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# The effect of visual complexity and congruity on consumer purchase intentions: the mediating role of fluency

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# Abstract

The aim of this PhD thesis is to study the effects of visual complexity (simple *versus* complex images) on consumer purchase intentions. The thesis also explores the mediating role of fluency and the moderating role of congruity. To address the research aims, this PhD thesis relied on insights from aesthetics literature (Palmer et al., 2013), as well as fluency theory (Lee and Labroo, 2004; Reber et al., 2004), to propose a framework that tests and predicts consumers' responses to visual stimuli. Specifically, the thesis employs three laboratory experiments, conducted in London at different times and days of the week. Study 1 investigates the effects of visual complexity (simple *versus* complex) on fluency, in terms of perceptual fluency (the ease with which people process the perceptual characteristics of a stimulus), conceptual fluency (the ease with which people understand the semantic meaning of a stimulus), and imagery fluency (the ease with which people imagine a stimulus). Study 2 explores the moderating effect of congruity (complex congruent *versus* complex incongruent images) on the relationship between visual complexity (simple *versus* complex images) and fluency. Finally, in Study 3, the relationship between visual complexity (simple *versus* complex images) and consumer purchase intentions is examined, as well as the mediating role of fluency (in terms of perceptual fluency, conceptual fluency, and imagery fluency).

Across the three experiments, this PhD thesis demonstrates that it is easier for consumers to perceive, understand semantically and imagine simple images, in comparison to complex images (Study 1). Overall, by examining the relationship between visual complexity and the three dimensions of fluency, the study offers a concurrent account of the role played by visual complexity in metacognitive processes of fluency. Thus, the thesis is the first of its kind in explaining the relationship between visual complexity and types of fluency. Furthermore, the thesis highlights that congruity moderates the effects of visual complexity on fluency; specifically, complex congruent images are perceived as more conceptually and imagery fluent than complex incongruent images. It is important to note that when comparing the effects of simple and complex images, simple images are found to be more fluent than complex images (Study 2). This research reaffirms the findings relating to congruity and conceptual fluency and provides a first-hand account of the relationship between congruity and perceptual fluency, as well as imagery fluency. Finally, in Study 3, the findings demonstrate that the effects of visual complexity on purchase intentions are mediated through fluency. In this way the PhD thesis responds to Palmer and colleagues (2013) call for future research to examine the link between

fluency and behavioural responses. Furthermore, taken together, the results of the three experiments offer several contributions to the literature by suggesting a model that explains consumers' responses to visual stimuli in relation to purchase intentions, as well as the metacognitive experiences underpinning that relationship. The study also introduces several practical implications for the business world with regard to the way brands could use images to influence consumer purchase intentions.

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# Chapter 1: Introduction

The aim of this chapter is to introduce the research project. The chapter is divided into three main parts. First, the chapter presents the research background and the theoretical debate underpinning this research topic, as well as the research gaps. The second part of the chapter discusses the research aims and objectives, as well as the theoretical contribution of the research. The final part outlines the structure of the thesis, explaining the organisation and content of each chapter.

## 1.1 Research Background

Imagine the following scenario: you are on Instagram and you scroll down the feed where lots of images emerge showing you the latest celebrity gossip, the current trends in local restaurants, a few home and fashion hacks, etc. Among these images, you encounter pictures showing different fashion products. For example, you are exposed to a picture of a *Dior* bag placed on its own. You scroll down a bit more and now you are exposed to a very similar bag from *Valentino,* placed against a contextual background. Later, you encounter a similar bag offered by *Gucci*, placed in an incongruent setting. Which image do you perceive and process more easily? Do you understand the idea of each picture effortlessly? Can you easily imagine the product in your mind? Which image would make you hit the "buy" button?

Brands adopt different strategies with regard to their visual communication on social media. Some brands use simple images, whereby their product is placed against a plain background. Several brands, including *Burberry* and *Dior*, predominantly use such stimuli to advertise their products on social media. Many practitioners support these strategies, as they allow consumers to focus mainly on the product (Coyne, 2015; Pracejus, Olsen and O'Guinn, 2006). By contrast, other brands, such as *Christian Louboutin* and *Valentino*, prefer to use complex images, in which their products are placed within a contextual background. This strategy is also supported, as it gives "consumers a sense of time and space" (Sekonda, 2014; Kusumasondjaja and Tjiptono, 2019; Yoo and Kim, 2014). Interestingly, the level of complexity depends on a number of factors, including the congruity of the picture, such as the degree to which the product and the background fit together. During the last few years, another interesting trend has also emerged, wherein brands display their products against an incongruent background. Such complex incongruent and juxtaposed images aim to increase the attention of consumers, and brands such as *Dolce and Gabbana* and *Gucci* rely heavily on them in their social media

brand communication. As is evident, brands employ different strategies with regard to their visual communication on social media. With those strategies, brands not only aim to attract consumers' attention, gain competitive advantage, and communicate certain messages, but also to increase consumer purchase intentions (Li and Xie, 2020). It is worth noting that without appropriate guidance on the varying effects of visual stimuli, brands' efforts are not optimised.

Earlier studies have debated the effectiveness of different visual stimuli on consumer purchase intentions. Specifically, some scholars claim that simple images are more effective at influencing consumer purchase intentions (Bigoin-Gagnan and Lacoste-Badie, 2018; Kolesova and Singh, 2019; Pelet, Durrieu and Lick, 2020); while others claim the opposite and support the use of complex images (Shapiro, 1999; Yoo and Kim, 2014; Lee et al., 2018; Pieters, Wedel and Batra, 2010; Kim and Lennon, 2000). Interestingly, some scholars even argue that the use of moderate levels of visual complexity triggers higher levels of consumer purchase intentions (Wang et al., 2020; Geissler, Zinkhan and Watson, 2006; Mulken et al., 2014). The research on visual complexity and its impact on consumer purchase intentions is inconclusive at best, as seen from the above debate.

Past research has not only explored the direct relationship between visual complexity/simplicity and purchase intentions, but has also studied a number of variables that might mediate that relationship, such as mental imagery (Yoo and Kim, 2014), attitude (Lee, Hur and Watkins 2018), affect (Kusumasondjaja and Tjiptono, 2019), depth of processing (Song and Schwarz, 2015) and others. It is worth noting that there are many cognitive and metacognitive processes that trigger consumer behaviour, and indeed one of them is fluency (Knijnenburg et al., 2012; Mosteller et al., 2014). Fluency represents the ease with which people process information. It is a metacognitive and subjective experience, as it represents an evaluation of the cognitive process taking place in an individual's mind. Fluency accompanies every cognitive process and has different dimensions depending on the cognitive process/experience taking place, such as that of reading fluency, speaking fluency, retrieval fluency, diagnostic fluency, spatial reasoning fluency, and decision-making ease, among others. Past research suggests that some dimensions of fluency mediate the relationship between visual complexity and purchase intentions. For example, Bigoin-Gagnan and Lacoste-Badie (2018) demonstrate the mediating effects of perceptual fluency. The findings of the research show that visual complexity is perceptually disfluent, whereas visual simplicity (in terms of symmetry) is perceived fluently, which, in turn, influences consumer purchase

intentions. Perceptual fluency represents the ease with which people perceive, capture, and identify the features of a stimulus and is concerned with the cognitive process of perception. Interestingly, visual processing is perceptual at the beginning and then semantic; however, past research has not explored whether conceptual fluency (the ease with which people understand the semantic meaning of a stimulus) mediates the relationship between visual complexity and consumer purchase intentions. Furthermore, when people process visual stimuli, they often engage in mental imagery (McInnis and Price, 1987), hence imagery fluency (the ease with which people generate mental imagery of a stimulus) could perhaps also mediate that relationship. However, the research on fluency has not focused on these interrelationships. As perceptual fluency, conceptual fluency, and imagery fluency are crucial for scene processing, their effects need to be further explored.

It has already been established that simple images are more perceptually fluent than complex ones (Reber et al., 1998, 2004; Larsen et al., 2004; Wu et al., 2016; Maier and Dost, 2018; Mater and Landwehn, 2014), as they require less cognitive effort for processing and capturing information (Larsen et al., 2004). Past research has studied the way different perceptual dimensions of visual complexity, such as symmetry and arrangement (Reber, Schwarz and Winkielman, 2004; Mayer and Landwehn, 2014), colour contrast (Reber et al., 2004), and the number of elements displayed (Garner, 1974; Reber et al., 1998, 2004; Larsen et al., 2004; Peracchio and Meyers-Levy, 1997), affect perceptual fluency. On the other hand, the effect of visual complexity in terms of the presence *versus* absence of a contextual background on perceptual fluency has not previously been explored. Based on this gap in the literature, as well as the current strategies adopted by brands on social media and beyond, there is clearly a need for such research to be conducted.

Furthermore, in terms of their visual experience, people not only perceive stimuli, but also interpret their semantic meaning. Shapiro (1999) has claimed that it is easier for people to understand the semantic meaning of complex stimulus. Semantic meaning is associated with conceptual fluency and has been studied in a number of domains, such as priming (Lee and Labroo), semantic predictability (Whittlesea, 1993), and congruity (de Droog et al., 2011; Peracchio and Meyers-Levy, 2005); however, further examination with regard to complexity is required. For instance, examination of the effects of visual complexity in terms of the presence *versus* absence of a contextual background on conceptual fluency has been lacking over the past 20 years (Palmer et al., 2013; Shapiro, 1999). Hence, there is a need for an updated

study that re-explores this relationship. Maier and Dost (2018) have studied the effects of the contextual background on processing fluency; however, the nature of this dimension of fluency consists of both perceptual fluency and conceptual fluency. Hence, the individual results for perceptual fluency and conceptual fluency should be discussed further.

When people process visual stimuli, they often engage in different mental imageries. Mental imagery represents the cognitive experience of visualisation (Lutz and Lutz, 1978). As with fluency, it is a subjective experience. Mental imagery is linked to imagery fluency, which represents the ease with which individuals generate mental imagery (Mande, Petrova and Cialdini, 2006). The limited research on the effectiveness of visual complexity in influencing mental imageries has so far established that complex images are more imagery fluent. However, the studies either compared a sketch (not a picture) of a product in isolation with a picture of the product placed within a contextual background (Chang, 2013), or they used augmented and experience products (Maier and Dost, 2018b). Therefore, there is a need for research which compares the impact of a simple image, showing a typical product on a plain background, and a complex one, displaying the same product placed within a contextual background, on imagery fluency.

When discussing visual complexity in terms of the presence (*versus* absence) of a contextual background, it must be noted that the contextual background could be congruent or incongruent to the displayed product. As mentioned previously, showing a product against an incongruent contextual background is a popular trend among luxury fashion brands. Yet, fluency literature has not discussed the nature of product-contextual background congruity in the context of perceptual fluency or imagery fluency. On the other hand, the positive link between conceptual fluency and congruity has been confirmed in a number of contexts, such as text congruence (Whittlesea, 1993), character-product congruency (de Droog et al., 2011), banner congruency (Kao and Wang, 2013; Shen and Chen, 2007), picture-text congruency (Peracchio and Meyers-Levy, 2005), and hotel banner congruency (Van Rompay et al., 2010). Shapiro (1999) claimed that congruity between a product and its contextual background enhances conceptual fluency; however, the study was conducted almost 20 years ago and, therefore, there is clearly a need for updated information on that relationship. As visual processing is perceptual, conceptual, and often leads to mental imagery, there is a need for a study which compares the effects of congruity on the three dimensions of fluency referred to above: perceptual fluency, conceptual fluency, and imagery fluency.

Finally, previous research has established that fluent processing of a stimulus triggers behavioural intentions (Menon and Raghubir, 2003; Reber, Winkielman and Schwarz, 1998; Im and Ha, 2011; Im, Lennon and Stoel, 2010; Adaval, 2001; Eroglu et al., 2003; Schwarz and Clore, 1983; Gomez and Werle, 2019; Bigoin-Gagnan and Lacoste-Badie, 2018; Song and Schwarz, 2008; Dreisbach and Fischer, 2011; Winkielman, Schwarz, Fazendeiro and Reber, 2003; Storme, Myszkowski, Davila and Bournois, 2015; Coulter and Roggeveen, 2014). Past research has also confirmed that perceptual fluency affects purchase intentions (Bigoin-Gagnan and Lacoste-Badie, 2018; Im, Lennon and Stoel, 2010; Im and Ha, 2011; Gomez and Werle, 2019). However, perceptual fluency in the context of the ease with which people process the perceptual characteristics of the contextual background of an image and its relationship to purchase intentions has not been discussed previously. Similarly, prior research has observed the relationship between imagery fluency and consumer purchase intentions (Gregory et al., 1982; Petrova and Cialdini, 2005, 2007, 2008; Zhao, Hoeffler and Dahl, 2007); however, the influence of the ease of imagining a product in the context of the presence/absence of a contextual background on consumer purchase intentions has not previously been researched. It must also be noted that several research articles support the positive relationship between processing fluency and behaviour intentions (Dreisbach and Dischер, 2011; Song and Schwarz, 2008; Storme, Myszkowski, Davila and Bournois, 2015; Coulter and Roggeveen, 2014; Mosteller et al., 2014) but the individual effects of conceptual fluency on purchase intentions lack scrutiny. In fact, Palmer et al. (2013) have called for future research to investigate the relationship between fluency and behavioural intentions, as there is a clear gap in that area of research.

To address the aforementioned gaps in the literature, this PhD thesis studies the mediating role of fluency in the relationship between visual complexity and purchase intentions in the context of luxury fashion brand communication on social media. When discussing visual complexity, it must be noted that there are many perceptual dimensions that define it (Rayner, 1998; Oliva et al., 2004), such as the quantity of the objects presented (Snodgrass and Vanderwart, 1980), their symmetry and arrangement in the image (Reber, Schwarz and Winkielman, 2004; Mayer and Landwehr, 2014), the variety of the objects (Heylighen, 1997), and the colours and the contrast between them (Leder and Carbon, 2005).

Past research has discussed the effectiveness of visual complexity (*versus* simplicity) in the context of different perceptual factors, such as symmetry and arrangement, the gaze, the size,

as well as the position of the product, among others. Given the current trends on social media with regard to the presence *versus* absence of a contextual background, as well as the varying levels of congruity between products and their contextual background, the current study discusses visual complexity in the context of the contextual background. Specifically, the study uses simple images, showing a product on a plain background, and complex images, presenting the same product on a contextual background. In this way, the current study aims to extend knowledge of the effects of visual complexity on fluency and purchase intentions by focusing on pictorial information and contextual background. It is worth noting that the study explores the effects of visual complexity on perceptual fluency, conceptual fluency, and imagery fluency. So far, no study has explored these three types of fluency simultaneously. In addition, as contextual background could differ in its levels of congruity, the current research studies the moderating effects of congruity on the relationship between visual complexity and fluency. Therefore, the study compares complex congruent images, displaying a product within a congruent and matching background, and complex incongruent images, displaying the same product in an incongruent and mismatching background.

### 1.2 Research Aims

The aim of this PhD thesis is to investigate the effects of visual complexity on consumer purchase intentions. The thesis explores the mediating role of different metacognitive experiences taking place in the consumer's mind prior to purchase intentions. Specifically, the ease with which people process information (perceptual fluency), understand the semantic meaning of the stimulus (conceptual fluency), and imagine the stimulus (imagery fluency). Furthermore, as visually complex stimuli could differ in their levels of congruity, the thesis also determines if congruity plays a moderating role in the relationship between visual complexity and fluency. Therefore, the thesis set out several objectives, specifically:

- To review the literature on visual complexity and its effects on the types of fluency (i.e., perceptual, conceptual, and imagery fluency) and consumer purchase intentions.
- To review the literature on visual congruity and its impact on the types of fluency.
- To empirically examine the effects of visual complexity on the types of fluency.
- To make an empirical examination of the moderating effects of congruity on the relationship between visual complexity and the types of fluency.

- To test if the relationship between visual complexity and consumer purchase intentions is direct or mediated via fluency.

To elaborate, first, the current study aims to join the existing debate on the effectiveness of visual stimuli with varying levels of complexity (and simplicity) on consumer purchase intentions. This PhD thesis also aims to fill the gap in the literature surrounding aesthetics (Palmer et al., 2013) and fluency theory (Schwarz, 2004; Reber et al., 2004), and by offering a novel perspective on understanding consumers' responses to different visual stimuli. In integrating these theoretical streams of research, the study offers a new theoretical model that explains some of the mechanisms underpinning consumer purchase intentions.

Second, the study investigates the effects of visual complexity (in the context of the presence *versus* absence of a contextual background) on three dimensions of fluency. In this way, the study extends the fluency literature. The study contributes to perceptual fluency literature by exploring the impact of a novel perceptual dimension on perceptual fluency, specifically the contextual background. As the study researches the effects of visual complexity on conceptual fluency, it also contributes to the existing fluency research by providing an updated study on the topic. In this way, the study contributes to processing fluency theory by studying the individual effects of perceptual and conceptual fluency. Also, as imagery fluency has not received much attention in the literature to date, especially with regard to visual information, this PhD thesis fills an important gap by studying the link between visual complexity and imagery fluency. Overall, by examining the relationship between visual complexity and the three dimensions of fluency, the study offers a concurrent account of the role played by visual complexity in metacognitive processes of fluency. Thus, the thesis is the first of its kind in explaining the relationship between visual complexity and three types of fluency (i.e., perceptual, conceptual, and imagery fluency).

Third, the study compares complex congruent images (displaying a product on a matching contextual background) and complex incongruent images (displaying a product in an unmatching contextual background) in terms of how they influence perceptual fluency, conceptual fluency, and imagery fluency. The results of the current study shed light on the effects of congruity on different dimensions of fluency and, in this way, the thesis extends the fluency literature by incorporating the interactive role of visual complexity and congruity on consumer metacognitive processes, such as fluency. Past research has examined the relationship between congruity and conceptual fluency (Shapiro, 1999), wherein complex

congruent images were found to be more conceptually fluent in comparison with complex incongruent images. However, the effects of congruity on perceptual fluency and imagery fluency remain unexplored. This research reaffirms the findings relating to congruity and conceptual fluency and provides a first-hand account of the relationship between congruity and perceptual fluency as well as imagery fluency. Prior research proposed that congruity would positively influence perceptual fluency (Davenport and Potter, 2004; Rieger et al., 2008); however, the results of this PhD thesis demonstrate that congruity has no effect on perceptual fluency.

Finally, the study also extends the stream of research on fluency and behavioural intentions. Specifically, this PhD thesis expands past research exploring the effects of perceptual fluency (Storme, Myszkowski, Davila and Bournois, 2015; Bigoin-Gagnan and Lacoste-Badie, 2018; Gomez and Werle, 2019) and imagery fluency (Gregory et al., 1982; Petrova and Cialdini, 2005, 2007, 2008; Zhao, Hoeffler and Dahl, 2007) on behavioural intentions, by investigating the way in which the ease with which people perceive and imagine visual stimuli with varying levels of complexity influences their purchase intentions. The study also contributes to the findings of past research establishing a positive relationship between processing fluency and behaviour intentions (Dreisbach and Discher, 2011; Song and Schwarz, 2008; Storme, Myszkowski, Davila and Bournois, 2015; Coulter and Roggeveen, 2014; Mosteller et al., 2014) by demonstrating the individual effects of conceptual as well as perceptual fluency.

This study also offers a number of contributions to management for businesses, marketers, and advertisers. Specifically, the findings of this study suggest that companies should predominantly use simple images, as these allow consumers to perceive, understand, and imagine the presented products easier compared to complex stimuli. Moreover, the ease of processing triggers consumers' purchase intentions. Of course, brands cannot rely on simple images alone when communicating with consumers. Nonetheless, this PhD thesis suggests caution when applying complex visual stimuli. More specifically, brands should mainly use complex congruent images, as these allow consumers to understand and imagine the product easier when compared to complex incongruent stimuli.

### 1.3 Organisation of the Thesis

This PhD thesis contains seven chapters. The organisation of the rest of the thesis and the structure of each chapter are as follows.

Chapter 2, Literature Review: this chapter focuses on presenting a discussion of the previous literature on visual complexity, congruity, fluency, and mental imagery. The chapter is divided into four main parts. The first part discusses visual complexity; the second is concerned with visual congruity; the third focuses on fluency; and the final part discusses the nature of mental imagery and imagery fluency.

Chapter 3, Hypotheses Development: the aim of this chapter is to develop the hypotheses relevant to the research topic. The chapter is divided into three parts. The first part presents the hypotheses of the effects of visual complexity on fluency (tested in Study 1); the second part of the chapter develops the hypotheses related to the link between congruity and fluency (tested in Study 2); and the final part of the chapter discusses the hypotheses of the effects of visual complexity on fluency and consumer purchase intentions (tested in Study 3).

Chapter 4, Methodology: the aim of this chapter is to discuss the methodology used to study the research topic; specifically, the research philosophy, research approach, research design, research strategy, sampling, the three experiments, limitations, and ethical considerations.

Chapter 5, Analysis and Discussion: the aim of this chapter is to present the findings from the experiments testing the hypotheses developed in Chapter 3. This chapter is divided into three parts, each focusing on one experiment. The structure of each part is as follows: pilot study, participants and procedure, reliability measurement, manipulation checks, results, and a brief discussion.

Chapter 6, General Discussion: the aim of this chapter is to discuss in detail the key findings of the experiments. The chapter discusses each experiment individually, interprets the findings, and compares them with previous research results. The chapter also presents the main contributions of each experiment.

Chapter 7, Conclusion: the aim of the final chapter of this PhD thesis is to summarise the findings. The conclusion outlines the theoretical contributions, discusses the managerial implications of the findings, presents the limitations, and suggests avenues for future research.

# Chapter 2: Literature Review

The aim of this PhD thesis is to study the effects of visual complexity on consumer purchase intentions and the mediating role of fluency. This chapter presents the literature underpinning this research project. The chapter is divided into four main parts: the first part discusses visual complexity; the second part is concerned with visual congruity; the third part focuses on fluency; and, finally, the chapter discusses the nature of mental imagery and imagery fluency.

## 2.1 Visual Complexity

Aesthetics refers to a pleasing appearance of a stimulus and to beauty (Palmer et al., 2013). There are different theories of aesthetics but one of the most significant is the U-shape theory proposed by Berlyne (1971). This theory suggests that people form preferences for stimulus based on its arousing potential. Moreover, the arousing potential depends on (1) the physical properties of the stimulus, such as the intensity, brightness of the colours, etc.; (2) the ecological properties, which refer to the meaningfulness of the stimulus, such as an artwork; and (3) the collative properties, which represent the higher-order attributes, such as surprise, complexity, etc. According to Berlyne (1971), complexity is the most significant factor in predicting preference. Specifically, people prefer moderate levels of complexity and find stimuli that are not too simple or too complex more aesthetically pleasing. In fact, people avoid stimuli that are too complex as they contain too much information, which requires more processing effort. On the other hand, people find simple stimuli less interesting and try to avoid the increased uncertainty and ambiguity caused by insufficient information (Jang, Baek, Yoon and Choo, 2018; Geissler et al., 2006; Huffman and Khan, 1998).

Indeed, visual complexity is rooted in aesthetics; however, the debate on this began with Gestalt psychologists in the 20$^{th}$ century. The main aim of Gestalt psychology is to study the link between sensory input (a stimulus) and the perceptual experience (simple *versus* complex). It is connected to the way the human brain processes stimuli. Gestalt represents a coherent structure or a whole. Central to Gestalt psychology is "the law of *Prägnanz*", also known as the "principle of simplicity" or "maximum homogeneity" (Hochberg, 1957); the "simplicity principle" or "the minimum principle" (Boselie and Wouterlood, 1989; Kanizsa, 1979). *Prägnanz* signifies a "good" figure. According to Koffka (1935), "psychological organisation will always be as 'good' as the prevailing conditions allow" (p. 110). Moreover, *Prägnanz* refers to different properties, such as regularity, simplicity, symmetry (Koffka, 1935;

Wertheimer, 1923), continuity, nearness (Wertheimer, 1923), clarity, and the amount of information (Moshagen and Thielsch, 2010). All those properties are significant for the perception and pleasure of aesthetics (Moshgen and Thielsch, 2010) and, therefore, it could be concluded that Aesthetics and Gestalt are linked. According to Gestalt psychology, people prefer (find aesthetically appealing) objects and stimuli that are simple and clear, as they are able to process them easier and quicker. On the other hand, people perceive and interpret ambiguous or complex images in the simplest form(s) possible. In other words, when people process a complex stimulus, they perceive it as a whole (holistically) by grouping different elements together. Koffka (1935) describes "the whole" as "something else than the sum of its parts, because summing is a meaningless procedure, whereas the whole-part relationship is meaningful" (p. 176).

Visual complexity is central to Gestalt psychology and Aesthetics. The next section will, therefore, present the notion of visual complexity and outline the different types of visual complexity that are explored in this PhD thesis.

### 2.1.1 What is Visual Complexity?

This thesis focuses primarily on visual complexity. In fact, defining visual complexity is a challenging task and many scholars have attempted to provide a detailed definition of it. The pioneers in the visual complexity field, the psychologists Snodgrass and Vanderwart (1980), define visual complexity as the quantity of objects and other details or intricacy in a picture. Heylighen (1997) partly agrees with Snodgrass and Vanderwart's (1980) definition and adds that the perception of visual complexity is closely related to the variety of the elements presented in the stimulus. Moreover, Heylighen (1997) presents two different dimensions of visual complexity and variety: the first is that visual complexity tends to increase as a result of the amount, as well as the range, of objects presented; the second is that the visual complexity perceived increases as a result of the range of the illustrated materials and surface styles, even when the number of objects and surfaces remains unchanged. For example, when an image illustrates a real-world scene, it is more likely to incorporate these two levels of variety (objects as well as surface styles), hence the scene could be perceived as complex. Leder and Carbon (2005) support Heylighen's (1997) claim, adding that the variety of colours and their contrasts also plays an important role in the way people perceive the complexity of a stimulus. In other words, when there are many colours involved in the display and the contrast between them is low, the stimulus is perceived as more complex. It is worth noting that these definitions align

with the Gestalt law of *Prägnanz* (Koffka, 1935), which refers to the notion that the amount of information influences the "good" organisation, such that a stimulus presenting many details is considered complex, whereas a stimulus presenting fewer elements is considered as simple, or "good". People also find stimuli presenting fewer elements to be more aesthetically pleasing, in comparison to more complex stimuli (Palmer et al., 2013).

On the other hand, a large body of the literature perceives Snodgrass and Vanderwart's (1980) definition of visual complexity as incomplete, claiming that the way people perceive visual complexity depends not only on the quantity of the elements presented, but also on their symmetry and arrangement in the image (Reber, Schwarz and Winkielman, 2004; Mayer and Landwehr, 2014). Specifically, symmetric stimuli are perceived as simple as they are easier to process. For example, Mayer and Landwehr (2014) studied the way visual complexity and visual symmetry influence fluency and aesthetic preference. The researchers used abstract art images and the results demonstrated that symmetric stimuli tend to be easier to process and influence higher levels of consumer preferences. Symmetry also refers to the Gestalt principle of simplicity and the law of *Prägnanz* (Koffka, 1935), as well as to Aesthetics (Palmer et al., 2013), as people tend to find symmetric stimuli more aesthetically pleasing.

In an attempt to synthesise the nature of visual complexity, Oliva et al. (2004) conducted several experiments in which participants were told what visual complexity is and then they had to divide 100 pictures of real-world scenes (collected from the internet and magazines) into complex and simple groups, and to split each group into a number of subdivisions and to label each division and subdivision. The research concluded that a visual display could be perceived as simple or complex based on many factors, such as the number of elements presented, the symmetry, the layout, the variety of colours, the contrast of the colours, and the set-up of the image (Oliva et al., 2004). Therefore, it can be concluded that, generally, visual complexity depends on different perceptual dimensions (Oliva et al., 2004; Rayner, 1998). Furthermore, as complexity stems from the Latin word *"complexus",* which means "twisted together", Oliva et al. (2004) argue that a stimulus could be defined as complex when it is hard to identify the elements presented on it separately or when it is difficult to separate them from each other. In addition, the complexity of an image is based on the quantity of grouping of elements that the perceiver unconsciously performs, the familiarity with the scene, and the existing knowledge of the presented objects.

Another notable definition of visual complexity also provide Heaps and Hande (1999) with "a degree of difficulty in providing a verbal description of an image". In their experiment, participants were asked to range texture images based on many perceptual dimensions (e.g., depth, orientation, complexity, connectedness, and structure). The results of their study demonstrate that the complexity of a texture could be estimated based on the degree of perceivable structures. To be specific, disorganised patterns are seen as complex, whereas textures with repetitive and uniformly oriented patterns are judged as simple (less complex).

One of the recent definitions of visual complexity was proposed by Pieters et al. (2010) in the context of advertising. They argue that there are two different types of visual complexity: the first is feature complexity, which is related to the number of features in an advert; and the second is design complexity, whereby advertisements are perceived as complex when presenting an innovative and creative design.

In conclusion, visual complexity depends on different perceptual dimensions (Rayner, 1998; Oliva et al., 2004), such as the quantity of the objects presented (Snodgrass and Vanderwart, 1980), their symmetry and arrangement in the images (Reber, Schwarz and Winkielman, 2004; Mayer and Landwehr, 2014), the variety of the objects (Heylighen, 1997), as well as the colours and the contrast between them (Leder and Carbon, 2005). For the purposes of this PhD thesis, complexity is based on the presence *versus* absence of a contextual background. Therefore, a complex visual stimulus is an image presenting a product within a contextual background, while a simple visual stimulus is an image presenting a product on a plain background. To elaborate, brands use two types of images to promote their products. The first type of image displays the product only; it is usually considered as simple due to the low number of objects presented (Snodgrass and Vanderwart, 1980) and its simple arrangement (Reber, Schwarz and Winkielman, 2004; Mayer and Landwehr, 2014). There is also a smaller variety of objects and colours (Heylighen, 1997) and individuals could easily describe the image, as there is only one object in it (Heaps and Hande, 1999). The second type of image shows a product within a contextual background, surrounded by other objects. The literature defines the context of an image as "considerable information on the physical setting or locale, the spatial agreement of objects and people, and the activities associated with the consumption of the product" (Krishnamurthy and Sujan, 1999, p. 56). That image would be perceived as complex due to the increased number of presented objects, i.e. more than one (Snodgrass and Vanderwart, 1980), the low levels of symmetry and image arrangement (Reber, Schwarz and Winkielman, 2004;

Mayer and Landwehr, 2014), and the greater variety of objects and colours (Heylighen, 1997). Individuals might also describe the image with greater difficulty compared to the simple image, due to the richness of the information (Heaps and Hande, 1999). These two types of images have influenced a long and ongoing debate among practitioners and academics regarding their suitability for online product presentation, as well as their effectiveness in influencing consumer purchase intentions. Some of them recommend the use of simple images presenting only the product (usually on a white background) because it presses consumers to focus only on the product and thus allows "products to shine" (Coyne, 2015; Maier and Dost, 2018, Pracejus, Olsen and O'Guinn, 2006). Many academics support this practice (Bigoin-Gagnan and Lacoste-Badie, 2018; Kolesova and Singh, 2019; Pelet, Durrieu and Lick, 2020). In contrast, other practitioners and academics support the idea of using real-world settings (complex images) as they evoke "a sense of time and place" (Sekonda, 2014; Maier and Dost, 2018; Shapiro, 1999; Yoo and Kim, 2014; Lee, Hur and Watkins, 2018; Kim and Lennon, 2000, Wang et al., 2020; Geissler, Zinkhan and Watson, 2006; Mulken et al., 2014).

### 2.1.2 Visual Complexity and Other Disciplines

Complexity has been widely researched in a number of disciplines, including human-computer interactions (HCI) (Tuch et al., 2009), aesthetic preferences (Nadal et al., 2008; Reber et al., 2004; Choi and Lee, 2012), and behaviour intentions (Pelet, Durrieu and Lick, 2020; Shapiro, 1999; Yoo and Kim, 2014). A number of research studies have also taken place in the context of marketing and advertising (Morrison and Dianoff, 1972; Pieters et al., 2010). For instance, Morrison and Dianoff (1972) studied the complexity of advertisements and consumer responses to them. The research found that consumers spend more time focusing on the more complex advertisements.

Visual complexity has also been studied in the field of semiotics through the context of logos. For example, Janiszewski and Meyvis (2001) demonstrate that consumers tend to process simple logos easier than complex logos. Other studies researched visual complexity and package design (Orth and Malkewitz, 2012; Orth and Crouch, 2014). For example, Orth and Crouch (2014) studied visual complexity in terms of the context in which a package is placed, and how it affects its attractiveness as well as the ease of processing. The results of the study demonstrate that processing fluency and the attractiveness of the package increase when the item is placed within a low-complexity context. The opposite results are demonstrated when a package is placed within a more complex environment.

Extensive research on complexity has been conducted in the context of aesthetic preferences (Nadal et al., 2008). For instance, Maier and Dost (2018) research the preferences for visual complexity and found that images presenting the product (furniture) in a contextual background are processed less fluently compared to the images presenting the product only. On the other hand, they also found that consumers are more likely to prefer complex images compared to those that show the product only. Interestingly, Pandir and Knight (2006) present completely different results, disproving the link between complexity and pleasure. In their study, the researchers used 12 website homepages and asked the participants to evaluate the webpages by applying a ranking method. The findings of the research show that complexity is not a predictor of pleasure, regardless of the degree of interestingness of the stimulus. In the field of HCI, Tuch et al. (2009) also focused on visual complexity and aesthetic pleasure. For the purposes of their research, they used 36 screenshots of homepages and employed 28 participants and found that the simpler the stimulus, the higher the viewer's pleasure. In contrast to the research referred to earlier, Tuch et al.'s (2009) work demonstrated that higher levels of complexity lead to lower levels of pleasure. Similar results are found in Reber et al. (2004), specifically, that simple layouts tend to be processed easier and are found to be more aesthetically pleasing in comparison with complex ones. Choi and Lee (2012) conduct a similar study, investigating the visual aesthetics, information design, and complexity of a task in the context of smartphones. Their key finding is that there is a clear link between simplicity and aesthetic preference.

Pieters, Wedel and Batra (2010) also focused on visual complexity and its effect on consumer attention. The researchers divided complexity into feature complexity (representing the density of perceptual features) and design complexity (the creative design of advertisements). Their study used eye-tracking methods to analyse the results and demonstrates that high levels of features complexity could even have more negative effects for an advertisement as they distract consumers' attention away from the brand. On the other hand, design complexity has a positive impact on consumer attention on the advertisement.

Visual complexity has also been studied in the context of consumer purchase intentions. For example, Pelet, Durrieu and Lick (2020) conducted a study in the context of the visual complexity of the label design on bottles of wine. The findings demonstrate that low levels of visual complexity influence higher levels of pleasure, which results in higher levels of purchase intentions. The link between visual complexity and purchase intention was also explored by Shapiro (1999), who demonstrated that complex images presenting a product within a matching contextual background influence purchase intention more than simple images showing a

product only. Yoo and Kim (2014) confirm those results; however, they demonstrate that the relationship between visual complexity and behavioural intention is not direct but mediated by mental imagery and the positive emotional reaction towards the product. In their study, they suggested that future research should explore the role of visual fluency in the context of online product presentation.

As evident, the literature on the link between visual complexity and consumer purchase intentions offers mixed results regarding the effectiveness of visual stimuli with varying levels of complexity. As previously mentioned, practitioners also debate whether the use of simple images, presenting the product on a plain background (Coyne, 2015; Maier and Dost, 2018; Pracejus, Olsen and O'Guinn, 2006), or complex images (Sekonda, 2014; Maier and Dost, 2018) is more effective in influencing consumer purchase intentions. Therefore, the aim of this PhD thesis is to enter the debate and provide empirical evidence of the effectiveness of visual complexity (simple *versus* complex images) in influencing consumer purchase intentions.

It is crucial to note that visual complexity is linked to another major concept, specifically, visual congruity. The following section discusses the nature of visual congruence.

### 2.2 Visual Congruence

As mentioned in the previous section, some of the factors affecting consumer preference, as well as the arousing potential of a stimulus, are a product's collative properties (Berlyne, 1971). Collative properties refer to higher-order attributes, such as complexity and surprise. Interestingly, complexity and surprise are both linked to the concept of congruity. Specifically, the previous part of the chapter discussed that a complex image represents a product (or an object) placed within a contextual background. The background could be congruent to the product, as the perceiver expects to see such a scene, or incongruent, whereby the product and the background do not fit together or are juxtaposed and the perceiver is surprised (or even shocked) by the scene. This part of the chapter presents the existing congruity theories which are debated in the published literature and are related to the research topic. First, the nature of congruity and some key theories underpinning the phenomenon are discussed, such as congruity theory (Osgood and Tannenbaum, 1955), and schema-congruity theory (Mandel, 1982). Second, this part of the chapter presents past research on congruency.

### 2.2.1 The Nature of Congruity

Congruity refers to the similarity and fit between two or more stimuli (Rokeach and Rothman, 1965). It has been defined as a “match” (McDaniel, 1999), a “fit” (Pracejus and Olsen, 2004), “relevance” (Johar and Pham, 1999), and “similarity” (Gwinner and Eaton, 1999). The following subsections of this part of the chapter present congruity theory (Osgood and Tannenbaum, 1955), and schema-congruity theory (Mandel, 1982), in order to explain the nature of congruity.

#### 2.2.1.1 Congruity Theory

Congruity theory (Osgood and Tannenbaum, 1955) suggests that people seek harmony. The theory also adopts a triangle to portray the dynamism between units: Audience, Source, and Concept, or P-S-O. To illustrate this idea, if a person (P) gets a positive statement regarding an object, another person or a situation (O) from a source (S), then his attitude (P) could remain the same or change. The degree of the influence of the source (S) on the person’s attitude is based on the person’s (P) evaluation and the degree of liking and favouring the source (S) as well as/or the object (O). Another factor affecting the attitude of the person (P) is the congruity between the received message and his opinion/perception. For example, if the person (P) likes the source (S) and the object (O), and he then receives positive information form the source (S), there is clear congruity between their perception and the received message. On the other hand, if an incongruence appears, for example if the person (P) likes the source (S) and the object (O), but the source (S) provides some negative information about the object (O), then the attitude of the person (P) will change towards the source (S) as well as the object (O). The reason for this is that the incongruence leads to pressure and tension, so naturally the person (P) would want to resolve it by applying more cognitive effort to achieve congruity and balance.

Congruity theory (Osgood and Tannenbaum, 1955) shares a lot ofsimilarities with Balance theory (Heider, 1958). Specifically, according to both theories, people seek harmony (balance/congruity) and, in the case of an unbalanced state, a tension occurs and people apply more cognitive effort to achieve balance. Moreover, both theories use triangles to explain the dynamics in different relations: the P-X-O triangle in balance theory (Heider, 1958) is translated into Audience, Source, and Concept, or P-S-O, in congruity theory (Osgood and Tannenbeum, 1955). The theories also differ in other respects. For example, if incongruity occurs, in balance theory, the attitude towards O *or* X changes, whereas in congruity theory attitudes towards both the object (O) *and* (X) must change. In addition, balance theory suggests

that feelings among entities could be either “like” or “dislike”, while Osgood and Tannenbeum (1955) aimed to quantify the attitude on a semantic differential scale. Specifically, the theory aims to measure how positively or negatively the other person and the attitude, object, or event are evaluated.

#### 2.2.1.2 Schema-Congruity Theory

Schema theory aims to explain the way people process information by organising it and assessing it based on their previous knowledge and stored experiences. A schema refers to the cognitive “organized structures of prior knowledge stored in memory” (Stayman et al., 1992). According to Bartlett (1932), people categorise processed/received knowledge in schemas, from which information can be accessed when needed. In other words, people store a number of pieces of information, called nodes or schemas, that are all linked in such a way that when people think about one node, another is activated. Hence, when people encounter a new experience or piece of information, they search different schemas within their brain in order to find meaning and process the stimulus.

Peracchio and Tybout (1996) claimed that when schema and congruity theories are combined, they result in schema-congruity effect. Schema-congruity theory (Mandler, 1982) focuses on the way people process new information based on already-stored schemas (expectations). Moreover, schema-congruity theory is concerned with the consistency between information/stimulus and the stored schemas. Hence, if a new piece of information/situation or experience matches an already existing schema, it is perceived as congruent, which brings a feeling of comfort and familiarity to the individual. It is then easier for the individual to process familiar information as this does not require a lot of cognitive effort for processing (Mandler, 1982). Alternatively, if the presented stimulus does not match the existing schemas, inconsistency occurs and people require a lot of cognitive effort to solve it due to the novelty of the information or its incongruency with previously stored schemas. According to Sujan (1985), incongruent information requires not only more effort, but also more time for processing.

It is crucial to mention that congruity has a great impact upon people’s perception and their evaluation of received information or their experience of a situation (Fiske, 1982; Srull et al., 1985). For example, when a stimulus is highly incongruent, it usually leads to negative effects on the perception towards it. Moreover, it could even lead to negative feelings, such as “irritation” when the person cannot process the stimulus. However, incongruency could also

have some positive effects, especially when it is moderated, because in this case people could use different schemas to evaluate and understand the new information (Mandler, 1982; Meyers-Levy and Tybout, 1998). This has been confirmed by Fiske (1982), who claimed that when people use already-stored schemas, they process the stimulus easier and quicker, as they do not have to re-evaluate the information that has been previously processed and stored. Moreover, if the information to which people are exposed is in existing schemas, they are more likely to form positive judgements towards it (Fiske, 1982).

### 2.2.2 Congruity and Past Research

Congruity has been examined within different contexts, such as self-congruity (Dolich, 1969; Kressmann, Sirghy and Herrmann, 2006; Cowart et al., 2008; Sirgy et al., 1997), celebrity endorsements (Hemamalini and Kurup, 2014; Lynch and Schular, 1994; Liu et al., 2007; Balasubramanian et al., 2014), corporate social responsibility (CSR) (Jiménez, Ruiz de Maya, López, 2017; Cha, Yi and Bagozzi, 2016), and advertising (Wong, McClelland and Furnham 2019; Furnham, Bergland and Gunter, 2002; Belanche, Flavián and Pérez-Rueda, 2017). This section now discusses the previous literature on congruity.

According to Kressmann, Sirghy and Herrmann (2006), the term self-congruity represents "the match between consumers' self-concept (actual self, ideal self) and the user image (or 'personality') of a given product, brand, store, etc." (p. 955). It is crucial to mention that the concept of self-concept (or self-image) represents the perception of an individual about themselves, rather than the way others perceive them (Sirgy, 1982). Researchers claim that consumers tend to purchase and consume products that are congruent to their image and the characteristics by which they identify themselves. In this way, they are able to communicate their identity or ideal selves to their surroundings, as well as to the social group to which they belong (Dolich, 1969; Sirgy, 1982). Moreover, past research has established that congruence between consumer self-image and an image of a product or brand leads to a higher level of preference and satisfaction, as well as purchase intentions (Cowart et al., 2008; Singy et al., 1997). Congruence could even have a positive impact on brand loyalty, as evidenced through the research of Kressmann, Sirghy and Herrmann (2006). Their research contained 600 participants (car owners), who were asked to complete a survey related to their self-image and the image of the car they drive. The results of the study demonstrate that self-congruity leads to brand loyalty.

Past research on congruity has also focused on celebrity endorsement. Celebrity endorsement is a powerful tool used by brands to attract consumer attention (Biswas, Hussain and O'Sonnel, 2009). However, a crucial factor for its effectiveness is the level of congruity between the image of the celebrity and the image of the brand being advertised because celebrities may convey different associations to consumers when advertising a brand/ a product (Kamins and Gupta, 1994). Past research suggests that when the image of the celebrity fits the image of the brand/product, consumer purchase intention increases (Hemamalini and Kurup, 2014; Lynch and Schular, 1994; Liu et al., 2007; Balasubramanian et al., 2014). For example, Choi and Rifon (2012) studied the congruency between the image of a celebrity and the ideal self-image of consumers on the effectiveness of a campaign. The findings of the study indicate that congruence between the image of the celebrity and consumers' ideal self-image has a positive effect upon the effectiveness of the endorsement, the ad rating, and consumer purchase intentions. Liu, Huang and Minghua (2007) also researched the link between celebrity-product congruity and consumer purchase intentions. The study measures the attractiveness of celebrities (famous athletes) in that relationship. The findings of the study illustrate that congruity between the celebrity and the products leads to high levels of purchase intentions. The study also demonstrates that the attractiveness of the celebrity plays a significant role in influencing purchase intentions; specifically, when the celebrity is very attractive and the congruity levels are low, the levels of purchase intentions are higher compared with a case in which the celebrity is perceived as being less attractive but has higher levels of congruity with the product being advertised. Another example is a study conducted by Balasubramanian et al. (2014), which focused on product placement and consumer attitudes towards the brand. The study demonstrates that the congruity between the celebrity (actor) and the brand presented in a movie positively influences consumer attitudes towards the product, but the congruity between the character and the brands has no effect on the attitude towards the product. In addition, the findings of the study illustrate some negative results regarding the congruity between the movie and the brand.

Interestingly, congruity has been studied in the context of CSR. CSR congruence is defined as "the perceived congruence between a social issue and a company's business" (Du et al., 2010, p. 12). Many businesses advertise their CSR campaigns; however, these could be congruent or incongruent to the business activity. For example, García-Jiménez, Ruiz de Maya and López (2017) studied the topic in the context of consumer purchase intentions. Their study demonstrates a positive relationship between CSR campaigns and business activities on

purchase intentions and recommendations. A similar study was conducted by Cha, Yi and Bagozzi (2016) and demonstrates that when the CSR strategies match the brand, consumer brand-loyalty increases.

Congruity has also been studied in the context of ad-media. Within the context of advertising, congruity refers to "the significance of the degree of similarity between the program content and the advertisement content" (Furnham, Bergland and Gunter, 2002, p. 526). Wong, McClelland and Furnham (2019) studied the effect of programme-advertisement congruity on consumer memory in the context of sexual content. The participants in the study were exposed to sexual or non-sexual programmes and, while watching the programme, a randomly selected advertisement appeared either in a sexual programme (*The Bachelorette*) or non-sexual programme (*I'm a Celebrity…Get Me Out of Here!*). The results of the study demonstrate that sexual content in advertisements leads to higher levels of memorising, but that the congruity in this case had no effect on memorising. By contrast, Belanche, Flavián and Pérez-Rueda (2017) argue that when the advert and the media are congruent, the effectiveness of the advertising increases, together with the consumer interest. Moreover, the researchers were able to demonstrate that in the case of congruity, consumers tend to watch a *YouTube* advert for longer instead of skipping it. Chang et al. (2010) also studied congruity but did so in the context of online games and the advertisements featured in the game. The findings of their study reveal that in the case of congruity, purchase intentions for the advertised product, as well as consumer interest in the game and in the advert, increased.

To summarise, visual congruity refers to a match or fit between two or more elements. This part of the chapter discussed congruity theory (Osgood and Tannenbaum, 1955), and schema-congruity theory (Mandler, 1982). It concludes that central to each theory is the idea that people seek harmony and congruity in their relationships (Heider, 1958; Osgood and Tannenbaum, 1955), as well as when they process information (Mandler, 1982). In the case of incongruence, a tension occurs and individuals try to fix it by applying more cognitive effort. It is worth noting that congruity is also connected to visual complexity. Specifically, visual complexity is based on a number of perceptual factors (Rayner, 1998; Oliva et al., 2004), including the number (Snodgrass and Vanderwart, 1980) as well as the variety of the objects presented in the picture (Heylighen, 1997), the symmetry and arrangement (Reber, Schwarz and Winkielman, 2004; Mayer and Landwehr, 2014), the colours and the contrast between them (Leder and Carbon, 2005), and other elements. Congruity refers to the content of an image and the match between the different elements in it (Garretson and Niedrich, 2004). It is associated with "regularity"

(Winkielman et al., p. 5), or an unsurprising fit between two or more elements. Moreover, it is not only linked to complexity, but also reflects another Gestalt principle, that of the law of unity. Lauer (1979) claimed that "Unity implies that a congruity or arrangement exists among the elements in a design; they look as though they belong together, as though there is some visual connection beyond mere chance that has caused them to come together". It is crucial to mention that complexity and congruity are linked. Specifically, a complex image represents an object placed within a contextual background. Depending on the congruity of that contextual background, the complex image could be "complex congruent", where the product matches the contextual background; or it could be "complex incongruent" where the product and the background do not fit together. Visual complexity and congruity are not only concepts that are connected within the literature, but also popular tools that brands use to influence consumer attention, as well as purchase intentions. Specifically, brands use complex images, showing a product on a contextual background, but employ different levels of congruity. For example, brands such as *Valentino* and *Christian Louboutin* use complex congruent images, displaying a product on a matching and congruent contextual background. Other brands, such as *Dolce and Gabbana* and *Gucci*, use complex incongruent images, presenting a product on an incongruent contextual background.

The table below (Table 1) illustrates examples of these different types of images. Particularly, there are two complex images showing the same Dolce and Gabbana bag, where on the "complex" and "congruent" condition the bag is placed on a fitting contextual background, while on the "complex" and "incongruent" condition the same bag is placed on a non-matching contextual background as people do not expect to see such a luxury and elegant bag on the beach. It is also worth noting that simple images, displaying a single product on a plain background cannot be classified as "congruent" or "incongruent" because by definition congruity refers to a match between two or more elements on the display.

*Table 1: Examples of the interaction between visual complexity and congruity*

| | Congruity | |
|---|---|---|
| Visual Complexity | Congruent | Non-congruent |
| Simple | X | X |
| Complex |  |  |

It is crucial to mention that both images have their place in marketing and advertising as they can influence a number of cognitive (attention, depth of processing, mental imageries), affective (preferences, enjoyment) and behavioural responses. Specifically, the complex congruent images fit the consumers' expectations of where a product could be found or what a scene could portray, which enhances the object recognition, orientation, perception (Davenport, 2007; Kret and de Gelder, 2010; Mudrik, Lamy and Deouell, 2010) and semantic understanding of the image (Shapiro, 1999). On the other hand, the complex incongruent image has its purpose too, it creates "shock" as consumers do not expect to see a product placed in an incongruent scene. This shock triggers consumers' attention, depth of processing (Dahl et al., 2003) and recalling. Furthermore, processing visual complexity and visual congruity is a complicated process, which involves a number of cognitive and metacognitive processes and experiences (Zhao and Meyer, 2007), One of these processing experiences is called fluency. This thesis now examines the effects of visual complexity and congruity on fluency. The thesis

considers three types of fluency: perceptual fluency, conceptual fluency, and imagery fluency. The next subsection focuses on the nature of fluency, the link between fluency and information processing, past research on fluency, and processing fluency.

## 2.3 Fluency

Visual aesthetics refers to the way people perceive visual stimuli. In other words, an aesthetically satisfying experience is linked to a person's processing experience (Palmer et al., 2013; Reber, Schwarz and Winkielman, 2004). A number of cognitive as well as metacognitive processes and experiences take place when people process information (Zhao and Meyer, 2007). One of the domains of visual aesthetics and perception is processing fluency theory (Reber, Schwarz and Winkielman, 2004), which refers to the ease with which people process information (Schwartz, 2004). This part of the chapter focuses on fluency. First, this subchapter discusses the nature of fluency, its link to information processing, as well as past research on fluency. Second, the subchapter discusses the nature of processing fluency and the research that has been carried out in this area.

### 2.3.1 What is Fluency?

Fluency is defined as the "ease or difficulty with which new, external information can be processed" (Schwarz, 2004, p. 338). According to Oppenheimer (2008), "fluency is not a cognitive operation in and of itself but, rather, a feeling of ease associated with a cognitive operation, which can be generated by nearly any form of thinking" (p. 237). Moreover, it is not "the process itself but, rather, information about how efficient or easy the process feels" (Oppenheimer, 2008, p. 238). Therefore, fluency is a metacognitive experience (Nelson, 1996; Schwarz, 2004; Reber, Schwarz and Winkielman, 2004), as it represents the process of thinking about the thinking process and evaluating how easy the thought process feels (Schwarz, 2004). In a similar vein, fluency could be described as a feeling like any other body sensation (such as pain) because "it provides experiential information about otherwise inaccessible mental processes … and thus feedback about the state of the cognitive system" (Unkelback and Greifeneder, 2013, p. 3). In addition, according to Alter and Oppenheimer (2009), "as a rule, every cognitive task can be described along a continuum from effortless to highly effortful, which produces a corresponding metacognitive experience that ranges from fluent to disfluent, respectively" (p. 220).

It is important to note that fluency is a highly subjective experience because it is a function of an individual's previous experiences (Unkelback and Greifeneder, 2013). In other words, individuals might evaluate a certain cognitive process as fluent or disfluent (i.e., easy to process or difficult to process) based on a subjective comparison with their similar previous processing experiences (Parducci, 1968). This comparison influences an ongoing debate in the literature on whether fluency is a conscious experience (Foster et al., 2015). Indeed, many researchers have argued that fluency is a conscious experience because people have to be aware of their experience; otherwise, they would not be able to evaluate it (Forster et al., 2013; Regenberg, Häfner and Semin, 2012; Reber et al., 2004). In contrast, others claim that fluency is an unconscious experience (Reber et al., 2002; Topolinski and Strack, 2009; Winkielman, Schwarz and Reber, 2003). Specifically, everybody experiences fluency in some form or another; however, it often remains unnoticed, as people usually focus on their thoughts, rather than on evaluating their experience of thinking. Dehaene (2006) has added to the debate that fluency is a "pre-conscious experience", because to assess the level of fluency, people's attention must be focused on the experience. To some extent, Reber, Fazendiero and Winkielman (2002) claimed the same, as they describe fluency as an experience "at the periphery of the conscious awareness, resulting in a vague or 'fringe' experience of ease" (p. 3). Fringe consciousness is a "neither conscious nor unconscious" state (Maclagan, 2014) or "a radical condensation of unconscious information in near-consciousness" (Baars, Banks and Newman, 2003, p. 7). Fringe experiences are feelings that accompany information processing, "but stay in the periphery of awareness, being experienced only when attention is drawn to them" (Topolinski and Strack, 2008, p. 600; Russell, 2003). Moreover, fringe experiences provide contextual information about the objects on which the attention is focused (Topolinski and Strack, 2008; Mangan, 1993, 2001).

### 2.3.2 Fluency and Information Processing Theory

To further understand the nature of fluency, this part of the chapter considers information processing theory and analyses how this is linked to fluency. Information processing theory emerged in the 1950s and aimed to study the way people process information and respond to stimuli. The theory compares humans with computers in order to explain the way information is processed and stored in individual's mind (Lachman and Lachman, 1979). According to the theory, individuals, just like computers, receive, process and store information. Specifically, when exposed to a piece of information/a stimulus, people perceive it through their five human senses, and then the human brain processes the perceived information. The processing includes

encoding, recognition of the information, and a comparison with previously stored information. After this process, the brain stores the information.

As part of information processing theory, the stage model (Atkinson and Shiffrin, 1968) explains the steps involved in storing information. According to Atkinson and Shiffrin (1968), there are three stages of memory (or three types of memory): sensory memory, short-term memory (also known as working memory), and long-term memory. Sensory memory lasts for a very short time: about half a second for visual stimuli and about 3 seconds for auditory stimuli. If the sensory information is important and relevant, the mind processes that information into the short-term memory. Sensory memory is influenced by attention and automaticity. Attention is a form of the "limitations in our perceptual processing and response generation: to attend to one is to not attend to others" (Suthers, 1996, p. 1). Attention depends on other factors, such as the significance of the presented information and the complexity of that information (Driscoll, 2001).

The second stage of memory is short-term memory (also known as working memory). This type of memory is active and conscious because the received information is actively being processed. Short-term memory is very limited and in the case that newly received information is not rehearsed, it will eventually be forgotten. If the received information is to be remembered, it must be transferred to the long-term memory in the form of a schema. Specifically, the newly received information must be incorporated in the human's mind by matching the mind's existing information. In this case, the new information does not completely match the already existing structures (schemas), so these structures can be changed in order to add new information. Furthermore, if the new information is completely different from the existing structures, a new structure (schema) will be created in the human's mind. It is crucial to mention that the new structure should be linked to other relevant structures, although it will be part of a separate chunk of memory.

The third stage of memory is long-term memory, where information is stored for longer. If new information becomes part of the long-term memory, the interactions between the short-term and the long-term memory must be constant and very dynamic. Long-term memory has an unlimited capacity; however, the previously stored information does not always get retrieved when needed (Tulving and Pearlstone, 1966). Long-term memory is declarative (Tulving, 1972; semantic and episodic memory), procedural (how to do something), and involves imagery (Paivio, 1995; mental imagery).

To conclude, information processing theory explains how information is processed. For example, when people are exposed to new information, they use their five human senses to perceive the information (sensory memory). The next stage is task-specific; people use their working memory or long-term memory to accomplish the task. Information processing is related to the cognitive processes taking place when people process information. It is worth noting that fluency is linked to information processing, as it represents a metacognitive experience of evaluating those cognitive processes and the ease with which an information is perceived/processed. To be more specific, fluency is linked to every cognitive process taking place in the information-processing experience. Depending on the cognitive experience, as well as the memory activity at the time of processing, different types of fluency experiences emerge.

### 2.3.3 Past Research on Fluency

Fluency has been shown to have an influence on judgement across a wide array of domains (Winkielman, Schwarz, Fazendeiro and Reber, 2003; Alter and Oppenheimer, 2009). For example, fluency positively affects truth judgement (McGlone and Tofighbakhsh, 2000; Reber and Schwarz, 1999). Truth judgements are formed when people have the task of deciding whether or not a claim is true. However, when people do not have knowledge about a subject, they tend to rely on the level of fluency they have experienced in order to make a truth judgement. Specifically, people associate fluency with truth, and disfluency with false statements (Schwarz, 2004). For instance, Reber and Schwarz (1999) studied the effects of fluency on truth judgements by manipulating the text-background colour contrast of the following statements: “Lima is in Peru” and “Osrorno is in Chile”. The results of the study illustrate that the statement is processed easier and as a result, truer when presented on a white background (not on a dark blue or red background), as this is a more easy-to-read format. Moreover, in their review, Alter and Oppenheimer (2009) claim that when a stimulus is fluently processed, it will be perceived as true, even if the manipulation is based on visual ease (Reber and Schearz, 1999), rhyming (McGlone and Tofighbakhsh, 2000; a rhythmic aphorism is more likely to be perceived as true compared with a non-rhythmic one), or semantic priming (Kelley and Lindsay, 1993). However, if the stimulus is disfluent and hard to process, it is more likely to be perceived as false.

Other researchers have focused on the effects of fluency on affective judgements. For example, Reber, Winkielman and Schwarz (1998) researched the link between visual information processing (i.e., perceptual fluency) and preference. They conducted three separate

experiments in which they manipulated the levels of fluency by visual priming (in experiment 1), changing the figure-ground contrast (in experiment 2), and the presentation time (in experiment 3). The results of the study demonstrate that visual priming as well as a high contrast influence higher levels of perceptual fluency, which leads to positive affective judgements. Moreover, the findings of the study suggest that when people observe an object for a longer period of time, they are able to process it easier and, as a result, they form positive affective judgements towards it. Winkielman and Cacioppo (2001) conducted a similar study in which they asked participants to look at line drawings of everyday objects presented with matching or non-matching contour primes (experiment 1). The results of the study were analysed based on observation, whereby participants' reactions were perceived as positive when they activated their "smiling muscles" and as negative when they activated the "frowning muscles". The findings of the study demonstrate that when the stimuli are easily (fluently) perceived, then that fluent experience leads people to form positive affective responses. It could be concluded that people prefer visual stimuli which are easier to perceive (Reber et al., 1998; Winkielman and Cacioppo, 2001).

It has already been established that fluency is a metacognitively monitored process that has a tremendous effect on people's judgement (Schwartz, 2010). For example, fluency could determine which stimulus is more likeable (Bornstein and D'Agostino, 1992; Zajonic, 1968), more frequent (Tversky and Kahneman, 1973; Schwarz et al., 1991), more famous (Jacoby, 1989), or has better category members (Whittlesea and Leboe, 2000). Fluency can also affect choice. For example, Alter and Oppenheimer's (2006) study showed that when a stock company goes public and its name is easier to pronounce, it has greater success compared to those companies whose names are harder to pronounce. Moreover, stocks with more fluent names have been perceived as having higher value, which influences purchase decisions. Interestingly, fluency could also be associated with medicine and legal practice (Alter and Oppenheimer, 2009). For example, doctors may unintentionally use fluency when they make diagnoses for their patients. As some diagnoses are very complex, doctors might make the simplest and easiest-to-pronounce diagnosis. In addition, Pennington and Hastie (1992) argued that on some occasions the court or a decision-maker might favour the party advocating the most fluent story, and not the one presenting the most compelling legal argument.

In general, the majority of the aforementioned studies consistently document that fluent processing of a stimulus influences positive judgements towards it, whereas disfluent processing influences negative judgements towards a stimulus (Reber, Schwarz and

Winkielman, 2004; Schwartz et al., 1992; Winkielman et al., 2003; Schwarz, 2004). On the other hand, some contradictory results appear in the fluency literature. For instance, some studies have claimed that disfluency decreases people's confidence in their performance (Kelley and Lindsay, 1993; Koriat, 1993), whereas other studies show that disfluency increases confidence (Watkins, 1988). In addition, some studies found that fluent stimuli are judged to be more familiar (Monin, 2003), although other studies argue that disfluent stimuli are judged to be more familiar (Guttentag and Dunn, 2003).

To conclude, fluency affects many aspects of human lives and disciplines. Therefore, it could be difficult to prevent its effects on different judgement and decision-making processes. Fluency arises as a by-product of different mental processes (Alter and Oppenheimer, 2009), hence people experience different types of fluency depending on the cognitive tasks performed and the processes taking place. This PhD thesis is concerned with the way people process visual stimuli (complex *versus* simple, and congruent *versus* incongruent); hence, the ease with which they perceive (perceptual fluency) and understand (conceptual fluency) images is studied. The next section discusses these dimensions of fluency in more detail.

### 2.3.4 Types of Fluency and Where Fluency Arises From

The metacognitive experience of fluency arises from many cognitive processes (Schwartz, 2004; Oppenheimer, 2008; Alter and Oppenheimer, 2009). In 2009, Alter and Oppenheimer created a catalogue which illustrates the various cognitive processes that generate fluency. They claimed that "fluency experiences arise as a by-product of a wide array of cognitive processes, including but not limited to perception, memory, embodied cognition, linguistic processing, and higher order cognition" (Alter and Oppenheimer, 2009, p. 222). There are many types of fluency (perceptual fluency, conceptual fluency, embodied fluency, special fluency, retrieval fluency, etc.) and each of them is relevant to a particular cognitive process occurring in an individual's mind. For instance, types of fluency arising from perception are perceptual fluency and temporal perception fluency. Some types of fluency, such as memory fluency, retrieval fluency, and encoding fluency, arise from memory (Alter and Oppenheimer, 2009). This thesis is primarily concerned with perceptual fluency and conceptual fluency; therefore, the following subsections discuss each of these in detail and explain their origins.

#### 2.3.4.1 Processing Fluency

Processing fluency is a metacognitive experience concerned with the ease and speed with which stimuli/information can be processed, both perceptually and semantically. Processing fluency consists of perceptual fluency and conceptual fluency. The next two subsections discuss each of these individually.

##### 2.3.4.1.a Perceptual Fluency

Perceptual fluency represents the ease of processing the perceptual features of a stimulus (Lee and Labroo, 2004). Perceptual fluency arises from perception (Alter and Oppenheimer, 2009), which is a cognitive process referring to the ability of an individual to perceive, process, and capture the information received from the senses (the input). The perception could be visual, auditory, haptic (touch), olfactory, or taste-related. The focus of this PhD thesis is on visual stimuli; hence, visual perception is more relevant. This refers to the ability of people to see, capture, and interpret visual inputs through their eyes (Brown et al., 2007). The interpretation occurs by assessing the input through the senses and comparing it with the stored knowledge or past experiences. For example, when visual information is received through the visual senses, it tends to be compared with previously seen objects, stored information, knowledge, or experiences. In this way, the individual is able to process the stimuli perceptually.

Perceptual fluency refers to the ease of identifying the physical characteristics of a stimulus (Lee and Labroo, 2004; Chang, 2013) and, therefore, improves with mere exposure, visual contrast, figure-ground contrast, and the duration of the presentation of the stimulus (Reber, Winkielman and Schwarz, 1998). Winkielman et al. (2003) claimed that "perceptual fluency reflects the ease of low-level, data-driven operations that deal primarily with 'surface' features of the stimulus, or its perceptual form. As a consequence, perceptual fluency is influenced by variables such as simple repetition, form priming, contrast, duration, etc. These manipulations have been shown to influence responses primarily by changing the speed and accuracy of perceptual identification" (p. 354).

To study the factors that influence perceptual fluency, scholars have applied different visual manipulations, such as font manipulation (Alter and Oppenheimer, 2009; Novemsky et al., 2007; Simmons and Nelson, 2006; Reber and Schwarz, 1999). For example, Novemsky et al. (2007) study the effects of perceptual fluency on the evaluations of the overall products. They conduct four experiments that involved presenting the same product alternatives in either an easy-to-read or difficult-to-read font and ask the participants to justify their choice by providing

a few reasons (easy) or many reasons (difficult). The results of the experiments demonstrate the positive effects of perceptual fluency on the overall evaluations of products. Specifically, consumers process product information easier when it appears in an easy-to-read font, which causes them to exhibit less choice deferral.

Other perceptual factors that influence perceptual fluency are priming, figure-ground contrast (Reber et al., 1998; Mosteller et al., 2014), and duration of exposure (Rebel et al., 1998). For instance, Rebel, Winkielman and Schwarz (1998) suggest that when neutral objects are presented with a matching visual prime, individuals tend to like them more compared with the same object presented with a mismatching prime. Moreover, the study demonstrates that a stimulus with greater levels of figure-ground contrast is processed more fluently, which results in a positive object evaluation. Finally, the authors claimed that the duration of exposure positively affects perceptual fluency, as well as product evaluation. For instance, presenting a picture for a longer time influences positive evaluation (greater liking) as a result of the improved perceptual fluency. It could be concluded that easy-to-process stimuli are more positively evaluated and, specifically, that perceptual fluency positively affects affective judgements (such as the degree of liking).

As evidenced above, previous research on fluency has focused on particular perceptual dimensions, such as symmetry (Reber, Schwarz and Winkielman, 2004; Mayer and Landwehn, 2014), colour contrast (Reber et al., 1998; Mosteller et al., 2014), mere exposure, and priming (Rebel et al., 1998). Moreover, it has already been established that simple stimuli are more perceptually fluent compared to complex stimuli. However, visual complexity in terms of the presence *versus* absence of a contextual background has received very limited attention in the fluency literature. Contextual background has been studied in the context of object recognition, which is indirectly related to perceptual fluency. For instance, Oliva's (2004) research suggests that when an object is placed in a particular context, individuals tend to make certain associations with their own experiences and recognise the object easily. Moreover, the contextual background also enhances the understanding of ambiguous products, which might lead to a number of interpretations (Hoch and Ha, 1986; Maier and Dust, 2018). Maier and Dost (2018) propose one of the few studies in this area. Specifically, in their research, they use a simple image, displaying a product on a plain background, and a complex image, placing the same object within a specific contextual background. The study demonstrates that the presence of a contextual background decreases the levels of fluency. It is worth noting that the article

discusses the overall effect of perceptual and conceptual fluency (in terms of processing fluency), not their individual effects. In order to contribute to the fluency literature, this PhD thesis attempts to fill that gap by studying the effects of visual complexity (in terms of the absence of a contextual background – simple image, *versus* the presence of a contextual background – complex image) on perceptual fluency. Furthermore, as previously mentioned, the contextual background of complex images could differ in its congruity to the displayed object and, as a result, it could affect the processing experience. However, the link between visual congruity and perceptual fluency has not been explored previously. Therefore, this PhD thesis also compares the effects of complex congruent images, presenting a product within a matching contextual background, and complex incongruent images, showing the same product within a mismatching contextual background, on perceptual fluency.

Past research on fluency has discussed the impact of perceptual fluency on purchase intentions (Bigoin-Gagnan and Lacoste-Badie, 2018; Im, Lennon and Stoel, 2010; Im and Ha, 2011; Gomez and Werle, 2019). For example, Gomez and Werle (2019) argue that there is a positive relationship between them in the context of nutrition information. Specifically, their study indicates that when a label is easily processed and is perceptually fluent, consumers' intentions to purchase the product increase, for both healthy and unhealthy products. Moreover, in the study, some of the participants had little to no knowledge of nutrition and the results of the experiments demonstrate that these participants found the ease of perceptual processing a significant factor that determines their purchase intentions. On the other hand, other studies document that the effect of perceptual fluency on purchase intentions is mediated by different affective experiences, such as enjoyment (Im and Ha, 2011) and pleasure (Im, Lennon and Stoel, 2010). Therefore, the literature presents mixed and conflicting results on the direct and mediated relationship between perceptual fluency and consumer purchase intentions. To deepen the knowledge on this subject, this PhD thesis explores the relationship between perceptual fluency and consumer purchase intentions.

#### 2.3.4.1.b Conceptual Fluency

Conceptual fluency refers to the ease of processing the meaning and semantic message of a stimulus. It arises from higher-order cognition (Alter and Oppenheimer, 2009), which is related to people's previous knowledge (Lewis and Smith, 1993) and includes decision-making, reasoning, critical thinking, logical thinking, and other ways of thinking that are useful for solving complex questions, problems, and dilemmas (Lewis and Smith, 1993), as well as an

understanding of the meaning of the presented stimulus. Higher-order cognitive processes (in the same way as lower-order cognitive processes) depend on working memory resources (Conway, Jarrold, Kane, Miyake and Towse, 2007; Unsworth and Engle, 2007). According to Unsworth et al. (2009), "working memory refers to a limited-capacity system responsible for active maintenance, manipulation, and retrieval of task-relevant information that is needed for on-going cognition" (p. 635). This type of memory is active and conscious because the received information is actively being processed. Working memory (also known as short-term memory) is very limited and in the case that newly received information is not rehearsed, it will eventually be forgotten. It is used for temporarily storing and carrying out computational processes on mental representations necessary for successful task performance (Baddeley and Hitch, 1974).

Conceptual fluency can be affected by many factors, including repeated presentation of the same object/stimulus, semantic predictability, congruity, and rhyming (Kelley and Jacoby, 1998; McGlone and Tofighbakhsh, 2000; Roediger, 1990; Whittlesea, 1993). For example, Lee and Labroo (2004) explored how conceptual fluency influences product evaluation. The findings of their study demonstrate that when an advertising storyboard with a stimulus is presented within a predictive context (e.g., a bottle of beer presented in a bar) as well as when it is primed by related stimuli (e.g., an image of ketchup when advertising mayonnaise) it generates higher subsequent ratings. In another study, Whittlesea (1993) conducted an experiment in order to demonstrate the effects of conceptual fluency. The experiment began with a sequence of sentences, each of them presented for about 2 seconds. Later, a target word (test) was shown. At the next stage, the participants were asked to decide whether the target words were perceived as "pleasant" or "neutral". The findings of the study demonstrate that target words preceded with predictive sentences were more likely to be perceived as "pleasant", whereas those preceded with neutral sentences were regarded as "neutral". In other words, semantic predictability and the context affect conceptual fluency, which, in turn, leads to positive evaluations.

As previously mentioned, research documents that congruity positively affects conceptual fluency (Lee and Labroo, 2004; Koa and Wang, 2013; Peracchio and Mayers-Levy, 2005; Shapiro, 1999; Van Rompay et al., 2010). Specifically, past research on fluency indicates that congruity between two or more stimuli enhances the ease with which people process the

semantic meaning of a stimulus. For example, Shapiro (1999) also argues that if a product is displayed within a congruent background, the ease of semantic processing increases.

Another factor influencing conceptual fluency is the contextual background of a picture. In other words, when an object is placed within a contextual background, conceptual fluency increases because it is easier for people to understand the meaning and the message of the picture (Scott and Vargas, 2007). Shapiro (1999) claimed that the creation of meaning is subconsciously constructed and is facilitated by the presence of a contextual background. Moreover, he compared a simple image, showing a product on a plain background, and a complex one, displaying the same product within a contextual background. The findings of the study state that complex images are more conceptually fluent than simple images. In contrast, Wu et al. (2016) claim that visual complexity leads to lower levels of conceptual fluency and indicates that complex stimuli require much more effort for the interpretation of semantic meaning. Moreover, as mentioned previously, Maier and Dost (2018) studied the relationship between the fluency of a product picture with and without a contextual background and concluded that the contextual background decreases the levels of fluency. It is worth noting here that the study researched the joint effect of perceptual and conceptual fluency in terms of processing fluency, rather than the individual effects of conceptual fluency. As a result of the mixed findings on the topic and past literature on fluency having focused on processing fluency, instead of examining the separate effects of perceptual and conceptual fluency, it is clear that there is a need for new research which investigates the link between visual complexity and perceptual as well as conceptual fluency. Therefore, this PhD aims to fill that gap by comparing simple (a product picture without a contextual background) and complex (a product picture with a contextual background) images in terms of perceptual fluency, as mentioned in the previous subsection, and conceptual fluency.

Extant research demonstrates that when a stimulus is fluently processed, consumer behaviour intentions increase (Im and Ha, 2011; Im, Lennon and Stoel, 2010; Gomez and Werle, 2019; Bigoin-Gagnan and Lacoste-Badie, 2018; Song and Schwarz, 2008; Dreisbach and Fischer, 2011; Storme, Myszkowski, Davila and Bournois, 2015; Coulter and Roggeveen, 2014). For example, Storme, Myszkowski, Davila and Bournois (2015) conduct a research on the effects of processing fluency on consumer purchase intentions in the context of visual advertisements. Specifically, they indicate that when consumers can process an advertisement fluently, their attitude towards the stimulus and their purchase intentions increase. Coulter and Roggeveen (2014) found similar results in the context of pricing. Their study shows that fluent processing

triggers high levels of liking and purchase intentions. It is crucial to mention that past research on fluency focuses on processing fluency (representing perceptual fluency and conceptual fluency), rather than the individual effects of conceptual fluency on different behaviour intentions. Hence, in order to address this gap, this PhD thesis explores the effects of conceptual fluency on purchase intentions.

To summarise, fluency represents the ease with which people process information (Schwartz, 2004). It is a metacognitive and highly subjective experience, which is usually rated on a fluent-disfluent scale. This PhD thesis is interested in perceptual fluency (the ease with which people identify, capture, and process the features of a stimulus) and conceptual fluency (the ease with which people understand the semantic meaning and the message of stimuli). Those dimensions of fluency represent the processing fluency, which is concerned with the ease with which people process the features as well as the semantic meaning of stimuli. Processing fluency, just like visual complexity and congruity, is linked to aesthetics because it has been shown that people prefer stimuli and information that are easy to process (Palmer et al., 2013; Alter and Oppenheimer, 2009). According to Reber et al. (2004), processing fluency affects a person's aesthetic pleasure from stimuli. They found that simplicity, symmetry, contrast, and clarity facilitate the processing of visual stimuli. More specifically, the results of Reber et al.'s (2004) study demonstrate that people form aesthetic preferences around easy-to-process stimuli. Therefore, complex stimuli require more cognitive effort for processing, which, in turn, decreases the aesthetic pleasure (Palmer et al., 2013; Larsen et al., 2004; Reber et al., 2004). On the other hand, Landwehr, Labroo and Herrmann (2011) found that there is a positive link between complexity and aesthetic preferences. The same results were found in the context of advertisements, whereby complex advertisements influence higher levels of preferences compared to those that are easy to process (Van Enschot and Van Mulken, 2014). Maier and Dost's (2018) findings also support the aforementioned results because their study demonstrates that simple images (showing a product without a contextual background) are perceived as more fluent by consumers; however, consumers still prefer complex images (presenting a product within a contextual background).

As demonstrated, the literature on fluency suggests some mixed and conflicting views on processing fluency within the academic literature. One possible explanation is that processing fluency represents two different types of fluency: perceptual fluency and conceptual fluency. Although both are related to the way people process information (perceptually and semantically), they represent evaluations of two different cognitive processes. Moreover, the

literature review chapter so far has concluded that both dimensions of fluency are influenced by different factors. Therefore, the aim of this PhD thesis is to join the fluency debate by examining the effects of visual complexity on perceptual fluency and on conceptual fluency. In this thesis, visual complexity is discussed in the context of the presence (complex images) versus the absence (simple images) of a contextual background. Furthermore, the contextual background of images could offer varying levels of congruity, hence the study compares the effects of complex congruent and complex incongruent images on perceptual fluency and on conceptual fluency. It is also worth noting that past research has focused on the effects of processing fluency on different behaviour intentions, but the individual effects of conceptual fluency lack scrutiny. Therefore, this PhD thesis explores the relationships between perceptual fluency and of conceptual fluency on consumer purchase intentions.

When people process visual stimuli, they often engage in different fantasies and mental imageries related to the advertised product. Therefore, the thesis also explores the link between visual complexity and imagery fluency. This type of fluency is discussed separately in the following part of the chapter as it represents a theory of fluency as well as mental imagery.

## 2.4 Mental Imagery and Imagery Fluency

The aim of this part of the chapter is to explain the notion of imagery fluency. This part is divided into three main subsections: the first focuses on explaining what mental imagery is; the second discusses the difference between mental imagery and perception; and the third considers imagery fluency.

### 2.4.1 What is Mental Imagery?

Mental imagery refers to a subjective and conscious experience described as “a mental event involving visualisation of a concept or relationship” (Lutz and Lutz, 1978, p. 611). Mental imagery could involve the five human senses as “seeing something with the mind’s eye” (Mast et al., 2012), “hearing with the mind’s ear”, as well as “smelling with the mind’s nose”, even “feeling with the mind’s skin” (Kosslyn et al., 2006). In fact, imagery can incorporate as many senses as possible, in order to create or recreate an experience in someone’s mind (Vealy and Walter, 1993; Templin and Vernacchia, 1995).

Mental imagery can be conceptualised as “a mode of information processing which includes sensory representations (images) in working memory that are used in the same way as perceptions of external stimuli” (Goossens, 2000, p. 306). Therefore, it is important to explain

how mental imagery occurs in people's minds. According to Kosslyn, Thompson and Ganis (2006), mental imageries are generated "when a representation of the type created during the initial phases of perception is present but the stimulus is not actually being perceived; such representations preserve the perceptible properties of the stimulus and ultimately give rise to the subjective experience of perception" (p. 4). Furthermore, mental images could be generated in two different ways: the first is when the information stored in long-term memory is being activated; while the second is when a mental image is generated as a result of recently presented visual information (Kosslyn et al., 2001). It is worth noting that mental imagery could be voluntary, when individuals imagine something because they intend and want to, as well as being "stimulated by instructions from an external source or even oneself" (Burns, Biswas and Babin, 1993, p. 72), when individuals receive instructions on what and how to imagine.

Mental imagery has been a significant interest of many philosophers, including Aristotle, Augustine, Hume, and Kant. Aristotle (1930, in Leahy, 2000) described imagery as the persistence of a percept after the disappearance of the stimulus causing the imagery. Both Plato and Aristotle regarded mental images as an important part of human cognition. Specifically, Plato (1739, in Leahy, 2000) claimed that the human memory is like a wax tablet into which the senses can engrave picture-like impressions. Aristotle, on the other hand, claimed that any thought can carry an image with it (Leahy, 2000). Another well-known philosopher, David Hume, discussed the difference between imagery and perception, which, according to him, is in the clarity and degree of vivacity. For Hume, a forceful impression (the perception) could be gained through the senses, whereas imagery is simply a faint idea which appears in the mind when the perception is gone. This claim was also supported by Thomas Hobbes, who argued that "after the object is removed or the eye shut, we still retain an image of the thing seen, though more obscure that when we see it" (Hobbes, 1651).

Mental imagery has also been an interest of psychological scholars since the early 19$^{th}$ century. Some of the pioneers of experimental psychology, Wilhelm Wundt and William James, studied the cognitive processes underlying the "mental life". They both used experiments and relied on participants' subjective reporting of mental images (e.g., Wundt, 1912; James, 1890). It is crucial to mention that before conducting the experiments, participants were trained in the art of "introspection" and were instructed how to report their mental experiences. The results of the experiments demonstrated that there are similarities between visual perception and mental imagery.

### 2.4.2 Mental Imagery and Perception

Wundt (1912) stated that mental imagery and visual perception share a lot of similarities and they are not significantly different. “Mental imagery is the simulation or re-creation of perceptual experience (Kosslyn, Ganis and Thompson, 2001; Pearson, 2007) across sensory modalities” (Pearson et al., 2013, p. 13). In other words, mental imagery concerns the process by which sensory or perceptual information appears in the working memory of people, in the form of different ideas, memories, and feelings (MacInnis and Price, 1987). Mental imagery has often been seen as a form of perception and, therefore, it is important to explain the similarities and differences between them. Perky (1910) conducted the first study aiming to provide empirical evidence of the similarities between mental imageries and perception. The participants in the experiment were asked to look at a screen and imagine seeing different objects on that screen (such as a banana, a lemon, a tomato, etc.), while being exposed to a colourful patch matching the size and the shape of each object. At the end of the experiment, the participants claimed that the imagined objects were real and that they had actually seen them on the screen.

Other researchers investigated whether the brain areas of perception and mental imagery overlap (Podgorny and Shepard, 1978), and whether they are activated in a similar way (Marzi et al., 2006). It has been well documented in the literature that the same areas are activated when individuals imagine and when they perceive a stimulus with their senses. For example, Bensafi, Sobel and Khan (2007) prove this within the context of olfactory imagery, i.e., the same brain areas activate when people generate a mental imagery of a scent and when they perceive the actual scent itself.

Another similarity between mental imagery and perception is the intentionality because both concern a particular stimulus, such as an event, object, person, etc. (Harman, 1998). To be more specific, mental imagery and perception could be voluntary and occur only when the individual intentionally focuses on them, but they could also be involuntary, such as when an individual experiences a flashback or is given instructions to imagine and perceive something (Brogaard and Gatzia, 2017).

Some studies focus on the similarities between mental imagery and perception, whereas others investigate their differences. Mental imagery appears in the mind as a result of previous experiences. For example, Kosslyn et al. (2006) argue that a mental image occurs when “a representation of the type created during the initial phases of perception is present but the

stimulus is not actually being perceived" (p. 4). In addition, mental imagery arises from perceptual representations which are generated from stored information, not from that currently perceived by the senses' information. In contrast, perception is always a result of the sensory experience of perceiving the sensory stimuli (the input).

Another major difference is that mental imagery is generated consciously, even when the relevant stimuli are absent and cannot be perceived by the senses (Arshamian and Larson, 2014). For example, when a person can imagine his last birthday, he could recreate a particular episode stored in his memory. In addition, he might not taste his birthday cake again nor hear his loved ones singing "happy birthday" to him because these sensory stimuli are not present; however, he could recreate them in his mind (Arshamian and Larson, 2014). In contrast, perception occurs only when the stimuli are currently presented and the senses of the individual are activated to perceive the features of the stimuli (Brogaard and Gatzia, 2017). Furthermore, Brogaard and Gatzia (2017) made an interesting point by adding the idea of hallucinations. They suggested that it would be impossible for people to see an elephant when there is no elephant standing in front of them, or by seeing a picture of it, therefore they would not have an exact perceptual experience when they imagine an absent stimulus. Moreover, people can hallucinate seeing an elephant, which would define the experience as real even if the elephant is the result of a hallucination (Brogaard and Gatzia, 2017). However, hallucinations, just like dreams, are part of the mental imagery experience (Nanay, 2016).

### 2.4.3 Imagery Fluency

Mental imagery represents a visualisation (Lutz and Lutz, 1978). Just like fluency, this is a subjective experience linked to information processing. However, unlike fluency, it is a conscious experience. Although the two concepts are different, mental imagery represents a cognitive process (experience), whereas fluency represents the evaluation of the cognitive process; they are both strongly connected in imagery fluency. Imagery fluency represents the ease with which individuals imagine something (Mandel, Petrova and Cialdini, 2006). Similar to conceptual fluency, imagery fluency arises from the higher-order cognitive process, linked to the individual's previous knowledge and experiences.

Research on imagery fluency has established that people are usually more likely to have a fluent mental imagery experience when they evaluate a product (Dahl and Hoeffler, 2004), the likelihood of an event (Sherman et al., 1985), or the results of the outcome of a hypothetical situation (Mandel, Petrova and Cialdini, 2006). For example, Mandel, Petrova and Cialdini

(2006) studied the ease with which people imagine hypothetical situations and events which have not yet happened. Specifically, they studied the ease with which business school students were able to imagine a success or a failure by reading different stories: about a successful business student (assuming that success in this case is easy to imagine), a failed business student (assuming that failure is easy to imagine), and a biology student who is successful or unsuccessful (the level of difficulty of imagination is not affected as the focus is on a biology student). The results of the study demonstrate that when participants read the story of a business student achieving great success, the fluency of their imagination increased (they easily forecast higher annual salaries for themselves and made themselves more likely to desire luxury brands such as *Rolex* and *Lexus*). In contrast, when participants read the story of an unsuccessful fellow business student, they forecast lower annual salaries, resulting in a decreased preference for luxury brands. Finally, the fluency of their imagination decreased when they read the story of the biology student, as they could not identify themselves with that student; as a result, participants lowered their expectations about their future prospects, they forecast lower future salaries for themselves, and thus displayed a decreased interest in luxury brands.

Imagery fluency has been studied in the context of visual information. For example, Petrova and Cialdini (2005) suggest that imagery fluency has a positive link to product preference. As a result of three studies, they found that when consumers experience low levels of imagery fluency, their preferences for the product decrease. In other words, decreased fluency negatively affects product evaluation (Petrova and Cialdini, 2005). Moreover, their research demonstrates that when the presented information (the stimulus) is consistent with the mode of processing, individuals tend to create mental images easier compared to the opposite case, when the presented information is not consistent with the mode of processing.

The research on the effects of visual complexity on imagery fluency is very limited. One of the few studies exploring this area of research is by Chang (2013). Chang's study used two types of pictures (in Experiment 1): a complex image/narrative picture, showing the product (a pair of shoes) within a certain context (a traveller walking in these shoes, which, for this research, represents a complex image); and a simple one, showing a sketch of the product only. The initial suggestion of the researcher was that both images could influence imagery fluency based on the levels of understanding of the stimuli. However, the findings from the study demonstrated that the narrative picture (the complex image) led to higher levels of imagery fluency. Finally, Chang (2013) suggested that the factors affecting processing fluency (perceptual fluency and conceptual fluency) also affect imagery fluency. As a response to the

limited research on this topic, this PhD also explores the effects of visual complexity (simple *versus* complex images) on imagery fluency. Moreover, as complex images could differ in their levels of congruity, the research extends the knowledge of imagery fluency by investigating the effects of congruity on imagery fluency.

To summarise, mental imagery represents a subjective and conscious experience linked to information processing. Mental imagery could arise from short-term memory, as well as from long-term memory. Imagery fluency represents the ease with which individuals imagine something (Mandel, Petrova and Cialdini, 2006). As imagery fluency has not received much attention in previous literature, especially in terms of visual complexity and congruity, the aim of this PhD is to fill that gap by studying the relationship between different visual stimuli with varying levels of complexity (simple *versus* complex stimuli) as well as congruity (complex congruent *versus* complex incongruent stimuli) on imagery fluency. In addition, past research has already established that imagery fluency triggers behaviour intentions (Gregory et al., 1982; Petrova and Cialdini, 2005, 2007, 2008; Zhao, Hoeffler and Dahl, 2007) (in Chapter 3). Therefore, this thesis extends the fluency literature by examining the interrelationships between visual stimuli, imagery fluency, and consumer purchase intentions.

## 2.5 Chapter Summary

This thesis aims to research the effect of visual complexity on purchase intentions and the mediating role of fluency. There are many research papers on product pictures and their effectiveness in relation to purchase intentions. Interestingly, previous studies have revealed mixed results regarding visual complexity: some support the use of simple images (Bigoin-Gagnan and Lacoste-Badie, 2018; Kolesova and Singh, 2019; Pelet, Durrieu and Lick, 2020), others the use of complex images (Shapiro, 1999; Yoo and Kim, 2014; Lee, Hur and Watkins, 2018; Pieters, Wedel and Batra, 2010; Lee, Hur and Watkins, 2018; Wang et al., 2020; Geissler, Zinkhan and Watson, 2006; Mulken et al., 2014). Perhaps this lack of consensus is the reason for recent studies continuing to focus on visual complexity. For instance, Wang et al. (2020) studied the way products are presented in images and their contextual background in the context of web design. They measured the effect of background complexity on consumers' attention, information processing, and purchase intentions. The results of the study established that images with higher levels of visual complexity influence high levels of attention on the background, not on the product itself. Images with moderated complexity led to higher levels of purchase intentions.

The aim of this PhD thesis is to enter the debate on the effectiveness of visual complexity on purchase intentions. As there are a number of processing experiences taking place in consumers' minds prior to behavioural intentions, this PhD thesis explores the mediating role of three types of fluency (Figure 1). Fluency represents the ease with which people process information (Schwartz, 2004). It is a metacognitive and subjective experience, which is usually rated on a fluent-disfluent scale. This PhD thesis is particularly interested in the types of fluency that relate to visual processing, specifically, the study explores perceptual fluency, as it represents the ease with which people process and capture visual information, and conceptual fluency, which represents the ease with which people understand the semantic meaning of an image. Both types of fluency have been heavily discussed in the literature in terms of their joint effects, i.e. processing fluency. Therefore, one of the aims of this thesis is to explore the separate effects of visual complexity (simple *versus* complex visual stimuli) on perceptual and on conceptual fluency. In this thesis, visual complexity refers to the presence (*versus* absence) of a contextual background. The study uses two types of visual complexity: simple, showing a product on a plain background, and complex, presenting the same product on a contextual background. As the contextual background could be both congruent and incongruent to the product, the study also explores the moderating effect of congruity on the relationship between visual complexity and perceptual fluency as well as conceptual fluency. Therefore, this PhD thesis compares complex congruent images, where a product is shown within a congruent background in its typical matching scene, and complex incongruent images, where a product is placed in a non-fitting or non-matching background in an unexpected and somewhat surprising scene.

Images have been studied in the context of mental imagery processing (Rossiter, 1978; Shepard, 1967; Kisielius and Sternthal, 1984). It has already been established that visual stimuli, such as pictures, influence mental images (McInnis and Price, 1987; Hirshman, 1984; Babin et al., 1992). Mental imagery represents a visualisation (Lutz and Lutz, 1978), a subjective and conscious experience linked to information processing. Imagery fluency is an experience that accompanies mental imagery and represents the ease with which individuals generate a mental imagery (Mandel, Petrova and Cialdini, 2006). As imagery fluency is crucial for the processing of visual information and has not yet received much attention in the academic literature, especially in terms of visual complexity, one of the aims of this PhD thesis is to fill that gap by analysing the relationship between different visual stimuli of varying levels of complexity (simple *versus* complex stimuli) as well as congruity (congruent v*ersus*

incongruent stimuli) on imagery fluency. Finally, the study tests if imagery fluency mediates the relationship between visual complexity and purchase intentions.

The conceptual model is illustrated below in Figure 1.

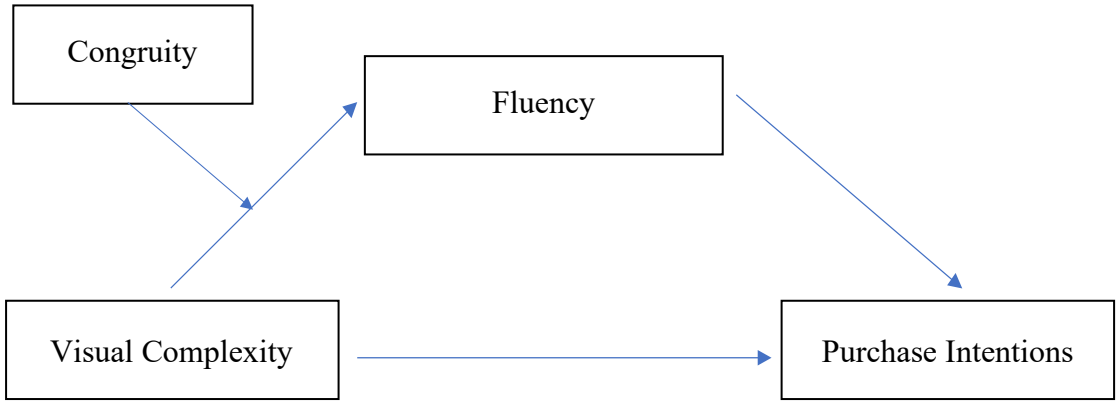


*Figure 1: The conceptual model*

# Chapter 3: Hypotheses Development

The aim of this PhD thesis is to study the effects of visual complexity (simple *versus* complex images) and congruity (congruent *versus* incongruent images) on fluency. The thesis explores the mediating role of fluency in the relationship between visual complexity and consumer purchase intentions in the context of luxury fashion brand communication on social media. The aim of this chapter is to develop the hypotheses relevant to the research topic. This chapter is divided into three parts. The first part presents hypotheses in respect of the effect of visual complexity on fluency; the second part develops hypotheses related to the link between congruity and fluency; and the final part discusses hypotheses of the interrelationships between visual complexity, fluency, and consumer purchase intentions.

## 3.1 The Influence of Visual Complexity on Fluency

The aim of this part of the chapter is to develop the hypotheses regarding the effects of visual complexity on fluency (perceptual fluency, conceptual fluency, and imagery fluency).

### 3.1.1 Visual Complexity and Perceptual Fluency

Visual complexity and perceptual fluency are both related to perception. Perceptual fluency refers to the identification of the psychical characteristics of a stimulus and represents the ease with which people process the perceptual features of a stimulus (Lee and Labroo, 2004). It is affected by a number of perceptual dimensions and arises from perception (Alter and Oppenheimer, 2009). It is worth noting that visual complexity is essential for the perception of visual stimuli (Ledder et al., 2004) and depends on different perceptual dimensions (Rayner, 1998; Oliva et al., 2004), such as the quantity of the objects (Snodgrass and Vanderwart, 1980), their symmetry and arrangement in the image (Reber, Schwarz and Winkielman, 2004; Mayer and Landwehr, 2014), the variety of the elements (Heylighen, 1997), the colours and the contrast between them (Leder and Carbon, 2005), familiarity with the scene, and the existing knowledge of the objects inside the scene (Rayner, 1998; Oliva et al., 2004). Therefore, when a product is presented on a white background and the main focus is on the product itself, that image is considered to be simple (less complex) compared to an image showing a product within a contextual background. As the contextual background makes the image more complex, images might be processed with greater difficulty, and the perceptual fluency would decrease (Reber et al., 1998; Maier and Dost, 2018).

Past research has documented the negative relationship between visual complexity and perceptual fluency in a number of contexts and different perceptual dimensions. For example, some scholars have focused on symmetry, as this is a perceptual factor that influences visual complexity, as well as the ease with which people process stimuli. Some scholars argue that symmetric visual stimuli are more perceptually fluent than asymmetric ones (Reber, Schwarz and Winkielman, 2004; Mayer and Landwehn, 2014). This was illustrated in a study by Mayer and Landwehr (2014), who show that symmetric stimuli are perceived easier and form higher preferences compared to asymmetric stimuli. Reber, Schwarz and Winkielman (2004) also studied symmetry and its influence on fluency and found that symmetric stimuli are easier to process as they usually contain less information. As a result, the scholars claim that symmetric stimuli are more fluent and lead to higher levels of aesthetic pleasure. Building on past research, it could be argued that when a product is presented in a picture within a contextual background illustrating a real-life scene, levels of symmetry are less likely to be achieved and, therefore, perceptual fluency would decrease.

Furthermore, visual complexity and perceptual fluency are both influenced by colour contrast. Specifically, a lower contrast increases the complexity of the images. People find it easier to perceive stimuli with higher, in comparison with lower contrast. For example, Reber et al. (1998) demonstrate that when the figure-ground contrast between an object and the background is lower, the perceptual fluency tends to decrease. On the other hand, the study shows that when the contrast is higher, the levels of perceptual fluency increase and the participants tend to form preferences about the stimuli. Similar research was conducted by Mosteller et al. (2014), who examine the text-background contrast in the context of an online retailing website. The study confirms that lower contrasts result in lower levels of fluency and liking. On the other hand, the levels of fluency increase when the contrast is higher. It is important to note here that complex images which present the product in a realistic environment do not stand out as clearly as simple ones presenting the product on a white background, as the contrast between them is more likely to be lower (Maier and Dost, 2018). Therefore, this PhD thesis assumes that complex images would lead to lower levels of perceptual fluency.

In a similar vein, Maier and Dost (2018) examined the effect of visual complexity on fluency and consumer perception. Their study used two types of pictures: one showing the product on a white background (simple) and the other showing the same product on a contextual background (complex). The results of the study demonstrate that images without a contextual background are perceived more fluently by consumers but they still prefer the pictures with a

contextual background. In other words, the results of their study state that the contextual background increases the complexity of the image and decreases fluency. Larsen et al.'s (2004) study is in line with that assertion, and explains that when people process a complex stimulus, they need more effort to perceive, capture, and process all the elements within it. A number of studies suggest that any additional information added to a picture increases its complexity and lowers the perceptual fluency levels because people require more effort to process it due to the increased amount of information contained in it (Wu et al., 2016; Garner, 1974; Reber et al., 1998, 2004; Larsen et al., 2004; Peracchio and Meyers-Levy, 1997). For example, Wu et al. (2016) investigate complex images (in the context of sales information) and their impact on fluency and consumer preferences. The results of the study demonstrate that when a product is presented on a white background with some additional information, the level of perceptual fluency decreases. Furthermore, when the product is presented without that contextual information, the levels of fluency increase. To conclude, complex stimuli influence lower levels of perceptual fluency, whereas simple stimuli lead to higher levels of perceptual fluency (Wu et al., 2016; Reber et al., 2004).

A different stream of fluency research indicates that complexity could positively influence perceptual fluence in some scenarios, such as when the complex stimulus presenting a typical product is exposed multiple times. For example, Landwehr et al.'s (2013) study argues that people form aesthetic preferences about a typical product design (in that instance a car design) when they are subject to a low level of exposure, which also has a positive effect on the number of sales. The study also demonstrates that mere exposure leads to increased perceptual fluency for atypical product design. Indeed, mere exposure influences fluency and, as discussed in the previous chapter, when a stimulus is presented multiple times to individuals, the level of fluency increases. This PhD thesis does not, however, focus on mere exposure.

In conclusion, visual complexity and perceptual fluency depend on a number of perceptual dimensions (symmetry, contrast, amount of information presented, etc.). Past research has demonstrated that visual complexity tends to decrease perceptual fluency due to the increased amount of information presented, which leads to the need for more time and effort for processing (Maier and Dost, 2018; Wu et al., 2016; Garner, 1974; Reber et al., 1998, 2004; Larsen et al., 2004; Peracchio and Meyers-Levy, 1997. On the other hand, simple images lead to increased levels of perceptual fluency. Consistent with past research findings, this PhD thesis claims that a simple image showing a single product on a plain background would be more

perceptually fluent than a complex image showing the same product placed within a contextual background.

***H1a: Visual complexity will have a negative effect on perceptual fluency, such that simple visual stimuli will increase perceptual fluency, while complex visual stimuli will decrease perceptual fluency.***

### 3.1.2 Visual Complexity and Conceptual Fluency

Conceptual fluency represents the ease with which people understand the meaning and the message of a stimulus. There are many factors that influence the level of conceptual fluency, one of which is certainly the contextual background of an image. Scott and Vargas (2007) as well as Whittlesea (1993) claimed that the contextual background creates a semantic meaning. Moreover, Shapiro (1999) suggested that the meaning is created subconsciously when people compare the meaning of the background with the object presented in the image. The result of his research demonstrates that conceptual fluency increases even with incidental exposure to a stimulus when the product is presented within a contextual background, as well as when the product is presented in a typical scene. Moreover, the background enhances the perception of the product meaning, hence it increases conceptual fluency.

Although previous work has argued that complex images increase the levels of conceptual fluency due to the contextual background adding additional information to the stimulus, which makes it easier for individuals to understand the meaning and the message of the image (Shapiro, 1999; Scott and Vargas, 2007; Whittlesea, 1993), psychology research suggests that situational cues could generate different associations in memory. This could be explained by the notion of schemas or nodes, which represent stored information related to knowledge or previous experiences (Quillian, 1968; Collins and Quillian, 1969). It is crucial to mention that those schemas are connected to each other (Collins and Quillian, 1969), so that when people are exposed to a stimulus, at least one node activates within their minds, which could influence the activation of other nodes related to the initially activated node or the stimulus itself (Quillian, 1968; Collins and Loftus, 1975). Therefore, a single stimulus could influence the activation of a number of schemas and, as a result, many interpretations of its meaning may emerge. Specifically, when people are exposed to a complex image containing a lot of information, a number of possible interpretations of its message and meanings may occur (Gay, 1986). As a result, it could be difficult for the individual to perceive the "correct" one. As one of the signs of error-free processing of a stimulus is processing fluency (Orth and Wiztz, 2014),

it could be claimed that the levels of conceptual fluency would decrease when people process complex stimuli, as it would be harder for them to process the semantic meaning and to find the correct one.

This claim could also be explained by illusory conjunction theory (Treisman, 1977). Illusory conjunction occurs when people process a visual stimulus displaying more than one object and incorrectly pair different elements of the stimulus together (Treisman and Schmidt, 1982; Becker, Neel and Anderson, 2010; Treisman, 2014). To illustrate this, visual stimuli contain a lot of information in terms of size, colours, elements within them, etc. Each dimension/piece of visual information is processed in a separate neural region of the brain; however, people perceive the objects or the scene holistically. Treisman and Gelade (1980) pointed out that "If focused attention to particular objects is prevented ... the features of the unattended objects are 'free floating' with respect to one another" (1980, p. 100). Moreover, as "attention is necessary for the correct perception of conjunctions" (Treisman and Gelade, 1989, p. 98), when it is not completely focused on the visual scene, the different elements of the scene could be combined incorrectly and this would lead to illusory conjunctions. These errors could be "consciously and confidently experienced as perceived physical objects" (Treisman and Schmidt, 1982, p. 138). Therefore, when people process a complex image (showing the product within a contextual background), they could incorrectly join different objects together. This illusory conjunction could confuse them and lead to the wrong interpretation of the meaning of the image. In contrast, if people are exposed to a simple image displaying a single product on a plain background, the possibility of illusory conjunction would be limited, as they only have to process the only object on the image. Hence, people's attention would be concentrated on that particular object only and this would eventually make it easier for them to process the meaning of the stimulus; i.e., conceptual fluency would increase.

Furthermore, this claim could also be explained by the biased competition theory of attention proposed by Desimone and Duncan (1995). The scholars claim that processing capacity is limited when it comes to an individual's visual system. According to the theory, people are not able to pay attention and capture everything presented to them at the same time. Moreover, each element presented in a visual scene "competes" for cognitive processing. Therefore, when an individual's attention is focused on a certain object, less processing capacity is available for the other objects. Since people have limited processing capacity, they are able to process a simple image easier because in this case their attention is focused only on the single displayed object. As a result, the cognitive effort required for (semantic) processing is lower, compared

to the case in which people process complex visual stimuli. This claim was confirmed by Wu et al. (2016), who studied the effects of visual complexity on processing fluency and pleasure. The results of their laboratory experiment suggest that visual complexity decreases the levels of perceptual fluency and conceptual fluency. The scholars explained the results by the differences in the cognitive effort required for each image. Specifically, a complex stimulus requires much more effort for the identification of the stimuli/information, as well as for the interpretation of its semantic meaning.

In conclusion, this PhD thesis claims that a contextual background increases the complexity of images, which lowers the conceptual fluency. To elaborate, past research has demonstrated that people require a lot of cognitive effort to process the semantic meaning of a complex image containing a lot of information, as it influences a number of schemas. Also, due to the increased number of elements, people may perform an incorrect joining of elements or potentially misunderstand its meaning and message. By contrast, a simple stimulus containing just one element would be easier to process, as it requires less cognitive effort. Moreover, consistent with past research on illusory conjunction (Triesman, 1977), information processing (Quillian, 1968; Collins and Quillian, 1969) and the biased competition theory of attention (Desimone and Duncan, 1995), this PhD thesis claims that a simple image displaying a product in isolation would be easier to process semantically (hence it is higher in conceptual fluency) in comparison to a complex image showing the same product placed in a real-world scene within a contextual background.

***H1b: Visual complexity will have a negative effect on conceptual fluency, such that simple visual stimuli will increase conceptual fluency, while complex visual stimuli will decrease conceptual fluency.***

### 3.1.3 Visual Complexity and Imagery Fluency

Imagery fluency refers to the ease with which people generate mental imagery (Mandel, Petrova and Cialdini, 2006). Images are structurally similar to mental imagery (Adaval and Wyer, 1998). Previous research supports the notion that contextual images influence mental imagery (Yoo and Kim, 2014; Mandel, Petrova and Cialdini, 2005; Babin and Burns, 1997) and "provide the materials necessary to facilitate the formation of more complete conceptions of the future consumption scenarios" (Krishnamurphy and Sujan, 1999, p. 57). It is interesting to investigate which type of image influences mental imagery faster and easier because the research on this topic to date has been very limited. One of the few studies on this topic was

proposed by Chang (2013). Two types of images were used in the study (in Experiment 1): a complex one, displaying a product (a pair of shoes) within a certain context (a traveller walking in those shoes); and a simple image (a sketch) displaying the product only (a pair of shoes). The results of the study revealed that the complex image influenced higher levels of imagery fluency compared with the simple image.

Indeed, past literature on imagery fluency has received limited attention. However, some studies have discussed the effect of a product picture and contextual background on imagery fluency (Kleine and Kernan, 1991; Maier and Dost, 2018b). For example, research has documented that product images, and specifically those displaying a product within a contextual background, influence imagery fluency (Maier and Dost, 2018b). Moreover, when comparing a simple image presenting a product on a white background and a complex image showing the same product within a contextual background, scholars indicate that the contextual background positively affects imagery fluency (Maier and Dost, 2018). Maier and Dost (2018) suggest that when contextual images are processed fluently, that fluent experience influences mental imagery, specifically: "fluency as an antecedent of mental imagery, in that the mediation was only significant when context enabled a fluency increase" (p. 212). Therefore, if an image is perceptually and conceptually processed, this will enhance the generation of mental imagery and thus would be easier for people to imagine the stimulus.

It is crucial to mention that mental imagery is generated from working memory, also known as the short-term memory, which is linked to something that the person just perceived, or from the long-term memory, which represents past experiences and knowledge. Moreover, when people process a complex image, a number of schemas and associations related to different elements of the image activate, which may lead to the generation of mental imagery related to part of the complex image, a story, or a fantasy about future events. In other words, as complex images contain a lot of elements, each of them could influence different associations or schemas, all related to the stored information, knowledge, and past experiences of the individual. Those mental imageries have been referred to as "mental simulation" (Tylor and Schneider, 1989), "consumption visions" (Phillips, Olson and Baumgartner, 1995), "narrative transportation" (Green and Brovk, 2000) and "mental simulation" (Escalas, 2004). Moreover, they could involve different characters, a number of events, or scenes in which the event is taking place (Phillips, Olson and Baumgartner, 1995). They could be chronological, where the events have a beginning, a middle part, as well as an end (Fiske, 1993). Moreover, these mental imageries are usually goal-oriented (Escalas, 2004), self-related, and others-related imagery

(Bone and Ellen, 1992; Dahl and Hoeffler, 2004). They could be very detailed (Phillips, Olson and Baurtner, 1995), so that consumers could even get "lost" in the story (Green and Brock, 2000, p. 702). To generate a mental imagery in the form of a story requires more time and cognitive effort as well as the activation of multiple schemas. Therefore, complex images would decrease the levels of imagery fluency.

Moreover, when people are exposed to complex images, they have to capture all the elements presented in it, which requires a lot of cognitive effort and leads to lower levels of perceptual fluency (Garner, 1974; Reber et al., 1998, 2004; Larsen et al., 2004; Peracchio and Meyers-Levy, 1997). Hence, imagining all the details from a complex image would be harder in comparison with imagining a single object placed in a simple image. In addition, when processing visual information, people would interpret the meaning of an image based on previously stored schemas; however, the possible meanings of a complex image containing a lot of information could be limitless, depending on the individuals' interpretation, their past experiences, and stored schemas. Moreover, they could even become confused and misinterpret the semantic meaning of a stimulus (Treisman, 1977). Therefore, the processing of the semantic meaning of the stimulus would not be an easy task and the conceptual fluency could decrease. Since complex images influence lower levels of perceptual fluency and conceptual fluency, this PhD argues that they also influence lower levels of imagery fluency based on the claim that all types of fluency lead to "remarkably uniform judgements across a range of domains" (Alter and Oppenheimer, 2009, p. 220). Specifically, even though fluency is related to different cognitive operations, and there are many types of fluency depending on the cognitive operations from which they are generated, "within each judgement context, people interpret fluency uniformly, regardless of how it is instantiated" (p. 227). In other words, fluency is generated from many cognitive operations; however, the results from each of them is the same, no matter what kind of cognitive process is influenced (Alter and Oppenheimer, 2009).

To conclude, when people process images, the schemas in their minds activate to enhance the processing of information. If people process a complex image containing a lot of information, a number of schemas related to different elements of the image would activate. Those schemas influence the generation of a mental imagery of the image or a "narrative transportation". This type of mental imagery requires more time and effort to generate as it is influenced by short-term memory (the image) as well as by long-term memory (the schemas). Moreover, to imagine the information in the image itself would be harder for people as the complex image contains a lot of information. Therefore, a simple image containing only one object/product would be

easier to imagine, as the mental imagery would consist of a single object only. In addition, as simple images are more perceptually and conceptually fluent, and due to the claim that all types of fluency lead to the same results (Alter and Oppenheimer, 2009), this PhD thesis claims that simple images would be easier to imagine.

***H1c: Visual complexity will have a negative effect on imagery fluency, such that simple visual stimuli will increase imagery fluency, while complex visual stimuli will decrease imagery fluency.***

Thus far, this part of the chapter has discussed the effects of visual complexity (simple *versus* complex) on fluency. As complex images containing contextual background information could be congruent or incongruent to the displayed product, the degree of congruity would potentially affect the ease with which people process and imagine visual stimuli. Therefore, the next part of the chapter develops hypotheses relevant to the effect of congruity on the three dimensions of fluency.

### 3.2 The Moderating Role of Congruity

In the context of visual complexity, previous research papers claim that the congruity between a product and its contextual background has an impact on consumer processing experiences (Shapiro, 1999). Therefore, this thesis investigates the effect of the congruity of complex images on fluency. In fact, fluency and congruity are linked, as Winkielman et al. (2011) stated that "A predictability relation underlies the fluency" (p. 6). Specifically, fluency represents the ease with which people process information (Schwartz, 2004) and evaluates the effort and speed of processing. On the other hand, congruity is concerned with content and the match between stimuli (Garretson and Niedrich, 2004). It is "about regularity" (Winkielman et al., p. 5) or, unsurprising and predictive match between two or more structures. According to Winkielman et al. (2011), people process matching elements easier. This thesis investigates whether product-contextual background congruity positively affects the ease with which people perceive (perceptual fluency), understand semantically (conceptual fluency), and imagine (imagery fluency) stimuli. Therefore, this section focuses on developing the hypotheses related to the moderating role of congruency in the relationship between visual complexity and fluency.

### 3.2.1 Congruity as a Moderator of the Influence of Visual Complexity on Perceptual Fluency

Perceptual fluency represents the ease with which a person perceives and identifies the features of a stimulus (Lee and Labroo, 2004; Oppenheimer, 2008). This can be influenced by a number of perceptual factors and stimulus features (Mandler et al., 1987, cited in Shapiro, 1999), such as figure-ground contrast (Reber, Winkielman and Schwarz, 1998), font manipulation (clear *versus* unclear) (Alter and Oppenheimer, 2008b; Novemsky, Dhar, Schwar and Simonson, 2007; Simmons and Nelson, 2006; Reber and Schwarz, 1999), mere exposure and the duration of the stimulus presentation (Reber, Winkielman and Schwarz, 1998).

According to Shapiro (1999), "Perceptual fluency asserts that when exposure leads to a memory trace for the perceptual features of the stimulus (e.g., shape, brightness), the features of the stimulus are more easily processed on a subsequent occasion" (p. 17). In other words, perceptual fluency is related to stimulus identification (Oppenheimer, 2008), which depends on the already stored schemas in an individual's mind. As previously mentioned, schemas are "organised structures of prior knowledge stored in memory" (Stayman et al., 1992). According to schema-congruity theory (Mandler, 1982), people create schemas when they process a stimulus for the first time, hence there are many nodes/schemas in someone's memory regarding objects, people, scenarios, events, experiences, etc. that help them to process the different information/stimuli they encounter on a daily basis (Dickinson, 2011). Specifically, when the information encountered is consistent with those schemas, it is perceived as "easy to process", hence more fluent. On the other hand, when the information is inconsistent, it is evaluated as "hard to process", as it requires more cognitive effort. For example, if a small child encounters a nurse for the first time, they encode a schema that a nurse is a female who works in a hospital and assists doctors. Hence, later, when the child encounters another female nurse, they could process the stimulus (the nurse) fluently due to the schema consistency. However, if the child encounters a male nurse, this stimulus (the male nurse) becomes inconsistent with the already stored schema of a female nurse and, as a result, the processing would be disfluent. This is also known as schema incongruence (Duffy and Kier, 2004). Schema incongruence requires additional cognitive effort to process a stimulus and to fix the incongruity. This additional cognitive effort suggests that the levels of fluency would decrease. Furthermore, schema incongruence (Duffy and Kier, 2004) leads to a "slowdown" effect, which is when the child has to process the information and update the existing schema with the conclusion that a nurse could in fact be of either sex. This slowdown effect usually leads to

negative judgements regarding the information being processed (Rojahn and Willemsen, 1994). For example, Rojahn and Willemsen (1994) found that people tend to rate leaders who are incongruent with their schemas as more ineffective compared with those who are congruent to the schemas. This could also be explained with the Backlash effect theory (Rudman and Fairchild, 2004), according to which people want to keep their stereotypes stable because it is then easier for them to understand the world and its dynamics, as well as the people around them and their behaviour. This means that when exposed to something that contradicts their stereotypes, i.e., it is incongruent to the schemas in their minds, people tend to make negative evaluations.

In the context of scene processing, past research demonstrates that in their daily visual experience, people encode a number of schemas (contextual associations) related to different objects. In this way, people form expectations of where an object could appear and what a certain scene could portray, which enhances the scene processing (Biederman, Glass and Stacy, 1972; Friedman, 1979; Shapiro, 1999). Therefore, when those expectations (or schemas) are congruent to the scene, people are able to process the scene easier on a perceptual level (Olive and Torralba, 2007; Biederman et al., 1982; Bar, 2004; Palmer, 1975). If the opposite occurs and people encounter an object (or a product) presented in an unpredicted and mismatching contextual background, it would be harder for them to recognise the object and to process the image (Davenport, 2007; Kret and de Gelder, 2010; Mudrik, Lamy and Deouell, 2010) due to the incongruity, as such a scene has not been encoded in the individual's mind via previous experiences. This claim has been supported by behavioural researchers who argue that when an object is presented in an incongruent scene, people need more time to identify it compared to an object placed in a congruent scene (Bar and Ullman, 1996; Davenport and Potter, 2004; Palmer, 1975; Rieger, Kochy, Schalk, Cruschow and Heinze, 2008). Therefore, if more time is required for processing, the scene is harder to process and requires more cognitive effort, due to the incongruent pairing between the object and its contextual background. In a similar vein, Remy et al. (2014) conducted a study in the context of brain cognition and the way visual scenes are processed in the brain. More specifically, their study was concerned with object recognition and categorisation, as well as the brain areas that activate during exposure to visual stimuli representing objects in congruent and incongruent contexts/scenes. They found that congruent scenes are processed easier as they have previously been stored as schemas, whereas incongruent scenes required more time to be processed, to solve the incongruence in them as well as to recognise and categorise the object. Hence, when consumers are exposed to a product

placed in an incongruent context, they could become aroused by the incongruency and attempt to solve it.

To conclude, perceptual fluency represents the ease with which people perceive the features of a stimulus (Lee and Labroo, 2004; Oppenheimer, 2008). According to Schema-Congruity theory (Mandler, 1982), people create schemas of the information they encounter. Therefore, when the encountered information is consistent with the stored schemas, it is perceived as easy to process, hence more fluent. On the other hand, when it is inconsistent, the information is evaluated as hard to process, as it requires more effort to process it. Similarly, when objects are presented in incongruent scenes, people need more time to identify them compared to the case when objects are placed in congruent scenes (Bar and Ullman, 1996; Davenport and Potter, 2004; Palmer, 1975; Rieger, Kochy, Schalk, Cruschow and Heinze, 2008). Consistent with these findings, this PhD thesis proposes that complex congruent images presenting a product within a fitting and matching contextual background would influence higher levels of perceptual fluency compared to complex incongruent images presenting the same product within an unfitting and mismatching contextual background.

***H2a: Congruity will moderate the relationship between visual complexity and perceptual fluency, such that complex congruent (incongruent) images will be significantly higher (lower) in perceptual fluency.***

### 3.2.2 Congruity as a Moderator of the Influence of Visual Complexity on Conceptual Fluency

Conceptual fluency represents the ease with which people process the semantic meaning of a stimulus (Lee and Labroo, 2004). As conceptual fluency is related to the semantic meaning and message of a stimulus, it is often studied in the context of scene processing. Scene processing is usually perceptual at the beginning and then conceptual (Biederman et al., 1982; Biederman et al., 1983; De Graef et al., 1992; Shapiro, 1999). Building on Schema-Congruity theory (Mandler, 1982), people process a number of scenes daily and form expectations of where an object could occur. For example, a toothbrush is usually found in the bathroom next to the toothpaste, not in the kitchen next to the cutlery. Hence, people encode a number of schemas in their daily visual experience (Mandler, 1982). As mentioned in the literature review chapter (Section 2.2.1, The Nature of Congruity), people tend to categorise and organise the information in their brains in schemas, which could be recalled later when they encounter a word, scene, image, stimulus, etc. that reminds them of, or is close to, an already stored schema

(Bartlett, 1932). Moreover, the schema that has been activated influences certain expectations regarding the possible objects or elements that may appear in the scene, and in this way it could be easier for the individual to identify the idea of the picture, as well as the target object or product (Biederman, Glass and Stacy, 1972; Friedman, 1979; Shapiro, 1999).

Due to the effects of schemas, past research on fluency confirms that there is a positive relationship between congruity and conceptual fluency. To elaborate, when a person is exposed to congruent stimuli, they usually process them more fluently compared to the cases when they are exposed to incongruent stimuli (Jacoby et al., 1989). For example, de Droog et al. (2011) studied the effect of character-product congruency on children's preferences for healthy foods. The study focused on familiar as well as unfamiliar characters for healthy food presentation and 1,666 children between four and six years old took part in the study. They were exposed to pictures of healthy food (a carrot) matched with five other characters, one of which was familiar, however incongruent to the product. The rest were unfamiliar characters placed in four scenarios: 1) the character was congruent perceptually as well as conceptually (orange rabbit and orange carrot); 2) the character was congruent conceptually (grey rabbit and a carrot); 3) the character was congruent perceptually (orange rhino and orange carrot); and 4) the character was totally incongruent (grey rhino and carrot). The findings of the study demonstrated that children preferred the pictures in which healthy food was presented with a familiar character, as well as with an unfamiliar character placed in a congruent scene (conceptually congruent as well as perceptually congruent).

In a different context, Whittlesea (1993) also studied the link between conceptual fluency and congruity. The participants in the study were exposed to target words and predicted and unpredicted sentences. For example, the word *boat* in the sentence: "The stormy seas tossed the boat" (predictive sentence) and "He saved his money and bought a boat" (surprising, unpredictable sentence). The participants were asked to read the sentences and to identify if the target word was semantically linked to a series of previously seen sentences. To summarise, the study demonstrated that people judged a stimulus (in this case the target word "boat") as more conceptually fluent when it was presented in a predictive context (or a predictive sentence) rather than an unpredicted context (unpredicted sentence). Therefore, it could be concluded that when the stimulus is congruent to its context, the conceptual fluency would increase. Moreover, it could be argued that situational cues have an impact upon the conceptual understanding of objects. For example, Lee and Labroo (2004) explore how conceptual fluency influences product evaluation. In other words, when a product (or an object) appears in the

consumer's mind readily and is conceptually fluent, as in the case when it is placed in a predictive context (a picture of ketchup in the context of a restaurant), consumers tend to rate it more favourably. In one of their experiments, Lee and Labroo (2004) illustrate that in a bar a person is expected to order a beer, instead of vitamins, hence the idea of having a beer at a bar is more fluent and comes to mind more easily, as it is unsurprising compared with ordering vitamins, which is typical for a pharmacy related context/scene. In a similar vein, Kao and Wang (2013) studied the emotional consequences of processing visual complexity in the context of banner ads. In their experiment 3, they demonstrate that conceptual fluency increases when complexity increases (whereas perceptual fluency decreases simultaneously). Moreover, the study concludes that the amount of information, and the consistency between a stimulus and its context, influences higher levels of conceptual fluency (Kao and Wang, 2013).

Shapiro (1999) argues that when products are presented in a congruent scene, they influence higher levels of conceptual fluency compared to incongruent images or simple images. In addition, Peracchio and Meyers-Levy's (2005) study also shows that a match, as opposed to a mismatch of symbolic connotations conveyed by a picture orientation and advertising slogan, has a positive influence on product attitudes. Similar results are documented by Shen and Chen (2007), who studied banners and their congruence with the website on which they appear. The results of their research demonstrate that when banners thematically match the website, consumers have a more positive response towards the advertisements. In addition, when banners do not match the website, consumer reactions towards the advertisements are not always favourable. Van Rompay et al. (2010) also examined fluency in the context of the online environment by researching the semantically non-matching and matching titles of hotel images on booking websites. The results of their study confirm that when the contextual background matches the product, the background facilitates the recognition of the meaning of the stimulus and increases the levels of fluency.

In conclusion, conceptual fluency is concerned with the ease with which the meaning and the message of a stimulus come to mind (Jacoby et al., 1989; Lee and Labroo, 2004). To process a scene perceptually as well as conceptually, people rely on encoded schemas in their minds. Based on these schemas, they form expectations related to the content of different scenes, hence when a product is presented within a congruent contextual background, it influences higher levels of conceptual fluency compared to the case when it is placed within an incongruent contextual background (Shapiro, 1999). Moreover, extant research confirms that there is a positive relationship between congruity and conceptual fluency (Van Rompay et al., 2010;

Peracchio and Meyers-Levy, 2005; de Droog et al., 2011; Lee and Labroo, 2004; Kao and Wang, 2013). Drawing upon previous research, this PhD thesis posits that complex congruent images will influence higher levels of conceptual fluency compared with complex incongruent images.

***H2b: Congruity will moderate the relationship between visual complexity and conceptual fluency, such that complex congruent (incongruent) images will be significantly higher (lower) in conceptual fluency.***

### 3.2.3 Congruity as a Moderator of the Influence of Visual Complexity on Imagery Fluency

Mental imagery is "(1) a process (not a structure) by which (2) sensory information is represented in working memory" (MacInnis and Price, 1987, p. 473). According to MacInnis and Price (1987), visual advertisements, such as pictures, influence the creation of mental images for consumers. Moreover, Hirshman (1984) claimed that mental imagery enhances the individual's ability to imagine or recall certain experiences when a product is not physically available for consumers. In this way, consumers are still able to evaluate a product based on the mental images they form in their minds. This can be explained by the nature of mental imagery, which can be generated in two different ways: the first is when the information stored in the long-term memory is being activated, and the second is via the working or short-term memory, when a mental image is generated as a result of recently presented information (Kosslyn et al., 2001).

The effects of congruity with regard to imagery fluency have not been scrutinised in substantial detail within prior research. One of the few effects studied in this topic was proposed by Zhang et al. (2020). Specifically, Zhang et al. (2020) investigate product presentation, contextual background, and imagery fluency for static presentation. The study used static as well as dynamic product presentation (the product shown in motion). In Experiment 2, the study indicates that congruity between the slogan and the background of a product picture influences imagery fluency, which triggers purchase intentions (Zhang et al., 2020). These results refer to Schema-Congruity theory (Mandler, 1982) and the notion that people encode schemas of knowledge, events, experiences, and scenarios in their memory (Bartlett, 1932). As people process a number of scenes daily, they encode a typical scene in which an object could be seen, and a number of contextual associations related to certain objects. In this way, they form expectations of where an object would appear and what a scene would portray (Mandler, 1982).

Therefore, if the schema of a contextual association matches the observed stimuli, it would be easier to generate mental imagery and imagery fluency would increase. On the other hand, if the opposite occurs and individuals encounter an object within an incongruent or a confusing or mismatching atmosphere, it would be harder for individuals to process it as the schemas in their minds are incongruent with the scene they encountered previously and, therefore, the mental imagery would require more effort to be generated. This is supported by past research suggesting that it is easier for people to generate mental imageries that are based on the experiences and schemas stored in their minds (Wyer, Hung and Jiang, 2008; Wyer and Radvansky, 1999). In other words, when the stimulus is congruent with the stored schemas, imagery fluency increases (Zhao et al., 2014).

To conclude, if consumers are exposed to complex congruent images in which a product appears in its typical scene, consumers already have a schema of a similar scene in their memory. Therefore, it is easier for them to generate mental imagery compared to the case when they are exposed to a surprising and incongruent match between a product and its contextual background. This could be explained by Schema-Congruity theory (Mandler, 1982) and the claim that when people are exposed to familiar (Wyer, Hung and Jiang, 2008; Wyer and Radvansky, 1999) and congruent scenes (Zhang et al., 2020), they generate mental imageries easier. Based on that, this PhD thesis suggests that complex congruent images would be more imagery fluent in comparison to complex incongruent images.

*H2c: Congruity will moderate the relationship between visual complexity and imagery fluency, such that complex congruent (incongruent) images will be significantly higher (lower) in imagery fluency.*

### 3.3 Purchase Intentions

The aim of this PhD thesis is to study the effects of visual stimuli of varying levels of complexity on consumer purchase intentions and the mediating role of fluency (in terms of perceptual fluency, conceptual fluency, and imagery fluency). Purchase intention is defined as an intention or a promise that a consumer makes to him/herself to purchase something (Fandos and Flavian, 2006). It is one of the most effective ways of predicting consumer purchase behaviour (Brown et al., 2003; Schlosser, 2003). This subsection focuses on developing the hypotheses related to the effects of visual complexity, fluency, and purchase intentions.

### 3.3.1 The Effects of Visual Complexity and Fluency on Purchase Intentions

#### 3.3.1.1 Visual Complexity and Purchase Intentions

Visual complexity is based on different perceptual dimensions, such as the quantity (Snodgrass and Vanderwart, 1980) and the range of objects and other details presented in an image (Heylighen, 1997), symmetry and arrangement (Reber, Schwarz and Winkielman, 2004; Mayer and Landwehr, 2014) and the colours and the contrast between them (Leder and Carbon, 2005). The complexity of visual stimuli, including pictures and advertisements, is essential to consumers' purchase intentions. As past research has offered mixed and conflicting results on the effect of visual complexity on consumer purchase intentions, this PhD thesis compares the effectiveness of a simple image (presenting a product on a plain background) and a complex one (presenting a product surrounded by other objects and having a contextual background) in influencing consumers' intentions to buy the presented product.

Previous research has divided the level of complexity into low and high, claiming that low levels of visual complexity are preferred as consumers have limited cognitive ability and would perceive and process them easier (Anderson and Jolson, 1980; Percy and Rossiter, 1983; Wu et al., 2016). Therefore, many academics suggest the use of simple images (Bigoin-Gagnan and Lacoste-Badie, 2018; Kolesova and Singh, 2019; Pelet, Durrieu and Lick, 2020). For example, Kolesova and Singh (2019) study the relationship between visual complexity and purchase intentions in the context of product presentation within online grocery retailing. They conduct two experiments and the results suggest that complex images containing a number of elements and details decrease purchase intentions in contrast to non-complex images. Another example is a study by Pelet, Durrieu and Lick (2020), who also research the effect of visual stimuli on consumer purchase intentions. They compare high and low levels of visual complexity of wine bottle label design and considered perceptual factors, such as colours, the presence and absence of a chateau on the labels, and other factors related to the design. The results of the experiments demonstrate that low levels of visual complexity lead to high levels of pleasure, which influence high levels of purchase intentions. Bigoin-Gagnan and Lacoste-Badie (2018) also research visual complexity and purchase intentions. The visual complexity in their study arose from manipulating the symmetry of the visual stimuli. The study demonstrates that simpler and more symmetric stimuli influence purchase intentions; however, that relationship is not direct, but mediated via perceptual fluency as well as aesthetic evaluation.

According to Abernethy and Franke (1996), one of the most important factors that could influence consumers' decisions is the amount of information presented in advertisements. Kim and Lennon (2000) also support that claim and added that when an advertisement presents more product information, it facilitates consumers' decision-making and leads to higher levels of purchase intention. Extant research also claims that visual complexity influences purchase intentions (Shapiro, 1999; Yoo and Kim, 2014; Lee, Hur and Watkins, 2018). For example, Shapiro (1999) demonstrates that complex images presenting a product with a contextual background have a greater influence on purchase intentions than simple images showing a product on a plain background. Similar results demonstrate Yoo and Kim (2014), who research online product presentation and consumer responses. They used two types of visual stimuli: simple, presenting a product with a solid background, and complex, presenting a product within a consumption background. The findings of the study confirm that complex images influence behavioural intentions but that this relationship is not direct and is mediated via mental imagery. To be specific, complex images influence mental imagery, which increases behavioural intentions via positive emotional reactions towards the product. Another example is a study by Lee, Hur and Watkins (2018), who examine the effect of visual complexity on the perceived luxury of products, as well as product attitude and consumer behavioural intentions (purchase intentions and intentions to share images). The results of the two experiments demonstrate that there is a positive relationship between visual complexity and purchase intentions but that relationship is mediated by perceived luxury and product attitude. Specifically, if consumers are familiar with a luxury brand, the level of perceived luxury is higher for less complex images, compared with images that are high in complexity. The opposite occurs when consumers are not familiar with a brand, and perceived luxury levels are then higher for complex images.

A consensus on the effectiveness of visual complexity has not been achieved in the literature. The debate has also deepened with findings that moderate levels of visual complexity would be more effective in influencing purchase intentions (Wang et al., 2020; Geissler, Zinkhan and Watson, 2006; Mulken et al., 2014). For example, Geissler, Zinkhan and Watson (2006) investigated visual complexity and its effects on consumer attention, attitude, and purchase intentions. They used online homepages to measure visual complexity. Homepages are much more complicated than images, as they present a number of elements and a combination of different colours, visuals, shapes, text, animation, effects, etc. The findings of the study demonstrate that consumers prefer moderate levels of visual complexity for online homepages,

and this leads to high levels of purchase intentions. Geissler, Zinkhan and Watson (2006) explained that when a stimulus is too complex, consumers may feel overwhelmed or even sometimes lost, due to the amount of information they are required to process. The same results were found in Wang et al. (2020), who studied product pictures and their effect on consumer visual processing. The focus of their study was specifically on background complexity. The results of the study demonstrated that complex images presenting a product within high levels of background complexity attract the consumer's attention. In addition, when a product is presented in an image with moderate levels of complexity, it influences higher levels of purchase intentions. Mulken et al. (2014) also studied visual complexity, by focusing on visual metaphors within advertising. They show that a moderate visual metaphor, i.e., the one with a moderate complexity level, would lead to higher levels of appreciation; specifically, purchase intentions towards the advertised product as well as the attractiveness of the advertisement. On the other hand, the opposite results were demonstrated for low as well as high levels of visual metaphors (visual complexity).

To study the effects of visual complexity on purchase intentions, this PhD thesis explores the mediating role of fluency. This part of the thesis develops three hypotheses regarding the relationship between visual complexity, fluency, and purchase intentions.

#### 3.3.1.2 The Mediating Role of Processing Fluency (i.e., Perceptual and Conceptual)

Many cognitive and metacognitive processes influence people's behaviour and one of them is processing fluency (Knijnenburg et al., 2012; Mosteller et al., 2014). Processing fluency can be used to predict the effort required to complete a certain task and, therefore, has a significant effect on someone's willingness to perform the task (Dreisbach and Fischer, 2011). Therefore, when processing fluency increases, the likelihood of performing a task also rises. Furthermore, the fluent processing of a stimulus (or a task) triggers a high affective experience (Winkielman, Schwarz, Fazendeiro and Reber, 2003), which, in turn, influences positive attitudes and behavioural intentions (Eagly and Chaiken, 1993). Song and Schwarz (2008) study fluency and behavioural intentions in the context of the readability of exercise instructions and intentions to exercise. Specifically, they focus on the effect of the ease with which people read exercise instructions on their willingness to incorporate the exercises into their daily habits. The results of the study demonstrate that when people read exercise instructions that are, to their mind, easy to read, they are more willing to perform the activity and to exercise, compared with the case in which it is difficult for participants to read the exercise instructions.

It is crucial to mention that the opposite is also valid, hence when processing fluency is low, it acts as an aversive signal and reduces the willingness of the individual to perform an activity or to accomplish a certain task (Dreisbach and Fischer, 2011; Im and Ha, 2011). Moreover, the decreased levels of processing fluency trigger negative affective responses (Winkielman, Schwarz, Fazendeiro and Reber, 2003), which eventually negatively affect behavioural intentions.

Prior research has studied the effect of processing fluency on behavioural intentions. For example, Storme, Myszkowski, Davila and Bournois (2015) researched the effects of processing fluency on attitude and purchase intentions in respect of visual advertisements. They used advertisements extracted from a French magazine containing pictures and text promoting different products (such as a beverage, a bicycle, and a car). The research participants were exposed to a single advertisement and were asked to answer a few questions related to the levels of processing fluency, attitudes, and purchase intentions. The results of the study illustrate that processing fluency is a predictor of attitude towards an advertisement, as well as purchase intentions. Similar research was conducted by Coulter and Roggeveen (2014), who examined the relationships among various prices (i.e., regular price, sale price, absolute discount, and relative discount), processing fluency, liking, and purchase intentions. The results of four experiments demonstrate that when deals are perceived fluently by consumers and with a greater level of liking, the levels of purchase intentions increase, compared with cases in which consumers are less fluent in processing the deals and price offers.

A positive relationship between fluency and behaviour intentions was also confirmed for perceptual fluency, which is a dimension of processing fluency. For example, Gomez and Werle (2019) studied the effect of fluency on purchase intentions in the context of unhealthy food products. They manipulated fluency using the level of clarity of the nutrition information labels on healthy and unhealthy food. The findings suggest that when the labels are clear and easy to process, that is, perceptually fluent, the levels of purchase intentions increase. The same results were found to be valid for both healthy food (experiment 1) and unhealthy food (experiment 2). The study also demonstrates that fluency was the most influential factor in terms of purchase intentions for the participants that had a lower level of knowledge of nutrition. Similarly, Bigoin-Gagnan and Lacoste-Badie (2018) conducted research on the effects of perceptual fluency on purchase intention in the context of visual complexity. Visual complexity was measured in terms of the levels of symmetry of the visual stimuli presented. The findings of their research demonstrate that symmetry reduces the levels of visual

complexity and increases the ease with which people perceptually process a stimulus (i.e., perceptual fluency). Moreover, the study illustrates that perceptual fluency influences purchase intentions; however, that relationship is mediated by aesthetic evaluation.

Additionally, previous research has also found that the link between perceptual fluency and purchase intentions is mediated by affect. It has already been established that perceptual fluency influences affective experiences (Jacoby and Dallas, 1981; Labroo et al., 2008; Reber et al., 1998; Im, Lennon and Stoel, 2010; Reber et al., 2004), such as liking, attractiveness, pleasure, enjoyment, etc. (Alter and Oppenheimer, 2009; Reber et al., 1998). For example, Reber et al. (2004) claim that when visual stimuli are perceptually fluent, they are liked more and are perceived with greater preference, in comparison to visual stimuli that are not perceptually fluent. Reber, Winkielman and Schwarz (1998) also confirmed that there is a link between perceptual fluency and preference.

Furthermore, previous research has demonstrated that the ease of processing stimuli influences positive feelings, which, in turn, leads to favourable evaluations (Menon and Raghubir, 2003; Reber, 1998). Im and Ha (2011) researched consumers' online shopping experience, their level of involvement (situational and enduring), purchase intentions, and fluency. The findings demonstrate that perceptual fluency has a positive relationship with enjoyment, and that enjoyment influences purchase intentions. Therefore, the relationship between perceptual fluency and purchase intentions is mediated by an affective experience, that is, enjoyment. In other research, Im, Lennon and Stoel (2010) studied the relationship between perceptual fluency and the pleasure of the consumer online shopping experience. These findings also suggest that perceptual fluency is positively related to aesthetic evaluation as well as pleasure. At the same time, pleasure has a significant influence on behavioural intentions. Many researchers have demonstrated a strong link between positive affect and behavioural intentions (Adaval, 2001; Eroglu et al., 2003; Schwarz and Clore, 1983).

In conclusion, building on past research findings that the fluent processing of a stimulus triggers behavioural intentions (Menon and Raghubir, 2003; Reber, Winkielman and Schwarz, 1998; Im and Ha, 2011; Im, Lennon and Stoel, 2010; Adaval, 2001; Eroglu et al., 2003; Schwarz and Clore, 1983; Gomez and Werle, 2019; Bigoin-Gagnan and Lacoste-Badie, 2018; Song and Schwarz, 2008; Dreisbach and Fischer, 2011; Winkielman, Schwarz, Fazendeiro and Reber, 2003; Storme, Myszkowski, Davila and Bournois, 2015; Coulter and Roggeveen, 2014), this PhD thesis predicts that perceptual fluency will influence consumer purchase intentions.

Alter and Oppenheimer (2009) suggest that fluency is a metacognitive experience arising from different cognitive operations. For example, perceptual fluency arises from perception, whereas conceptual fluency arises from higher-order cognition. Regardless of how fluency is generated, "within each judgement context, people interpret fluency uniformly" (Alter and Oppenheimer, 2009, p. 227). Hence, based on past research demonstrating the positive effects of perceptual fluency on purchase intentions (Bigoin-Gagnan and Lacoste-Badie, 2018; Im, Lennon and Stoel, 2010; Im and Ha, 2011; Gomez and Werle, 2019), as well as building on the claim that all types of fluency lead to "remarkably uniform judgements across a range of domains" (Alter and Oppenheimer, 2009, p. 220), this PhD thesis claims that conceptual fluency would also influence purchase intentions. Moreover, processing fluency represents two dimensions of fluency: perceptual fluency and conceptual fluency. Therefore, as processing fluency influences behaviour intentions (Dreisbach and Fischer, 2011; Song and Schwarz, 2008; Storme, Myszkowski, Davila and Bournois, 2015; Coulter and Roggeveen, 2014), this thesis claims that both perceptual fluency and conceptual fluency would have such effects on purchase intentions. Based on earlier evidence regarding the effects of visual complexity on perceptual and conceptual fluency, and their subsequent effects on behavioural intentions, this thesis hypothesises that both perceptual and conceptual fluency will mediate the relationship between visual complexity and purchase intentions. Specifically, this PhD posits the following:

***H3a: Perceptual fluency will mediate the relationship between visual complexity and consumer purchase intentions.***

***H3b: Conceptual fluency will mediate the relationship between visual complexity and consumer purchase intentions.***

#### 3.3.1.3 The Mediating Role of Imagery Fluency

Extant research has documented that asking people about the possibility of performing a certain behaviour influences them to perform it (Fitzsimons and Morwitz, 1996; Greenwald, Carnot, Beach and Young, 1987; Morwitz, Johnson and Schmittlein, 1993). This relationship is mediated by mental imagery (Anderson, 1983; Cialdini, 2001) because when people are asked about the likelihood of performing a type of behaviour, they first generate a mental imagery of that behaviour. Specifically, when people imagine a behaviour, such as taking a trip or starting a new job, their intentions to perform the imagined activity increase (Anderson, 1983). For example, Gregory et al. (1982) demonstrated that when people generated mental imagery of themselves using cable TV and enjoying its benefits, they felt more likely to purchase the

service compared with those individuals who only received information about the cable TV service.

The ease with which people generate mental imagery influences behavioural intentions (Levav and Fitzsimons, 2006). Past research demonstrates that imagery fluency influences purchase intentions (Petrova and Cialdini, 2005; Zhao, Hoeffler and Dahl, 2007). For example, Petrova and Cialdini (2005) studied imagery fluency and its effects on different variables in the context of vacation ads. To manipulate imagery fluency, the study used two versions of an advertisement – one with and one without – instructions to imagine. A total of 135 participants took part in the experiment and were randomly exposed to one of the two versions of the ad. They were then asked to complete a distraction task. Later, the participants assessed the imagery fluency, purchase intention, and brand attributes regarding the vacation. The results of the study demonstrate that the advertisement containing instructions to imagine influenced higher levels of imagery fluency, which triggered increased levels of purchase intentions as well as brand attitude. In another study, Petrova and Chialdini (2007) demonstrate that if consumers are considering whether to purchase a product, they try to generate a mental imagery of their experience using the product. The results of the study indicate that the likelihood of buying a product increases based on the accessibility of the mental imagery. Petrova and Cialdini (2008) also studied imagery fluency and behavioural intentions in the context of advertisements. Their study demonstrated that when consumers are able to imagine the advertised product or the suggested scenario easily, their behaviour intentions increased.

Drawing upon previous research which demonstrates a link between imagery fluency and behaviour intentions (Gregory et al., 1982; Petrova and Cialdini, 2005, 2007, 2008; Zhao, Hoeffler and Dahl, 2007), this PhD thesis argues that imagery fluency would influence purchase intentions. This claim is also based on past research demonstrating a relationship between processing fluency and behavioural intentions (Dreisbach and Fischer, 2011; Song and Schwarz, 2008; Storme, Myszkowski, Davila and Bournois, 2015; Coulter and Roggeveen, 2014) and on the notion that all types of fluency lead to "remarkably uniform judgements across a range of domains" (Alter and Oppenheimer, 2009, p. 220). Furthermore, building on earlier evidence regarding the effects of visual complexity on imagery fluency and their subsequent effects on behavioural intentions, this thesis hypothesises that imagery fluency will mediate the relationship between visual complexity and purchase intentions. Therefore, this thesis will argue the following:

***H3c: Imagery fluency will mediate the relationship between visual complexity and consumer purchase intentions.***

## 3.4 Chapter Summary

The aim of this PhD thesis is to investigate the mediating role of fluency in the relationship between visual complexity (simple *versus* complex images) and consumer purchase intentions. This chapter developed three hypotheses based on the effect of visual complexity on fluency (H1), the moderating role of congruity (H2), and the interrelationships between visual complexity, fluency, and consumer purchase intentions (H3). Specifically, the hypotheses suggest that it is easier for people to identify and perceive, semantically understand, and imagine a simple image (presenting a product on a plain background) compared with a complex image (presenting the product within a contextual background). In other words, the thesis claims that simple images are more perceptually, conceptually, and imagery fluent. Second, the hypotheses propose that complex congruent images (displaying a product within a matching and fitting contextual background) are easier to process perceptually, semantically, and in terms of imagery in comparison to the complex incongruent images (showing the product within a mismatching and unfitting contextual background). Finally, the hypotheses assume that fluency (in terms of perceptual fluency, conceptual fluency, and imagery fluency) will mediate the relationship between visual complexity and consumer purchase intentions. Table 2 below summarises the hypotheses developed in this chapter and outlines the studies that investigated the proposed relationships.

*Table 2: Summary of the hypotheses*

| **Hypothesis** | **Study** |
|---|---|
| *H1a: Visual complexity will have a negative effect on perceptual fluency, such that simple visual stimuli will increase perceptual fluency, while complex visual stimuli will decrease perceptual fluency.* | 1, 2, 3 |
| *H1b: Visual complexity will have a negative effect on conceptual fluency, such that simple visual stimuli will increase conceptual fluency, while complex visual stimuli will decrease conceptual fluency.* | 1, 2, 3 |
| *H1c: Visual complexity will have a negative effect on imagery fluency, such that simple visual stimuli will increase imagery fluency, while complex visual stimuli will decrease imagery fluency.* | 1, 2, 3 |
| *H2a: Congruity will moderate the relationship between visual complexity and perceptual fluency, such that complex congruent (incongruent) images will be significantly higher (lower) in perceptual fluency.* | 2 |
| *H2b: Congruity will moderate the relationship between visual complexity and conceptual fluency, such that complex congruent (incongruent) images will be significantly higher (lower) in conceptual fluency.* | 2 |
| *H2c: Congruity will moderate the relationship between visual complexity and imagery fluency, such that complex congruent (incongruent) images will be significantly higher (lower) in imagery fluency.* | 2 |
| *H3a: Perceptual fluency will mediate the relationship between visual complexity and consumer purchase intentions.* | 3 |
| *H3b: Conceptual fluency will mediate the relationship between visual complexity and consumer purchase intentions.* | 3 |
| *H3c: Imagery fluency will mediate the relationship between visual complexity and consumer purchase intentions.* | 3 |

Thus far, this PhD thesis has discussed the literature underpinning the research topic and developed several hypotheses on the effects of visual complexity on fluency and purchase intentions, as well as on the moderating effects of congruity. The following chapter presents the research methodology that was used to test the hypotheses.

# Chapter 4: Methodology

The aim of this PhD thesis is to study the effect of visual complexity (simple *versus* complex images) on consumer purchase intentions and to explore the mediating role of fluency. The thesis also researches the moderating effects of congruity (complex congruent *versus* complex incongruent images) on the relationship between visual complexity and fluency. The aim of this chapter is to discuss the methodology used to test the hypotheses developed in the previous chapter. This chapter presents the research philosophy, approach, design, strategy, and sampling technique, the three experiments conducted, the data analysis approach taken, the limitations of the study, and the ethical considerations observed by the researcher.

## 4.1 Research Philosophy

Each scientific research project is based on a philosophical assumption which guides the research processes and leads researchers to appropriate research decisions at different stages of the research (Gill and Johnson, 2010). The philosophical assumptions play an important role in the way scientific research is conducted. These assumptions encompass an ontology (the nature of reality), an epistemology (the approach to knowledge generation), and an axiology, "the role of values and ethics within the research process" (Saunders et al., 2016, p. 128).

"Ontology is concerned with the nature of reality" (Saunders et al., 2009, p. 110). It can be both objective and subjective. An objective ontology suggests that reality is single, stable, and exists independently of social actors. On the other hand, according to a subjective ontology, reality is different for each person and is based on the interpretations and perceptions of the social actors (Saunders et al., 2012).

Epistemology is the study of knowledge (Edgar and Sedgwick, 2008) and is concerned with "what is regarded as appropriate knowledge about the social world" (Bryman and Bell, 2015, p. 19). It addresses the questions, "How do we know what we know? What is the relationship between the knower and what is known?" (Antwi and Hamza, 2015). Epistemology could be based on objectivism, whereby knowledge is seen as objective and quantifiable (Johnson and Duberley, 2000). An objective epistemology posits that knowledge is gained via experiences and observing measurable facts (Sauders et al., 2016). In contrast, a subjective epistemology suggests that knowledge is based on interpretations and that there are multiple paths to achieving knowledge (Walsham, 1993). It aims to understand a phenomenon through the meanings that people assign to it (Bryman and Bell, 2015).

There are three main philosophical approaches which are used in business and management research: interpretivism, realism, and positivism (Saunders et al., 2016). An interpretivist philosophy aims to achieve understanding about the world based on the experiences of the social actors and their subjective interpretations of the social reality (Bryman, 2012). The interpretivist philosophy is characterised by a subjective ontology, i.e., reality is socially constructed, and it is based on the subjective experiences and perspectives of social actors (Mayers, 2008). The interpretivist epistemology is subjective and aims to explain a phenomenon through the meanings that people assign to it (Bryman and Bell, 2015). In other words, knowledge is based on interpretations (Walsham, 1993). The axiology is value-laden, i.e. the researcher is involved in the data collection process and aims to understand the participants' interpretations and perspectives about the researched phenomenon and the factors that influence their viewpoints (Kaplan and Maxwell, 1994). Usually, the interpretivist philosophy is applied with qualitative research methods, which provide rich and in-depth data relying on interviews (structured, semi-structured, or unstructured), case studies, focus groups, ethnography, etc. (Saunders et al., 2016). The data analysis is usually based on coding and thematic analysis, discourse analysis, textual analysis, or other forms of analysis (Bryman and Bell, 2015).

In contrast to the interpretivism, realism is characterised by a scientific approach to knowledge development. It relies on the assumption of an existing external reality which is independent of social actors. Moreover, its approach to knowledge is objective and it assumes that it could be observed. Realism has been defined by Phillips (1987) as "the view that entities exist independently of being perceived, or independently of our theories about them" (p. 205). There are two forms of realism: direct and critical (Saunders et al., 2012). Direct realism (or naïve realism) assumes that the world is stable and unchanging; it portrays reality as being reflected in what people perceive and does not consider the underlying mechanisms driving the social phenomenon (Bhaskar, 1989). On the other hand, critical realism suggests that reality is partially understood by what people perceive. This approach assumes that in order to understand the social world, all the underlying structures that generate a social phenomenon must be considered (Bhaskar, 1989). The axiology of realism suggests a value-laden research process, whereby personal views, experiences, and cultural background influence the researcher (Saunders et al., 2012).

The positivist philosophy also assumes a scientific approach to knowledge development. August Comte originated the positivist philosophy; he claimed that reasonings and

observations are the key in studying human behaviour and further theorised that knowledge comes from experiments, senses, and observations (Johnson and Duberley, 2000). The positivist philosophy "has an atomistic, ontological view of the world as comprising discrete, observable elements and events that interact in an observable, determined and regular manner" (Collins, 2010, p. 38). Central to the positivist philosophy is an objective approach to ontology; in other words, reality is single and stable (Hudson and Ozanne, 1988). Moreover, the positivist philosophy "asserts that social phenomena and their meanings have an existence that is independent of social actors" (Bryman, 2012, p. 3). Hence, the social actors in the reality are not the creators of that reality but independent actors within it. With regard to the epistemological position, positivists believe in "the empiricist view that knowledge stems from human experience" (Collins, 2010, p. 38). Moreover, it assumes that knowledge can be tested by experience (Howell, 2013) and is seen as objective and quantifiable (Johnson and Duberley, 2000). Thus, quantifiable data generated from empirical observations and tested statistically can be considered to be the only source of knowledge and can, therefore, be used in the development and modification of theories (Saunders et al., 2012; Howell, 2013). The positivist philosophy suggests the use of quantitative research methods for data collection and analysis. Data collection often relies on surveys and questionnaires using large randomly selected samples (Easterby-Smith et al., 2008). Typical of such research is the demonstration of causality between variables and the use of hypotheses, which are confirmed or rejected (Johnson and Duberley, 2000). In order to obtain objective quantifiable data, researchers must also use rigorous scale measurements from large samples. Conclusions can then be drawn from empirical investigations, not from subjective interpretations, and the results can be generalised and based on observable phenomenon, resulting in theory development (Saunders et al., 2012). In terms of axiology, the role of the researcher is to remain neutral and independent (Carson et al., 2001) by objectively observing and analysing the data. The researcher's main aim is to provide positivist-based research, which can be done through a focus on the facts as opposed to the interpretation of the participants' feelings, thoughts, perceptions, and emotions; all of which are irrelevant to positivist-based research (Crowther and Lancaster, 2008).

This PhD thesis aims to study the relationship between visual complexity and consumer purchase intentions and to explore the mediating role of fluency. The thesis developed three hypotheses (see Chapter 3: Hypotheses Development) to test the relationships between visual complexity, congruity, fluency, and consumer purchase intentions. The method of data collection was based on a quantitative experimental design. The analysis of the results

demonstrated the relationships between the different variables. Based on the nature of the research topic, the hypotheses developed, and the method selected for data collection, the positivist philosophical approach seemed to be the most appropriate. The study could not adopt an interpretivist approach, as it relies on the subjective interpretation of qualitative data (such as interviews), which is not appropriate for the nature of this research topic. The realist paradigm relies on the integration of the values and perceptions of the researcher in the research process (Bryman, 2012); at present, the investigation implements a structured methodology which involves minimal interference from the researcher. This PhD thesis also uses objective measurable data, and thus the realist approach was deemed to be unsuitable for this research.

The research philosophical approach selected may be the most suitable for this research topic and the nature of the research; however, this does not suggest a lack of criticism. The main critique that positivist philosophy faces is that it completely ignores the "human factor" and individuals' perspectives, meanings, feelings, and emotions. It is also accused of dehumanising people by only seeing them as experimental objects of manipulation and control (Howell, 2013). Silverman (1970) also claimed that it is impossible to investigate human behaviour in order to find a logical explanation for it by relying on observations or other quantitative research methods because people are different; their actions are not always logical and cannot be generalised. This leads to the next critique – the lack of accuracy because of the generalisation (Silverman, 1970). In other words, human behaviour cannot be generalised because each individual is different, has a different past, experiences, perspectives, and understandings about the world or a phenomenon based on a number of factors. Thus, showing the impossibility of predicting behaviour and the assumption that validity is generalisable for all individuals is inaccurate (Silverman, 1970). The next criticism is concerned with the role of the researcher, who is independent in the research process and is limited to understanding the "subjective meanings that the actors themselves attach to their acts" (Silverman, 1970, p. 128).

Despite all the criticism that positivists face, the majority of research conducted in the context of fluency is based on the positivist philosophical approach. More specifically, researchers develop hypotheses, test them scientifically, and the majority of them use an experimental research design. They also rely heavily on measurement scales and manipulation. Likewise, this PhD thesis used well-developed scales to measure all the hypothetical relationships. The researcher also employed pre-tests and manipulation checks as well as quantitative statistical analyses in order to test the developed hypotheses, however possible biases might appeared unnotably. Therefore, to address this possibility and the potential limitations of positivism, this

PhD thesis considered applying a postpositivist stance. The main difference between positivism and postpositivism is the role of the researcher. According to postpositivism, "no matter how faithfully the scientist adheres to scientific method research, research outcomes are neither totally objective, nor unquestionably certain" (Crotty, 1998, p. 40). In positivism, the researcher is independent and completely objective, whereas postpositivists claim that the researcher as a human being could be influenced by a number of factors (including different theories and background knowledge), which could eventually have an impact on the researcher's observations and conclusions. In other words, the researcher is still aiming to be honest and objective but unintentional or unnoticeable biases might appear. As a result, an objective epistemology cannot be achieved because the researcher cannot provide completely objective knowledge. In terms of ontology, postpositivists claim that the world and reality cannot be fully explored and understood due to the limitations of the researcher (Maxwell, 2012). Therefore, reality can only be explored to a specific extent, it is defined as "probable" and is not certain. When considering the research questions, the hypotheses developed, and the analysis, this PhD thesis followed a strict protocol, whereby the researcher aimed to be objective and honest. However, possible unnoticeable biases might appear and, therefore, it was deemed to be more appropriate for this PhD thesis to take a postpositivist rather than a positivist stance.

### 4.2 Research Approach

The selected philosophical doctrine always determines the research approach. The research approach could be deductive, inductive, or abductive (Saunders et al., 2012). A deductive approach is concerned with "developing a hypothesis (or hypotheses) based on existing theory, and then designing a research strategy to test the hypothesis" (Wilson, 2010, p. 7). In other words, the research begins with a theory, then hypotheses are developed and later tested empirically (Ketokivi and Mantere, 2010), which will "lead to a confirmation or a rejection of the hypothesis" (Snieder and Larner, 2009, p. 16). Conclusions are then drawn based on premises; meaning that they are based on factual circumstances. Research that utilises a deductive approach usually tests relationships and relies on precision methodology for testing causal interactions (Gill and Johnson, 2010). Moreover, it is usually based on quantitative research methods and uses larger samples which allow for generalisation.

In contrast to the deductive approach, an inductive approach is used in research which aims to gain understanding of the meanings and perspectives of individuals. The context surrounding

the social phenomena under investigation is taken into consideration within inductive research, which often entails qualitative data collection from small samples. It is not concerned with generalisation, and it is more flexible. In addition, the role of the researcher is not seen to be independent of the research process (Ketokivi and Mantere, 2010).

These approaches are conceptually different (see Table 3) but both are still used in conjunction in business and marketing research (Saunders et al., 2012). More specifically, they are combined in an abductive approach (Suddaby, 2006), which is used to observe, recognise, and follow patterns and then further relate these patterns to conceptual and theoretical frameworks. The approach is used as a foundation for the development of new theories, as well as the modification of pre-existing theories (Saunders et al., 2012). The present research strategy implemented a postpositivist philosophical approach to the development of knowledge and was centred around hypotheses related to visual complexity, congruity, fluency, and consumer purchase intentions; later, those hypotheses were tested in order to develop conclusions. Based on that, the deductive approach seemed to be the most suitable research approach for this PhD study.

*Table 3: Deductive and inductive approaches*

| Deduction emphasises | Induction emphasises |
|---|---|
| • Scientific principles<br>• Moving from theory to data<br>• The need to explain causal relationships between variables<br>• The collection of quantitative data<br>• The application of controls to ensure validity of data<br>• The operationalisation of concepts to ensure clarity of definition<br>• A highly structured approach<br>• Researcher independence of what is being researched<br>• The necessity to select samples of sufficient size in order to generalise conclusions | • Gaining an understanding of the meanings humans attach to events<br>• A close understanding of the research context<br>• The collection of qualitative data<br>• A more flexible structure to permit changes of research emphasis as the research progresses<br>• A realisation that the researcher is part of the research process<br>• Less concerned with the need to generalise |

*(Source: Saunders et al., 2009, p. 127)*

### 4.3 Research Design

The selection of a research approach, research design, and research strategy is underpinned by the philosophical approach adopted (Wilson, 2014). Research design can be defined as a detailed written statement that aims to systematise research activity in a way that maximises the likelihood of achieving the research objectives (Easterby-Smith, 2015). The research design specifies the approach of the conveyance of the proposed research, the tools of data collection, and the selected data analysis methods. It also takes ethics into account, as well as any limitations that may arise during the process of researching a phenomenon. The research design could be qualitative, quantitative, or mixed-methods (representing a combination of qualitative and quantitative research methods).

The qualitative research approach is usually associated with the interpretivist philosophy and with interviews or observations as data collection methods. In contrast, quantitative research methods are usually associated with the positivist philosophical approach, whereby empirical

data collection approaches are used, such as experiments and questionnaires. Quantitative research is used within the deductive approach, which focuses solely on testing causal relationships between variables that are operationalised and analysed statistically (Saunders et al., 2012).

This PhD thesis aims to study the effects of visual complexity on consumer purchase intentions and the mediating role of fluency. The study builds on aesthetics and fluency theory to predict the relationships between the different variables. The research adopted a postpositivist philosophical approach aiming to establish causal relationships between visual complexity, congruity, different metacognitive processes, and consumer purchase intentions. More specifically, three hypotheses were developed based on the above-mentioned theories and these were tested empirically. Based on the above discussion, a quantitative research design was deemed to be the most suitable for the purpose of the topic.

### 4.4 Research Strategy

The research strategy is an important part of the research methodology, as it is concerned with the resources and tools that enhance the research process. The research strategy is determined by the research philosophy and the research methods selected for data collection and data analysis (Denzin and Lincoln, 2005). A postpositivist philosophy and a quantitative research design were selected for this research topic. There are certain data collection and data analysis methods which are used in specific research designs. For example, a quantitative research design adopts experiments, surveys, and questionnaires, while in qualitative research, scientists use interviews and observations (Saunders et al., 2012). Interestingly, there are research methods for data collection which are used in every type of research design. For example, case studies could be employed in quantitative, qualitative, and mixed-methods research designs.

Surveys "question individuals on a topic or topics and then describe their responses" (Jackson, 2011, p. 17). Survey is a quantitative method for collecting data from a large sample, aiming to explain a relationship between two or more variables or to describe specific aspects of a population (Saunders et al., 2012). This data collection method incorporates the use of structured interviews and questionnaires, which are, interestingly, very similar. The main difference between them is that an interview requires an interviewer, while questionnaires do not (Bryman, 2012). Surveys are a fast way of collecting data (especially compared with experiments, observation, and interviews) and are easy to analyse. The main issue with surveys

is that participants may provide inaccurate information, aim to provide a desirable or "accurate" answer, or misunderstand some of the questions (Bryman, 2012).

Another data collection method is the case study, which postulates an in-depth understanding of the researched social phenomenon. As mentioned above, case studies can be used in qualitative, quantitative, and mixed-methods research. As with surveys, case studies are often employed in business and management research (Saunders et al., 2012).

Another research strategy used in quantitative research is the experimental design. The experimental research is often considered to be the most rigorous research method. It aims to predict causal relationship between two or more variables. Experiments are often used by business and management scientists, especially when analysing cause and effect relationships; and they are regarded as the strongest tool for testing such relationships (Bradley, 2007). Usually, experiments require one (or more) independent variable that is manipulated to explore its effects on the dependant variable. Those manipulations are controlled and are consistent across the experimental conditions and thus disregard any other explanations for the established causality (Neuman, 2011). It is important to note that experiments aim to regulate the effect of any contextual variables that may influence, affect, or threaten the validity of a causal relationship. Furthermore, typical for the experiments is the random assignment of participants to different conditions of the independent variable. To elaborate, experiments usually require two groups, of randomly selected participants and a control condition, which ensures equality and limits the possibility of biased data. In other words, in experiments, participants are less likely to provide socially "desirable" answers (in contrast with surveys). Based on the above-mentioned information and on the consideration that this PhD thesis adopted quantitative research methods to test the developed hypotheses and to establish causal relationships between visual complexity, congruity, fluency, and consumer purchase intentions, an experimental approach was considered to be the most appropriate research strategy for this research topic.

The experiments could be laboratory or non-laboratory. Laboratory experiments usually allow a high level of control in the setting of the experiments. Moreover, they are usually managed in an artificial setting, where the researcher has greater control over the independent variable and can manipulate it while everything else remains the same (Fiske et al., 2010). As a result, the internal validity of the study increases but the external validity (the extent to which the research findings can be replicated in other settings, at different times, and with different samples) is then jeopardised (Fiske et al., 2010).

In contrast, non-laboratory experiments, which are also known as field experiments, study research queries that are evident in real-life settings and can, therefore, explore social behaviours within the natural environment in which they are likely to take place (Heynes, 2006). Since the experiments are conducted in natural and realistic settings, the researcher has a low level of control and there are many extraneous variables, which could challenge the internal validity of the experiment, especially because of the manipulated variables and the context of the study. Also, the participants are usually unaware that they are participating in an experiment, or at least are not being made aware of the purpose of the study, which limits the possibility of biased responses and demand behaviours (Fiske et al., 2010). Furthermore, randomly assigning participants to experimental conditions is extremely challenging in field experiments, as a result of involuntary experimenter bias occurring when organising the selection of participants and the conditions to which they will be assigned. Due to the nature of the non-laboratory experiments, the findings could be generalised and applied in different settings and samples, allowing for a higher level of validity (Fiske et al., 2010). In addition, although it is clear that the researcher usually has to select between laboratory and field experiments, this always suggests negotiation between internal and external validity.

When researchers have to make a selection between a laboratory or a field experiment, they should also take realism into account (Fiske et al., 2010). To be more specific, realism can involve either experimental, mundane, or psychological realism (Aronson and Carlismith, 1968). Experimental realism represents the extent to which the experimental situations are realistic and the degree to which participants are involved in them; it is usually conducted in laboratory experiments. Mundane realism represents the extent to which the created experimental situation is similar to the one participants experience in real life; it is usually conducted in field research, as people are typically studied in their everyday life and daily activities. Psychological realism is the extent to which the experimental situation influences the same psychological states or processes in participants as in their real lives.

Finally, when researchers select between laboratory and field experiments, they usually consider if the experiments should be categorised as impact experiments or judgement experiments. Impact experiments have certain impacts on participants, for example, on their feelings and emotions or their psychological state as they usually require high levels of participant involvement. In contrast, judgement experiments require lower levels of participant involvement, as they do not have an impact on participants. Specifically, in judgement

experiment, participants usually are asked to observe different stimuli and make evaluations or judgements related to them (Wilson et al., 2010).

This PhD thesis aims to study the effects of visual complexity on consumer purchase intentions and the mediating role of fluency. The study also aims to examine the moderating effect of congruity on the relationship between visual complexity and fluency. In other words, the study aims to establish causality between visual stimuli, consumer experiences, and behavioural intentions, hence the research required some level of control over the variables. Based on that, it appeared that laboratory experiments would be the most appropriate for this research. The experiments were conducted around shopping centres and universities, not in the laboratory; however, the participants were randomly selected and placed in different experimental conditions in order to limit the possibility of biased answers. Moreover, the participants in this research were asked to make different judgements, which implied that a judgement experiment would be the most appropriate to use. This also confirms that laboratory experiments would be the most appropriate for this present study.

### 4.5 Sampling

Sampling is a crucial part of every piece of research, as it allows the researcher to collect data from a particular part of the population (Saunders et al., 2009). There are two sampling techniques: probability and non-probability sampling.

Probability sampling (also known as random sampling) is characterised by a random selection method (Saunders et al., 2009). In other words, all people have an equal chance of being selected for participation in a study. The results can also be generalised. Hence, when employing probability sampling, the data is representative of the entire population. However, using probability sampling usually involves a specific "sampling frame", which represents a list of all cases in the population and, based on that information, people are invited to participate. This leads to a number of challenges when conducting business research and, due to those difficulties, probability sampling is not popular among business and marketing researchers (Saunders et al., 2009).

In contrast, non-probability sampling refers to a non-random selection method. Specifically, the probability of being selected is unknown, hence the different groups in the population do not have an equal chance of participating in the study (Sekaran and Bougie, 2003). Moreover, the information collected cannot be generalised. Non-probability sampling can be divided into purposive and convenience sampling. When applying purposive sampling, researchers collect

data from a particular type within the population, i.e., they select participants who are eligible according to different criteria. Moreover, purposive sampling can involve judgement and quota sampling (Sekaran and Bougie, 2003). When using a judgement sampling technique, the researcher makes judgements in selecting participants who can answer the research questions and help the researcher meet the research objectives. This is usually applied when the research topic and questions that require specialised knowledge on the subject area (Sekaran and Bougie, 2003). In quota sampling, the researcher selects participants according to certain qualities and criteria. Specifically, the population is divided into quotas based on particular criteria (such as age, income, and education) and the researcher selects participants who represent a certain quota. Generalisation in this case is possible (Sekaran and Bougie, 2003).

Convenience sampling is also a non-probability sampling method. It is concerned with collecting data from people who are conveniently available. This method saves time and is cost-effective. On the other hand, there are some disadvantages of using this method in terms of generalisation. To be specific, social psychology research relies heavily on the convenience sampling technique and tends to employ students in their recruitment because this is usually easier and less expensive compared with utilising other groups; however, relying too much on a specific sample, such as a student one, could limit the generalisability of the findings to other samples (Fiske et al., 2010).

This current study focuses on the effects of visual complexity on consumer purchase intentions and the mediating role of fluency in the context of luxury fashion brand communication on social media. The study proposes several hypotheses based on the relationship between visual stimuli, fluency, and purchase intentions. The participants in the study did not need to be luxury fashion brand consumers in order to participate, as the main focus of the PhD thesis is on the way they process visual stimuli (in terms of perceptual fluency, conceptual fluency, and imagery fluency) and the behavioural intentions this provokes. For collecting data, the researcher approached people around shopping centres and universities in London. Therefore, the study used convenience sampling. According to Calder et al. (1982), “As long as a sample is relevant to the universe of the theory, it constitutes a test of that theory” (p. 241). Therefore, the selection of a convenience sample (over a random sample representing the entire population) is supported and justified.

### 4.6 Overview of the Studies Conducted for this Research

The aim of this PhD thesis is to predict behavioural responses to different visual stimuli. More specifically, the PhD thesis explores the effect of visual complexity on consumer purchase intentions, as well as the mediating role of fluency (in terms of perceptual fluency, conceptual fluency, and imagery fluency). The interrelationships between the variables were examined through three experiments. Specifically, in Study 1, the thesis examined the effect of visual complexity on fluency. In Study 2, the thesis investigated the moderating effects of congruity on the relationship between visual complexity and fluency. Study 3 tested the mediating effects of fluency on the relationship between visual complexity and consumer purchase intentions.

All three studies were carried out in the form of an online survey with visual complexity manipulation. According to Fiske et al. (2010), internet studies have gained popularity in the field of psychology, particularly in judgement experiments. Moreover, they claim that online research promotes accurate data and lowers the possibility of errors in the data collection process. On the other hand, as with any other method of research and data collection, online surreys face a lot of challenges. One of them is the amount of attention participants pay to the online survey. It is also worth noting that online surveys limit generalisability, as they do not represent the entire population (Fiske et al., 2010).

#### 4.6.1 Study 1

Study 1 aimed to investigate the relationship between visual complexity and fluency. Specifically, the study adopted a between-groups experimental design that compared the type of visual complexity (simple *versus* complex visual stimuli) and its impact on types of fluency (perceptual fluency, conceptual fluency, and imagery fluency). The dependent variable was fluency (perceptual fluency, conceptual fluency, and imagery fluency). The independent variable was visual complexity. The independent variable was manipulated while measuring consumer metacognitive experiences using different scales. Prior to the experiment, a pilot study was conducted to create and test the visual complexity manipulation.

##### 4.6.1.1 Pilot Study

To study the effects of visual complexity on fluency, past research manipulated visual complexity by exposing participants to a simple or a complex visual stimulus (Maier and Dost, 2018; Shapiro, 1999). This research followed a similar approach to visual complexity manipulation. Therefore, the study required a simple picture, representing a product placed on a plain background, and a complex picture, displaying the same product placed on a contextual

background. The study used a *Montblanc* business bag as the product. On the simple image, the product was placed on its own on a white background, whereas on the complex image, the bag was placed on a business contextual background, surrounded by many smart and work-related objects. The images were manipulated using Adobe Photoshop. A pilot experiment was conducted to ensure that both images would be suitable for the purpose of this study.

The pilot study recruited approximately 30 participants, who were exposed to both images and asked to complete some questions related to the simplicity and complexity of the images. Specifically, on a 7-point scale, from "Strongly Disagree" to "Strongly Agree", the participants rated the following questions for each picture: "Is this picture simple?" and "Is this picture complex?"

#### 4.6.1.2 Procedure

The participants were approached around universities as well as shopping centres in London and asked to participate in a study investigating their sharing behaviour. The aim of this "cover story" was to avoid suspicion, as well as to move their focus from the perspective of the study. The topic of the PhD thesis and the actual purpose of the project were shared on the final page of the experiment. The experiment was administered online using an online survey application: Qualtrics. The participants completed the survey using the researcher's personal iPad after providing informed consent (see Appendix 1).

The experiment started with socioeconomic questions, as well as questions regarding the participants' behaviour on social media. Later, the participants were exposed to either the simple or the complex image and were asked a set of manipulation-check questions as well as questions regarding the ease with which they processed and imagined the image. The study concluded with a debriefing statement. It is important to mention that data were collected on different days of the week (weekdays as well as weekends) and at different times.

#### 4.6.1.3 Manipulation Checks

As mentioned previously, the level of visual complexity was manipulated. Specifically, some participants were exposed to a simple image, whereas the rest of the participants were exposed to the complex image. To make sure that the manipulation was successful, the participants rated the level of visual complexity of the image they were exposed to, using the following statements: "The image is complex", "The image is crowded", "The image has a lot of variety", "The image is complicated", and "The image is simple", on a 7-point scale (from "Strongly Disagree" to "Strongly Agree").

#### 4.6.1.4 Independent Variable

The independent variable, visual complexity, was manipulated. Some of the participants were exposed to the simple image, displaying a single product, whereas the rest of the participants were exposed to a complex image, presenting the same product within a contextual background.

#### 4.6.1.5 Dependent Variable

The dependent variable was fluency; specifically, perceptual fluency, conceptual fluency, and imagery fluency. To study the levels of perceptual fluency, the PhD thesis relied on a bipolar scale adopted by Mosteller, Donthu and Eroglu (2014), whereby participants rated the following criteria regarding their perceptual experience of the image they were exposed to: "Cluttered/Uncluttered, Messy/Neat, Crowded/Spacious, and Hard to view/Easy to view". For the purposes of this thesis, a "Hard to perceive/Easy to perceive" criteria was added. To measure the levels of conceptual fluency, the participants were asked to use a 7-point scale (from 1 = "Strongly Disagree" to 7 = "Strongly Agree") to rate the following statements: "The meaning of the image was easy to understand", "The message of the image was easy to understand", and "The idea of the image was easy to understand" (Lee and Labroo, 2004). Finally, the imagery fluency was rated using Bone and Ellen's (1992) scale, where participants were asked to use a 7-point scale (from 1 = "Strongly Disagree" to 7 = "Strongly Agree") to rate the following statements in respect of the image: "I had difficulty imagining the depicted image in my head", "I quickly generated images of what was depicted in the image", and "I found it easy to imagine the depicted image".

### 4.6.2 Study 2

Building on Study 1, Study 2 examined the moderating effect of congruity on the relationship between visual complexity and fluency. The study utilised a 2 (visual complexity: simple *versus* complex) x 2 (congruency: congruent visual stimuli *versus* incongruent visual stimuli) between-groups experimental design. The dependent variable was fluency (perceptual fluency, conceptual fluency, and imagery fluency). The independent variable was visual complexity, and the moderator was congruity. For the purposes of the study, both complexity and congruity were manipulated and the rest of the settings and questions remained the same. A pilot experiment was first conducted in order to select the most suitable images for this study.

#### 4.6.2.1 Pilot Study

Visual complexity represents a stimulus containing more than one element and having a contextual background, whereas congruity represents the fit between two or more elements. As the study was focused on visual stimuli with varying levels of complexity and congruity, the pilot study aimed to find a simple image presenting a product on a plain background and two equally complex images displaying the same product. Both complex images should differ in their levels of congruity between the displayed product and its contextual background. The selected product for this study was a *Valentino* bag. In a complex congruent image, the product should be placed in a matching atmosphere, whereas in the complex incongruent image, the product should be placed in an unfitting scene. To ensure that appropriate pictures were selected, the study employed approximately 30 participants for the pilot study. All the participants were exposed to five pictures presenting the product (the Valentino bag) placed in different scenes: (1) one showing the product on its own; (2) another one displaying it in a living room; (3) a picture displaying the product in a picnic setting; (4) a picture showing the product on a rock in the middle of a river; and (5) another image placing the product in a gym. First, the participants were asked to complete questions related to the levels of visual complexity on a 7-point scale (from "Strongly Disagree" to "Strongly Agree") using the following statements: "Is this picture simple?" and "Is this picture complex?".

Next, the participants were asked to rate the congruity levels of each picture using a 7-point scale (from "Strongly Disagree" to "Strongly Agree") in response to the following questions: "Does the background of the image offer a fit with the product?", "Do you think the product and the background are congruent?", and "Is there a good match between the background and the products?".

#### 4.6.2.2 Procedure

Similar to Study 1, the participants were approached around shopping centres and universities in London. They were first asked to participate in a study investigating consumer sharing behaviour on social media. After giving consent (see Appendix 1), they completed an online survey in Qualtrics using the researcher's personal iPad. First, the respondents answered some socio-demographic questions and questions related to their social media behaviour. Next, they were exposed to a single image (a simple, a complex congruent, or a complex incongruent image) and asked to complete the same set of questions regarding the levels of visual complexity and congruity, as well as their metacognitive experiences looking at the image in

terms of perceptual fluency, conceptual fluency, and imagery fluency. The study then concluded with a debriefing statement. The data were collected on weekdays and weekends at different times.

#### 4.6.2.3 Manipulation Checks

To ensure that the manipulation was successful, manipulation-check questions related to the levels of visual complexity and congruity were included in the survey. The aim of those questions was to ensure that the simple image was perceived as significantly simpler compared to the two complex images. The complex images should also be perceived as equally complex, although their congruity levels should differ significantly. Similar to Study 1, the participants in Study 2 rated the levels of visual complexity using the following statements: "The image is complex", "The image is crowded", "The image has a lot of variety", "The image is complicated", and "The image is simple". Then, they rated the levels of congruity of each picture using a 7-point scale (from "Strongly Disagree" to "Strongly Agree") in response to the following questions: "The product and the background are congruent", "There is a good match between the product and the background?", and "The image offers a good fit between the product and the background".

#### 4.6.2.4 Independent Variable and Moderator

The independent variable for this study was visual complexity and the moderator was congruity. They were both manipulated: some participants were exposed to the simple image, others to the complex congruent image showing the product within a congruent and matching scene, and the rest of the participants were exposed to the complex incongruent image displaying the same product within a mismatching and surprising atmosphere.

#### 4.6.2.5 Dependent Variable

The dependent variable was fluency (perceptual fluency, conceptual fluency, and imagery fluency). Perceptual fluency was measured using the following bipolar scale: "Cluttered/Uncluttered, Messy/Neat, Crowded/Spacious, Hard to view/Easy to view" (adapted from Mosteller, Donthu and Eroglu, 2014). Again, the "Hard to perceive/Easy to perceive" item was added. Conceptual fluency was measured using a 7-point scale (from 1 = "Strongly Disagree" to 7 = "Strongly Agree"), whereby the participants rated the following statements: "The meaning of the image was easy to understand", "The message of the image was easy to understand", and "The idea of the image was easy to understand" (adapted from Chang, 2013; Wu et al., 2016). To rate the levels of imagery fluency, the participants were asked to rate the

following statements using a 7-point scale (from 1 = “Strongly Disagree” to 7 = “Strongly Agree”) for the image they were exposed to: “I had difficulty imagining the depicted image in my head”, “I quickly generated images of what was depicted in the image”, and “I found it easy to imagine the depicted image” (Bone and Ellen, 1992).

### 4.6.3 Study 3

Study 3 aimed to assess the effect of visual complexity on consumer purchase intentions and the mediating role of fluency. The study utilised a between-groups design (visual complexity: simple *versus* complex visual stimuli). The dependent variable was consumer purchase intentions. The mediator was fluency, in terms of perceptual fluency, conceptual fluency, and imagery fluency. The independent variable was visual complexity. A pilot study was conducted to ensure the selection of the most suitable images for this study.

#### 4.6.3.1 Pilot Study

The aim of this pilot study was to check if the selected images were suitable for this study. In particular, the study required a simple image presenting the product only and a complex image, displaying the same product within a contextual background. The product for Study 3 was an item of black *Prada* luggage. The participants were exposed to: (1) a picture showing the product on its own and (2) a picture displaying the same product at an airport. The participants were asked to rate the levels of visual complexity using the same procedure as the one employed in the previous studies.

#### 4.6.3.2 Procedure

The experiment followed a similar procedure as the previous two studies and was also administered online using Qualtrics, the online survey application on which researchers develop surveys. Similar to the previous studies, the survey was opened online on the researcher’s personal iPad. The researcher approached participants in public places in London (specifically, universities and shopping centres) and asked them to complete a survey regarding consumer sharing behaviour on social media. After giving informed consent (see Appendix 1), the participants completed the survey using the iPad. At the beginning of the survey, the participants answered some socio-demographic questions, as well as some questions related to their social media behaviour. They were then exposed to an image (simple or complex) and asked to answer questions regarding the levels of complexity of the picture (manipulation-check questions). Next, they evaluated their metacognitive experiences in terms of perceptual fluency, conceptual fluency, and imagery fluency. Finally, the participants answered a small

set of questions in relation to their intentions to purchase the product, as well as their sharing intentions on social media. The study concluded with a debriefing statement. It is worth noting that data were, collected on different days of the week (weekdays as well as weekends) and at different times.

#### 4.6.3.3 Manipulation Checks

The independent variable was manipulated using a similar manipulation to that employed in Study 1. Specifically, the participants were asked to rate the levels of visual complexity of the image they were exposed to using the following scale: “The image is complex”, “The image is crowded”, “The image has a lot of variety”, “The image is complicated”, and “The image is simple”.

#### 4.6.3.4 Independent Variable

The independent variable was visual complexity. This variable was manipulated: some participants were exposed to the simple image and others to the complex image showing the product within a contextual background.

#### 4.6.3.5 Mediator and Dependent Variables

The mediator was fluency in terms of perceptual fluency, conceptual fluency, and imagery fluency. Similar to the previous two studies, Study 3 measured perceptual fluency using Mosteller, Donthu and Eroglu’s (2014) scale (“Hard to perceive/Easy to perceive” was added). The levels of conceptual fluency were measured using the scale adapted from Lee and Labroo (2004) and the study used Bone and Ellen’s (1992) scale to measure the levels of imagery fluency.

The dependent variable for Study 3 was purchase intentions. In order to measure the level of purchase intentions, the study adopted Smith et al.’s (2007) scale, where the participants used a 5-point bipolar scale to rate the possibility of purchasing the product through the following criteria: “Unlikely/Likely”, “Improbable/Probable”, and “Impossible/Possible”.

### 4.7 Data Analysis

This study used SPSS 25 software to analyse the collected data. The reliability of the data was first measured, followed by a range of t-tests (where it is necessary to determine if there is a significant difference between the means of two groups) as well as one-way analysis of variance (ANOVA) (where it is necessary to compare means between three or more groups) to

test the hypotheses. In addition, regression analysis (SPSS, Process) was employed when there was a need to check the relationships between different variables.

### 4.8 Limitations

This study investigated the way people process different visual stimuli and the behavioural intentions they provoke. To study the research topic, the thesis adopted an experimental research design. As the three studies were laboratory experiments, they carried a few limitations. The first limitation is related to internal validity (Fiske et al., 2010). There are three types of validity: internal, external, and construct. Internal validity refers to the validity of the causality and is concerned with whether the manipulation of the independent variable was the only cause of the variation in the dependent variable. Therefore, there has to be a high level of control of any independent variable that could cause variation in the dependent variable. This could be achieved in a laboratory experiment by employing random assignments. For the purposes of this research, in the data collection process, participants were approached in public places (around universities and shopping centres) and they were randomly assigned to certain conditions. In each of the three experiments, a computer generation application randomly assigned participants to those conditions with regard to the stimulus they had to observe.

Second, as mentioned previously, researchers often compromise between external and internal validity because when they achieve high levels of internal validity, this may jeopardise external validity (Fiske et al., 2010). External validity is concerned with whether similar effects in different contexts or populations could reoccur (Fiske et al., 2010). Therefore, external validity could be threatened by the population used for data collection. For instance, some studies rely too much on student samples; however, this could limit the generalisability of the findings to other samples (Sears, 1986). Moreover, the settings of the experiments could also have negative effects on generalisability. For this PhD thesis, the data were collected around shopping centres and universities, not in laboratory settings. However, it is crucial to mention that the data were collected from actual consumers with different backgrounds. As a result, it could be concluded that the sample is more “real” and reliable compared to student samples.

The third challenge is related to construct validity, which is concerned with the theoretical conceptualisation of the variables and with the measures used to reflect them. Construct validity could be negatively affected by errors in manipulation and measurement (Fiske et al., 2010). To avoid this, the current study used well-known scales from previous studies that

measured similar variables. In addition, the researcher performed a number of pilot studies and manipulation checks to ensure that the manipulations were successful.

The next limitation is related to the possibility of demand characteristics. Demand characteristics portray the biased responses of participants, where they provide desirable responses aiming either to help the researcher or avoid negative social evaluation (Orne, 1962). Demand characteristics can also be influenced by the researcher's behaviour. To avoid this limitation, the study used written statements and instructions, which minimise the need for verbal explanations from the researcher.

Finally, the experiments in this PhD thesis used a cover story in order to ensure successful manipulations and to avoid the possibility of biased responses. Cover stories are often used in judgement experiments, where participants are given a certain rationale for the experiments in order to avoid suspicion regarding the actual aim of the study. In addition, this increases the attention of the participants (Fiske et al., 2010). The cover story for this PhD thesis informed participants that they would be taking part in a survey that investigates their sharing behaviour on social media. The cover story was consistent with the settings of the experiment, as there were a few questions regarding consumer sharing behaviour on social media. Finally, it is worth noting that the current study measured the dependent variable using self-report measure scales, which may have the possibility of additional biases (Fiske et al., 2012).

### 4.9 Ethical Considerations

As this PhD thesis used primary data collection, a number of ethical considerations needed to be taken into account. First, the topic was researched using quantitative research methods involving human participation. Therefore, prior to undertaking the experiments, ethical approval from the University of Essex Ethics Committee needed to be granted. Second, before conducting the experiments, each participant had to provide informed consent (see Appendix 1), stating that she or he willingly participated in this research (Fontana and Frey, 2000). Moreover, all the participants were aware that they could withdraw from the research at any stage (Fontana and Frey, 2000). Third, as this PhD thesis examines the effects of different metacognitive processes, so it is crucial to mention that participants' mental health as well as well-being were not harmed in any way. Furthermore, following the University's ethics guidelines, it is important to note that participants were not harmed, embarrassed, or put in uncomfortable positions at any stage of the experiments. Fourth, due to the nature of the experimental research design, the participants were not initially aware of the purpose of the

study. However, at the end of each experiment, participants were debriefed about the actual topic of the survey and the nature of the experiment and, once again, were given the chance to withdraw from the study if they wished. Finally, the research did not require or collect any personal information from the participants. Moreover, all three experiments were completely anonymous and the information received was treated with confidentiality and used only for academic purposes. Only the researcher and her two supervisors have access to the received information. In case participants had any concerns regarding the experiment, their participation, or the way the data would be used, the researcher's as well as her supervisors' contact information was provided prior to the beginning of each experiment.

### 4.10 Chapter Summary

This chapter has established the methodological approach of the study. The PhD thesis aims to research the relationship between visual complexity and consumer purchase intentions, as well as the mediating role of fluency. The thesis also studies the moderating effects of visual congruity in the link between visual complexity and fluency. The nature of the research topic suggested the adoption of a postpositivist philosophy and deductive approach. Moreover, the study relied on quantitative research methods for data collection and analysis because the thesis developed a number of hypotheses in order to study the relationship between the different variables. Furthermore, to test the causal relationships between visual complexity, congruity, fluency, and purchase intentions, the study adopted an experimental research design, specifically those of laboratory and judgement experiments. To be more specific, the participants for each experiment were approached around shopping centres and universities in London. They were randomly selected (applying a convenience sampling technique) and asked to participate in a study investigating consumer sharing behaviour on social media, in order to avoid biased responses. The actual purpose of the experiment was shared at the end of the study. Participants completed a survey form (administered by Qualtrics) using the researcher's personal iPad. The participants provided informed consent (see Appendix 1) prior to taking part in the project and the experiments were completely anonymous and confidential. Moreover, the data received were used for academic purposes only.

To study the interrelationships between visual complexity, congruity, fluency (in terms of perceptual fluency, conceptual fluency, and imagery fluency), and consumer purchase intentions, the study employed three experiments. Study 1 researched the effects of visual complexity (simple *versus* complex) on fluency, in terms of perceptual fluency, conceptual

fluency, and imagery fluency. To extend Study 1, Study 2 considered the moderating effect of congruity on the relationship between visual complexity (simple *versus* complex images) and fluency (perceptual fluency, conceptual fluency, and imagery fluency). Building on these two previous studies, Study 3 explored the relationship between visual complexity (simple *versus* complex images) and consumer purchase intentions, as well as the mediation role of fluency (in terms of perceptual fluency, conceptual fluency, and imagery fluency). The study relied on rigorous scale measurements to measure the relationships among the different variables. To analyse the data, this study used a range of statistical methods, such as descriptive statistics, t-tests, ANOVA, and regression analysis (SPSS, Process).

This thesis has discussed the literature related to visual complexity, congruity, and fluency theory (Chapter 2: Literature Review), developed a number of hypotheses to test potential relationships among the variables (Chapter 3: Hypotheses Development), and provided information on the methodological approach (Chapter 4: Methodology). The next chapter focuses on data analysis of each of the three experiments conducted for this research.

# Chapter 5: Analysis and Discussion

The aim of this PhD thesis is to study the effect of visual complexity on consumer purchase intentions and the mediating role of fluency. The thesis also investigates the moderating effects of congruity. The aim of this chapter is to outline the findings from the three experiments conducted to test the developed hypotheses. This chapter is divided into three parts, each of which focuses on one experiment. The structure of each part is as follows: pilot study, participants' profile and procedure, reliability, manipulation checks, results, and a brief discussion.

## 5.1 Study 1

The aim of Study 1 was to examine the effect of visual complexity on fluency (see Figure 2). The study adopted a between-groups experimental design that compared the type of visual complexity (simple *versus* complex visual stimuli) and its impact on types of fluency (perceptual fluency, conceptual fluency, and imagery fluency). The dependent variable was fluency. The independent variable was visual complexity. It is crucial to mention that visual complexity was manipulated and that each participant was randomly assigned a single picture: a simple image presenting the product on a plain background or a complex image displaying the same product within a contextual background. Prior to the experiment, a pilot study was conducted to create the visual complexity manipulation.

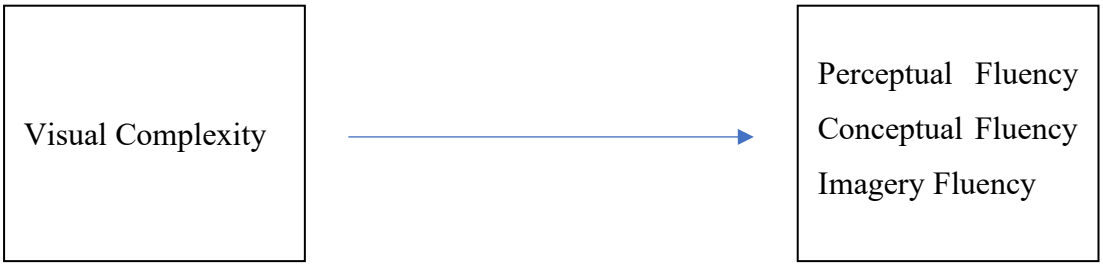


*Figure 2: Study 1 model*

### 5.1.1 Pilot Study

Previous studies have manipulated the levels of visual complexity by presenting a picture showing a product on a white background (a simple visual stimulus) and a picture showing the same product within a contextual background (a complex visual stimulus) to the participants (Maier and Dost, 2018; Shapiro, 1999). The current research builds on previous work to

investigate the effects of visual complexity on fluency. Two images (see Figure 3) were selected for the study: one simple, displaying a *Montblanc* business bag on a plain background; and one complex, showing the same product in a business setting, surrounded by other elegant and business-related objects. To manipulate the visual stimuli, the researcher designed two images (one with and one without a contextual background) using Adobe Photoshop and the brand's official Instagram pages. Specifically, the complex image was taken from *Montblanc*'s Instagram page and the researcher then cropped the bag and placed it on a white background. It is worth noting that the position of the product and its size remained the same in both images. The name of the brand was not mentioned or shown and the logo was blurred to avoid biased responses.

*Image 1*

*Image 2*

*Figure 3: Images for Study 1*

To make sure that the selected images were suitable for the study, a pilot experiment was conducted. A total of 32 participants took part in the study. They were exposed to the images and asked to rate the level of visual complexity of each image on a 7-point scale (from 1 = "Strongly Disagree" to 7 = "Strongly Agree") using the following statements: "Is this picture simple?" and "Is this picture complex?".

The means for visual complexity were calculated for each picture and are demonstrated in Table 4.

*Table 4: Simplicity and complexity results of Pilot Study 1*

| Image | Simplicity | Complexity |
|---|---|---|
| Image 1 (Simple image) | M = 6.34<br>SD = 1.01 | M = 1.97<br>SD = 1.48 |
| Image 2 (Complex image) | M = 5.07<br>SD = 1.54 | M = 3.29<br>SD = 1.70 |

A t-test indicated that both images differ significantly in their levels of visual complexity. Specifically, the complex image was perceived as significantly more complex ($M_{complex}$ = 3.29, SD = 1.70, $p < .001$) than the simple image ($M_{simple}$ = 1.97, SD = 1.48). Similarly, the simple image was identified as significantly simpler ($M_{simple}$ = 6.34, SD = 1.01, $p < .001$) than the complex image ($M_{complex}$ = 5.07, SD = 1.54).

### 5.1.2 Participants and Procedure

A total of 108 people (61% female; age = 29.8) participated in the study. The participants were randomly approached in public spaces, around universities and large shopping centres, and asked to volunteer in the study. They were told that the aim of the research was to investigate consumers' sharing behaviour on social media. All the participants provided informed consent.

At the beginning, participants were asked to answer some socio-demographic questions as well as questions regarding their behaviour on social media. Later, they were randomly assigned to a single image (simple or complex) and asked to complete manipulation-check questions regarding the level of visual complexity of the image they were exposed to. To ensure that there was no systematic response bias, a number of variables were cross-checked (see Appendix 3). At the end of the survey, the participants were asked to rate the levels of fluency (perceptual fluency, conceptual fluency, and imagery fluency) they experienced when looking at the image. At the end of the survey, the real aims and objectives of the project were shared with the participants.

### 5.1.3 Reliability

To measure the levels of perceptual fluency, conceptual fluency, and imagery fluency, the study adapted scales from previously published work. Before testing the hypotheses, reliability analysis was conducted for all the scale measurements used in the study. As demonstrated in

Table 5, all the scales are reliable, as all the Cronbach's alphas are above the threshold of .70 (DeVellis, 2012).

*Table 5: Scale reliability for Study 1*

| **Variable** | **Perceptual Fluency** | **Conceptual Fluency** | **Imagery Fluency** |
|---|---|---|---|
| Cronbach's alpha | .87 | .87 | .71 |
| Number of items | 5 | 3 | 3 |
| Scale items | The image was:<br>Cluttered/Uncluttered<br>Messy/Neat<br>Crowded/Spacious<br>Hard to view/Easy to view<br>Hard to perceive/Easy to perceive | The meaning of the image was easy to understand<br>The message of the image was easy to understand<br>The idea of the image was easy to understand | I had difficulty imagining the depicted image in my head<br>I quickly generated images of what was depicted in the image<br>I found it easy to imagine the depicted image |
| Scale type | 7-point bipolar scale | 7-point scale<br>(1 = Strongly Disagree to 7 = Strongly Agree) | 7-point scale<br>(1 = Strongly Disagree to 7 = Strongly Agree) |
| Source | Mosteller et al. (2014) | Lee and Labroo (2004 | Bone and Ellen (1992) |

### 5.1.4 Manipulation Checks

At the beginning of the survey, the participants were exposed to a single image (simple or complex). To check whether the visual complexity manipulation had been successful, the participants were asked to rate the level of complexity of the image they were exposed to. The participants used a 7-point scale (from "Strongly Disagree" to "Strongly Agree") to rate the following statements: "The image is complex", "The image is crowded", "The image has a lot of variety", or "The image is complicated" (Leigh, 1984; Geissler et al., 2006) (a = .85) and "The image is simple".

The findings of one-way ANOVA illustrated that the respondents perceived the complex image ($M_{complex} = 3.51$, SD = 1.12) as being significantly more complex ($F(1,103) = 69.906$, $p < .001$), compared to the simple image ($M_{simple} = 1.75$; SD = 0.80). Similarly, the simple image ($M_{simple} = 6.39$, SD = 0.55) was identified as being significantly simpler ($F(1,103) = 39.577$, $p < .001$)

compared to the complex image ($M_{complex}$ = 4.45, SD = 1.80). To conclude, the manipulation of the visual complexity was successful.

### 5.1.5 Results

The aim of Study 1 was to investigate the effects of visual complexity on perceptual fluency, conceptual fluency, and imagery fluency. The independent variable was visual complexity (simple *versus* complex visual stimuli). The dependent variable was fluency (in terms of perceptual fluency, conceptual fluency, and imagery fluency). As the study investigated the effect of visual complexity on three dimensions of fluency, this part of the chapter is divided into three sections, each discussing the effects of visual complexity on one dimension of fluency: the first discusses the effects of visual complexity on perceptual fluency, the second focuses on the relationship between visual complexity and conceptual fluency, and the third considers the link between visual complexity and imagery fluency.

#### 5.1.5.1 Visual Complexity and Perceptual Fluency

Part of Study 1 investigates the effects of visual complexity on perceptual fluency. Visual complexity and perceptual fluency depend on a number of perceptual dimensions, such as symmetry, the number of objects and elements presented, the colours displayed and the contrast between them, the position of the target object, and the pairing between different elements and others. The study posits that it would be harder for people to process and capture the information presented on a complex visual stimulus, as it presents the product within a contextual background, hence, it is richer in information. Thus, it requires more cognitive effort for perceptual processing. In contrast, it would be easier for people to process the simple image, as it shows a single product placed on a plain background. Therefore, simple images are more perceptually fluent compared with complex images. Specifically, the following hypothesis was tested:

> ***H1a: Visual complexity will have a negative effect on perceptual fluency, such that simple visual stimuli will increase perceptual fluency, while complex visual stimuli will decrease perceptual fluency.***

The results of one-way ANOVA (see Table 6 and Table 7) indicate that simple images are easier to process perceptually ($M_{simple}$ = 5.48, SD = 1.51) compared to complex images ($M_{complex}$ = 4.23, SD = 1.56). Moreover, the results demonstrate that there is a significant difference between the levels of perceptual fluency of both images ($F(1,103) = 15.604$, $p < .001$). Therefore, it could be concluded that visual complexity negatively affects perceptual

fluency, such that simple images influence higher levels of perceptual fluency than complex images. The results of Study 1 support and confirm H1a.

*Table 6: Study 1: Descriptives for visual complexity and perceptual fluency*

**Descriptives**

Perceptual Fluency

| | N | Mean | Std. Deviation | Std. Error | 95% Confidence Interval for Mean Lower Bound | 95% Confidence Interval for Mean Upper Bound | Minimum | Maximum |
|---|---|---|---|---|---|---|---|---|
| -1.00 | 53 | 5.4833 | 1.50987 | .25165 | 4.9725 | 5.9942 | 1.60 | 7.00 |
| 1.00 | 52 | 4.2319 | 1.55663 | .18740 | 3.8579 | 4.6058 | 1.00 | 7.00 |
| Total | 105 | 4.6610 | 1.64554 | .16059 | 4.3425 | 4.9794 | 1.00 | 7.00 |

*Table 7: Study 1: ANOVA results for visual complexity and perceptual fluency*

**ANOVA**

Perceptual Fluency

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 37.050 | 1 | 37.050 | 15.604 | .000 |
| Within Groups | 244.560 | 103 | 2.374 | | |
| Total | 281.610 | 104 | | | |

The findings of the study demonstrate that when consumers are exposed to complex stimuli, they require much more cognitive effort to process and capture all the physical characteristics. Hence, the perceptual process feels harder (i.e., perceptual fluency is lower) compared to the case in which they process simple visual stimuli. To elaborate, as a complex visual stimulus contains a contextual background (Maier and Dost, 2018) and a lot of detail (Wu et al., 2019; Garner, 1974; Reber et al., 1998, 2004; Larsen et al., 2004; Peracchio and Meyers-Levy, 1997), it requires more cognitive effort to process and capture all the information (Larsen et al., 2004). In contrast, a simple visual stimulus presents a single detail (Garner, 1974; Reber et al., 1998, 2004; Larsen et al., 2004; Peracchio and Meyers-Levy, 1997) on a plain background (Maiser and Dost, 2018), which influences higher levels of perceptual fluency as people require less cognitive effort for perceptual processing (Larsen, 2004). Finally, the findings of the study confirm past research results suggesting that there is a negative relationship between visual complexity and perceptual fluency (Maier and Dost, 2018; Reber et al., 1998, 2004; Larsen et al., 2004; Wu et al., 2016; Garner, 1974; Peracchio and Meyers-Levy, 1997). Furthermore, the

study expands prior research by investigating the effects of visual complexity on perceptual fluency in the context of the presence *versus* absence of a contextual background.

#### 5.1.5.2 Visual Complexity and Conceptual Fluency

This study also investigated the effects of visual complexity (simple *versus* complex images) on conceptual fluency. It could be argued that complex images presenting the product within a contextual background create certain meanings and semantic messages due to the presence of the background information. On the other hand, the opposite statement could also be justified. Specifically, as people store schemas in their minds based on their past experiences and knowledge, they could perceive and analyse the meaning of complex images differently or perhaps even find multiple meanings and messages within that image. As a result, finding the semantic meaning of a complex image would require a lot of time and cognitive effort. In contrast, it would be easier for people to process the meaning of a simple image displaying a single object. Moreover, that meaning would be clearer due to the lack of additional information on the image. Therefore, the study speculates that simple images are more conceptually fluent than complex images. Specifically, the following hypothesis was tested:

> ***H1b: Visual complexity will have a negative effect on conceptual fluency, such that simple visual stimuli will increase conceptual fluency, while complex visual stimuli will decrease conceptual fluency.***

The results of one-way ANOVA (see Table 8 and Table 9) indicate that simple images influence higher levels of conceptual fluency ($M_{simple} = 4.89$, $SD = 1.57$) compared to complex images ($M_{complex} = 3.95$, $SD = 1.49$). Moreover, the results demonstrate that there is a significant difference in the levels of conceptual fluency between the two images ($F(1,103) = 8.999$, $p < .005$). Therefore, visual complexity negatively affects conceptual fluency, such that simple images influence higher levels of conceptual fluency than complex images. The results of Study 1 support H1b.

*Table 8: Study 1: Descriptives for visual complexity and conceptual fluency*

**Descriptives**

Conceptual Fluency

| | N | Mean | Std. Deviation | Std. Error | 95% Confidence Interval for Mean | | Minimum | Maximum |
|---|---|---|---|---|---|---|---|---|
| | | | | | Lower Bound | Upper Bound | | |
| -1.00 | 53 | 4.8889 | 1.56955 | .26159 | 4.3578 | 5.4199 | 1.00 | 7.00 |
| 1.00 | 52 | 3.9517 | 1.49320 | .17976 | 3.5930 | 4.3104 | 1.00 | 7.00 |
| Total | 105 | 4.2730 | 1.57693 | .15389 | 3.9678 | 4.5782 | 1.00 | 7.00 |

*Table 9: Study 1: ANOVA results for visual complexity and conceptual fluency*

**ANOVA**

Conceptual Fluency

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 20.779 | 1 | 20.779 | 8.999 | .003 |
| Within Groups | 237.839 | 103 | 2.309 | | |
| Total | 258.618 | 104 | | | |

With regard to the effect of visual complexity on conceptual fluency, the findings indicate that simple images influence higher levels of conceptual fluency, whereas complex images influence lower levels of conceptual fluency. In other words, it is easier for people to understand the semantic meaning of simple visual stimulus presenting a single object compared to complex visual stimulus displaying the same product within a contextual background. It could be concluded that the contextual background lowers conceptual fluency. Moreover, a complex stimulus, displaying a number of elements, could provoke people to perform an incorrect joining of two or more elements together (Triesman, 1977), which may confuse people and lead them to the "wrong" interpretation, as well as finding multiple meanings of the stimulus. As a result, this could also complicate the process of discovering the semantic meaning and message behind a complex image. Therefore, finding the semantic meaning of complex images requires a lot of cognitive effort and thus is conceptually disfluent. Furthermore, according to the schema-congruity theory (Mandler, 1982), people store schemas in their minds based on their past experiences and knowledge, so that when they encounter a complex image rich in information, multiple schemas could activate, potentially leading to the interpretation of multiple meanings of the stimulus (Gay, 1986). On the other hand, simple images displaying a single product on a plain background could influence higher levels of

conceptual fluency as the attention of the perceiver is focused on that single object, which does not "compete" for attention and cognitive processing with other elements in the image (Desimone and Duncan, 1995). Moreover, the possibility of finding multiple meanings (Gay, 1986) or performing an incorrect joining of elements (Triesman, 1977) for that particular image is limited. Finally, the current research findings contradict past research results suggesting that an added contextual background enhances the semantic processing of the image and increases the levels of conceptual fluency (Scott and Vargas, 2007; Whittlesea, 1993; Shapiro, 1999). In this way, the present study adds another perspective to the relationship between visual complexity (and simplicity) and conceptual fluency by demonstrating that simple images are more conceptually fluent than complex images.

#### 5.1.5.3 Visual Complexity and Imagery Fluency

The final part of Study 1 tested the effects of visual complexity on imagery fluency. Imagery fluency represents the ease with which people create a mental imagery (Mandel et al., 2006). Mental imagery is generated from the short-term and/or the long-term memory. As mentioned previously, when people process complex images, multiple schemas in their minds can activate. Those schemas are generated from the long-term memory and could potentially lead to a number of memories, fantasies, and dreams, which eventually influence mental imageries. Therefore, generating those mental imageries could take more time and more cognitive effort. In addition, if people attempt to create a mental imagery of a complex image itself, this would also require a lot of cognitive effort as that image is rich in information. On the other hand, a simple image would be easier to imagine, as it displays a single object only. Therefore, this PhD thesis suggests that simple images influence higher levels of imagery fluency. More specifically, the following hypothesis was tested:

> ***H1c: Visual complexity will have a negative effect on imagery fluency, such that simple visual stimuli will increase imagery fluency, while complex visual stimuli will decrease imagery fluency.***

The results of one-way ANOVA (see Table 10 and Table 11) demonstrate that simple images influence significantly higher levels of imagery fluency ($M_{simple} = 5.22$, $SD = 1.15$) compared to complex images ($M_{complex} = 4.47$, $SD = 1.29$, $F(1,103) = 8.718$, $p < .005$). Therefore, visual complexity negatively affects imagery fluency, such that simple images influence higher levels of imagery fluency than complex images. The results of Study 1 support and confirm H1c.

*Table 10: Study 1: Descriptives for visual complexity and imagery fluency*

**Descriptives**

Imagery Fluency

| | N | Mean | Std. Deviation | Std. Error | 95% Confidence Interval for Mean | | Minimum | Maximum |
|---|---|---|---|---|---|---|---|---|
| | | | | | Lower Bound | Upper Bound | | |
| -1.00 | 53 | 5.2222 | 1.14919 | .19153 | 4.8334 | 5.6111 | 3.00 | 7.00 |
| 1.00 | 52 | 4.4686 | 1.28633 | .15486 | 4.1596 | 4.7776 | 1.00 | 7.00 |
| Total | 105 | 4.7270 | 1.28667 | .12557 | 4.4780 | 4.9760 | 1.00 | 7.00 |

*Table 11: Study 1: ANOVA results for visual complexity and imagery fluency*

**ANOVA**

Imagery Fluency

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 13.436 | 1 | 13.436 | 8.718 | .004 |
| Within Groups | 158.738 | 103 | 1.541 | | |
| Total | 172.174 | 104 | | | |

To elaborate, in contrast to the past research findings suggesting that complex images are more imagery fluent compared to the simple images (Chang, 2013; Kleine and Kernan, 1991; Maier and Dost, 2018b), this current study demonstrates that complex images displaying a product within a contextual background influence lower levels of imagery fluency compared with simple images. In this way, the findings of the current study contribute to the academic literature by showing that the generation of mental imageries from a simple picture is easier, faster, and requires less cognitive effort compared to generating mental imagery from a complex image. Complex images appear to be harder to imagine, as they contain a lot of information. In addition, the richness of information they contain could influence a number of schemas activated from the long-term memory, which could eventually lead to the recreation of past experiences or complex narratives. Moreover, the results of the study confirm the past literature claim that all kinds of fluency allow "remarkably uniform judgements across a range of domains" (Alter and Oppenheimer, 2009, p. 220). Finally, the findings of the study contribute to the fluency literature by indicating the positive effects of simple images (in comparison to complex images) on imagery fluency.

To conclude, Study 1 demonstrated that simple images are more perceptually fluent, conceptually fluent, and imagery fluent than complex images. In other words, capturing and identifying the physical characteristics (perceptual fluency), understanding the semantic

meaning and the message (conceptual fluency), and generating a mental imagery (imagery fluency) of simple images is faster and requires less cognitive effort compared to processing and imagining complex images.

### 5.2 Study 2

Study 2 was designed to investigate the effect of visual complexity on fluency and the moderating role of congruity in that relationship (Figure 4). Specifically, the study utilised an experimental design whereby visual complexity and congruity were manipulated to capture the effects of simple *versus* complex, as well as congruent *versus* incongruent, visual stimuli. The dependent variable was fluency (perceptual fluency, conceptual fluency, and imagery fluency), the independent variable was visual complexity, and the moderator was congruity. The study utilised a 2 (visual complexity: simple *versus* complex) x 2 (congruency: congruent visual stimuli *versus* incongruent visual stimuli) between-groups experimental design.

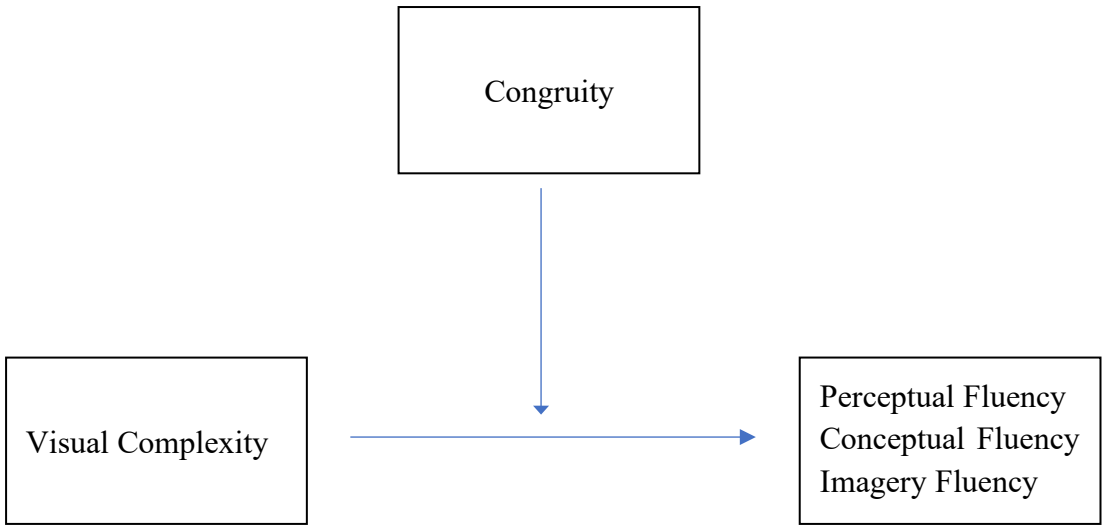


*Figure 4: Study 2 model*

#### 5.2.1 Pilot Study

The aim of the pilot study was to select suitable images for Study 2. As the aim of the study was to investigate the moderating effect of congruity on the relationship between visual complexity and fluency (perceptual fluency, conceptual fluency, and imagery fluency), the selected images should be one simple, and two equally complex images (presenting a product within a contextual background) but differing in their levels of congruity. To be more specific, one of the images should present the product on its own (simple image), another should place

the same product in a congruent setting, and the other should display the product in an incongruent setting. A total of 36 participants took part in the pilot experiment. They were exposed to five pictures presenting the same product, a *Valentino* bag, placed in different scenes: (1) the product on its own, (2) another showing the bag in a living room, (3) an image displaying the product in a picnic setting, (4) a picture showing the product on a rock in the middle of a river, and (5) another image placing it in a gym (see Figure 5). Similar to Study 1, the images were manipulated using Adobe Photoshop and Instagram. The researcher used a picture of the product posted by *Valentino* on Instagram, cropped the bag, and placed it on different contextual backgrounds. The position and the place of the product remained the same in every picture. The size and format of all the images were also the same. These practices ensured that the visual manipulation was based only on the presence *versus* absence and the congruence *versus* the incongruence of the contextual background. Similar to Study 1, the name of the brand was not mentioned or shown in order to avoid biased responses.

Image 1

Image 2

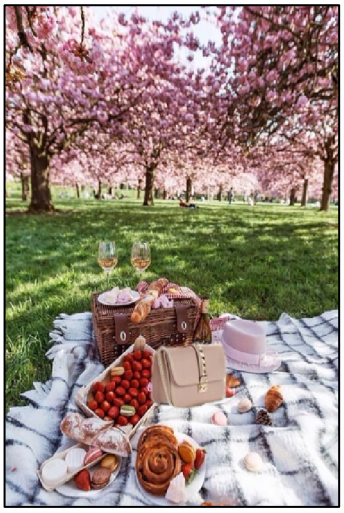

Image 3

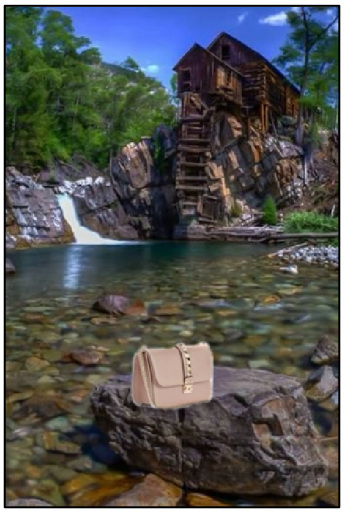

Image 4


Image 5

*Figure 5: Images for Study 2*

The participants in the pilot study were asked to rate the levels of complexity of the images on a 7-point scale (from "Strongly Disagree" to "Strongly Agree") in response to the following statements: "Is this picture simple?" and "Is this picture complex?". They were then asked to rate the levels of congruity of each picture using a 7-point scale (from "Strongly Disagree" to "Strongly Agree") in response to the following questions: "Does the background of the image offer a fit with the product?", "Do you think the product and the background are congruent?", and "Is there a good match between the background and the product?".

The means for visual simplicity (see Table 12), complexity (see Table 13), and visual congruity (see Table 14) were calculated for each picture and are presented below.

*Table 12: Simplicity results for Pilot Study 2*

| | **Image 1** | **Image 2** | **Image 3** | **Image 4** | **Image 5** |
|---|---|---|---|---|---|
| Mean | 6.03 | 3.53 | 3.44 | 2.97 | 4.10 |
| SD | 1.49 | 1.93 | 1.80 | 1.79 | 1.67 |

*Table 13: Complexity results for Pilot Study 2*

| | **Image 1** | **Image 2** | **Image 3** | **Image 4** | **Image 5** |
|---|---|---|---|---|---|
| Mean | 1.97 | 4.63 | 4.63 | 4.81 | 3.89 |
| SD | 1.38 | 1.91 | 1.72 | 1.84 | 1.69 |

*Table 14: Congruity results for Pilot Study 2*

| | **Image 2** | **Image 3** | **Image 4** | **Image 5** |
|---|---|---|---|---|
| Mean | 5.38 | 4,67 | 1.95 | 2.2 |
| SD | 1.37 | 1.55 | 1.30 | 1.48 |

The results of the t-test suggested that images 1, 2, and 4 were the most suitable for the study. Specifically, image 1 (the simple image) was perceived to be significantly simpler ($M_{simple}$ =

6.03, SD = 1.49) than images 2 ($M_{congruent}$ = 3.53, SD = 1.93) and 4 ($M_{incongruent}$ = 2.97, SD = 1.79, p < .001). In addition, image 2 (the complex congruent image) and image 4 (the complex incongruent image) were selected for the experiment because the two images did not differ significantly with regard to their levels of visual complexity ($M_{congruent}$ = 4.63, SD = 1.91, $M_{incongruent}$ = 4.81, SD = 1.84, p > .005). However, they differed in their levels of congruity, as image 2 was perceived as significantly more congruent ($M_{congruent}$ =5.38, SD = 1.37) than image 4 ($M_{incongruent}$ =1.95, SD = 1.30, p < .001). Furthermore, the two complex images were identified as being significantly more complex than the simple image ($M_{simple}$ = 1.97, SD = 1.38, $M_{congruent}$ = 4.63, SD = 1.91, $M_{incongruent}$ = 4.81, SD = 1.84 p < .00l). Therefore, it could be concluded that these images were suitable for this study.

### 5.2.2 Participants and Procedure

A total of 259 people (Female = 55%, $M_{age}$ = 33.4 years) participated in the study. Just like in Study 1, the participants in Study 2 were randomly approached in public spaces and asked if they would volunteer to take part in the study. All the participants provided informed consent before taking part in the experiment. To avoid any suspicion, they were told that the aim of the experiment was to research consumer sharing behaviour on social media.

At the beginning of the survey, the participants completed some socio-demographic questions and some questions in relation to their behaviour on social media. Later, they were randomly assigned a single image (simple, complex congruent, or complex incongruent) and asked to answer some manipulation-check questions regarding the levels of complexity and congruity of the image they were exposed to. To ensure that there was no systematic response bias, a number of variables were cross-checked (see Appendix 3). Finally, the participants were asked to rate the levels of perceptual fluency, conceptual fluency, and imagery fluency they felt whilst looking at the stimulus. At the end, the participants were presented with a debriefing statement clarifying the actual research topic and its aims.

### 5.2.3 Reliability

The study adopted fluency scales from previous published work. A reliability test for the scale measurements was conducted before analysing the results of the study. Table 15 shows that the Cronbach's alphas are above the threshold of .70 and, therefore, all scales are reliable (DeVellis, 2012).

*Table 15: Scale reliability for Study 2*

| Variable | Perceptual Fluency | Conceptual Fluency | Imagery Fluency |
|---|---|---|---|
| Cronbach's alpha | .93 | .94 | .79 |
| Number of items | 5 | 3 | 3 |
| Scale items | The image was:<br>Cluttered/Uncluttered<br>Messy/Neat<br>Crowded/Spacious<br>Hard to view/Easy to view<br>Hard to perceive/Easy to perceive | The meaning of the image was easy to understand<br><br>The message of the image was easy to understand<br><br>The idea of the image was easy to understand | I had difficulty imagining the depicted image in my head<br><br>I quickly generated images of what was depicted in the image<br><br>I found it easy to imagine the depicted image |
| Scale type | 7-point bipolar scale | 7-point scale<br>(1 = Strongly Disagree to 7 = Strongly Agree) | 7-point scale<br>(1 = Strongly Disagree to 7 = Strongly Agree) |
| Source | Mosteller, Donthu and Eroglu (2014) | Lee and Labroo (2004 | Bone and Ellen (1992) |

### 5.2.4 Manipulation Checks

As previously mentioned, the participants were randomly exposed to a simple, a complex congruent, or a complex incongruent image. In order to check if the complexity and congruity manipulation had been successful, the participants were asked to complete questions related to the levels of visual complexity and congruity of the image they were exposed to. Specifically, the participants used a 7-point scale (from "Strongly Disagree" to "Strongly Agree") to evaluate the following statements related to visual complexity: "The image is complex", "The image is crowded", "The image has a lot of variety", "The image is complicated" (Leigh, 1984; Geissler et al., 2006) (a = .88), and "The image is simple". They were then asked to respond to a set of visual congruency statements: "The product and the background are congruent", "There is a good match between the background and the product", and "There is a good fit between

the background and the product" (a = .89), which they had to answer using a 7-point scale (from "Strongly Disagree" to "Strongly Agree").

The results of one-way ANOVA showed that the simple image is significantly simpler ($M_{simple}$ = 5.67, SD = 1.438) than the complex congruent ($M_{congruent}$ = 3.43, SD = 1.86) and the complex incongruent ($M_{incongruent}$ = 3.09, SD = 1.78) images (F (2,224) = 52.422, p < .001). The findings also demonstrated that there is no significant difference between the levels of complexity between the complex congruent ($M_{congruent}$ = 4.49, SD = 1.49) and complex incongruent images ($M_{incongruent}$ = 4.52, SD = 1.45, F (1,147) = 0.023, p = .879). However, both images are significantly more complex than the simple image ($M_{simple}$ = 2.18, SD = 1.10; F (2,224) = 75.694, p < .001). Moreover, both complex images differ in their levels of congruity: specifically, the complex congruent image was found to be significantly higher in congruity compared to the complex incongruent image ($M_{congruent}$ = 4.65, SD = 1.54 *vs* $M_{incongruent}$ = 2.61, SD = 1.46; F (1,147) = 68.249, p < .001).

### 5.2.5 Results

The aim of Study 2 was to investigate the moderating effects of congruity on the relationship between visual complexity and fluency (perceptual fluency, conceptual fluency, and imagery fluency). The independent variable was visual complexity (simple *versus* complex visual stimuli) and the moderator was congruity (congruent *versus* incongruent visual stimuli). The dependent variable was fluency (perceptual fluency, conceptual fluency, and imagery fluency). As the study investigated the effect of visual stimuli with varying levels of complexity and congruity on three dimensions of fluency, this part of the chapter is divided into three parts, each discussing the results in respect of one type of fluency.

#### 5.2.5.1 Complexity, Congruity, and Perceptual Fluency

The study re-tested the findings from Study 1 and the effects of visual complexity on perceptual fluency (H1a). Again, the study speculates that visual complexity negatively affects perceptual fluency. Specifically, that simple images are more perceptually fluent compared to complex images. The study re-tested the following hypothesis:

> ***H1a: Visual complexity will have a negative effect on perceptual fluency, such that simple visual stimuli will increase perceptual fluency, while complex visual stimuli will decrease perceptual fluency.***

The results of one-way ANOVA (see Table 16 and Table 17) demonstrate that the simple image is significantly more perceptually fluent ($M_{simple}$ = 5.87, SD = 1.43) compared to the complex image ($M_{complex}$ = 3.60, SD = 1.61, F (1,225) = 109.758, p < .001). To conclude, Study 2 confirms the results of the previous experiment by demonstrating that people process simple images more easily compared to complex images. The results of Study 2 provide further support for H1a and reconfirm it.

*Table 16: Study 2: Descriptives for visual complexity and perceptual fluency*

**Descriptives**

Perceptual fluency

| | N | Mean | Std. Deviation | Std. Error | 95% Confidence Interval for Mean | | Minimum | Maximum |
|---|---|---|---|---|---|---|---|---|
| | | | | | Lower Bound | Upper Bound | | |
| Simple | 78 | 5.8718 | 1.42882 | .16178 | 5.5496 | 6.1939 | 1.60 | 7.00 |
| Complex | 149 | 3.6000 | 1.61178 | .13204 | 3.3391 | 3.8609 | 1.00 | 7.00 |
| Total | 227 | 4.3806 | 1.88838 | .12534 | 4.1336 | 4.6276 | 1.00 | 7.00 |

*Table 17: Study 2: ANOVA results for visual complexity and perceptual fluency*

**ANOVA**

Perceptual fluency

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 264.237 | 1 | 264.237 | 109.758 | .000 |
| Within Groups | 541.678 | 225 | 2.407 | | |
| Total | 805.915 | 226 | | | |

To elaborate, the results of the study illustrate that simple images presenting a single product on a white background are perceptually captured and processed easier compared to complex images presenting the same product placed on a contextual background. In this way, the study confirms previous research findings suggesting that when an object (or a product) is presented in a picture containing a lot of additional information (Reber et al., 1998, 2004; Larsen et al., 2004; Wu et al., 2016) or in a real-world scene (Maier and Dost, 2018), the level of perceptual fluency decreases.

Building on this finding, the study also investigated the moderating role of congruity. In their daily visual experiences, people encode a number of schemas related to object pairing

(Dickinson, 2011). In other words, people expect to encounter a particular object in a "suitable" atmosphere/scene (Dickinson, 2011). Therefore, when exposed to a congruent visual stimulus displaying an object in a typical scene, people process it easily, as the scene is familiar and consistent with the schemas stored in their mind. On the other hand, an image presenting a product in incongruent and unpredictable scenes might create image-schema incongruence (Duffy and Kier, 2004), which results in more time and effort required to perceive and process the image. Therefore, that image/scene would be perceptually disfluent. Based on those claims, this PhD thesis argues that congruent visual stimuli influence higher levels of perceptual fluency, while incongruent visual stimuli influence lower levels of perceptual fluency. Specifically, Study 2 tested the following hypothesis:

***H2a: Congruity will moderate the relationship between visual complexity and perceptual fluency, such that complex congruent (incongruent) images will be significantly higher (lower) in perceptual fluency.***

The one-way ANOVA analysis (see Table 18 and Table 19) shows that complex congruent images ($M_{congruent}$ = 3.84, SD = 1.67) and complex incongruent images ($M_{incongruent}$ = 3.37, SD = 1.53) influence similar levels of perceptual fluency. Moreover, the results demonstrate that there is no significant difference in the levels of perceptual fluency between the images (F (1,147) = 3.178, p = .077). Therefore, it could be concluded that congruity has no effects on perceptual fluency. The results of Study 2 reject H2a.

*Table 18: Study 2: Descriptives for visual congruity and perceptual fluency*

**Descriptives**

Perceptual Fluency

| | | | | | 95% Confidence Interval for Mean | | |
|---|---|---|---|---|---|---|---|
| | N | Mean | Std. Deviation | Std. Error | Lower Bound | Upper Bound | Minimum |
| Non-congruent image | 77 | 3.3740 | 1.53292 | .17469 | 3.0261 | 3.7220 | 1.00 |
| Congruent image | 72 | 3.8417 | 1.66892 | .19668 | 3.4495 | 4.2338 | 1.00 |
| Total | 149 | 3.6000 | 1.61178 | .13204 | 3.3391 | 3.8609 | 1.00 |

*Table 19: Study 2: ANOVA results for visual congruity and perceptual fluency*

**ANOVA**

Perceptual Fluency

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 8.137 | 1 | 8.137 | 3.178 | .077 |
| Within Groups | 376.343 | 147 | 2.560 | | |
| Total | 384.480 | 148 | | | |

To elaborate, the study demonstrates that congruity has no effects on perceptual fluency. The results of the study contrast with previous research findings suggesting that incongruent scenes require more time, hence more cognitive effort, to process the scene and to identify the different objects compared to congruent scenes (Bar and Ullman, 1996; Davenport and Potter, 2004; Palmer, 1975; Rieger, Kochy, Schalk, Cruschow and Heinze, 2008). This can be explained by the nature of the interaction between complexity and perceptual fluency. Notably, perceptual fluency represents the ease with which people capture and process the physical characteristics of a stimulus and it depends on a number of perceptual dimensions, such as the information presented in the picture (Maier and Dost, 2018), the level of symmetry (Mayer and Landwehn, 2014), and the colours used and the contrast between them (Reber et al., 1998). Therefore, the levels of perceptual fluency for congruent and incongruent images would not differ as both images are complex; specifically, both are rich in information (Maier and Dost, 2018). As a result of these perceptual factors, it is evident that people require a lot of time and cognitive effort to process complex images on a perceptual level. This study contributes to the literature by demonstrating that congruity has no impact on perceptual fluency in the context of product -contextual background congruity.

#### 5.2.5.2 Complexity, Congruity, and Conceptual Fluency

This study investigates the relationship between visual complexity and conceptual fluency and re-tested the results from Study 1 and H1b. Study 2 again assumes that visual complexity negatively affects conceptual fluency, such that complex images would be lower in conceptual fluency, whereas simple images would be higher in conceptual fluency. The study re-tested the following hypothesis:

> ***H1b: Visual complexity will have a negative effect on conceptual fluency, such that simple visual stimuli will increase conceptual fluency, while complex visual stimuli will decrease conceptual fluency.***

The results of one-way ANOVA (see Table 20 and Table 21) indicate that simple images are easier to process semantically ($M_{simple}$ = 5.12, SD = 1.39) compared with complex images ($M_{complex}$ = 3.59, SD = 1.81; F (1,225) = 42.363, p < .001). The findings of the study support the results from Study 1 and H1b by demonstrating that simple images influence higher levels of conceptual fluency than complex images.

*Table 20: Study 2: Descriptives for visual complexity and conceptual fluency*

**Descriptives**

Conceptual Fluency

| | N | Mean | Std. Deviation | Std. Error | 95% Confidence Interval for Mean | | Minimum | Maximum |
|---|---|---|---|---|---|---|---|---|
| | | | | | Lower Bound | Upper Bound | | |
| Simple | 78 | 5.1154 | 1.38725 | .15708 | 4.8026 | 5.4282 | 1.00 | 7.00 |
| Complex | 149 | 3.5906 | 1.80844 | .14815 | 3.2978 | 3.8834 | 1.00 | 7.00 |
| Total | 227 | 4.1145 | 1.82321 | .12101 | 3.8761 | 4.3530 | 1.00 | 7.00 |

*Table 21: Study 2: ANOVA results for visual complexity and conceptual fluency*

**ANOVA**

Conceptual Fluency

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 119.034 | 1 | 119.034 | 42.363 | .000 |
| Within Groups | 632.211 | 225 | 2.810 | | |
| Total | 751.244 | 226 | | | |

Study 2 also investigated the effect of product-background congruity on conceptual fluency. Based on schema-congruity theory (Mandler, 1982), the thesis suggests that it would be easier for people to understand the semantic meaning and the message of a picture presenting a congruent to the product scene, as that scene would be related to the schemas they previously stored in their minds. On the other hand, when a scene is incongruent, it would be harder to process semantically and would require a lot of cognitive effort to resolve the incongruency and to understand the semantic meaning of the picture. Therefore, those pictures would be harder to process semantically and would be evaluated as conceptually disfluent. In this part of the study, the thesis tested the following hypothesis:

***H2b: Congruity will moderate the relationship between visual complexity and conceptual fluency, such that complex congruent (incongruent) images will be significantly higher (lower) in conceptual fluency.***

The one-way ANOVA (see Table 22 and Table 23) demonstrates that congruity affects the levels of conceptual fluency. Specifically, the complex congruent image ($M_{congruent}$ = 4.39, SD = 1.69) is more conceptually fluent compared with the complex incongruent image ($M_{incongruent}$ = 2.84, SD = 1.58). Furthermore, the analysis illustrates that there is a significant difference in the levels of conceptual fluency between the two images (F (1,147) = 33.493, p < .001). It could be concluded that congruity positively affects conceptual fluency, such that complex congruent images influence higher levels of conceptual fluency than complex incongruent images. The results of Study 2 support H2b and therefore confirm it.

*Table 22: Study 2: Descriptives for visual congruity and conceptual fluency*

**Descriptives**

Conceptual Fluency

| | N | Mean | Std. Deviation | Std. Error | 95% Confidence Interval for Mean Lower Bound | 95% Confidence Interval for Mean Upper Bound | Minimum |
|---|---|---|---|---|---|---|---|
| Non-congruent image | 77 | 2.8398 | 1.58263 | .18036 | 2.4806 | 3.1990 | 1.00 |
| Congruent image | 72 | 4.3935 | 1.69444 | .19969 | 3.9953 | 4.7917 | 1.00 |
| Total | 149 | 3.5906 | 1.80844 | .14815 | 3.2978 | 3.8834 | 1.00 |

*Table 23: Study 2: ANOVA results for visual congruity and conceptual fluency*

**ANOVA**

Conceptual Fluency

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 89.819 | 1 | 89.819 | 33.493 | .000 |
| Within Groups | 394.208 | 147 | 2.682 | | |
| Total | 484.027 | 148 | | | |

To illustrate, the study demonstrates that it is easier for people to understand the semantic meaning and hidden message of complex congruent images displaying a product in congruent scenes. The findings support previous research results suggesting that congruent stimuli influence higher levels of conceptual fluency (Van Rompay et al., 2010; Peracchio and Meyers-Levy, 2005; de Droog et al., 2011; Lee and Labroo, 2004; Kao and Wang, 2013). Those results

are also consistent with schema-congruity theory and the claim that it is easier for people to process familiar stimuli (Mandler, 1982).

#### 5.2.5.3 Visual Complexity, Congruity, and Imagery Fluency

Study 2 also re-tested the results from Study 1 and H1c by investigating the link between visual complexity and imagery fluency. This study speculates that simple images are easier to imagine than complex images. The study re-tested the following hypothesis:

> ***H1c: Visual complexity will have a negative effect on imagery fluency, such that simple visual stimuli will increase imagery fluency, while complex visual stimuli will decrease imagery fluency.***

The results of one-way ANOVA (see Table 24 and Table 25) indicate that it is significantly easier for people to imagine simple images ($M_{simple}$ = 5.11, SD = 1.39) compared to the complex images ($M_{complex}$ = 4.48, SD = 1.43). Moreover, the results demonstrate that there is a significant difference in the levels of imagery fluency between the two images (F (1,225) = 10.217, p < .005). To conclude, the results of the study confirm the findings from Study 1 and H1c by demonstrating that visual complexity negatively affects imagery fluency, such that simple images are more imagery fluent than complex images.

*Table 24: Study 2: Descriptives for visual complexity and imagery fluency*

**Descriptives**

Imagery Fluency

| | N | Mean | Std. Deviation | Std. Error | 95% Confidence Interval for Mean | | Minimum | Maximum |
|---|---|---|---|---|---|---|---|---|
| | | | | | Lower Bound | Upper Bound | | |
| Simple | 78 | 5.1090 | 1.39024 | .15741 | 4.7955 | 5.4224 | 1.00 | 7.00 |
| Complex | 149 | 4.4765 | 1.42887 | .11706 | 4.2452 | 4.7078 | 1.00 | 7.00 |
| Total | 227 | 4.6938 | 1.44435 | .09587 | 4.5049 | 4.8827 | 1.00 | 7.00 |

*Table 25: Study 2: ANOVA results for visual complexity and imagery fluency*

**ANOVA**

Imagery Fluency

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 20.480 | 1 | 20.480 | 10.217 | .002 |
| Within Groups | 450.992 | 225 | 2.004 | | |
| Total | 471.471 | 226 | | | |

The final part of Study 2 investigated the effect of congruity and imagery fluency. Based on the schema-congruity theory (Mandler, 1982) as well as on the previous work demonstrating a positive link between congruity and imagery fluency (Zhao et al., 2014; Zhang et al., 2020), this PhD thesis suggests that it would be easier for people to generate mental imageries of a complex congruent image compared to an incongruent image. Specifically, the thesis tested the following hypothesis:

***H2c: Congruity will moderate the relationship between visual complexity and imagery fluency, such that complex congruent (incongruent) images will be significantly higher (lower) in imagery fluency.***

The findings of the one-way ANOVA (see Table 26 and Table 27) show that congruity affects imagery fluency. Moreover, the complex congruent images ($M_{congruent}$ = 4.91, SD = 1.43) influence significantly higher levels of imagery fluency than complex incongruent images ($M_{incongruent}$ = 4.07, SD = 1.31; F (1,147) = 13.925, p < .001). Hence, it could be concluded that congruity positively affects imagery fluency. The results of Study 2 confirm H2c.

*Table 26: Study 2: Descriptives for visual congruity and imagery fluency*

**Descriptives**

Imagery Fluency

| | N | Mean | Std. Deviation | Std. Error | 95% Confidence Interval for Mean Lower Bound | 95% Confidence Interval for Mean Upper Bound | Minimum |
|---|---|---|---|---|---|---|---|
| Non-congruent image | 77 | 4.0714 | 1.30967 | .14925 | 3.7742 | 4.3687 | 1.00 |
| Congruent image | 72 | 4.9097 | 1.43234 | .16880 | 4.5731 | 5.2463 | 2.00 |
| Total | 149 | 4.4765 | 1.42887 | .11706 | 4.2452 | 4.7078 | 1.00 |

*Table 27: Study 2: ANOVA results for visual congruity and imagery fluency*

**ANOVA**

Imagery Fluency

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 26.147 | 1 | 26.147 | 13.925 | .000 |
| Within Groups | 276.020 | 147 | 1.878 | | |
| Total | 302.168 | 148 | | | |

To elaborate, the results of the study suggest that congruent stimuli are easier to imagine than incongruent stimuli. The current research findings align with Zhang et al.'s (2020) claim that congruity influences high levels of imagery fluency. Moreover, the results also support previous research findings that people generate mental imageries easier when exposed to familiar scenes (Wyer, Hung and Jiang, 2008; Wyer and Radvansky, 1999). As research on imagery fluency has been very limited, the current research contributes to the literature by demonstrating the effect of visual complexity on imagery fluency and the moderating role of congruity.

To summarise, Study 2 demonstrated that complex congruent images displaying a product within a congruent scene are more conceptually fluent and imagery fluent. Specifically, people process the semantic meaning (conceptual fluency) and generate a mental imagery (imagery fluency) easier when exposed to a complex congruent image compared to the complex incongruent image. However, Study 2 shows that congruity between a product and its contextual background has no effect on perceptual fluency. It is important to note that when comparing simple and complex images, simple images still lead to higher levels of perceptual fluency, conceptual fluency, and imagery fluency.

### 5.3 Study 3

Study 3 sought to test the relationship between visual complexity and consumer purchase intentions, as well as the mediating role of fluency (in terms of perceptual fluency, conceptual fluency, and imagery fluency). These interrelationships are illustrated below in Figure 6. This study utilised a between-groups design (visual complexity: simple *versus* complex visual stimuli). The dependent variable was purchase intentions. The mediator was fluency (perceptual fluency, conceptual fluency, and imagery fluency). The independent variable was visual complexity. This variable was manipulated, where some participants were exposed to a simple image, others to a complex image. Prior to conducting the experiment, a pilot study was conducted to create the visual complexity manipulation.

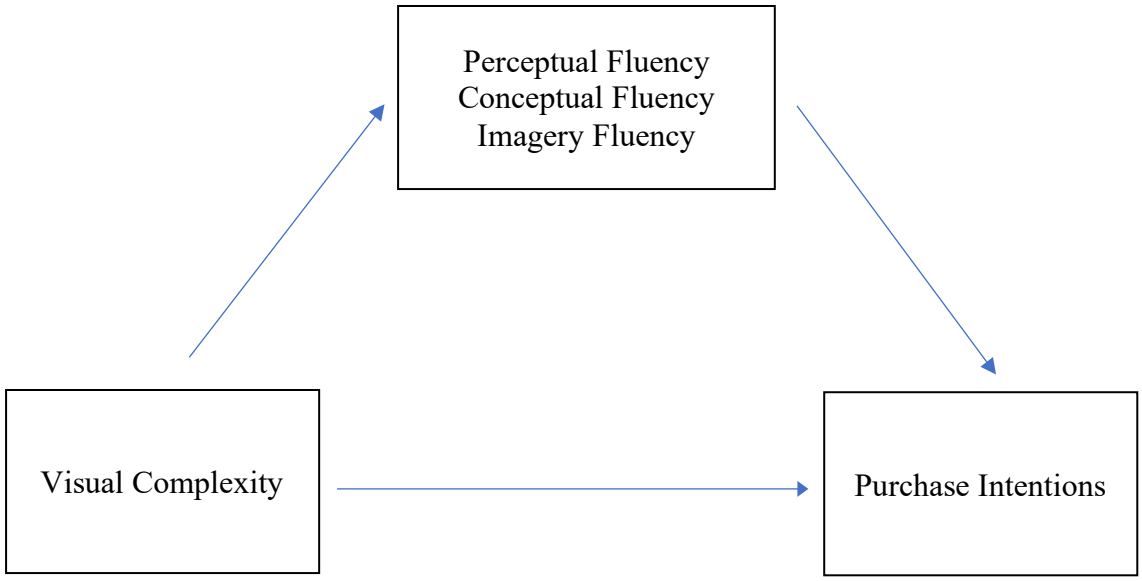


*Figure 6: Study 3 model*

### 5.3.1 Pilot Study

The aim of the pilot study was to select the right images for the study. As the aim of Study 3 was based on the effects of visual complexity, the study required two images: a simple image placing the product on a plain background, and a complex one displaying the same product within a contextual background. 34 participants took part in the pilot study. They were exposed to two pictures, each showing the same product, an item of *Prada* luggage: 1) a picture of the product on its own and 2) a picture showing the luggage in an airport (shown in Figure 7). The participants were then asked to use a 7-point scale (from "Strongly Disagree" to "Strongly Agree") to rate the levels of visual complexity in response to the following questions for each picture: "Is this picture simple?" and "Is this picture complex?". It is important to mention that the manipulation of the images was done similarly to the previous studies by using Adobe Photoshop and *Prada*'s Instagram page.

Image 1

Image 2

*Figure 7: Images for Study 3*

The means for simplicity and visual complexity were calculated for each picture and are summarised in Table 28 and Table 29 below.

*Table 28: Simplicity results for Pilot Study 3*

| | Image 1 | Image 2 |
|---|---|---|
| Mean | 6.34 | 4.41 |
| SD | 1.05 | 1.97 |

Table 29: Complexity results for Pilot Study 3

| | Image 1 | Image 2 |
|---|---|---|
| Mean | 1.93 | 3.66 |
| SD | 1.59 | 1.95 |

A t-test indicated that the two images differed significantly in visual complexity. To be more specific, the simple image (image 1) ($M_{simple}$ = 6.34, SD = 1.05) was perceived as significantly simpler than the complex image (image 2) ($M_{complex}$ = 4.41, SD = 1.97, $p < .001$). Furthermore, the complex image was perceived as significantly more complex compared with the simple image ($M_{simple}$ = 1.93, SD = 1.59, $M_{complex}$ = 3.66, SD = 1.95, $p < .001$).

### 5.3.2 Participants and Procedure

The experiment recruited 196 (Female = 77.4%, $M_{age}$ = 34.05) people living in England. Just like in Study 1 and Study 2, the participants in this study were randomly approached in public spaces and asked to volunteer in a study investigating consumers' sharing behaviour on social media. All the participants provided informed consent before taking part in the experiment.

Similar to Study 1 and Study 2, the survey began with some socio-demographic questions as well as questions related to the participants' consumer behaviour on social media. After that each participant was randomly assigned to a single image, which could be simple or complex. Here, it is important to mention that a number of variables were cross-checked to ensure that there was no systematic response bias (see Appendix 3). To test if the visual complexity manipulation was successful, participants completed a number of manipulation-check questions. At the end of the survey, the participants were asked to rate the levels of fluency (perceptual fluency, conceptual fluency, and imagery fluency) they experienced when looking at the stimulus, as well as the level of their intention to purchase the displayed product. At the end of the study, the respondents were exposed to a debriefing statement explaining the actual research topic and the aim of the research project.

### 5.3.3 Reliability

Before testing the hypotheses, reliability analysis was conducted for all scale measurements in the study. As demonstrated in Table 30, all scales are above the cut-off point of .70 (DeVellis, 2012), hence, all the scales are reliable.

*Table 30: Scale reliability for Study 3*

| Variable | Perceptual Fluency | Conceptual Fluency | Imagery Fluency | Purchase Intentions |
|---|---|---|---|---|
| Cronbach's alpha | .93 | .95 | .77 | .87 |
| Number of items | 5 | 3 | 3 | 3 |
| Scale items | The image was:<br>Cluttered/Uncluttered<br>Messy/Neat<br>Crowded/Spacious<br>Hard to view/Easy to view<br>Hard to perceive/Easy to perceive | The meaning of the image was easy to understand<br>The message of the image was easy to understand<br>The idea of the image was easy to understand | I had difficulty imagining the depicted image in my head<br>I quickly generated images of what was depicted in the image<br>I found it easy to imagine the depicted image | What is the probability that you will purchase the product presented in the image in the future?<br>Unlikely/Likely<br>Improbable/ Probable<br>Impossible/ Possible |
| Scale type | 7-point bipolar scale | 7-point scale (1 = Strongly Disagree to 7 = Strongly Agree) | 7-point scale (1 = Strongly Disagree to 7 = Strongly Agree) | 7-point bipolar scale |
| Source | Mosteller, Donthu and Eroglu (2014) | Lee and Labroo (2004 | Bone and Ellen (1992) | Smith (2007) |

### 5.3.4 Manipulation Checks

The manipulation check for visual complexity was similar to the one used in Study 1. Specifically, the participants in the study were asked to use a 7-point scale (from "Strongly Disagree" to "Strongly Agree") to rate statements regarding their perception of the level of visual complexity of the image they were exposed to: "The image is complex", "The image is crowded", "The image has a lot of variety", "The image is complicated" (Leigh, 1984; Geissler et al., 2006) (a = .82), and "The image is simple".

The findings of ANOVA illustrate that the respondents perceived the simple image as significantly simpler compared to the complex image ($M_{simple}$ = 6.12, SD = 0.93; $M_{complex}$ =

4.17, SD = 1.54, F (1,196) = 79.008, p < .001). Moreover, the results demonstrate that the complex images are identified as significantly more complex ($M_{complex}$= 3.70, SD = 1.13) than the simple images ($M_{simple}$ = 1.72, SD = 0.72, F (1,196) = 147.174, p < .001). Therefore, it could be concluded that the visual complexity manipulation was successful.

### 5.3.5 Results

The study aimed to test a number of hypotheses with regard to the effects of visual complexity on consumer purchase intentions, as well as the mediating role of fluency. In the first part, the study re-tested the results from Study 1 in terms of the relationship between visual complexity and fluency (Hypotheses 1a, 1b, and 1c) to check the robustness of the experimental findings. Later, the study explored the mediating role of fluency in the relationship between visual complexity and purchase intentions (Hypotheses 3a, 3b, and 3c).

#### 5.3.5.1 Visual Complexity and Fluency

Study 3 aimed to replicate the findings from Study 1 and to re-test the effects of visual complexity on fluency in terms of perceptual fluency, conceptual fluency, and imagery fluency. First, the study re-tested the effects of visual complexity on perceptual fluency (H1a) in terms of the following hypothesis:

> ***H1a: Visual complexity will have a negative effect on perceptual fluency, such that simple visual stimuli will increase perceptual fluency, while complex visual stimuli will decrease perceptual fluency.***

Similar to Study 1, the hypothesis was tested using one-way ANOVA (see Table 31 and Table 32). The results illustrate that simple images influence significantly higher levels of perceptual fluency ($M_{simple}$ = 6.19, SD = 1.34) compared to complex images ($M_{complex}$ = 4.29, SD = 1.45, F (1,196) = 80.464, p < .001).

*Table 31: Study 3: Descriptives for visual complexity and perceptual fluency*

**Descriptives**

Perceptual Fluency

| | N | Mean | Std. Deviation | Std. Error | 95% Confidence Interval for Mean Lower Bound | 95% Confidence Interval for Mean Upper Bound | Minimum | Maximum |
|---|---|---|---|---|---|---|---|---|
| -1.00 | 97 | 6.1851 | 1.33635 | .16326 | 5.8591 | 6.5110 | 1.00 | 7.00 |
| 1.00 | 101 | 4.2855 | 1.44585 | .12632 | 4.0356 | 4.5354 | 1.20 | 7.00 |
| Total | 198 | 4.9283 | 1.67026 | .11870 | 4.6942 | 5.1624 | 1.00 | 7.00 |

*Table 32: Study 3: ANOVA results for visual complexity and perceptual fluency*

**ANOVA**

Perceptual Fluency

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 159.954 | 1 | 159.954 | 80.464 | .000 |
| Within Groups | 389.628 | 196 | 1.988 | | |
| Total | 549.582 | 197 | | | |

To elaborate, the results confirm that visual complexity negatively affects perceptual fluency. In other words, simple images displaying a product on a plain background are captured and processed perceptually more easily than complex images showing a product within a contextual background. In this way, the results of Study 3 confirm the results from the previous two studies as well as H1a. Moreover, the findings of this study support previous research which suggests that visual complexity reduces perceptual fluency (Maier and Dost, 2018; Reber et al., 2004; Mater and Landwehn, 2014; Reber et al., 1998, 2004; Larsen et al., 2004; Wu et al., 2016).

Next, the study investigated the effect of visual complexity on conceptual fluency and tested the following hypothesis:

> ***H1b: Visual complexity will have a negative effect on conceptual fluency, such that simple visual stimuli will increase conceptual fluency, while complex visual stimuli will decrease conceptual fluency.***

One-way ANOVA was used to analyse the results (see Table 33 and Table 34). The findings illustrate that simple images influence significantly higher levels of conceptual fluency ($M_{simple}$

= 4.96, SD = 1.48) than complex images ($M_{complex}$ = 3.32, SD = 1.64, F (1,196) = 47.410, p < .001). Therefore, visual complexity would lower the levels of conceptual fluency.

*Table 33: Study 3: Descriptives for visual complexity and conceptual fluency*

**Descriptives**

Conceptual Fluency

| | N | Mean | Std. Deviation | Std. Error | 95% Confidence Interval for Mean | | Minimum | Maximum |
|---|---|---|---|---|---|---|---|---|
| | | | | | Lower Bound | Upper Bound | | |
| -1.00 | 97 | 4.9602 | 1.48224 | .18108 | 4.5987 | 5.3217 | 1.00 | 7.00 |
| 1.00 | 101 | 3.3206 | 1.63530 | .14288 | 3.0379 | 3.6033 | 1.00 | 6.00 |
| Total | 198 | 3.8754 | 1.76229 | .12524 | 3.6284 | 4.1224 | 1.00 | 7.00 |

*Table 34: Study 3: ANOVA results for visual complexity and conceptual fluency*

**ANOVA**

Conceptual Fluency

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 119.165 | 1 | 119.165 | 47.410 | .000 |
| Within Groups | 492.650 | 196 | 2.514 | | |
| Total | 611.816 | 197 | | | |

The results of Study 3 confirm the findings from Study 1 and Study 2 and support H1b. In this way, the study again contradicts past research claims that complex visual stimuli presenting a product within a contextual background enhance the understanding of the semantic meanings and messages of the stimuli and, as a result, influence higher levels of conceptual fluency (Shapiro, 1999; Whittlesea, 1992). The results of this study demonstrate that complex images influence lower levels of conceptual fluency because they are richer in information and require much more cognitive effort to process semantically. Specifically, the elements presented in the picture could potentially lead to multiple interpretations (Gay, 1986) or the incorrect joining of elements (Triesman, 1977) that could lead to misinterpretation of the meaning and the message of the image. In contrast, a simple visual stimulus is more conceptually fluent as the perceiver's attention is focused on the single element presented within it (Desimone and Duncan, 1995) and the possibility of multiple interpretations (Gay, 1986) or false understandings as a result of incorrect joining of different elements of the picture (Triesman, 1977) are minimised.

The study also explored the effect of visual complexity on imagery fluency and re-tested the following hypothesis:

> ***H1c: Visual complexity will have a negative effect on imagery fluency, such that simple visual stimuli will increase imagery fluency, while complex visual stimuli will decrease imagery fluency.***

Similar to Study 1, the results of one-way ANOVA (see Table 35 and Table 36) demonstrate that simple images are significantly higher in imagery fluency compared to complex images ($M_{simple}$ = 5.40, SD = 1.09; $M_{complex}$ = 4.19, SD = 1.45, F (1,196) = 35.690, p < .001). In other words, visual complexity negatively affects imagery fluency; specifically, simple images are easier for people to imagine compared to complex images.

*Table 35: Study 3: Descriptives for visual complexity and imagery fluency*

**Descriptives**

Imagery Fluency

| | N | Mean | Std. Deviation | Std. Error | 95% Confidence Interval for Mean | | Minimum | Maximum |
|---|---|---|---|---|---|---|---|---|
| | | | | | Lower Bound | Upper Bound | | |
| -1.00 | 97 | 5.3955 | 1.09246 | .13346 | 5.1291 | 5.6620 | 3.00 | 7.00 |
| 1.00 | 101 | 4.1947 | 1.44724 | .12645 | 3.9445 | 4.4448 | 1.00 | 7.00 |
| Total | 198 | 4.6010 | 1.45138 | .10314 | 4.3976 | 4.8044 | 1.00 | 7.00 |

*Table 36: Study 3: ANOVA results for visual complexity and imagery fluency*

**ANOVA**

Imagery Fluency

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 63.925 | 1 | 63.925 | 35.690 | .000 |
| Within Groups | 351.055 | 196 | 1.791 | | |
| Total | 414.980 | 197 | | | |

The findings of Study 3 confirm the results presented in Study 1 and Study 2 and provide further support for H1c. In this way, the study once again contradicts previous research arguing that complex images are more imagery fluent compared to simple images (Chang, 2013; Kleine and Kernan, 1991; Maier and Dost, 2018) and proposes an interesting contribution to the literature. In fact, a complex image is richer in information and requires more cognitive effort to generate mental imagery compared to a simple image presenting a single product only.

Moreover, a complex image could influence multiple stored schemas in a consumer's long-term memory due to the multiple elements and objects contained within it. As a result, those schemas could influence a number of memories as well as complicated fantasies. To generate such mental imagery requires a lot of cognitive effort and, therefore, complex images are imagery disfluent.

#### 5.3.5.2 The Mediating Role of Fluency

One-way ANOVA demonstrate that simple images are not significantly higher in purchase intentions compared to complex images ($M_{simple} = 3.82$, SD = 1.68; $M_{complex} = 3.39$, SD = 1.50, F (1,196) = 6.914, $p > .07$). Based on these results the final part of Study 3 investigated the mediating role of fluency on the relationship between visual complexity and consumer purchase intentions. This part of the chapter is divided into three sections, each of which discusses the mediating role of one type of fluency.

#### 5.3.5.2.a Perceptual Fluency

To study the relationship between visual complexity, perceptual fluency, and purchase intentions, mediation analysis was used (with IV = Visual complexity, Mediator = Perceptual Fluency, and DV = Purchase Intentions; Hayes, 2019, model 4: 5,000 bootstrapped samples). The results indicate that visual complexity affects the levels of perceptual fluency ($\beta = -.95$, SE = 0.11, t = -8.97 $p < .001$; 95% CI = [-1.16 to -.74]). The findings also show that perceptual fluency affects purchase intentions ($\beta = .27$, SE = 0.08, t = 3.57, $p < .01$; 95% CI = [0.12 to 0.43]). Furthermore, the effects of visual complexity on purchase intentions are not direct (effect = -0.07, SE = 0.14, t = -0.55, $p > .05$; 95% CI = [-0.34 to 0.19]) but mediated by perceptual fluency. Finally, the indirect effects analysis shows that mediation is significant (95% CI = [-0.42 to -0.12]). (see Appendix 5)

The results of the study demonstrate that perceptual fluency has a positive effect on purchase intentions. In other words, when people effortlessly process the physical characteristics of a stimulus, they are much more likely to purchase the product presented in the picture. On the other hand, when the stimulus is harder to process and it is perceptually disfluent, consumers' purchase intentions are lower. Therefore, perceptual fluency influences higher levels of purchase intentions. The study aligns with previous literature which suggests that there is a positive relationship between perceptual fluency and purchase intentions (Bigoin-Gagnan and Lacoste-Badie, 2018; Im, Lennon and Stoel, 2010; Im and Ha, 2011; Gomez and Werle, 2019). The results of this study also extend past research demonstrating the link between processing

fluency and behaviour intentions (Dreisbach and Fischer, 2011; Song and Schwarz, 2008; Storme, Myszkowski, Davila and Bournois, 2015; Coulter and Roggeveen, 2014) by demonstrating the individual effects of perceptual fluency.

With regard to the effects of visual complexity on purchase intentions, the study found that the relationship is not direct but mediated by perceptual fluency. Therefore, simple visual stimuli influence high levels of perceptual fluency, and perceptual fluency leads to consumer purchase intentions. In other words, when people process the features of simple visual stimuli easily, that ease of perceptual processing influences their willingness to purchase the presented product. Hence, the results of Study 3 support H3a. The study contributes to previous research findings suggesting the positive effect of simple images on consumer purchase intentions (Bigoin-Gagnan and Lacoste-Badie, 2018; Kolesova and Singh, 2019; Pelet, Durrieu and Lick, 2020), by adding that the effect is mediated by perceptual fluency. In addition, the results of the study contradict the claim that high levels of visual complexity (Shapiro, 1999; Yoo and Kim, 2014; Lee, Hur and Watkins, 2018; Pieters, Wedel and Batra, 2010) and moderate levels of visual complexity (Wang et al., 2020; Geissler, Zinkhan and Watson, 2006; Mulken et al., 2014) influence consumer purchase intentions.

**5.3.5.2.b Conceptual Fluency**

Second, the study investigated the relationship between visual complexity, conceptual fluency, and purchase intentions by using mediation analysis (with IV = Visual Complexity, Mediator = Conceptual Fluency, and DV = Purchase Intentions; Hayes, 2019, model 4: 5,000 bootstrapped samples). The results indicate that visual complexity affects the levels of conceptual fluency ($\beta = -.82$, SE = 0.12, $t = -6.89$, $p < .001$; 95% CI = [-1.05 to -0.58]). The findings also show that conceptual fluency triggers purchase intentions ($\beta = .33$, SE = 0.07, $t = 4.93$, $p < .001$; 95% CI = [0.20 to 0.46]). Furthermore, the effects of visual complexity on purchase intentions are not direct (effect = -0.07, SE = 0.12, $t = -0.53$, $p > .05$; 95% CI = [-0.31 to 0.18]) but mediated by conceptual fluency. Finally, the indirect effects analysis shows that the mediation is significant (95% CI = [-0.41 to -0.15]) (see Appendix 5).

To elaborate, the results of the study show that conceptual fluency has a positive effect on purchase intentions. Moreover, when people are able to find the semantic meaning and the message of a stimulus easily, their purchase intentions increase. In contrast, when the stimulus is harder to process semantically, it is perceived as conceptually disfluent and consumers are less likely to purchase it. It could be concluded that conceptual fluency influences higher levels

of consumer purchase intentions. Furthermore, the study contributes to the received wisdom from the literature stating that there is a positive link between processing fluency and behaviour intentions (Dreisbach and Discher, 2011; Song and Schwarz, 2008; Storme, Myszkowski, Davila and Bournois, 2015; Coulter and Roggeveen, 2014; Mosteller et al., 2014) by adding to the literature on the individual effects of conceptual fluency on consumer purchase intentions.

The study also demonstrates that the relationship between visual complexity and purchase intentions is mediated by conceptual fluency. Specifically, when people find the hidden meaning and semantic message of a stimulus easily, they are more likely to purchase the product presented in the image. In other words, simple visual stimuli influence high levels of conceptual fluency, which triggers consumer purchase intentions. Hence, the results of Study 3 confirm H3b. As previous research work claims that simple images influence purchase intentions (Bigoin-Gagnan and Lacoste-Badie, 2018; Kolesova and Singh, 2019; Pelet, Durrieu and Lick, 2020), this PhD thesis contributes to that body of literature by demonstrating that this relationship is mediated by conceptual fluency. In addition, the current research findings do not support the claim that high levels (Shapiro, 1999; Yoo and Kim, 2014; Lee, Hur and Watkins, 2018; Pieters, Wedel and Batra, 2010) and moderate levels of visual complexity (Wang et al., 2020; Geissler, Zinkhan and Watson, 2006; Mulken et al., 2014) influence purchase intentions. Finally, the results of Study 3, testing H3a and H3b, confirm the claim that all types of fluency lead to "remarkably uniform judgements across a range of domains" (Alter and Oppenheimer, 2009, p. 220).

#### 5.3.5.2.c Imagery Fluency

Finally, to investigate the effect of imagery fluency on the relationship between visual complexity and purchase intentions, mediation analysis was used (with IV = Images, Mediator = Imagery Fluency, and DV = Purchase Intentions; Hayes, 2019, model 4: 5,000 bootstrapped samples). The findings reveal that visual complexity affects the levels of imagery fluency ($\beta$ = -.60, SE = 0.10, t = -5.97, $p < .001$; 95% CI = [-0.80 to -0.40]). The findings also show that imagery fluency affects purchase intentions ($\beta$ = .38, SE = 0.08, t = 4.84, $p < .001$; 95% CI = [0.23 to 0.54]). Furthermore, the effects of visual complexity on purchase intentions are not direct (effect = -0.11, SE = 0.12, t = -0.87, $p > .05$; 95% CI = [-0.34 to 0.13]) but mediated by imagery fluency. Finally, the indirect effects analysis shows that the mediation is significant (95% CI = [-0.35 to -0.12]) (see Appendix 5).

To elaborate, the results of the study show that imagery fluency has a direct effect on purchase intentions. Specifically, when people find it easy to generate mental imagery of a stimulus, their purchase intentions increase. However, if generating mental imagery is harder, the consumers' purchase intentions decrease. Therefore, it can be concluded that imagery fluency influences consumer purchase intentions. In this way, the results of the study support previous research demonstrating the link between imagery fluency and behaviour intentions (Gregory et al., 1982; Petrova and Cialdini, 2005, 2007, 2008; Zhao, Hoeffler and Dahl, 2007).

The study also demonstrates that the relationship between visual complexity and purchase intentions is mediated by imagery fluency. In other words, when people easily generate a mental imagery of a stimulus, their intentions to purchase increase. Specifically, simple images lead to higher levels of imagery fluency; and imagery fluency influences consumer purchase intentions. Therefore, the results of Study 3 confirm H3c. In this way, the study extends past research suggesting a positive link between simple images and purchase intentions (Bigoin-Gagnan and Lacoste-Badie, 2018; Kolesova and Singh, 2019; Pelet, 2020) by claiming that imagery fluency mediates that relationship. The results also contradict previous studies which claim that stimuli with high (Shapiro, 1999; Yoo and Kim, 2014; Lee, Hur and Watkins, 2018; Pieters, Wedel and Batra, 2010) or moderate levels of visual complexity (Wang et al., 2020; Geissler, Zinkhan and Watson, 2006; Mulken et al., 2014) influence purchase intentions. Moreover, based on the results of Study 3 and the confirmation of H3a, H3b, and H3c, the study demonstrates that the claim that fluency leads to "remarkably uniform judgements across a range of domains" (Alter and Oppenheimer, 2009, p. 220) is valid for the effects of perceptual fluency, conceptual fluency, and imagery fluency on consumer purchase intentions. A summary of the results of tested the hypotheses can be seen in Table 37.

*Table 37: Summary of the results of the tested hypotheses*

| Hypothesis | Study | Findings |
|---|---|---|
| ***H1a: Visual complexity will have a negative effect on perceptual fluency, such that simple visual stimuli will increase perceptual fluency, whilecomplex visual stimuli will decrease perceptual fluency.*** | 1, 2, 3 | Supported |
| ***H1b: Visual complexity will have a negative effect on conceptual fluency, such that simple visual stimuli will increase conceptual fluency, while complex visual stimuli will decrease conceptual fluency.*** | 1, 2, 3 | Supported |
| ***H1c: Visual complexity will have a negative effect on imagery fluency, such that simple visual stimuli will increase imagery fluency, while complex visual stimuli will decrease imagery fluency.*** | 1, 2, 3 | Supported |
| ***H2a: Congruity will moderate the relationship between visual complexity and perceptual fluency, such that complex congruent (incongruent) images will be significantly higher (lower) in perceptual fluency.*** | 2 | Rejected |
| ***H2b: Congruity will moderate the relationship between visual complexity and conceptual fluency, such that complex congruent (incongruent) images will be significantly higher (lower) in conceptual fluency.*** | 2 | Supported |
| ***H2c: Congruity will moderate the relationship between visual complexity and imagery fluency, such that complex congruent (incongruent) images will be significantly higher (lower) in imagery fluency.*** | 2 | Supported |
| ***H3a: Perceptual fluency will mediate the relationship between visual complexity and consumer purchase intentions.*** | 3 | Supported |
| ***H3b: Conceptual fluency will mediate the relationship between visual complexity and consumer purchase intentions.*** | 3 | Supported |
| ***H3c: Imagery fluency will mediate the relationship between visual complexity and consumer purchase intentions.*** | 3 | Supported |

## 5.4 Chapter Summary

The aim of this PhD thesis is to investigate the relationship between visual complexity and consumer purchase intentions, as well as the mediating role of fluency. The thesis also explores the moderating effect of congruity. To study the interrelationships between the variables, the thesis carried out three experiments. This chapter discussed the results of the experiments and provided a brief discussion of each finding. In Study 1, the thesis investigated the effects of visual complexity on fluency in terms of perceptual fluency, conceptual fluency, and imagery fluency. The study compared simple (images displaying a product on a white background) *versus* complex (images presenting the same product placed within a contextual background) visual stimuli. The results of the study demonstrated that simple images are more perceptually fluent, conceptually fluent, and imagery fluent in comparison to complex images. In particular, it is easier for people to perceive and capture simple images, as they contain less information; i.e., these images are more perceptually fluent (confirming H1a). Similarly, due to the reduced information within a simple image, people are able to understand the semantic meaning (confirming H1b) and to generate a mental imagery easier (confirming H1c) of simple images compared to the complex images.

Building on the above results, Study 2 researched the moderating effect of congruity on the relationship between visual complexity (simple *versus* complex images) and fluency (in terms of perceptual fluency, conceptual fluency, and imagery fluency). The results confirmed the findings from Study 1. The findings of the study also demonstrated that complex congruent images (presenting a product within a congruent scene) are more conceptually fluent (confirming H2b) and imagery fluent (confirming H2c). In other words, people process the semantic meaning (conceptual fluency) and create a mental imagery (imagery fluency) easier when looking at a complex congruent image than at a complex incongruent image. It is important to note that the levels of perceptual fluency for both complex images do not differ significantly, therefore, congruity has no effect on perceptual fluency (rejecting H2a).

Finally, Study 3 explored the relationship between visual complexity (simple *versus* complex images) on consumer purchase intentions. The study researched the mediating role of fluency. The results of the study demonstrated that fluency mediates the relationship between visual complexity and consumer purchase intentions. In other words, simple visual stimuli lead to higher levels of perceptual, conceptual, and imagery fluency. Moreover, that ease of processing (i.e., fluency) triggers consumers' intentions to purchase the product. It is worth noting that the relationship between visual complexity and consumer purchase intentions is not direct but

mediated by perceptual fluency (confirming H3a), conceptual fluency (confirming H3b), and imagery fluency (confirming H3c).

Thus far, this PhD thesis has discussed the literature on visual complexity, congruity, and fluency theory (Chapter 2: Literature Review), developed a number of hypotheses to test the interrelationships between the different variables (Chapter 3: Hypotheses Development), discussed the methodology (Chapter 4: Methodology), and outlined the findings of each experiment (Chapter 5: Analysis and Discussion). The next chapter provides a general discussion of the results of the three experiments.

# Chapter 6: General Discussion

The aim of this PhD thesis is to investigate the relationship between visual complexity (simple *versus* complex images) and consumer purchase intentions, and the mediating role of fluency (in terms of perceptual, conceptual, and imagery fluency). This PhD also examines the moderating role of congruity in the relationship between visual complexity and fluency. In this chapter, the thesis provides a general discussion of the key findings of the experiments.

## 6.1 General Discussion

Visual stimuli are essential for any successful branding and marketing strategy. Some brands use simple images, presenting their products in isolation in order to influence consumer purchase intentions. Many academics support this practice (Bigoin-Gagnan and Lacoste-Badie, 2018; Kolesova and Singh, 2019; Pelet, Durrieu and Lick, 2020). Other brands use complex visual stimuli, placing their products within a contextual background with the aim of communicating a certain message or meaning to consumers. This strategy is also supported with the claim that these images evoke "a sense of time and place" (Kusumasondjaja and Tjiptono, 2019; Sekonda, 2014; Shapiro, 1999; Yoo and Kim, 2014; Lee, Hur and Watkins, 2018; Kim and Lennon, 2000, Pieters, Wedel and Batra, 2010). The debate on the use of visual stimuli also captures the level of complexity, specifically, some scholars recommending the use of moderate levels of visual complexity (Wang et al., 2020; Geissler, Zinkhan and Watson, 2006; Mulken et al., 2014). Interestingly, during the last few years, a new trend has emerged and brands have started to use complex incongruent images, whereby their products are placed in a mismatching and even surprising setting in order to attract consumer attention.

Building on this debate in the literature, this PhD thesis aims to test the effectiveness of different visual stimuli in respect of consumer purchase intentions. Moreover, the study investigates the mediating role of fluency in that relationship. Fluency is an important metacognitive experience, which occurs every time an individual performs any cognitive activity and has been proven to have an effect on behavioural intentions (Schwarz, 2021; Alter and Oppenheimer, 2009). There are many types of fluency, however, as this PhD thesis focuses on the effects of visual stimuli on consumer purchase intentions, three specific dimensions of fluency have been examined: perceptual fluency (the ease with which people perceive the physical characteristics of stimuli), conceptual fluency (the ease with which people understand the meaning of the stimuli), and imagery fluency (the ease with which people generate mental imagery). By investigating the interrelationships between visual stimuli, fluency (perceptual

fluency, conceptual fluency, and imagery fluency) and consumer purchase intentions, the study aims to create a framework that can predict consumer responses to different visual stimuli.

The thesis developed three hypotheses that were tested in three laboratory experiments. Each experiment was based on a different manipulation of visual stimuli. In Study 1, the thesis investigated the effects of visual complexity on perceptual fluency, conceptual fluency, and imagery fluency. In this experiment, visual complexity was manipulated, whereby some participants were exposed to a simple and others to a complex visual stimulus. In Study 2, the researcher tested the moderating effects of congruity on the relationship between visual complexity and fluency; and manipulated the levels of complexity and congruity, whereby some participants were exposed to a simple image, others to a complex congruent image, and the rest of the participants to a complex incongruent image. Finally, in Study 3, the researcher investigated the effects of visual complexity on consumer purchase intentions, as well as the mediating effect of fluency. For this study, visual complexity was again manipulated, whereby some participants were exposed to a simple and others to a complex image. These interrelationships are illustrated below in the conceptual model that was first shown at the end of Chapter 2 and it is reproduced here (Figure 1). The next part of the chapter provides a general discussion that summarises the main findings of the three studies. In addition, in order to develop a theoretical framework of consumer responses (in terms of behavioural intentions) to visual stimuli, this section of the thesis also compares the results of the three studies.

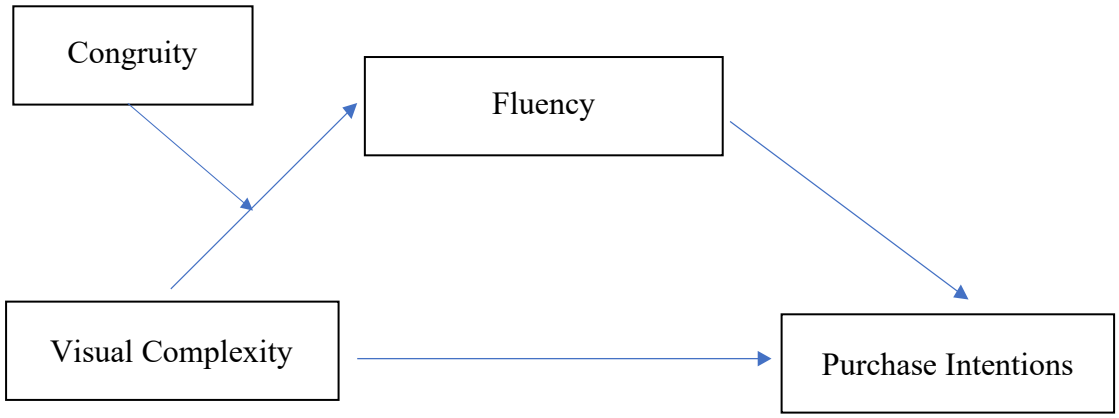


*Figure 1: The conceptual model*

## 6.2 Effects of Visual Complexity on Fluency

Study 1, part of Study 2, and Study 3 all aimed to investigate the effects of visual complexity (simple *versus* complex images) on consumer metacognitive experiences in terms of perceptual fluency, conceptual fluency, and imagery fluency. The results of the studies consistently demonstrate that simple images (presenting a single object on a plain background) are easier to perceive (i.e. they are more perceptually fluent), to understand semantically (hence, they are more conceptually fluent), and to imagine (they are more imagery fluent) in comparison to complex images (presenting the product within a contextual background).

Perceptual fluency refers to the ease with which people perceive and process information (Reber et al., 2004). It is influenced by different perceptual factors, such as the amount of information presented (Wu et al., 2016; Garner, 1974; Reber et al., 1998, 2004; Larsen et al., 2004; Peracchio and Meyers-Levy, 1997), symmetry (Reber et al., 2004; Mater and Landwehn, 2014), and the colour contrast in the image (Reber et al., 1998), etc. Similarly, visual complexity also depends on different perceptual factors (Rayner, 1998; Oliva et al., 2004). Therefore, perceptual factors determine the complexity of an image and affect the ease with which people process a stimulus (i.e., perceptual fluency). The findings of the studies (Study 1, Study 2, and Study 3) confirm that adding a contextual background to a product picture increases the complexity of the image, which triggers lower levels of perceptual fluency. Moreover, when complexity increases, people need more time and cognitive effort to process the physical characteristics of the stimulus. Therefore, the more complex the stimulus is, the more time and effort it requires for processing. When consumers undertake a lot of effort to perform a task or to process information, the levels of fluency – in this case perceptual fluency – decrease (Reber et al., 2004; Schwarz, 2004; Alter and Oppenheimer, 2009).To elaborate, when consumers are exposed to an image displaying a product placed within a contextual background, they have to capture all the elements and dynamics presented in the picture. Thus, they need more cognitive effort and time to process the perceptual dimensions of the visual stimulus, which decreases their levels of perceptual fluency. In contrast, when consumers are exposed to a visual stimulus presenting a single object (simple image), they have to capture and identify only one item. This process requires less cognitive effort and time, hence the processing experience is easier. Therefore, it can be concluded that perceptual fluency increases for simple images. The results of the study indicate that consumers are able to perceive the physical characteristics of images containing a single object easier due to the

absence of a contextual background, as well as the reduced number of displayed elements (Reber et al., 1998; Wu et al., 2016; Maier and Dost, 2018).Moreover, the findings of the three experiments are consistent with past research suggesting that complexity reduces perceptual fluency (Reber et al., 1998, 2004; Larsen et al., 2004; Wu et al., 2016; Maier and Dost, 2018; Mater and Landwehn, 2014). The current study extends the knowledge of the impact of visual complexity on perceptual fluency by exploring the role of a contextual background. The contextual background incorporates a number of complexity dimensions (symmetry, colours and contrasts, and the amount of information contained therein); however, previous research on contextual background paid limited attention with regard to its influence on fluency. Furthermore, this study extends previous work carried out by Maier and Dost (2018), who examined an ambiguous product and the combined effects of processing fluency. This study extends their work by demonstrating the differential effects of conceptual and perceptual fluency as well as by adding a contextual contribution through the use of luxury goods.

Conceptual fluency refers to the ease with which people process the meaning and the message of stimuli (Lee and Labroo, 2004). This PhD thesis shows that visual complexity negatively affects conceptual fluency, such that simple images are more conceptually fluent compared with complex images. As mentioned previously, a contextual background increases complexity due to the increased number of displayed elements (Reber et al., 1998; Wu et al., 2016; Maier and Dost, 2018). The results of this PhD research indicate that the contextual background decreases the levels of conceptual fluency because people require more cognitive effort to understand the meaning and the message of the stimulus. These results can be explained through schema-congruity theory (Mandler, 1982) and the idea that people store information in their minds in the shape of nodes or schemas. As those schemas are connected, the activation of one schema (or node) may activate another. Therefore, when people are exposed to complex images, presenting a lot of details and elements, each part of the image could influence a number of schemas. In turn, this could lead to more than one meaning and interpretation of the image (Gay, 1986). Consequently, it would be harder for the perceiver to find error-free processing, which is typically required for fluent experiences (Orth and Wiztz, 2014), thus the levels of conceptual fluency would decrease. Furthermore, as a complex image contains a lot of information, people may perform an incorrect pairing of the presented elements, known as an “illusory conjunction”, which would eventually lead them to attribute an incorrect meaning to or understanding of the image (Treisman, 1977). In contract, illusionary conjunctions (Treisman, 1977), or the possibility of finding multiple meanings (Gay, 1968), would be limited

when people are exposed to a simple image containing a single element. It is worth noting that these results are valid for typical/luxury fashion products; the study did not focus on innovative or augmented products. Furthermore, the findings of this study are also consistent with the theory of limited processing (Desimone and Duncan, 1995), according to which people have limited processing ability and cannot process and pay an equal amount of attention to everything they encounter. Therefore, when people process complex visual stimuli, each detail of the stimulus competes for processing and attention. However, when viewers are exposed to a simple image presenting only one object, people can focus their processing capacity mainly on that single object. To conclude, this PhD thesis demonstrates that visual complexity reduces conceptual fluency. Therefore, this new finding contradicts those of the previous studies which suggest that a contextual background creates meaning and facilitates the understanding of that meaning (Scott and Vargas, 2007; Shapiro, 1999; Whittlesea, 1992). It is crucial to mention that Whittlesea's (1992) study found a positive correlation between contextual information and a stimulus; however, the study was conducted in the context of textual information. Shapiro's (1999) study conducted similar experiments to those within this PhD thesis, in which the researcher used a typical product placed in a picture with a plain background (simple image) and in a picture with a contextual background (complex image), and found that complex images were easier to process semantically. Although the findings of this PhD thesis contradict past research results, they deepen the understanding of the interrelationship between visual complexity and conceptual fluency and provide an up-to-date data as well as a new perspective on the way consumers process images semantically.

With regard to the effects of visual complexity on imagery fluency, the findings of this study reveal that simple images are more imagery fluent than complex images. To elaborate, complex visual stimuli present a number of elements and dynamics, which people first perceive, then remember, and then try and imagine and visualise. Hence, people have to process a number of details (which requires a lot of effort, as demonstrated previously) before they try to generate mental imagery. On the other hand, when exposed to a simple image, people only have to process a single object and the generation of mental imagery is easier as it involves less cognitive effort. In other words, when comparing simple *versus* complex images, the complex ones appear to be harder to imagine as they contain a lot of information. These findings can also be explained by schema-congruity theory (Mandler, 1989). Specifically, as people store information in their minds in the form of schemas, complex images could activate multiple schemas related to the details presented within the stimuli. Those schemas can activate a

previous experience, a dream, or a memory in the consumer's mind, and might influence the recreation of such a memory or experience in the form of a mental imagery. To recreate such mental imagery or multiple mental imageries may influence story-like mental imagery, also known as a "narrative". Moreover, the setting of the picture can also influence daydreaming, such as the consumer perhaps wishing to "be in" the picture. Those narratives (mental imagery) require more time and effort compared to the mental imagery of a single product. The results of this PhD thesis are inconsistent with previous findings suggesting that complex images influence higher levels of imagery fluency than simple images (Chang, 2013; Maier and Dost, 2018, Kleine and Kernan, 1991). Interestingly, Chang (2013) also compared the effects of simple and complex images on fluency and hypothesised that both types of images would influence high levels of imagery fluency. It is worth noting that in her research, the simple image represented a sketch of a pair of shoes, while the complex image displayed a pair of shoes being worn and placed in a field (the product in use). The difference in the type of the simple image condition in her research (referring to a sketch) and in this research (a picture of the product on a plain background) could potentially influence the different results. As the different effects of imagery fluency have not been scrutinised in substantial detail, the current study contributes to prior research by demonstrating that a simple image presenting a single object on a plain background influences higher levels of imagery fluency.

In conclusion, the findings of this PhD thesis show that, in order to process the physical characteristics, to find the semantic meaning, and to create a mental imagery of a complex image, requires a lot of cognitive effort; hence, that image is perceptually, conceptually, and imagery disfluent.

The next section of this chapter discusses the moderating role of congruity in the relationship between visual complexity and fluency.

### 6.3 The Moderating Role of Congruity

This PhD thesis aimed to investigate the moderating role of congruity (complex congruent *versus* complex incongruent visual stimuli) on the relationship between visual complexity and consumer metacognitive experiences in terms of perceptual fluency, conceptual fluency, and imagery fluency. The study demonstrates that simple images (presenting a single object on a plain background) are more perceptually, conceptually, and imagery fluent than complex ones (presenting the product within a contextual background). This PhD thesis also demonstrates that congruity has no significant effect on perceptual fluency, however complex congruent

images are more conceptually and imagery fluent in comparison to complex incongruent images.

The research examines the relationship between product-background congruity and perceptual fluency. The findings indicate that the levels of perceptual fluency for a complex congruent and a complex incongruent image are not significantly different. In other words, the effort required to process the physical characteristics of a picture presenting a product in a typical and congruent context and a picture displaying the same product in a surprising and incongruent background is almost the same. It is worth noting that the results were examined and were valid in the case of both images being equally complex and both presenting a product in a specific background surrounded by other details, however, they differed in their levels of congruity. By definition, perceptual fluency represents the ease with which people process and capture the features of a stimulus (Lee and Labroo, 2004) and, therefore, the nature of perceptual fluency is related to, and affected by, different perceptual dimensions, including complexity. In other words, previous research has established that visual complexity (in terms of asymmetry (Reber, Schwarz and Winkielman, 2004; Mater and Landwehn, 2014), low figure-ground contrast (Reber et al., 1998), and the richness of the information presented (Reber et al., 1998, 2004; Larsen et al., 2004; Wu et al., 2016, Maier and Dost, 2018) reduce the levels of perceptual fluency, as people need more time and effort to process those stimuli. Therefore, when presenting two equally complex visual stimuli differing only in their levels of congruity, consumers require almost the same amount of time and cognitive effort to process each of them on a perceptual level and to capture all the details presented. It can be concluded that congruity has no effect on perceptual fluency. In this way, the study contradicts past research findings suggesting that incongruent scenes require more time, and hence more cognitive effort, for processing and identifying the different objects compared to congruent scenes (Bar and Ullman, 1996; Davenport and Potter, 2004; Palmer, 1975; Rieger et al., 2008). Finally, it must be noted that the relationship between perceptual fluency and product-background congruence has not been discussed previously within the academic literature. Therefore, and importantly, the current study contributes to the research on fluency theory by demonstrating that congruity has no effect on perceptual fluency.

With regard to the effects of congruity on conceptual fluency, this thesis shows that complex congruent images influence higher levels of conceptual fluency, whereas complex incongruent images influence lower levels of conceptual fluency. In other words, people process the semantic meaning and message of an image presenting a product in a typical and expected

scene more easily than the semantic meaning of an image presenting the same product in an incongruent and surprising scene. These findings can be explained using schema-congruity theory (Mandler, 1989) and the claim that people find it easier to process the consistent to the stored schemas of information. For example, if a person stored a schema of an object pairing or an object appearing in a particular scene, such as a toothbrush next to the toothpaste in a bathroom, when they later encounter a similar scene, they would be able to process it easily. On the other hand, when they encounter an incongruent scene, such as a toothbrush in a hair salon, the scene would be perceived as incongruent and people will process it with much more effort and perhaps attempt to resolve the inconsistency. Moreover, past research confirms that there is a positive relationship between congruity and conceptual fluency in different contexts, such as text congruence (Whittlesea, 1993), character-product congruency (de Droog et al., 2011), banner congruence (Kao and Wang, 2013; Shen and Chen, 2007), picture-text congruence (Peracchio and Meyers-Levy, 2005), and hotel banner congruency (Van Rompay et al., 2010). The current PhD thesis supports those results and adds another congruity context in terms of luxury products and contextual backgrounds. Shapiro (1999) also compared congruent and incongruent product-background stimuli and found that congruent stimuli are more conceptually fluent than incongruent stimuli. Therefore, the current findings confirm Shapiro's (1999) results and demonstrate that the same findings are valid almost 20 years later. Finally, it is crucial to mention that the claim that all types of fluency lead to the same results (Alter and Oppenheimer, 2009) must be reconsidered in the context of congruity, as perceptual fluency and conceptual fluency lead to different results. Therefore, those two types of fluency must be examined separately, not as "processing fluency".

Study 2 also examined the effects of congruity on imagery fluency. Consistent with previous research findings (Zhang et al., 2020; Zhao et al., 2014; Wyer, Hung and Jinag, 2008; Wyer and Radvansky, 1999), this PhD thesis found that congruent images are more imagery fluent than incongruent images. In other words, it is easier for people to imagine a scene presenting a product in a matching and congruent setting. These results can also be explained through the schema-congruity theory (Mandler, 1989), according to which people store schemas based on their knowledge and past experiences and, when they encounter information similar to those schemas, they tend to process it easier. Therefore, when a product is placed in a familiar and typical setting, the schemas in the consumer's mind are consistent with the scene, which enhances the processing and imagining of the scene displayed in the image. In other words, when people are exposed to familiar (Wyer, Hung and Jiang, 2008; Wyer and Radvansky,

1999) and congruent scenes (Zhang et al., 2020), they generate mental imageries easier. In contrast, when the stimulus is placed in a surprising setting, the scene is inconsistent, not only with the product, but also with the stored schemas of where the product could be seen. In that way, the processing as well as the generation of mental imagery would be harder as it would require more cognitive effort. Moreover, according to Maier and Dost (2018), when it is challenging to process a stimulus, it would be a difficult task to imagine it. Finally, as imagery fluency has received limited attention in the literature, especially in terms of its relationship with visual stimuli, this part of the study has made an important contribution to the literature by demonstrating the positive effects of congruity on imagery fluency in the context of product-contextual background congruity.

### 6.4 The Mediating Effect of Fluency

This thesis has examined the effects of visual complexity and consumer purchase intentions, as well as the mediating role of perceptual fluency, conceptual fluency, and imagery fluency. In particular, the results of the study illustrate that perceptual fluency mediates the relationship between visual complexity and fluency. More specifically, a simple image presenting a single product on a white background is captured and processed easier on a perceptual level in comparison to a complex image presenting the same product placed within a contextual background. In other words, the perceptual processing of a simple image requires less cognitive effort than a complex image. Furthermore, the findings of the study demonstrate that perceptual fluency has a positive effect on purchase intentions. In other words, when people effortlessly process the physical characteristics of a stimulus, their intentions to purchase the product presented in the picture increase. On the other hand, when a stimulus is harder to process and is perceptually disfluent, consumers' purchase intentions are lower. Therefore, it can be concluded that perceptual fluency influences higher levels of purchase intentions. Moreover, the study also provides support to previous research suggesting a positive relationship between perceptual fluency and purchase intentions (Bigoin-Gagnan and Lacoste-Badie, 2018; Im, Lennon and Stoel, 2010; Im and Ha, 2011; Gomez and Werle, 2019). The majority of the previous research also discusses the combined effects of perceptual fluency and conceptual fluency in the context of processing fluency and its positive effects on different behaviour intentions (Dreisbach and Discher, 2011; Song and Schwarz, 2008; Storme, Myszkowski, Davila and Bournois, 2015; Coulter and Roggeveen, 2014; Mosteller et al., 2014). Thus, the current study extends these findings and demonstrates that visual complexity, in terms of the

presence *versus* absence of a contextual background, affects the ease of perceptual fluency, which, in turn, triggers purchase intentions.

The findings of this study also demonstrate the mediating role of conceptual fluency. To elaborate, people find simple images easier to understand semantically than complex images. The need for greater cognitive effort in the semantic processing of complex images is expected because they contain a lot of information and consumers could potentially find multiple interpretations (Gay, 1986) based on different associations they make with the elements displayed in the images. Furthermore, there is even a possibility of performing an "illusory conjunction" (Treisman, 1977), which could confuse the consumers further. On the other hand, when processing a simple image presenting a single object, such threats are minimised. Moreover, based on the theory of limited processing (Desimone and Duncan, 1995), when processing a simple image, consumers' attention is focused on the single objects in the image. The findings of the study also show that conceptual fluency has a positive effect on purchase intentions. In other words, when people find it easy to process the message and the meaning of an image, their intentions to purchase the advertised product increase. Similarly, if an image is harder to process, the level of purchase intentions decreases. These results support prior research suggesting a positive link between processing fluency and behaviour intentions (Dreisbach and Discher, 2011; Song and Schwarz, 2008; Storme, Myszkowski, Davila and Bournois, 2015; Coulter and Roggeveen, 2014; Mosteller et al., 2014). Furthermore, the results of the study explore the notion of processing fluency separately , i.e., as perceptual fluency and conceptual fluency, and their effects on consumer purchase intentions. In this way, the findings of the current research extend previous research on fluency because the relationship between fluency and behaviour intentions thus far has been discussed in the context of processing fluency and perceptual fluency, not conceptual fluency.

This thesis also shows the mediating role of imagery fluency in the relationship between visual complexity and consumer purchase intentions. The results of this study demonstrate that simple images influence imagery fluency, which in turn leads to higher purchase intentions. As a simple image contains just one object, it is easier for people to imagine it than a complex image which contains a lot of elements. In other words, generating mental imagery based on a simple image requires less cognitive effort in comparison to a complex image. Finally, this study has explored the relationship between imagery fluency and purchase intentions. The results of the study demonstrate that when it is easy for people to generate mental imagery of a stimulus, their intentions to purchase the product increase. Hence, imagery fluency (as with perceptual

fluency and conceptual fluency) influences consumer purchase intentions. These results support previous research demonstrating the positive effects of imagery fluency on behaviour intentions (Gregory et al., 1982; Petrova and Cialdini, 2005, 2007, 2008; Zhao, Hoeffler and Dahl, 2007).

To conclude, the overall results of the thesis state that the relationship between visual complexity and purchase intentions is not direct but is mediated by fluency. It is worth noting that earlier research has argued for a white space or burning money effect, which is defined as "The conspicuously open space found between other design elements or objects within the borders of an ad" (Pracejus, Olsen and O'Guinn, 2006, p. 82). It suggests that increased white space in an advertisement or other visual stimuli are a reflection of leadership, high quality, aesthetics, harmony, and elegance, which leads to positive brand evaluations (Pracejus, O'Guinn and Olsen, 2013; Pracejus, Olsen and O'Guinn, 2006). Based on these assertions, simple images presenting a product on a plain background (simple visual stimuli) should have a greater influence on purchase intentions than complex images. Contrary recent evidence (Kwan, Dai and Wyer, 2017) suggests that white space may not be as persuasive as had previously been claimed. This research demonstrates no significant direct effect of visual complexity on purchase intentions. Moreover, this research shows that the effect of visual complexity operates through the metacognitive processes of fluency.

Indeed, many processes are taking place in a consumer's mind when processing visual stimuli, therefore, the results of this PhD thesis highlight the underlying mechanism underpinning consumer behaviour. In this way, the study makes an important contribution to the fluency and behavioural literature by proposing a new model that explains and predicts consumer behaviour in response to visual stimuli. Specifically, these results contribute to the literature by supporting the claim that simple images influence consumer purchase intentions (Bigoin-Gagnan and Lacoste-Badie, 2018; Kolesova and Singh, 2019; Pelet, Durrieu and Lick, 2020); however, this PhD thesis adds the finding that the positive relationship is not direct but mediated by perceptual fluency, conceptual fluency, and imagery fluency. To elaborate, simple images are easier to perceive, process semantically, and imagine (due to the lower amount of information) compared to the complex images, and that ease of processing in turn influences consumers' intentions to buy the advertised product. It can be concluded that the results of the study show that the metacognitive experience of fluency is a powerful tool for influencing consumer purchase intentions. It is worth noting that the thesis has discussed perceptual, conceptual, and imagery fluency, as these dimensions of fluency are related to visual scene processing and the

results are consistent for each of them. Therefore, the study makes a unique contribution to the literature, as no other study has yet explored the effects of these three types of fluency simultaneously.

Furthermore, the study contradicts the arguments that high levels of visual complexity (Shapiro, 1999; Yoo and Kim, 2014; Lee, Hur and Watkins, 2018; Pieters, Wedel and Batra, 2010, Kim and Lennon, 2000) and moderate levels of visual complexity (Wang et al., 2020; Geissler, Zinkhan and Watson, 2006; Mulken et al., 2014) influence consumer purchase intentions.

### 6.5 Chapter Summary

Taken together, the findings of this PhD thesis show that the relationship between visual complexity (simple *versus* complex images) and consumer purchase intentions is mediated by fluency. The study concludes that simple images (those displaying a product on a white background) are perceived, processed semantically, and imagined easier than complex images (those presenting the same product placed within a contextual background), as they require less cognitive effort. Consequently, that ease of processing, i.e., fluency, influences a consumer's intentions to purchase the product. Finally, the results of the study also demonstrate that congruity moderates the relationship between visual complexity (simple *versus* complex images) and fluency. Hence, simple images are found to be more fluent than complex images, although complex congruent images (presenting a product within a congruent scene) are more conceptually fluent and imagery fluent than complex incongruent images (presenting a product within an incongruent scene). On the other hand, congruity has no effect on perceptual fluency.

In this and the previous chapters, this PhD thesis discussed the literature underpinning the current research (Chapter 2: Literature Review); developed a number of hypotheses to test the interrelationships between visual complexity, congruity, fluency, and consumer purchase intentions (Chapter 3: Hypotheses Development); discussed the methodology employed in the study (Chapter 4: Methodology); presented the findings of each experiment (Chapter 5: Analysis and Discussion); and provided a general discussion of the main results and contributions of the research (Chapter 6: General Discussion). The next chapter provides a summary of the findings and discusses their theoretical contributions and managerial implications.

# Chapter 7: Conclusion

This PhD thesis has examined the interrelationships between visual complexity (simple *versus* complex images), congruity (congruent *versus* incongruent images), fluency (perceptual fluency, conceptual fluency, and imagery fluency), and consumer purchase intentions. Previously, the thesis presented the theory related to and underpinning this research (Chapter 2: Literature Review), developed several hypotheses to test the relationships between the variables (Chapter 3: Hypotheses Development), discussed the methodology (Chapter 4: Methodology), presented the results of the experiments (Chapter 5: Analysis and Discussion), and provided a discussion of the findings (Chapter 6: General Discussion). The aim of this chapter is to summarise the findings and the main conclusions of this PhD thesis. The chapter first outlines the theoretical contributions, followed by the managerial implications of the findings. The chapter then discusses the limitations of the study and suggests avenues for future research.

## 7.1 Theoretical Contributions

The current piece of research relied on insights from the literature on aesthetics (Palmer et al., 2013) and fluency theory (Lee and Labroo, 2004; Reber et al., 2004) to propose a framework that tests and predicts consumers' responses to visual stimuli. The results of the experiments carried out in this PhD thesis offer new theoretical insights into the findings of past research on visual complexity, congruity, perceptual fluency, conceptual fluency, imagery fluency, and behavioural intentions. This part of the chapter discusses the theoretical contributions of the findings.

### 7.1.1 Visual Complexity and Fluency

By studying the way people process visual stimuli, this PhD thesis contributes to the literature on fluency. Specifically, the study demonstrates that visual complexity negatively affects perceptual fluency. In other words, the study indicates that simple images (presenting a single product on a plain background) are more perceptually fluent than complex images (presenting the same product within a contextual background). These findings seem to only confirm past research suggesting that visual complexity reduces fluency (Reber et al., 1998, 2004; Larsen et al., 2004; Wu et al., 2016; Maier and Dost, 2018; Mayer and Landwehn, 2014) but actually they extend the received wisdom by exploring the role of visual complexity in terms of the presence *versus* absence of a contextual background in perceptual fluency. In other words, the

majority of the previous research has focused on a particular perceptual dimension of visual complexity, such as symmetry (Reber et al., 2004; Mater and Landwehn, 2014), colours and contrasts (Reber et al., 1998), and amount of information (Wu et al., 2016; Garner, 1974; Reber et al., 1998, 2004; Larsen et al., 2004; Peracchio and Meyers-Levy, 1997), while a limited amount of research has explored the contextual background as a visual complexity dimension. Furthermore, this research extends Maier and Dost's (2018) study, which investigated the effect of processing fluency on images with and without a contextual background, by highlighting the individual effects of perceptual fluency and conceptual fluency.

With regard to the effects of visual complexity on conceptual fluency, this study suggests that visual complexity reduces conceptual fluency. Therefore, simple images are easier to understand semantically than complex images. These findings contradict past research that claims that a contextual background enhances the understanding of the meaning and the message of an image (Scott and Vargas, 2007; Shapiro, 1999; Whittlesea, 1992). In this way, the current study provides up-to-date research of the effects of visual complexity on conceptual fluency.

The different effects of visual stimuli on imagery fluency have not been scrutinised in substantial detail in the literature. Therefore, this study contributes to the research on fluency by demonstrating the negative effects of visual complexity on imagery fluency; specifically, that a simple image presenting a single product on a plain background influences higher levels of imagery fluency in comparison to complex images presenting the product within a contextual background. Although these new findings are inconsistent with previous research (Chang, 2013; Maier and Dost, 2018), they extend the knowledge of imagery fluency by demonstrating its effects in relation to typical product pictures with and without a contextual background, rather than sketches (Chang et al., 2018) or pictures of experiential and augmented products (Maier and Dost, 2018).

### 7.1.2 Visual Congruity and Fluency

The results of the current study shed light on the effects of congruity on fluency. Previous studies have not explored congruity in the context of perceptual fluency or imagery fluency. The findings of this PhD thesis demonstrate that congruity has no effect on perceptual fluency; specifically, when comparing two equally complex images differing only in their levels of congruity, they are both processed similarly on a perceptual level. This is a novel finding for fluency theory as product-contextual background congruity has not been previously

investigated. Furthermore, this PhD thesis highlights the positive relationship between congruity and imagery fluency. The present research has found that congruent images, showing a product in a congruent atmosphere, are more imagery fluent than incongruent images showing the same product in an incongruent setting. In this way, the study makes an important contribution to the literature by demonstrating a positive relationship between product-contextual background congruity and imagery fluency. Moreover, the study deepens knowledge of the effects that congruity has on different dimensions of fluency.

With regard to the effects of congruity on conceptual fluency, the results illustrate that complex congruent images are more conceptually fluent than complex incongruent images. Therefore, people process the semantic meaning of an image presenting a product in its expected scene easier in comparison to an image showing the same product in an incongruent scene. These findings support past research that demonstrates a positive relationship between congruity and conceptual fluency. However, it is worth noting that previous research has discussed congruity and its impact on conceptual fluency within different contexts, such as text congruence (Whittlesea, 1993), character-product congruency (de Droog et al., 2011), banner congruency (Kao and Wang, 2013; Shen and Chen, 2007), picture-text congruency (Peracchio and Meyers-Levy, 2005), and hotel banner congruency (Rompay et al., 2010). Hence, the current study extends these papers by studying congruity in terms of the presentation of a typical product (a luxury fashion item) on a contextual background. Shapiro (1999) conducted a similar study and also found that congruity positively affects conceptual fluency. Thus, this PhD thesis provides updated results confirming Shapiro's (1999) findings.

Another theoretical contribution made by this research is related to the nature of processing fluency. It is important to highlight that processing fluency in the context of congruity provides different results. Furthermore, the claim that different types of fluency trigger similar results (Alter and Oppenheimer, 2009) is not valid for perceptual fluency and conceptual fluency in the context of visual congruity. Therefore, those two types of fluency must be examined separately, not as "processing fluency". This is an important contribution to the literature, as the majority of papers on fluency have explored the ease of perceptual and semantic processing together (in terms of processing fluency). These two dimensions of fluency are indeed connected, as visual processing is perceptual at the beginning but then conceptual; however, perceptual and conceptual fluency could lead to different results, as demonstrated in Study 2.

This PhD thesis indicates that congruity plays a moderating role in the relationship between visual complexity and fluency. Specifically, when comparing the effects of simple and complex

images, simple images influence higher levels of perceptual fluency, conceptual fluency, and imagery fluency than complex ones. However, complex congruent images are found to be more conceptual and imagery fluent than complex incongruent images. These results contribute to the literature on fluency, as no other study has yet explored the moderating effect of product-contextual background congruity on the relationship between visual complexity and perceptual, conceptual, and imagery fluency.

### 7.1.3 The Mediating Role of Fluency

This study contributes to the existing debate on the direct as well as interactive effects of visual stimuli on purchase intentions, where some academics claim that simple images (Bigoin-Gagnan and Lacoste-Badie, 2018; Kolesova and Singh, 2019; Pelet, Durrieu and Lick, 2020) and others that complex images (Shapiro, 1999; Yoo and Kim, 2014; Pieters, Wedel and Batra, 2010; Lee, Hur and Watkins, 2018) influence consumer purchase intentions. The study contributes to the debate by demonstrating that the influence of visual complexity on consumer purchase intentions is mediated by perceptual fluency, conceptual fluency, and imagery fluency. In other words, simple images are easier to process perceptually (perceptually fluent) and semantically (conceptually fluent) and to imagine (imagery fluent) compared to complex images; and that ease of processing influences consumers' intentions to buy the product. Building on this, the PhD thesis makes a novel contribution by proposing that the three dimensions of fluency should mediate the relationship between visual stimuli and consumer purchase intentions.

Finally, this study responds to Palmer et al.'s (2013) call for research exploring the effects of fluency on behavioural intentions and further extends fluency theory by demonstrating that perceptual fluency, conceptual fluency, and imagery fluency trigger consumer purchase intentions. The results are consistent with prior research (Gregory et al., 1982; Petrova and Cialdini, 2005, 2007, 2008; Zhao, Hoeffler and Dahl, 2007) showing that when people generate mental imageries easily, they are more likely to purchase the product they imagine. The study also provides support for previous research demonstrating a positive relationship between perceptual fluency and purchase intentions (Bigoin-Gagnan and Lacoste-Badie, 2018; Im, Lennon and Stoel, 2010; Im and Ha, 2011; Gomez and Werle, 2019). Moreover, the study shows that conceptual fluency also has a positive effect on purchase intentions; hence, when people are able to process the semantic meaning of an image fluently, their intentions to purchase the product increase. These results expand upon previous research findings

suggesting a positive link between processing fluency and behaviour intentions (Dreisbach and Discher, 2011; Song and Schwarz, 2008; Storme, Myszkowski, Davila and Bournois, 2015; Coulter and Roggeveen, 2014; Mosteller et al., 2014) by demonstrating the individual effects of conceptual fluence and perceptual fluency. Therefore, the thesis improves the knowledge on the influence of conceptual fluency on purchase intentions, which has not been discussed so far in the literature.

As demonstrated above, the study contributes to the academic literature in a variety of ways. It is important to note that the findings of this PhD thesis have not only made theoretical contributions, but they could also be applied in the business world to enhance the performance of brands on social media and beyond. The next section discusses the managerial implications of the findings.

### 7.2 Managerial Implications

The current research offers a variety of practical implications for managers and businesses. Brands employ varying strategies with regard to the complexity of the images they use for their advertising campaigns, including posts on social media. Some brands use simple images, showing a product in isolation on a plain background. This practice has received a lot of support from academics and practitioners, as it allows consumers to focus solely on the product (Coyne, 2015; Maier and Dost, 2018; Pracejus, Olsen and O'Guinn, 2006; Bigoin-Gagnan and Lacoste-Badie, 2018; Kolesova and Singh, 2019; Pelet, Durrieu and Lick, 2020). Other brands prefer the use of complex images, placing a product in a certain setting/contextual background, portraying a specific meaning or message. This practice has also received a lot of support from academics and practitioners (Sekonda, 2014; Kusumasondjaja and Tjiptono, 2019; Yoo and Kim, 2014; Shapiro, 1999; Lee, Hur and Watkins, 2018; Pieters, Wedel and Batra, 2010). The current research offers insights that could help brands to increase consumer purchase intentions.

For example, one of the main findings of this PhD thesis is that simple images influence consumer purchase intentions via fluency. This implies that a simple image allows consumers to easily process the picture and the presented product, to understand its meaning and message, as well as to generate a fantasy or a mental imagery of the product. That ease of processing in turn leads to increased purchase intentions. Therefore, the current research recommends the use of simple images, especially when the aim of marketers is to influence consumer purchase intentions. The current trends on social media suggest the use of highly complex images, rich

in detail, portraying multi-layered meanings. The findings of this research recommend caution in employing such strategies, as consumers might not find it easy to perceive all the displayed elements on the image. As a result, complex multi-layered stimuli could potentially lead to consumers performing an incorrect joining of elements together or simply misinterpreting the meaning that campaigns intend to convey. This misunderstanding by the intended audience(s) could potentially affect and harm a company's bottom line. Furthermore, as consumers' imagination is a powerful tool in influencing their purchase intentions, the study demonstrates that complex images, perhaps due to the increased number of presented objects, are harder to imagine.

Another interesting finding of this research is that complex images do not appear to be as effective as simple images in influencing consumer purchase intentions. The reason for this is hidden in consumer processing experiences. As consumers cannot process complex images as easily as simple ones, the purchase intention rates for products displayed on complex images are lower. Of course, when advertising their products on and offline, brands have to employ complex visual stimuli in order to gain a competitive advantage, to differentiate themselves from the competitors, and to communicate, entertain, or educate consumers. For such campaigns, this research offers guidance on the use of visual complexity. Specifically, the research recommends the use of complex images, placing the product in a fitting setting, i.e., complex congruent images as opposed to complex incongruent images. Complex congruent images correspond to the already existing schemas in consumers' minds and, therefore, consumers are able to better understand them semantically and imagine them easier which, in turn, increases their intention to purchase the advertised product. Furthermore, the same strategy is recommended when companies aim to influence consumers to engage more and to better understand the message of visual stimuli.

### 7.3 Limitations and Future Research

This PhD thesis has researched the way people process visual stimuli and the behavioural intentions they provoke. The findings of the research provide a number of theoretical contributions and practical implications that will benefit the literature as well as the business world. On the other hand, the research has identified limitations as well as avenues for future research. Both are discussed in the following paragraphs.

In the experiments, the research focused on the effects of visual complexity in terms of the presence or absence of a contextual background on different dimensions of fluency. The

products used in Study 1 (a black *Montblanc* business bag) and in Study 3 (a piece of black *Prada* luggage) were presented on a white background in the simple image condition, which offered a strong colour contrast between the product and the white background. On the other hand, in Study 2, the used product (a beige *Valentino* bag) was also placed on a white background in the simple image condition; however, the contrast between the colour of the product and the background was not as strong as that in the other two studies. Although the results of the three experiments demonstrate consistency with regard to the effects of visual complexity on fluency, and that visual complexity manipulation was based on the contextual background (not the colour contrast), the experimental conditions slightly in respect of the presentation of the product in the three experiments, specifically in the simple image condition. Therefore, future research could extend the findings of this PhD thesis by exploring visual complexity, not only in the context of a contextual background, but also in combination with colour contrast. Furthermore, future research could study if the presence (*versus* absence) of certain colours in pictures would affect the information processing and behavioural intentions of consumers.

Another perceptual limitation of this research is related to the position of the product. The study manipulated the contextual background of the product pictures. However, the position of the product in the image (central, on the left/right-hand side, in the background, etc.) could potentially have an impact on fluency and behavioural intentions (Lam et al., 2017). Past research demonstrates that the position of the product affects the information processing (Hommel et al., 2001), as well as consumers' decision-making processes (Valenzuela and Raghubir, 2015). Specifically, any space or direction cues in the image have an effect on attention (Hommel et al., 2001), which has implications for the ease with which people process the information (Klein and Pontefract, 1994; Bardi et al., 2015). Moreover, the same is valid for gaze (Langton and Bruce, 1999): brands often use models in their visual communication and past research has explored the way that gaze affects consumers' processing experiences and behavioural intentions (Lam et al., 2017). This was not the focus of the current research; however, future studies could examine if the position of the product (e.g., if it is placed in the image on the left- *versus* right-hand side; or central *versus* top *versus* bottom) as well as the gaze of models affect perceptual fluency, conceptual fluency, and imagery fluency and the effectiveness of the image.

Knowledge of the influence of visual stimuli on imagery fluency is very limited. This research examined the interactive effects of visual complexity and visual congruity on imagery fluency.

However, more research is required to provide evidence of other perceptual dimensions of visual complexity, such as symmetry, colour contrast, and the number of elements, and the way they affect the ease with which people imagine a product.

This thesis used well-established scales to measure different variables, however there is one limitation that relates to the perceptual fluency scale. Some of the items on that scale, specifically "cluttered", "messy", and "crowded", are linked not only to perception but also might seem like "complexity" items. The study checked the discriminant validity but, to avoid confusion, future research could modify the scale or use other scales.

In Study 3, this PhD thesis investigated the impact of visual complexity on consumer purchase intentions. The results suggested that fluency mediates the relationship between visual complexity and behavioural intentions, such that simple images are processed perceptually, semantically, and imagery easier (compared to complex images), which, in turn, influences consumer purchase intentions. As the research on fluency and behavioural variables is limited (Pancer, Chandler, Poole and Noseworthy, 2019), the current research highlights the need for future research investigating the effects of perceptual fluency, conceptual fluency, and imagery fluency on different behaviours on social media, such as liking, commenting, and sharing.

It is important to note that there are different factors that might weaken the generalisability of the results of this PhD thesis. First, when manipulating the incongruity condition in Experiment 2, the researcher did not take into consideration adding an additional incongruity image design. For example, an incongruent image displaying a product placed in an incongruent manner (e.g. upside down) on a congruent environment. Second, to avoid biased responses, the researcher blurred the logos of the products used in the experiments; however, if some of the participants recognised the products and the brands, they might have provided biased answers. Also, participants could have perceived the products used in the experiments as luxury goods, which could also impact the way they answered the questions in the survey. These limitations should be addressed by future research.

Prior research indicates the effects of different types of fluency on a number of cognitive judgements, however, the effects of fluency on different cognitive processes and experiences have not been researched in sufficient detail (Palmer et al., 2013). Therefore, future research could examine the impact of fluency on cognition, such as attention, perception, and depth of processing. Furthermore, this research investigated the role of imagery fluency on image processing and behavioural intentions but ignored the cognitive process of mental imagery.

Therefore, future research could fill this gap by investigating the way perceptual fluency, conceptual fluency, and imagery fluency interact with mental imagery.

In the three experiments the study demonstrated the effects of visual stimuli of varying levels of complexity and congruity on perceptual fluency, conceptual fluency, and imagery fluency. The research established that simple images are easier to process, understand, and imagine, however, image processing involves a lot more cognitive as well as metacognitive experiences than the ones studied in this PhD thesis. For example, a scene could influence memory, which triggers not only imagery fluency, but also retrieval fluency. Therefore, future research could extend the framework proposed in this PhD thesis by investigating the effects of visual complexity and congruity on retrieval fluency.

This research proposed a framework that predicts consumer behaviour and explains some of the underlying mechanisms influencing consumer purchase intentions, however, in the experiments, the study used images of typical products. More specifically, the context of the investigation in this study was limited to luxury fashion products only. Future research could attempt to replicate the results by exploring other types of products, such as augmented products, experiential products (Maier and Dost, 2018), food packaging, and car advertisements. Future studies could also test the proposed framework in other contexts and disciplines.

This PhD thesis focused predominantly on visual stimuli and the way people process them, however, brands use combinations of pictures and text to portray a meaning or to communicate with consumers. Therefore, there is a need for a research extending the proposed model by employing not only images of varying levels of complexity and congruity, but also text with similar manipulations. It would be interesting to investigate the way people process campaigns that use visual and textual information and perhaps in this case future research could also explore the effects of reading fluency as well as perceptual, conceptual, and imagery fluency. A similar study was conducted by Yoo and Kim (2014) but they focused on the effect of mental imagery, not fluency.

Another limitation of this study refers to the customer journey. The study focused on the way consumers process visual stimuli in the context of luxury fashion brand communication, however, the study did not take into account the different stages of the customer journey and at which stage simple and complex images are more effective. Potentially, future research could fill that gap. Furthermore, the study was conducted in the context of social media brand

communication but brands' presence on social media is not only related to influencing consumer purchase intentions. Social media content is often aimed at entertaining or inspiring consumers, therefore, future research could explore the effects of visual stimuli on different aspects of the consumer experience on social media and if or how fluency has an impact on them.

Another potential avenue for future research relates to the sample of this research. The data for the research were collected in London around universities and shopping centres, therefore, the majority of the participants were from or living in England. It would be interesting to check whether the current results could be replicated in other cultures and countries. Moreover, to achieve generalisation, instead of using convenient sampling techniques, future research could examine the responses of broader representative groups. Finally, this study did not focus on variables such as gender or age, hence, future research could study the effects of visual complexity on fluency and consumer behavioural intentions and compare the responses of male and female participants as well as younger *versus* older participants.

### 7.4 Chapter Conclusion

This PhD thesis studied the effects of visual complexity on consumer purchase intentions, as well as the mediating role of fluency in the context of luxury fashion brand communication on social media. This chapter discussed the theoretical contributions and managerial implications of the findings. The chapter also outlined the limitations and suggested several avenues for future research.

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# Appendices

## Appendix 1: Consent form

Q1 Dear participant,

This questionnaire is investigating consumer sharing behaviour on social media. You will not be asked to provide your name, email, phone number or any personal information. Data collected through this questionnaire will be aggregated and you will not be individually identifiable in any reports or publications from this research. All information collected will be kept securely and will only be accessible by myself and my supervisors only. If you agree to participate in this study, please click "I agree" to continue. If you need to contact us in future, please contact me (pivano@essex.ac.uk) or Dr. Maged Ali (maaali@essex.ac.uk). You can also contact us in writing at: EBS, University of Essex, Colchester CO4 3SQ.

Yours,

Polly Sokolova

**Appendix 2: Consumer behaviour on social media and socioeconomic questions**

Q2 What is your gender?

- ○ Male (1)
- ○ Female (2)

Q3 What is your age in years?

Q4 What is your marital status?

- ○ Married (1)
- ○ Widowed (2)
- ○ Divorced (3)
- ○ Separated (4)
- ○ Never married (5)
- ○ In a relationship (6)

Q5 Do you share photos on social media? This could be photos of yourself, places, food, buildings or any other photos.

- ○ Yes (1)
- ○ No (2)

Q6 How often do you share photos on social media?

- ○ More than once daily (1)
- ○ Once daily (2)
- ○ 2-3 times a week (3)
- ○ Once a week (4)
- ○ Once a fortnight (5)
- ○ Once a month (6)
- ○ Less than once a month (7)

Q7 What do you share most often on social media? Please rank the following from 1 to 4.

_____ Photos (1)

_____ Text (including quotes) (2)

_____ Video (3)

_____ Stories (4)

Q8 What is your favourite social media?

| | Dislike a great deal (1) | Dislike a moderate amount (2) | Dislike a little (3) | Neither like nor dislike (4) | Like a little (5) | Like a moderate amount (6) | Like a great deal (7) |
|---|---|---|---|---|---|---|---|
| Facebook (1) | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Instagram (2) | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Twitter (3) | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Snapchat (4) | ○ | ○ | ○ | ○ | ○ | ○ | ○ |

Q15 Would you share this image on social media?

- ○ Definitely yes (1)
- ○ Probably yes (2)
- ○ Might or might not (3)
- ○ Probably not (4)
- ○ Definitely not (5)

**Appendix 3: Randomization Test**

Study 1

**ANOVA**

Gender and Perceptual Fluency

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 5.981 | 27 | .222 | .908 | .599 |
| Within Groups | 18.781 | 77 | .244 | | |
| Total | 24.762 | 104 | | | |

**ANOVA**

Age and Perceptual Fluency

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 1921.319 | 27 | 71.160 | 1.032 | .441 |
| Within Groups | 5311.881 | 77 | 68.985 | | |
| Total | 7233.200 | 104 | | | |

**ANOVA**

Gender and Conceptual Fluency

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 5.101 | 16 | .319 | 1.427 | .148 |
| Within Groups | 19.661 | 88 | .223 | | |
| Total | 24.762 | 104 | | | |

**ANOVA**

Age and Conceptual Fluency

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 1439.530 | 16 | 89.971 | 1.367 | .177 |
| Within Groups | 5793.670 | 88 | 65.837 | | |
| Total | 7233.200 | 104 | | | |

**ANOVA**

Gender and Imagery Fluency

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 4.759 | 27 | .280 | 1.218 | .268 |
| Within Groups | 20.003 | 87 | .230 | | |
| Total | 24.762 | 104 | | | |

**ANOVA**

Age and Imagery Fluency

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 1032.095 | 17 | 60.711 | .852 | .630 |
| Within Groups | 6201.105 | 87 | 71.277 | | |
| Total | 7233.200 | 104 | | | |

Study 2

**ANOVA**

Gender and Perceptual Fluency

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 7.969 | 30 | .266 | 1.073 | .373 |
| Within Groups | 48.533 | 196 | .248 | | |
| Total | 56.502 | 226 | | | |

**ANOVA**

Age and Perceptual Fluency

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 413780.349 | 30 | 13792.678 | .777 | .792 |
| Within Groups | 3462707.77 | 196 | 17757.476 | | |
| Total | 3876488.12 | 225 | | | |

**ANOVA**

Gender and Conceptual Fluency

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 5.110 | 18 | .284 | 1.149 | .307 |
| Within Groups | 51.392 | 208 | .247 | | |
| Total | 56.502 | 226 | | | |

**ANOVA**

Age and Conceptual Fluency

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 335555.939 | 18 | 18641.997 | 1.090 | .364 |
| Within Groups | 3540932.18 | 207 | 17105.953 | | |
| Total | 3876488.12 | 225 | | | |

**ANOVA**

Gender and Imagery Fluency

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 2.251 | 12 | .188 | .740 | .711 |
| Within Groups | 54.252 | 214 | .254 | | |
| Total | 56.502 | 226 | | | |

**ANOVA**

Age and Imagery Fluency

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 74219.888 | 12 | 6184.991 | .346 | .979 |
| Within Groups | 3802268.24 | 213 | 17851.025 | | |
| Total | 3876488.12 | 225 | | | |

Study 3

**ANOVA**

Gender and Perceptual Fluency

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 6.949 | 30 | .232 | 1.150 | .285 |
| Within Groups | 33.642 | 167 | .201 | | |
| Total | 40.591 | 197 | | | |

**ANOVA**

Age and Perceptual Fluency

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 3057.727 | 30 | 101.924 | .859 | .680 |
| Within Groups | 19707.349 | 166 | 118.719 | | |
| Total | 22765.076 | 196 | | | |

**ANOVA**

Gender and Conceptual Fluency

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 3.408 | 18 | .189 | .912 | .565 |
| Within Groups | 37.183 | 179 | .208 | | |
| Total | 40.591 | 197 | | | |

**ANOVA**

Age and Conceptual Fluency

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 2771.403 | 18 | 153.967 | 1.371 | .151 |
| Within Groups | 19993.674 | 178 | 112.324 | | |
| Total | 22765.076 | 196 | | | |

**ANOVA**

Gender and Imagery Fluency

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 2.886 | 12 | .241 | 1.180 | .300 |
| Within Groups | 37.705 | 185 | .204 | | |
| Total | 40.591 | 197 | | | |

**ANOVA**

Age and Imagery Fluency

| | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|
| Between Groups | 1229.522 | 12 | 102.460 | .875 | .573 |
| Within Groups | 21535.554 | 184 | 117.041 | | |
| Total | 22765.076 | 196 | | | |

## Appendix 4: Correlation Matrix

Study 1

Correlations

| | CONFLU |
|---|---|
| complex | |
| PERFLU | |
| CONFLU | |
| IMGFLU | .399** |

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

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

STUDY 2

Correlations

| | PERFLU | CONFLU | IMGFLU |
|---|---|---|---|
| COMPLEX | | | |
| CONGRU | | | |
| PERFLU | | | |
| CONFLU | .440** | | |
| IMGFLU | .163* | .466** | |

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

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

STUDY 3

Correlations

| | IMAGE | PERFLU | CONFLU | IMGFLU | PURINT |
|---|---|---|---|---|---|
| IMAGE | | | | | |
| PERFLU | -.395** | | | | |
| CONFLU | -.519** | .346** | | | |
| IMGFLU | -.458** | .286** | .635** | | |
| PURINT | -.224** | .312** | .381** | .374** | |

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

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

## Appendix 5: Process Output (Study 3)

### A. Perceptual Fluency

```
**************************************************************************
Model  : 4
   Y  : PURINT
   X  : SIMPCOMP
   M  : PERFLU
Sample
Size:  198
**************************************************************************
OUTCOME VARIABLE:
 PERFLU
Model Summary
        R       R-sq        MSE          F        df1        df2          p
    .5395      .2910     1.9879    80.4640     1.0000   196.0000      .0000
Model
                coeff         se          t          p       LLCI       ULCI
constant       5.2353      .1059    49.4441     .0000     5.0265     5.4441
SIMPCOMP       -.9498      .1059    -8.9702     .0000    -1.1586     -.7410

Standardized coefficients
                coeff
SIMPCOMP       -.5686

Covariance matrix of regression parameter estimates:
          constant   SIMPCOMP
constant     .0112      -.0036
SIMPCOMP     -.0036      .0112

**************************************************************************
OUTCOME VARIABLE:
```

PURINT

Model Summary

| R | R-sq | MSE | F | df1 | df2 | p |
|---|---|---|---|---|---|---|
| .3144 | .0989 | 2.3078 | 10.6959 | 2.0000 | 195.0000 | .0000 |

Model

| | coeff | se | t | p | LLCI | ULCI |
|---|---|---|---|---|---|---|
| constant | 2.0468 | .4188 | 4.8878 | .0000 | 1.2209 | 2.8727 |
| SIMPCOMP | -.0744 | .1355 | -.5489 | .5837 | -.3416 | .1928 |
| PERFLU | .2748 | .0770 | 3.5707 | .0004 | .1230 | .4266 |

Standardized coefficients

| | coeff |
|---|---|
| SIMPCOMP | -.0467 |
| PERFLU | .2883 |

Covariance matrix of regression parameter estimates:

| | constant | SIMPCOMP | PERFLU |
|---|---|---|---|
| constant | .1754 | -.0337 | -.0310 |
| SIMPCOMP | -.0337 | .0184 | .0056 |
| PERFLU | -.0310 | .0056 | .0059 |

********** DIRECT AND INDIRECT EFFECTS OF X ON Y **********

Direct effect of X on Y

| Effect | se | t | p | LLCI | ULCI | c'_ps |
|---|---|---|---|---|---|---|
| -.0744 | .1355 | -.5489 | .5837 | -.3416 | .1928 | -.0467 |

Indirect effect(s) of X on Y:

| | Effect | BootSE | BootLLCI | BootULCI |
|---|---|---|---|---|
| PERFLU | -.2610 | .0760 | -.4153 | -.1181 |

Partially standardized indirect effect(s) of X on Y:

| | Effect | BootSE | BootLLCI | BootULCI |
|---|---|---|---|---|
| PERFLU | -.1639 | .0458 | -.2564 | -.0762 |

**********

Bootstrap estimates were saved to a file

Map of column names to model coefficients:

| | Conseqnt | Antecdnt |
|---|---|---|
| COL1 | PERFLU | constant |
| COL2 | PERFLU | SIMPCOMP |
| COL3 | PURINT | constant |
| COL4 | PURINT | SIMPCOMP |
| COL5 | PURINT | PERFLU |

********** BOOTSTRAP RESULTS FOR REGRESSION MODEL PARAMETERS **********

OUTCOME VARIABLE:

PERFLU

| | Coeff | BootMean | BootSE | BootLLCI | BootULCI |
|---|---|---|---|---|---|
| constant | 5.2353 | 5.2337 | .1059 | 5.0129 | 5.4338 |
| SIMPCOMP | -.9498 | -.9503 | .1019 | -1.1446 | -.7418 |

---

OUTCOME VARIABLE:

PURINT

| | Coeff | BootMean | BootSE | BootLLCI | BootULCI |
|---|---|---|---|---|---|
| constant | 2.0468 | 2.0534 | .3854 | 1.2941 | 2.8297 |
| SIMPCOMP | -.0744 | -.0785 | .1340 | -.3384 | .1806 |
| PERFLU | .2748 | .2732 | .0739 | .1285 | .4190 |

********** ANALYSIS NOTES AND ERRORS **********

Level of confidence for all confidence intervals in output:
95.0000

Number of bootstrap samples for percentile bootstrap confidence intervals:
5000

NOTE: Standardized coefficients for dichotomous or multicategorical X are in
partially standardized form.

------ END MATRIX -----

**CONCEPTUAL FLUENCY**

Run MATRIX procedure:

********** PROCESS Procedure for SPSS Version 3.5 **********

Written by Andrew F. Hayes, Ph.D. www.afhayes.com
Documentation available in Hayes (2018). www.guilford.com/p/hayes3

**********
Model : 4
Y : PURINT
X : SIMPCOMP
M : CONFLU

Sample
Size: 198

**********

OUTCOME VARIABLE:

CONFLU

Model Summary

| R | R-sq | MSE | F | df1 | df2 | p |
|---|---|---|---|---|---|---|
| .4413 | .1948 | 2.5135 | 47.4098 | 1.0000 | 196.0000 | .0000 |

Model

| | coeff | se | t | p | LLCI | ULCI |
|---|---|---|---|---|---|---|
| constant | 4.1404 | .1191 | 34.7754 | .0000 | 3.9056 | 4.3752 |
| SIMPCOMP | -.8198 | .1191 | -6.8855 | .0000 | -1.0546 | -.5850 |

Standardized coefficients

| | coeff |
|---|---|
| SIMPCOMP | -.4652 |

Covariance matrix of regression parameter estimates:

| | constant | SIMPCOMP |
|---|---|---|
| constant | .0142 | -.0046 |
| SIMPCOMP | -.0046 | .0142 |

**********

OUTCOME VARIABLE:

PURINT

Model Summary

| R | R-sq | MSE | F | df1 | df2 | p |
|---|---|---|---|---|---|---|
| .3827 | .1465 | 2.1859 | 16.7294 | 2.0000 | 195.0000 | .0000 |

Model

| | coeff | se | t | p | LLCI | ULCI |
|---|---|---|---|---|---|---|
| constant | 2.1250 | .2973 | 7.1474 | .0000 | 1.5386 | 2.7113 |

| | | | | | | |
|---|---|---|---|---|---|---|
| SIMPCOMP | -.0660 | .1237 | -.5334 | .5944 | -.3100 | .1780 |
| CONFLU | .3286 | .0666 | 4.9330 | .0000 | .1972 | .4600 |

Standardized coefficients

| | coeff |
|---|---|
| SIMPCOMP | -.0415 |
| CONFLU | .3637 |

Covariance matrix of regression parameter estimates:

| | constant | SIMPCOMP | CONFLU |
|---|---|---|---|
| constant | .0884 | -.0190 | -.0184 |
| SIMPCOMP | -.0190 | .0153 | .0036 |
| CONFLU | -.0184 | .0036 | .0044 |

********** DIRECT AND INDIRECT EFFECTS OF X ON Y **********

Direct effect of X on Y

| Effect | se | t | p | LLCI | ULCI | c'_ps |
|---|---|---|---|---|---|---|
| -.0660 | .1237 | -.5334 | .5944 | -.3100 | .1780 | -.0415 |

Indirect effect(s) of X on Y:

| | Effect | BootSE | BootLLCI | BootULCI |
|---|---|---|---|---|
| CONFLU | -.2694 | .0675 | -.4077 | -.1491 |

Partially standardized indirect effect(s) of X on Y:

| | Effect | BootSE | BootLLCI | BootULCI |
|---|---|---|---|---|
| CONFLU | -.1692 | .0410 | -.2529 | -.0952 |

**************************************************************************

Bootstrap estimates were saved to a file

Map of column names to model coefficients:

| | Conseqnt | Antecdnt |
|---|---|---|
| COL1 | CONFLU | constant |

COL2 CONFLU SIMPCOMP

COL3 PURINT constant

COL4 PURINT SIMPCOMP

COL5 PURINT CONFLU

***** BOOTSTRAP RESULTS FOR REGRESSION MODEL PARAMETERS ******

OUTCOME VARIABLE:

CONFLU

| | Coeff | BootMean | BootSE | BootLLCI | BootULCI |
|---|---|---|---|---|---|
| constant | 4.1404 | 4.1391 | .1161 | 3.9115 | 4.3623 |
| SIMPCOMP | -.8198 | -.8219 | .1150 | -1.0499 | -.5934 |

---

OUTCOME VARIABLE:

PURINT

| | Coeff | BootMean | BootSE | BootLLCI | BootULCI |
|---|---|---|---|---|---|
| constant | 2.1250 | 2.1265 | .2862 | 1.5902 | 2.7029 |
| SIMPCOMP | -.0660 | -.0690 | .1227 | -.3103 | .1654 |
| CONFLU | .3286 | .3286 | .0699 | .1896 | .4636 |

********** ANALYSIS NOTES AND ERRORS **********

Level of confidence for all confidence intervals in output: 95.0000

Number of bootstrap samples for percentile bootstrap confidence intervals: 5000

NOTE: Standardized coefficients for dichotomous or multicategorical X are in partially standardized form.

------ END MATRIX -----

**IMAGERY FLUENCY**

Run MATRIX procedure:

***************** PROCESS Procedure for SPSS Version 3.5 *****************

Written by Andrew F. Hayes, Ph.D. www.afhayes.com
Documentation available in Hayes (2018). www.guilford.com/p/hayes3

**************************************************************************
Model : 4
Y : PURINT
X : SIMPCOMP
M : IMGFLU

Sample
Size: 198

**************************************************************************
OUTCOME VARIABLE:
IMGFLU
Model Summary

| R | R-sq | MSE | F | df1 | df2 | p |
|---|---|---|---|---|---|---|
| .3925 | .1540 | 1.7911 | 35.6904 | 1.0000 | 196.0000 | .0000 |

Model

| | coeff | se | t | p | LLCI | ULCI |
|---|---|---|---|---|---|---|
| constant | 4.7951 | .1005 | 47.7098 | .0000 | 4.5969 | 4.9933 |
| SIMPCOMP | -.6004 | .1005 | -5.9741 | .0000 | -.7986 | -.4022 |

Standardized coefficients

| | coeff |
|---|---|
| SIMPCOMP | -.4137 |

Covariance matrix of regression parameter estimates:

| | constant | SIMPCOMP |
|---|---|---|
| constant | .0101 | -.0033 |
| SIMPCOMP | -.0033 | .0101 |

**********

OUTCOME VARIABLE:

PURINT

Model Summary

| R | R-sq | MSE | F | df1 | df2 | p |
|---|---|---|---|---|---|---|
| .3782 | .1430 | 2.1948 | 16.2687 | 2.0000 | 195.0000 | .0000 |

Model

| | coeff | se | t | p | LLCI | ULCI |
|---|---|---|---|---|---|---|
| constant | 1.6495 | .3951 | 4.1745 | .0000 | .8702 | 2.4288 |
| SIMPCOMP | -.1055 | .1210 | -.8720 | .3843 | -.3440 | .1331 |
| IMGFLU | .3829 | .0791 | 4.8425 | .0000 | .2270 | .5388 |

Standardized coefficients

| | coeff |
|---|---|
| SIMPCOMP | -.0662 |
| IMGFLU | .3490 |

Covariance matrix of regression parameter estimates:

| | constant | SIMPCOMP | IMGFLU |
|---|---|---|---|
| constant | .1561 | -.0220 | -.0300 |
| SIMPCOMP | -.0220 | .0146 | .0038 |
| IMGFLU | -.0300 | .0038 | .0063 |

********** DIRECT AND INDIRECT EFFECTS OF X ON Y **********

Direct effect of X on Y

| Effect | se | t | p | LLCI | ULCI | c'_ps |
|---|---|---|---|---|---|---|
| -.1055 | .1210 | -.8720 | .3843 | -.3440 | .1331 | -.0662 |

Indirect effect(s) of X on Y:

| | Effect | BootSE | BootLLCI | BootULCI |
|---|---|---|---|---|
| IMGFLU | -.2299 | .0593 | -.3541 | -.1216 |

Partially standardized indirect effect(s) of X on Y:

| | Effect | BootSE | BootLLCI | BootULCI |
|---|---|---|---|---|
| IMGFLU | -.1444 | .0360 | -.2196 | -.0771 |

**********

Bootstrap estimates were saved to a file

Map of column names to model coefficients:

| | Conseqnt | Antecdnt |
|---|---|---|
| COL1 | IMGFLU | constant |
| COL2 | IMGFLU | SIMPCOMP |
| COL3 | PURINT | constant |
| COL4 | PURINT | SIMPCOMP |
| COL5 | PURINT | IMGFLU |

***** BOOTSTRAP RESULTS FOR REGRESSION MODEL PARAMETERS ******

OUTCOME VARIABLE:

IMGFLU

| | Coeff | BootMean | BootSE | BootLLCI | BootULCI |
|---|---|---|---|---|---|
| constant | 4.7951 | 4.7961 | .0919 | 4.6123 | 4.9753 |
| SIMPCOMP | -.6004 | -.6000 | .0915 | -.7810 | -.4223 |

---

OUTCOME VARIABLE:

PURINT

| | Coeff | BootMean | BootSE | BootLLCI | BootULCI |
|---|---|---|---|---|---|
| constant | 1.6495 | 1.6473 | .3788 | .9179 | 2.3816 |
| SIMPCOMP | -.1055 | -.1050 | .1271 | -.3519 | .1425 |
| IMGFLU | .3829 | .3831 | .0794 | .2262 | .5380 |

********** ANALYSIS NOTES AND ERRORS **********

Level of confidence for all confidence intervals in output: 95.0000

Number of bootstrap samples for percentile bootstrap confidence intervals: 5000

NOTE: Standardized coefficients for dichotomous or multicategorical X are in partially standardized form.

------ END MATRIX -----