent neuromarketing study has shown that trust seals are the most efficient tools for increasing trust and lowering the degree of perceived consumer risk while purchasing online (Casado-Aranda *et al.*, 2019).

A trust promoting seal (or trust mark) is a logo provided by an independent third party, which is generally displayed on the e-tailer website and that certifies a retailer's reliability (Casado-Aranda *et al.*, 2019; Özpolat and Jank, 2015). Previous literature has investigated the role of trust promoting seals in reducing risk and enhancing trust in online retailers. Findings indicated that consumers' initial trust in an online retailer was positively influenced by the presence of a trust mark on the website (Gefen, Karahanna, & Straub, 2003; McKnight, Choudhury, & Kacmar, 2004). According to Kim & Benbasat (2003), when a retailer makes use of a trust promoting seal, consumers' perceived uncertainty and risk associated with online

shopping are likely to be reduced. Additionally, Kerkhof and van Noort (2010) demonstrated that consumers perceive lower risk levels and more favorable attitudes toward a website when presented with trust cues such as third-party certifications (i.e., trust promoting seals).

In the present research, I propose that the presence of a trust promoting seal on a retailer's webpage can mitigate the effect of visual complexity on consumers' risk perception. Specifically, trust promoting seals are expected to act as risk relievers, weakening the relationship between visual complexity and perceived product risk.

Putting this formally:

H4: The presence (vs. absence) of trust promoting seals will moderate the relationship between the different degrees of visual complexity (high vs. medium vs. low) and perceived product risk. Specifically, when the degree of visual complexity is higher, the perceived risk will be lower if trust promoting seals are displayed on the retailer's home page.

Considering the above-described relationships, the following conceptual model has been developed:



## **Research Methodology**

The present research adopted an online experimental design to answer the problem statement and its research questions. This kind of design is now considered a standard practice because of the vast number of people that can be reached in a relatively short time and because of the lower costs involved, compared to laboratory and field experiments (Birnbaum, 2004; Hair *et al.*, 2010; Reips, 2000). Besides, one of the disadvantages of this experimental design is that it does not allow plenty of control of the process (for example, the same subject can participate more than one time to the experiment, by opening the link by different devices). To minimize this problem, in the present study two countermeasures were adopted: first, a pretest

was conducted, then, the randomized allocation of participants to only one condition of the main experiment was adopted (Reips, 2000).

The key purpose of the pretest was to validate the stimuli (*Visual Complexity* and *Trust Promoting Seals*) used in the main study, while the purpose of the main study was to test the hypotheses developed in Chapter 2.

The main study employed a **3** (*Visual complexity: high vs. medium vs. low*) **x 2** (*Trust Promoting Seals: presence vs. absence*) between-subjects design, where each respondent was exposed to only one treatment (Charness, Gneezy, & Kuhn, 2012). In this way, the carryover effects were avoided, since respondents would not have the opportunity to use what has been learned from one condition in the subsequent one (Charness *et al.*, 2012). Furthermore, with randomization, potential biases were avoided and the chance of being exposed to any treatment was equal for each participant.

#### Pretest

The main purpose of the pretest was to identify the stimuli to be used in the main study. Three out of five stimuli that vary in visual complexity perception were selected from the pretest, as well as one of three different trust promoting seals.

Drawing from Deng and Poole (2010) pretest experiment, participants were exposed to the homepage of a generic *fictitious* retailer ("EverythingYouNeed.com") rather than to an existing one, since participants might have held existing attitudes toward the already existing retailer and its brand that could have distorted their responses. Each homepage showed differed from the other only in the number and variety of products displayed to consumers, representing different levels of visual complexity. First, participants were asked to rate each question from the four-item Visual Complexity Scale, then those from the three item Choice Overload scale. After that, participants were asked to assess the trustworthiness of the three trust promoting seals. At the end of the survey, demographic questions were asked to learn more about the sample.

# **Main Experiment**

The main experiment consisted of an online study where participants were asked to fill in a survey. To the aim of this research, two variables were manipulated: Visual Complexity (*high vs. medium vs. low*) and Trust Promoting Seals (*presence vs. absence*).

As a result of the pretest, the different levels of visual complexity belonging to the different images shown have been defined. For this study, the images with *low - medium - high* visual complexity scores have been selected and used as the main conditions.

Furthermore, the pretest allowed for the identification of the trust mark to be used in the main study. In three of the six visual complexity conditions (*high vs. medium vs. low*) the trust mark was applied. To avoid possible biases, the logo was applied in the same position in each of the conditions: specifically, in the top left corner. The other three visual complexity conditions (*high vs. medium vs. low*) have been left at their basic level, meaning that the space previously occupied by the trust promoting seal has been left blank.

After reading the instructions, participants were randomized in one of the six conditions created. The conditions were: *low* visual complexity - *no* trust promoting seal; *low* visual complexity – trust promoting seal; *medium* visual complexity - *no* trust promoting seal; *medium* visual complexity – *no* trust promoting seal; *high* visual complexity - *no* trust promoting seal; *high* visual complexity - *no* trust promoting seal; *high* visual complexity – *no* trust p

### **Results Summary**

The aim of this study was to shed light on the concept of visual complexity and its effect on online purchase intention. Additionally, I was interested in discovering if this relationship could be explained by consumers' perceived risk associated with that purchase. Finally, the effect of trust promoting seals on the relationship between visual complexity and online purchase intention was assessed, to test if the presence of a trust mark could have potentially altered the above-mentioned relation. In an online experiment with 193 participants, both the visual complexity level displayed on a retailers' homepage as well as the presence of trust promoting seals were manipulated to investigate the relationship between Visual Complexity and Product Risk Perception (moderated by the presence or absence of trust promoting seals), as well as the effect of Product Risk Perception on Online Purchase Intention. The data were analyzed through the analysis of variance (ANOVA), and Macro Process Model 4 developed by Hayes (2013).

Results from the mediation analysis showed a significant positive effect of Visual Complexity (both for the medium and the high levels) on Product Risk Perception ( $b_{vc\_med} = 1.44$ , t = 5.46, p = .000;  $b_{vc\_high} = 2.38$ , t = 9.09, p = .000), suggesting that the higher the level

of Visual Complexity, the higher the Perceived Risk associated with that purchase. By means of these findings it could be concluded that the hypothesis H2 is confirmed.

Furthermore, it has been found that Product Risk Perception was negatively related to Online Purchase Intention (b = -.668, t = -10,09, p = .000), meaning that when consumers perceive higher level of risk associated with the online purchase, their intention to buy decreases significantly. Additionally, results showed that Visual Complexity was a significant predictor of Online Purchase Intention ( $b_{vc\_med} = -.79$ , t = -7.64, p = .008;  $b_{vc\_high} = -1.26$ , t = -4.26, p = .000), which implies that by increasing the number of products and their variety (e.g., Visual Complexity), consumers' Online Purchase Intention significantly decreases. These results were in line with hypothesis H1, which therefore was accepted. As for the direct effect of Visual Complexity on Purchase Intention through Perceived Product Risk (c'-path), results revealed this relationship to be not significant ( $b_{vc\_med} = .17$ , t = .68, p = .50;  $b_{vc\_high} = .33$ , t = 1.16, p = .25). The indirect effect of Visual Complexity on Online Purchase Intention via Product Risk Perception (ab-path) was found significant, ( $b_{vc\_med} = -.58$ , 95% C.I. = -1.38, -.54;  $b_{vc\_high} = -.96$ , 95% C.I. = -2.13, -1,07), confirming the hypothesis H3. In sum these results showed the existence of full mediation.

Finally, by means of additional Macro Process Model 4 mediation analyses, I also checked whether the relationship between Visual Complexity, Perceived Product Risk and Online Purchase Intention changed when controlling for age, gender, or familiarity with online shopping. As for gender, it was proven to not have a significant effect on Product Risk Perception (b = .09, t = .51, p = .61), neither on Online Purchase Intention (b = .03, t = .17, p = .86). The same results were shown for age; indeed, it did not affect Product Risk Perception (b = .05, t = .53, p = .59) nor Online Purchase Intention (b = .12, t = 1.38, p = .17). Additionally, the effect of familiarity with online shopping on Product Risk Perception was not significant (b = -.83, t = -1.01, p = .31), and the same result was revealed for Online Purchase Intention (b = -0.05, t = -0.06, p = .95). In sum, this research demonstrated that when it comes to visual complexity, the less is more.

## **Discussion, Limitations and Avenues for Further Research**

Overall, the main study provided support for H1, which stated that a high level of Visual Complexity decreases consumers' Intention to Purchase Online. However, results are in contrast with Berlyne's aesthetic theory (1974), showing that the relationship between Visual Complexity and Online Purchase Intention was not described by an inverted U-shaped curve.

To illustrate, drawing from Berlyne's theory, I expected that a high or a low level of Visual Complexity would have reduced consumers' Online Purchase Intention compared to a medium Visual Complexity level. By contrast, the present research found that consumers' intention to buy online is higher when they are faced with a low degree of Visual Complexity. However, it must be considered that the high Visual Complexity condition was found to be marginally significantly different compared to low Visual Complexity condition in terms of Choice Overload (p=0.05). This means that when consumers were presented with the high Visual Complexity condition, they felt overwhelmed and found it hard to make a decision compared to the low Visual Complexity condition.

Furthermore, I checked for the effect of Visual Complexity on Product Risk Perception: in previous chapters, it was hypothesized that a higher level of Visual Complexity corresponds to a higher level of Product Risk Perception. As expected, a significant effect of Visual Complexity on Product Risk Perception was revealed, meaning that a higher level of Visual Complexity corresponds to higher degrees of Product Perceived Risk, supporting the hypothesis H2. Additionally, I tested if the relationship between Visual Complexity and Product Risk Perception was negatively moderated by the presence of a Trust Promoting Seal. The analysis has demonstrated that the presence of a trust mark does not weaken (nor strengthen) the relationship between Visual Complexity and Perceived Product Risk. In other words, the Trust Promoting Seal does not play a key role in shaping people's perception of the risk associated with a product when consumers are faced with a high visually complex retailer's website. This result may be related to the fact that most of the sample belongs to an age group between 18 and 30 years old. Indeed, it has been shown that older people typically tend to rely more on mechanisms that promote trustworthiness, such as trust promoting seals (Dychtwald & Gable, 1990; Lumpkin, Caballero & Chanko, 1989). Finally, it was hypothesized and confirmed by the analysis that the relationship between Visual Complexity and Online Purchase Intention was explained by consumers' Product Risk Perception. Specifically, results have shown that the relationship between Visual Complexity and Online Purchase Intention was mediated by consumers' Perceived Risk associated with the purchase. Thus, results lead support to hypothesis H3. In sum, all the hypotheses that have been made were verified.

Theoretically, this study has several implications. First, the present research enriches current literature on visual complexity and its behavioral implications. Previous studies focused on online visual complexity perception based on elements such as links, colors, text readability, and advertising, while the current research identifies different stimuli designs that are associated with visual complexity. Specifically, the definition of visual complexity taken in consideration

for this study refers to the number and variety of products shown in a retailer's homepage. Furthermore, the present research does not support Berlyne's aesthetic theory (1974) which describes the relationship between visual complexity and pleasantness as an inverted U-shaped curve. Indeed, findings of this study suggest that the less visually complex the homepage, the less consumers' perception of product risk and thus, the higher the intention to buy from that website. Moreover, enhancing the study from Song and Schwarz (2008), the present work enriches the current literature on process fluency and perceived risk. Indeed, apart from Song and Schwarz (2008) study, none of the previous research have investigated the relationship between process fluency and risk perception, which instead was one of the main focuses of the present work. In line with their study, results showed that when faced with visually complex stimulus, perceived as dysfluent, consumers' online purchase intention decreased significantly. Besides, this study contributes to the stream of literature on online store environments, retailers' web stores and consumers' behavioral outcomes, enhancing Eroglu, Machleit, and Davis (2003), Wu *et al.* (2016) and Orth and Crouch (2014) studies, by demonstrating how a higher degree visual complexity negative influences online purchase intention.

This study also generates some practical implications. First, the results show the importance of a simple design in shaping consumers' risk perception and intention to buy from an online retailer. Indeed, it is paramount for retailers to make a good first impression, and thus to minimize consumers' risk perception, to retain them on their webpages, increasing the chance of buying from the online store. Findings showed how an increasing number and variety of products significantly increases consumers' perception of risk related to that specific product, making consumers avoid the purchase. Additionally, I tested whether the presence of a trust mark on a retailer's website could influence the perception of risk caused by the level of visual complexity shown on a homepage. However, results showed that despite the presence of a trust promoting seal on the retailer's webstore, the perception of risk associated with the degree of visual complexity displayed was unaffected. Thus, it could be concluded that showing a trust promoting seal is not an effective way for retailers to control consumers' perceived product risk caused by an overly complex web page.

This research has some limitations which firstly arise from the sample. Indeed, subjects for the main experiment were reached through convenience sampling from the researcher's personal network, which resulted in an overrepresentation of young adults. Thus, future research can try to reach a number of subjects where each age group is represented by a comparable number of participants. Secondly, this research has considered only variety and number of products as factors influencing perception of home page complexity, while other features that may affect the visual complexity perception of a homepage, such as background complexity, background colors, screen size, use of animations, and links, were omitted from this study. Future research should investigate whether adding one or more of these stimuli to those used for this study leads to different conclusions. Thirdly, the present work contemplated the role of only one type of perceived risk, namely Product Risk Perception. Further research might instead look into other types of online relevant risk (such as financial risk) as potential mediators of the relationship between Visual Complexity and Online Purchase Intention. Indeed, additional research is necessary to explore the effects of risk on consumers' shopping behavior. Finally, although this research did not find a significant interaction effect between Visual Complexity and Trust Promoting Seals, future research should investigate other potential moderators. Indeed, the usage of third-party certifications is not the only trust-building strategy that retailers can use to convey reliability to their customers. For example, it can be investigated if satisfied customers reviews play a role in the described relationship.