CRANFIELD UNIVERSITY

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THE EFFECT OF KNOWLEDGE MISCALIBRATION ON THE DIMENSIONS OF CONSUMER VALUE

SCHOOL OF MANAGEMENT

PhD Thesis

PhD in Management

Academic Year: 2014 - 2015

Supervisors: Dr Radu Dimitriu, Professor Simon Knox

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ABSTRACT

Consumer value is an important determinant of consumers' post-use behaviour, for example satisfaction, repeat purchase and word of mouth. The existing research mainly looks at the factors associated with the product and service providers to improve consumer value. Few studies on the role of the consumer in shaping consumer value have found consumer knowledge to be an important element in shaping consumer value. Adopting critical realism, this PhD expands this area of knowledge by investigating knowledge miscalibration (i.e., the inaccuracy in subjective knowledge) as a significant antecedent of consumer value.

Most of the time, consumers' perceptions of what they think they know (i.e., subjective knowledge) has been shown to be different from what they actually know (i.e., objective knowledge). Thus, subjective knowledge is usually inaccurate. This inaccuracy in subjective knowledge relative to objective knowledge is called knowledge miscalibration. Although the effect of knowledge miscalibration on consumers' purchasing decisions has been investigated in the consumer behaviour literature, its role in the use stage of consumption has received much less attention. The aim of this research is to examine the effect of knowledge miscalibration on product or service use, and more specifically on the value consumers derive from actually using products or services (i.e., value-in-use).

In this research a critical realism paradigm is pursued, implying that reality exists in the three domains of the empirical, the actual and the real. The research starts with observing regularity in the empirical domain (i.e., consumer value) followed by imagining the causal power in the actual and the real domains (i.e., knowledge miscalibration), shaping the research question. A retroductive strategy is followed, firstly by proposing the effect of knowledge miscalibration on consumer value and secondly by conceptually and empirically testing this relationship.

This research conceptualises that knowledge miscalibration influences consumer value dimensions, described as efficiency, excellence, play and aesthetics. It is suggested that underconfidence (i.e., knowledge miscalibration where subjective knowledge is deflated) and overconfidence (i.e., knowledge miscalibration where subjective

knowledge is inflated) influence consumer value dimensions differently as they generate different consequences in use. Therefore, a conceptual model is developed that describes the effect of knowledge miscalibration (i.e., overconfidence and underconfidence) on the dimensions of consumer value.

The empirical part of the research is designed by conducting a covariance-based study and an experimental investigation in order to gain both internal and external validity. The covariance-based investigation is conducted in the context of amazon.com online shopping. Knowledge miscalibration and consumer value dimensions are measured in this study. This study supports the negative effect of underconfidence on efficiency, excellence, play and aesthetics and the negative effect of overconfidence on play.

The experimental investigation is designed in the context of prezi.com, an online dynamic presentation creation website that enables its users to move between slides, words and images during their presentations. In this study, overconfidence and underconfidence are manipulated and their effects on the dimensions of consumer value are examined. The findings of this study show that underconfidence negatively influences efficiency, excellence and aesthetics, while overconfidence negatively impacts excellence, play and aesthetics.

Overall, this PhD concludes that knowledge miscalibration negatively influences the dimensions of consumer value, with the exception of overconfidence impacting efficiency. The contradictory results of the covariance-based study observed in the experimental study can be explained through its inability to account for reciprocal relationships (i.e., where consumer value dimensions also impact knowledge miscalibration) and the existence of a third variable affecting both independent and dependent variables. Furthermore, the context of the experimental study (employing a new consumption task) is proposed to be the main reason for the lack of support for the effect of underconfidence on play.

Keywords:

Overconfidence, Underconfidence, Value-in-use, Knowledge calibration, Subjective knowledge, Customer value

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GLOSSARY OF TERMS

*Consumer value: "*An interactive, relativistic preference experience" (Holbrook, 1996, p. 138).

Flow: An optimal state of mind where there is a deep engagement with a consumption task (Csikszentmihalyi, 1990).

Knowledge miscalibration: Inaccuracy in subjective knowledge (relative to objective knowledge).

Objective knowledge: Actual consumer knowledge about a product or service.

Overconfidence: Knowledge miscalibration where subjective knowledge is inflated (relative to objective knowledge).

Self-efficacy: The self-assessment of the performance of consuming a product or service.

Subjective knowledge: The self-assessment of consumer knowledge about a product or service.

Underconfidence: Knowledge miscalibration where subjective knowledge is deflated (relative to objective knowledge).

Use: A mental, physical or virtual use or possession of resources (Grönroos and Voima, 2013).

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1 INTRODUCTION

1.1 CONSUMER VALUE

Academics have explained value as an important factor in business operations. Woodruff (1997) suggests that consumer value (or customer value in a broad sense) is the primary source of competitive advantage, while Porter (1985) defines businesses as value creating entities. Practitioners also verify the crucial role of value in business operations. For example, in the latest American Marketing Association's definition of marketing in 2013, marketing aims to create, communicate and deliver offerings that have value for stakeholders (American Marketing Association, 2013).

Although there is agreement on the importance of value, the way it is defined varies across academic disciplines and paradigms. In particular, the focus on exchange (i.e., the focus on the exchange of resources vs. the focus on the exchange of the application of resources) identifies the way value is defined. Traditionally, value was viewed as attached to the resources exchanged (e.g., Porter, 1985; Christopher, 2005); in this view, value is added to the resources through internal chains of processes (Porter, 1985) or chains of businesses (Christopher, 2005), for example, in the case of a Smartphone, the value is added to the actual Smartphone product through supply, manufacturing, marketing and delivery activities.

However, the service-dominant logic of marketing embeds value in the application of resources rather than in resources per se (Vargo and Lusch, 2008). In fact, in the service-dominant logic service as the application of resources for the benefit of another party is the unit of exchange and value is always determined by the beneficiary (Vargo and Lusch, 2008). Therefore, consumers integrate their own resources (e.g., knowledge and skills) and exchanged resources (e.g., products) to create value (Vargo and Lusch, 2004). In the case of using software for instance, consumers apply their software knowledge and use the features of the software to solve their problems, creating value when they actually use the software. Although this view highlights the role of consumer resources in the value creation process, there are only a few studies that offer empirical evidence for it (e.g., Barrutia and Gilsanz, 2012; van Beuningen, de Ruyter and

Wetzels, 2011). This PhD follows the service-dominant logic view of exchange to shed light on the effect of consumer resources on consumer value.

In the service-dominant logic value refers to value-in-use, signifying that value is perceived by the consumer in a specific use situation (Woodruff and Flint, 2006) through "an interactive, relativistic preference experience" (Holbrook, 1996, p. 138). Use is the mental, physical or virtual use or possession of resources (Grönroos and Voima, 2013). Consumer value is an outcome of consumers' evaluations and performances in the use of a product or a service (Woodruff, 1997); it reflects rational (e.g., price and quality; Zeithaml, 1988) and non-rational (e.g., emotion; Holbrook and Batra, 1987) aspects in use. In fact, consumer value is a multidimensional phenomenon, dealing with different aspects of use such as efficiency, excellence, play and aesthetics (Holbrook, 1999), which are investigated in this PhD. In addition, consumer value is a strong predictor of consumers' post-use intentions (Chen and Dubinsky, 2003; Lam, Shankar, Erramilli and Murthy, 2004; Liu and Jang, 2009; Overby and Lee, 2006). Therefore, it is crucial for businesses to understand factors determining consumer value, in particular those residing with the consumer (i.e., consumer resources).

1.2 CONSUMER KNOWLEDGE

Arnould, Price and Malshe (2006) classify consumer resources into economic, physical, social and cultural resources. Economic resources are material objects, such as goods and money, or physical spaces, such as a garden or a house. Physical resources are those related to the mental and physical capabilities of a consumer, such as sensorimotor (i.e., pertaining to responses caused by sensory stimuli) endowment, energy and emotion. Social resources are social relationship networks around the consumer, which can be demographic groups, such as families, ethnic groups and emerging groups, for example brand communities or consumer tribes. Finally, cultural resources are specialised knowledge and skills required to achieve specific goals.

Among the different types of consumer resources discussed in the framework established by Arnould *et al.* (2006), consumer knowledge (i.e., a cultural resource) is strongly established in consumer behaviour literature. Consumer knowledge has been selected for this research as it is an important construct in shaping consumer behaviour,

including consumer decision-making (Bettman and Park, 1980; Beattie, 1982; Moorman, Diehl, Brinberg and Kidwell, 2004), information search (Brucks, 1985), evaluation and judgement (Cordell, 1997; Hong and Strenthal, 2010; Rao and Monroe, 1988; Sujan, 1985), information processing (Alba and Hutchinson, 1987; Cowley and Mitchell, 2003; Srull, 1983) and product involvement (Park and Moon, 2003). Therefore, instead of looking at all types of consumer resources, this research will focus on the specific resource of consumer knowledge.

Consumers' knowledge of products and services has always been an important factor in buyer-seller relationships. For instance, the ancient marketplaces of Athens were sectioned in such a way that consumers could easily find the products they required; these market sections, named after the product sold there, matched consumers' knowledge of the location of the products or services that they intended to buy (Trentmann, 2012). Indeed, the ancient marketplaces in Athens had a product categorisation similar to the consumers' categorisation of the products in their long-term memory.

Consumer knowledge has played a crucial role in company-consumer relationships since the industrial revolution, with the emergence of a wide variety of complex products. One of the main challenges for manufacturers has been to increase consumers' knowledge of their products and services so as to ensure more people consume their products or services (Weaver, 1935). Furthermore, consumers with a better knowledge of products and services have benefited from the rational use of those products and services (Kyrk, 1930). For instance, when the telephone was invented and commercialised in the late 19th century, on the one hand companies needed to educate consumers on how to use the telephone in order to sell their products, and on the other hand consumers needed to learn how to use the telephone to exploit its potential benefits.

Empirical studies have shown that consumer knowledge influences different aspects of consumer behaviour. For instance, Staelin (1978) illustrates that increasing consumer knowledge about safety principles reduces the number of consumption related injuries. Alternatively, Brucks (1985) reveals that consumer knowledge positively influences information search and information acquisition for consumers. A general conclusion

from Hutchinson and Eisenstein (2008) is that consumer knowledge increases the potential benefits consumers receive from using a product or service. Barrutia and Gilsanz (2012) have also found a positive relationship between consumer knowledge and consumer value.

Consumer knowledge can be divided into objective and subjective knowledge (Alba and Hutchinson, 2000; Brucks, 1985); objective knowledge is the product or service information retrievable from the long-term memory that can be validated for accuracy, whereas subjective knowledge is consumers' self-assessment of the validity of the product or service information they retain in memory (Brucks, 1985; Carlson, Vincent, Hardesty and Bearden, 2009; Park, Mothersbaugh and Feick, 1994). For example, a consumer's knowledge about the return policy of an online shopping website is her objective knowledge, whereas her perception of the validity of this knowledge is her subjective knowledge. The consumer may recall that the return policy is 14 days, reflecting her objective knowledge. This can be true or false, demonstrating the consumer's level of objective knowledge. The consumer also has a perception about the validity of her objective knowledge. For instance, she might think that her knowledge about the 14 day return policy is 80% correct, reflecting the level of subjective knowledge. An individual's subjective knowledge is frequently inaccurate, which means that in many situations the individual does not know how much she knows (Alba and Hutchinson, 2000; Lichtenstein and Fischhoff, 1977). This phenomenon is referred to as knowledge miscalibration.

1.3 KNOWLEDGE MISCALIBRATION

Knowledge calibration is the agreement between subjective and objective knowledge about a product or service that a consumer can apply to a consumption task (Alba and Hutchinson, 2000), and knowledge miscalibration represents its reverse. The agreement between subjective and objective knowledge reflects the accuracy of subjective knowledge, and therefore knowledge miscalibration refers to the inaccuracy in subjective knowledge. Knowledge miscalibration can take one of two forms: overconfidence or underconfidence. A consumer is overconfident when her subjective knowledge is inflated (Alba and Hutchinson, 2000) and underconfident when her

subjective knowledge is deflated. In fact, some consumers have product or service knowledge (i.e., objective knowledge) that they are not aware of (i.e., deflated subjective knowledge or underconfidence), while others have less knowledge about a product or service (i.e., objective knowledge) than they think they have (i.e., inflated subjective knowledge or overconfidence).

Individuals may incur costs (i.e., economic and non-economic) as a consequence of overconfidence and underconfidence. They might lose the opportunity to take advantage of applying knowledge (i.e., which they are not aware of) in a task or they might pursue the wrong path (Dunning, Heath and Suls, 2004); for instance, an underconfident individual may not apply for a good college or university based on an inaccurate assessment of her knowledge (Dunning *et al.*, 2004), or an overconfident individual might purchase a high-end digital camera that she thinks is matched with her own knowledge of camera use where in fact it is not (Burson, 2007).

To date, investigations of overconfidence and underconfidence have focused on purchase decisions. These studies have shown that lower levels of knowledge miscalibration result in better purchase decisions (Alba and Hutchinson, 2000; Burson, 2007; Kidwell, Hardesty and Childers, 2008). However, knowledge miscalibration can continue to impact the use of products and services, in addition to consumers' purchasing decisions. In fact, consumers appraise the possible means needed to achieve a certain goal (Bagozzi and Dholakia, 1999). Bagozzi (1992) defines the self-assessment of consumers' resources (e.g., subjective knowledge) as one of the primary means-appraisal processes. Indeed, in their daily product or service consumptions people take action based on their impression of their own skill, knowledge and ability to actually use products and services. Therefore, the inaccuracy in subjective knowledge (i.e., knowledge miscalibration) can play a crucial role in the *use* stage of consumption. However, it is less clear how overconfidence and underconfidence affect the use stage of consumption, and the related perceived value of products or services. For instance, in the case of the overconfident consumer with the high-definition camera, the question is: how does her knowledge miscalibration impact the value she attributes to the use of the camera? Alternatively, imagine another consumer who believes she knows little about the Amazon website, while she actually knows how to use Amazon very well; the

question here is how this consumer's underconfidence influences the value she attributes to the use of the Amazon shopping website. To answer these questions, the goal of this PhD research is to understand the role of knowledge miscalibration in the value consumers derive from the use stage of consumption.

1.4 AIM AND RESEARCH QUESTION

The goal of positivist deductive research is to provide conceptual and empirical support for a hypothesised theory (Blaikie, 2007). However, a positivist paradigm does not explain how these hypothesised theories are developed. They can be developed through induction reasoning which is based on, at a minimum, a single observable event (Mantere and Ketokivi, 2013); for example, the researcher observes that a knowledgeable consumer perceives value positively and hypothesises the effect of consumer knowledge on consumer value. Hypothesis development could also be the outcome of deductive reasoning based on existing theories (Mantere and Ketokivi, 2013). For instance, the researcher hypothesises the effect of consumer knowledge on consumer value in online contexts, based on established theories that consumer knowledge affects consumer value in offline contexts and based on the fact that consumers behave similarly in offline and online contexts. However, these paradigms limit the theory development to existing theories and observable events. Critical realism helps this PhD to look beyond observed events and existing theories. In a critical realism paradigm, a causal mechanism, which is not observable with the event, is imagined first and its validity is investigated in the later stages of the research (Bhaskar, 1998). Applying a retroductive research strategy based on critical realism (Bhaskar, 1998), this research hypothesises and validates that knowledge miscalibration affects consumer value.

Knowledge miscalibration has not yet been conceptually or empirically observed as a causal mechanism of consumer value. Therefore, the value of this PhD is to imagine knowledge miscalibration as a causal mechanism of consumer value (i.e., beyond the existing understanding and observation of causal mechanisms) and to validate this proposition conceptually and empirically. Therefore, the question this research poses is:

- What is the effect of knowledge miscalibration on consumer value?

In fact, critical realism informs the entire research process from defining the research question to investigating its validity. According to Bhaskar (1998) and as debated later in this thesis, the second part of this PhD which seeks to validate the effect of knowledge miscalibration on consumer value conceptually and empirically is in line with a deductive objectivism paradigm.

1.5 POSITIONING THE FIELD OF ENQUIRY

Self-assessment of performance (i.e., self-efficacy; Bandura, 1977) and self-assessment of knowledge (i.e., subjective knowledge; Park *et al.*, 1994) have been investigated in both psychology and consumer behaviour. The effect of self-efficacy and subjective knowledge on people's performance has also been studied in educational psychology (e.g., Bandura, 1977; Eccles and Wigfield, 1995; Gist, Schwoerer and Rosen, 1989) as well as human-machine interaction literature (e.g., Kuo, Chu, Hsu and Hsieh, 2004; Oulasvirta, Wahlström and Ericsson, 2011). These studies have been followed in the marketing and consumer behaviour literature by investigations into the effect of self-efficacy on consumers' evaluations of the economic worth of a product or service (e.g., McKee, Simmers and Licata, 2006; van Beuningen *et al.*, 2011; van Beuningen, de Ruyter, Wetzels and Streukens, 2009).

However, these works are not concerned with inaccuracy in self-assessment (i.e., miscalibration). In educational psychology, Kim, Chiu and Zou (2010) and Winne and Jamieson-Noel (2002) identify that it is the inaccuracy in self-efficacy that determines performance rather than self-efficacy per se. Consumer behaviour literature has also started exploring the consequences of knowledge miscalibration in the use of products and services (Pillai and Hofacker, 2007). Nonetheless, the relationship between knowledge miscalibration and consumer value dimensions resulting from use has neither been clearly conceptualised nor empirically investigated. Table 1 shows the two aspects of self-assessment (i.e., self-assessment of performance and self-assessment of knowledge) and the relevant studies focusing on inaccuracy in self-perceptions.

Table 1: Aspects of Self-assessment and the Consequent Type of Miscalibration

	Self-assessment	**Inaccuracy in Self-assessment**
Performance	Self-efficacy (Bandura, 1977)	Miscalibration of achievement (Kim *et al.,* 2010)
Knowledge	Subjective knowledge (Burcks, 1985)	Knowledge Miscalibration (Overconfidence and underconfidence) (Alba and Hutchinson, 2000; Lichtenstein and Fischhoff, 1977)

Table 2: Existing Studies on Miscalibration

Concept	**Performance**	**Decision**	**Consumer Value**
Miscalibration of Performance	Kim *et al.,* 2010; Winne and Jamieson-Noel, 2002	Burson, 2007; Pearson and Liu-Thompkin, 2012	Research Opportunity
Knowledge Miscalibration	Research Opportunity	Alba and Hutchinson, 2000; Kidwell *et al.,* 2008	Research Opportunity

Table 2 shows a categorisation of the research conducted on miscalibration from different points of view. Studies on miscalibration of performance have focused on inaccuracy in the self-efficacy rather than subjective knowledge (i.e., the interest of this research), for example in consumer behaviour Burson (2007) introduces skill matching as a process in which a consumer chooses a skill-based product (i.e., those products that can be ranked by skill levels such as sport-related goods and technological products), aligning it with her skill rank (i.e., based on performance). The findings show that consumers relatively underestimate their skills when they face more challenging tasks and choose skill-based products based on their own assessment of their product skill level, which may not be accurate. Pearson and Liu-Thompkins (2012) also show that consumers underestimate their performance in using direct-to-consumer genetic tests. They indicate that miscalibration of performance (i.e., the inaccuracy in self-efficacy) negatively determines consumers' attitude and purchase intention. In response to these

negative consequences, the authors suggest immediate educational interventions and show that these interventions reduce the miscalibration of performance.

Similar to the miscalibration of performance, there are few studies in the area of knowledge miscalibration in consumer behaviour literature. For example, Alba and Hutchinson (2000) conceptualise knowledge miscalibration and theorise their fundamental components. Moreover, Kidwell *et al.* (2008) indicate that in addition to knowledge miscalibration, emotional miscalibration influences consumer decision-making quality. Emotional miscalibration refers to the extent of disagreement between objective emotional ability (i.e., emotional intelligence) and subjective emotional ability; objective emotional ability is the ability to interpret emotional information in a consumption experience and subjective emotional ability is the subjective assessment of the consumer's objective emotional ability. Based on these definitions, Kidwell *et al.* (2008) reveal that emotionally miscalibrated consumers make low quality decisions in healthy food selections.

However, these studies follow the goods-dominant logic of marketing as they try to explain the reasons for exchange decisions rather than actual value creation in use. Pillai and Hofacker (2007) suggest that knowledge miscalibration has consequences in use such as a lack of experience of flow and an experience of frustration. However, the effect of knowledge miscalibration on consumer value has not been investigated. In other words, although the effect of knowledge miscalibration on people's decision-making (i.e., purchasing decision in the consumption context) has been investigated in psychology and marketing literature, its role in post-decision behaviour (i.e., post-purchase behaviour in the consumption context) needs further investigation. Therefore, this research advances knowledge by conceptualising and investigating the relationship between knowledge miscalibration and consumer value.

1.6 METHOD

Following a critical realism paradigm (Bhaskar, 1998), this research begins with the imagination of knowledge miscalibration as a causal mechanism of consumer value. This PhD also aims to provide conceptual and empirical support for the effect of knowledge miscalibration on consumer value. First, in Chapter 4, the relationships

between different types of knowledge miscalibration (i.e., overconfidence and underconfidence) on the one hand and dimensions of consumer value on the other are conceptualised.

Second, these relationships are empirically investigated. The empirical investigation includes a covariance based study (i.e., Study 1) and an experimental study (i.e., Study 2). Study 1 follows the consumer behaviour paradigm of investigating knowledge miscalibration through a subjective probability paradigm (i.e., a method to measure knowledge miscalibration level; Alba and Hutchinson, 2000), which is a covariance-based method. This study is performed to investigate the existence of the relationship and to provide a basis for comparison with Study 2, which is an experimental method. Study 2 manipulates knowledge miscalibration (i.e., both overconfidence and underconfidence) through enhanced calibration feedback (i.e., feedback about objective knowledge, subjective knowledge and knowledge miscalibration; Sieck and Arkes, 2005). A pilot study is performed during each study in order to validate the data collection instruments.

The empirical studies are performed in the online contexts of amazon.com (i.e., Study 1) and prezi.com (i.e., Study 2). Online consumer behaviour has been investigated in marketing literature through concepts such as technology acceptance models (e.g., Koufaris, 2002; Morgan-Thomas and Veloutsou, 2013), online customer experience (e.g., Novak, Hoffman and Yung, 2000; Rose, Clark, Samouel and Hair, 2012) and online consumer value (e.g., Methwick, Malhotra and Rigdon, 2001; Overby and Lee, 2006), which are all relevant to the concept of consumer value. Furthermore, both consumer knowledge and consumer value are important elements of consumer behaviour in online settings (Barrutia and Gilsanz, 2012). Therefore, focusing on online contexts fit the purpose of this research and provides a platform to contribute to online consumer behaviour literature.

1.7 CONTRIBUTIONS

This PhD has a number of potential contributions. Firstly, it extends the knowledge miscalibration literature (e.g., Alba and Hutchinson, 2000; Hansen and Thomsen, 2013; Kidwell *et al.*, 2008) by looking at the consequences it has beyond purchase decision-

making and in use situations. Secondly, while the extant studies have tended to look at knowledge miscalibration holistically without distinguishing between overconfidence and underconfidence (Gershoff and Johar, 2006; Hansen and Thomsen, 2013; Kidwell *et al.*, 2008; Pillai and Kumar, 2012), this PhD argues that underconfidence and overconfidence should be treated separately as they trigger different consumption behaviours (Moore and Healy, 2008; Pillai and Hofacker, 2007). Thirdly, unlike previous consumer behaviour studies that have only measured knowledge miscalibration (e.g., Gershoff and Johar, 2006; Kidwell *et al.*, 2008; Pillai and Hofacker, 2007; Pillai and Kumar, 2012), in this research it is both manipulated (through an experimental study) and measured (in an initial covariance-based study). Fourthly, the PhD adds to the area of knowledge looking at antecedents of consumer value (e.g., Lähteenmäki and Nätti, 2013; Lemke, Clark and Wilson, 2011; Macdonald, Wilson, Martinez and Toosi, 2011; van Beuningen *et al*., 2011; Barrutia and Gilsanz, 2012) by introducing knowledge miscalibration as a further determinant of consumer value. Fifthly, as the research investigates different dimensions of consumer value, in particular efficiency, excellence, play and aesthetics, it contributes to studies looking into these dimensions (e.g., Maenpaa, Kale, Kuusela and Mesiranta, 2008; Munnukka and Jarvi, 2012; Mathwick and Rigdon, 2004; Sonderegger, Sauer and Eichenberger, 2014). Finally, this PhD contributes to online consumer behaviour literature, particularly through the advancement of technology acceptance models (e.g., Ha, Yoon and Choi, 2007; Morgan-Thomas and Veloutsou, 2013), as well as online consumer value and customer experience literature (e.g., Kim, Suh and Lee, 2013; van Noort, Voorveld and van Reijmersdal, 2012; Yang, Lu, Gupta and Cao, 2012).

This research has a number of potential practical implications. First, it demonstrates an opportunity for value creation by influencing consumers' self-assessment of knowledge, for example companies may be able to improve consumer value by altering knowledge miscalibration levels. Second, it provides an advanced element for evaluating consumers in terms of marketing practices such as segmentation, promotion and product development, for instance different market segments with varied levels of knowledge miscalibration may need different product features and promotional materials. Finally, it reveals a hidden factor in value creation which could have wrongly been used to improve some aspects of the business-consumer relationship, for example businesses

may influence their consumers' knowledge miscalibration level through their communication strategies without being aware of their negative consequences in use.

1.8 REPORT STRUCTURE

In order to provide readers with a clear understanding of the logic behind this PhD dissertation, its structure is briefly described as follows:

Chapter 1. Introduction - the current chapter identifies the research question and the importance of the topic addressed by this PhD. In this chapter the field of enquiry is positioned, the research method is briefly explained, and potential contributions in theory and practice are identified.

Chapter 2. Literature Review - this chapter defines and describes the service-dominant logic of marketing, the concepts of consumer knowledge, knowledge miscalibration and consumer value, and their sub-dimensions. In particular, the consequences of knowledge miscalibration are discussed in this chapter to provide a basis for further conceptualisation.

Chapter 3. Research Philosophy - this chapter explains the philosophical implications of the research and the research strategy implemented. The philosophical paradigm of the research is explained in this chapter, followed by the research strategy.

Chapter 4. Conceptual Model - this chapter describes and documents the hypothesised relationships between knowledge miscalibration and the consumer value dimensions, leading to the conceptual model being advanced. In particular, the effects of overconfidence and underconfidence on efficiency, excellence, play and aesthetics are conceptualised.

Chapter 5. Methodology - this chapter explains the empirical research method used to further investigate the validity of the conceptual model. The rational for empirical investigation and detailed considerations of the method is explained in this chapter. In particular, two empirical studies, including a covariance-based and an experimental investigation, are described.

Chapter 6. Findings - this chapter presents the data collection and analysis conducted to investigate the conceptual model developed in Chapter 4. The findings of the two studies (i.e., firstly a covariance-based study, and secondly an experimental study) are also presented in this chapter.

Chapter 7. Discussion and Conclusion - the final chapter discusses the findings of the current PhD and describes the contribution of the research towards the existing literature, its implications for practice, the research limitations, and recommendations for future research.

2 LITERATURE REVIEW

2.1 INTRODUCTION

This chapter outlines the study areas that inform this research and defines the relevant concepts. As the research is informed by the service-dominant logic of marketing, the literature on the service-dominant logic is reviewed and its relation to this research is stated before the relevant concepts are explained. Next, the concepts of knowledge miscalibration and consumer value, their sub-dimensions and the related constructs are defined and described. Figure 1 illustrates the main fields of study for this research. It looks at the relationships between knowledge miscalibration and consumer value dimensions. Knowledge miscalibration is part of the consumer knowledge literature. Furthermore, as knowledge miscalibration is an inaccuracy in subjective knowledge, the concepts of subjective knowledge and self-efficacy are also relevant to this research. Therefore, in the following sections, the service-dominant logic and the concepts of consumer knowledge, subjective knowledge, self-efficacy, knowledge miscalibration, and consumer value are defined and explained.

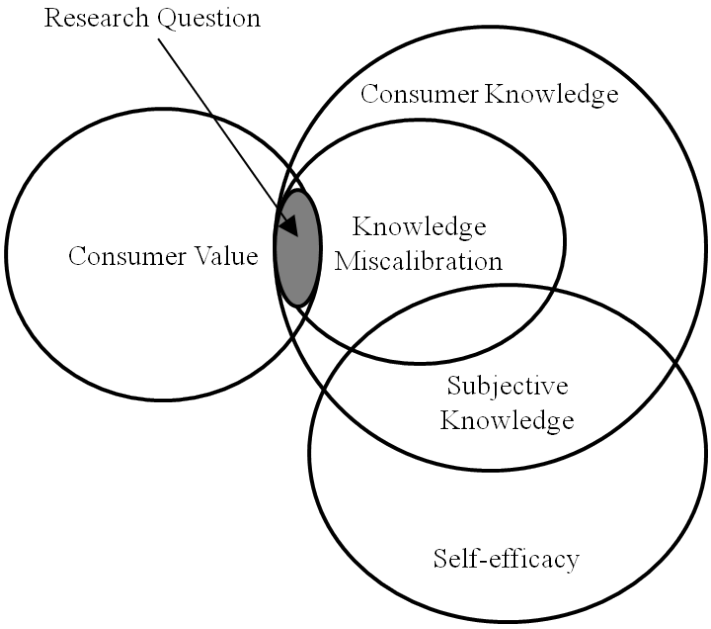


Figure 1: Mapping the Field

2.2 SERVICE-DOMINANT LOGIC

Bastiat (1860) criticised political economists who linked value to tangible objects, suggesting that efforts are transmitted in an exchange rather than goods and value is embedded in the use of material objects. However, he was ignored by fellow economists who claimed that his idea was not an economic theory (Schumpeter, 1954). The marketing discipline also followed the traditional economic theory of exchange, focusing on goods.

The pre-1980s was the 'crawling out' period for service marketing emerging as a marketing sub-discipline (Fisk, Brawn and Bitner, 1993). However, marketing researchers approached service and service related phenomena using the goods-dominant logic view of marketing where services were perceived as anything not being goods (Vargo, Lusch and Morgan, 2006). Thereafter, a divergence was observed from the goods-dominant logic towards the view mentioned by Bastiat (1860) in order to describe services, service delivery and service consumption. For example, Prahalad and Ramaswamy (2004) argued that value is co-produced by parties (i.e., buyer and seller) rather than produced separately. This divergence initiated the idea of the emergence of a new dominant logic by Vargo and Lusch (2004) called *the service-dominant logic*.

In the service-dominant logic, parties integrate their resources and other resources available in the environment or offered by other social units for exchange in order to create value for their benefit; operant, intangible resources are the basis of exchange rather than operand, tangible resources. In this logic it is argued that applied, specialised skills and knowledge are the focus of any economic exchange. Therefore, individuals apply their own skills and knowledge to provide a service and exchange this service with others for another service that they need. In this process, goods may be transmitted as a mechanism in order to provide services for parties (Vargo and Lusch, 2006). Indeed, in the service-dominant logic, a service is not defined as an alternative product form. Rather, it is labelled as "the application of specialised competences (Operant resources-knowledge and skills), through deeds, processes, and performances for the benefit of another entity or the entity itself" (Vargo and Lusch, 2006, 43).

Vargo and Lusch (2004) presented eight foundational premises for the service-dominant logic. In response to critiques and suggestions from other researchers, they refined these (Vargo and Lusch, 2008) into ten foundational premises (FP) which are the heart of the service-dominant logic. Table 3 is a summary of these foundational premises.

Table 3: Foundational Premises of the Service-Dominant Logic (Adapted from Vargo and Lusch, 2008)

Premise Number	Foundational Premise of the Service-Dominant Logic
FP1	Service is the fundamental basis of exchange.
FP2	Indirect exchange masks the fundamental basis of exchange.
FP3	Goods are a distribution mechanism for service provision.
FP4	Operant resources are the fundamental source of competitive advantage.
FP5	All economies are service economies.
FP6	The customer is always a co-creator of value.
FP7	The enterprise cannot deliver value, but can only offer value propositions.
FP8	A service-centred view is inherently customer oriented and relational.
FP9	All social and economic actors are resource integrators.
FP10	Value is always uniquely and phenomenologically determined by the beneficiary.

Traditionally, value was perceived as being embedded in product and companies created value through embedding it in their outputs (e.g., Beckman, 1957; Porter, 1980). However, as is evident in FP6, FP7 and FP10 of the service-dominant logic, value can only be proposed by a company and is co-created by the consumer. Therefore, value is determined by the consumer on the basis of value-in-use (Vargo and Lusch, 2008), where *use* is a mental, physical or virtual use or possession of resources (Grönroos and Voima, 2013). The service-dominant logic explores the need for improvements not only in the firm's value propositions but also in the way consumers integrate their resources. For instance, there is a need for firms to help consumers to allocate their resources (e.g., budget and effort) in the best way (Wilkie and Moore, 2006).

Arnould *et al.* (2006) introduce a cultural resource-based theory of the consumer. They explain that consumers apply their operand and operant resources for their life projects based on the different roles they play in life to achieve their life goals. In this description, while operand resources are tangible economic resources, such as income and goods, operant resources are the consumer's competencies, which are virtual resources. Arnould *et al*. (2006) also describe operand resources as resources over which the consumer has allocative capabilities to perform life projects; these resources can be material objects such as goods and money or physical spaces that the consumer has control over, such as a garden or a house. On the other hand, the configuration of consumers' operant resources shapes the use of their operand resources as well as a company's operand and operant resources. These operant resources are categorised into social, cultural and physical resources. In this classification, physical resources are those related to the mental and physical capabilities of a consumer, such as sensorimotor (i.e., pertaining to motor responses caused by sensory stimuli) endowment, energy and emotion. Furthermore, social resources are social relationship networks around the consumer which can be demographic groups such as families, ethnic groups and emerging groups, for example brand communities or consumer tribes. Finally, cultural resources are specialised cultural capital, skills and goals. Therefore, any specialised knowledge and skills are cultural resources (Figure 2).

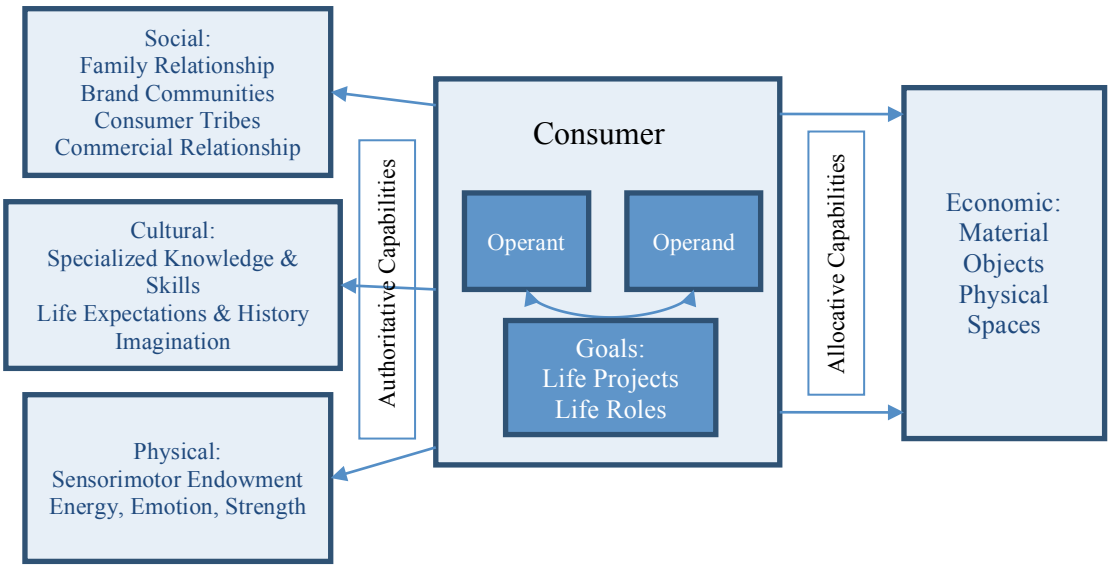


Figure 2: Consumer Operand and Operant Resources (Arnold *et al.*, 2006)

The service-dominant logic focuses on operant resources and describes them as fundamental sources of competitive advantage (Vargo and Lusch, 2004). Similarly, Arnould *et al.* (2006) claim that the type, quantity and quality of consumer operant resources affect the role of the consumer, company and the value sought by the consumer from an experience. Indeed, marketers propose a package of operant resources including images, symbols and myths to consumers in order to inspire their imagination of consumption. However, consumers derive more or less value from the value proposition based on their ability to integrate resources as well as the imagined value perceived from the value proposition. As explained in Chapter 1, this research aims to shed light on the relationship between consumer resources and value creation by investigating the effect of consumer knowledge miscalibration on consumer value. These concepts are reviewed in the following sections.

2.3 CONSUMER KNOWLEDGE

Consumer knowledge has been an important consideration in buyer-seller relationships. The importance of consumer knowledge was highlighted in the early 19th century (e.g., Kelley, 1899; Kelley, 1908), when scholars encouraged organisations to focus on consumer knowledge (e.g., Kitson, 1923; Schlink and Brady, 1928) and consumer education (e.g., Kyrk, 1930; Koos, 1934; Palmer and Schlink, 1934; Weaver, 1935) to improve the product and service consumption experience. Consumer knowledge was operationalised (e.g., Due, 1955; Oxenfeldt, 1950) and its role in product and service consumption started being investigated (e.g., Alba and Hutchinson, 1987; Bettman and Park, 1980; Goldman, 1977; Primeaux, 1970;).

Consumer knowledge has traditionally been viewed as a unidimensional phenomenon representing product familiarity (e.g., Park and Lessig, 1981) or prior knowledge (e.g., Bettman and Park, 1980). These studies are concerned with the amount of information about or experience consumers gain from a product (Alba and Hutchinson, 1987). However, different ways of operationalising consumer knowledge such as the number of product purchases (e.g., Bettman and Park, 1980), objective tests (e.g., Brucks, 1985) and subjective measures (e.g., Johnson and Russo, 1984) have suggested that consumer knowledge is a multidimensional construct. Alba and Hutchinson (1987) propose

familiarity and expertise as two components of consumer knowledge, where familiarity is the frequency of product-related experience and expertise is the ability to perform consumption tasks successfully. However, familiarity appears to be an antecedent of what consumer knowledge actually is. For example, Alba and Hutchinson (1987) theorise that repeated task experiences increases the amount of cognitive resources available for the task, leading to improved task performance. Indeed, the categorisation of consumer knowledge into familiarity and expertise explains the process of consumer knowledge formation and its behavioural consequences.

Focusing on consumer knowledge itself, researchers have divided it into objective and subjective knowledge (Alba and Hutchinson, 2000; Brucks, 1985). Objective knowledge is the product or service information retrievable from long-term memory that can be validated for accuracy; subjective knowledge is consumers' self-assessment of the validity of the product or service information they retain in memory (Brucks, 1985; Carlson *et al.*, 2009; Park *et al.*, 1994). In other words, objective knowledge reflects actual knowledge about a product, and subjective knowledge represents the consumer's perception of her knowledge about the product (Alba and Hutchinson, 2000; Brucks, 1985). These two dimensions of knowledge are explained in the following sections to create a better understanding of consumer knowledge.

2.3.1 Objective Knowledge

Objective knowledge has a positive impact on the way consumers perform consumption tasks. Brucks (1985) shows that objective knowledge improves information search activities by reducing the number of inappropriate searches for irrelevant information. Sujan (1985) have also found that consumers with strong objective knowledge have efficient product evaluation strategies as they rapidly process product information they understand and engage in analytical processes about new product information. However, Cowley and Mitchell (2003) indicate that knowledgeable consumers may not always be efficient in learning. For example, they show that, when provided with use situation (i.e., the reason and context in which a product or service is going to be used), low-knowledge consumers focus on information which is relevant to that use situation, while high-knowledge consumers learn about other use situations as well (i.e., those

which are irrelevant to that use situation). Although Cowley and Mitchell (2003) show that objective knowledge does not create information processing efficiency at the encoding (i.e., learning) stage, finding that objective knowledge provides consumers with a wider range of information with an appropriate structure during the retrieval stage (i.e., when the information is used).

Objective knowledge can also define how consumers evaluate a product or service. Hong and Sternthal (2010) investigate the interaction between objective knowledge, information processing mode (i.e., progressive vs. assessment) and the level of construal (i.e., high vs. low). They show that consumers with a high level of objective knowledge evaluate a product more favourably when they process information progressively (i.e., they evaluate features one by one and eliminate the worst performer at each stage until the best product is selected) than through assessment (i.e., evaluate all features together and select the best product). They have also shown that consumers with a high level of objective knowledge evaluate a product more favourably when they receive high construal information (i.e., abstract information about the features of a product) compared to low construal information (i.e., concrete information about the performance of a product). Lee and Lee (2011) also illustrate that consumers with a low level of objective knowledge evaluate advertisements favourably when they include information about competitors, whereas consumers with a high level of objective knowledge show no difference in their evaluations in such circumstances. Overall, objective knowledge leads to evaluations that are well articulated, consistent and stable over time (de Bont and Schoormans, 1995; Roy and Cornwell, 2004).

Objective knowledge is measured by an impartial third party or through an objective test (Cordell, 1997). These methods however may not be able to reflect the actual level of objective knowledge. Indeed, while objective tests and third party evaluations remove subjective biases, they are also associated with other biases (Brucks, 1985). For example, objective tests may only gauge a portion of consumers' objective knowledge. Despite this, objective tests are the most reliable ways to measure objective knowledge (Alba and Hutchinson, 2000).

Overall, studies on objective knowledge imply that the amount of consumption-related information stored in consumers' long-term memory predicts their capability and

motivation for searching, processing and evaluating relevant information. However, sometimes consumers with a low level of objective knowledge behave similarly to those with a high level of objective knowledge. Rao and Monroe (1988) illustrate that objective knowledge has a U-shaped effect on using price as an indicator of quality; in fact, consumers with little knowledge about a product use its price to evaluate the quality more than those with moderate knowledge. Interestingly, highly knowledgeable consumers also use price as a quality indicator. Bruwer and Buller (2012) have found similar effects when consumers use country-of-origin as a quality cue, which could be due to the fact that consumers with a high level of objective knowledge have an extensive experience with the product and have shaped a strong quality-price association in their memory (Herr, 1989). However, this effect may reflect the impact of subjective knowledge (i.e., a strong belief in knowledge about quality-price association) rather than objective knowledge, and this is shown by Rao and Monroe (1988) to be due to the association between objective and subjective knowledge. In the next section, subjective knowledge as the next dimension of consumer knowledge is defined and its role in consumer behaviour is explained.

2.3.2 Subjective Knowledge

Subjective knowledge is also an important consideration in consumer behaviour. Park and Lessig (1981) show that subjective knowledge is associated with interest in a product and leads to purchase decision-making because of the reduced evaluation time. Andaleeb and Basu (1994) also demonstrate that consumers with a low level of subjective knowledge associate perceived fairness with perceived quality more strongly for technically complex products and services than for simple products and services. This is due to the fact that consumers with low subjective knowledge consider fairness as an important factor in covering their lack of knowledge in a transaction. Alternatively, Moorman *et al.* (2004) illustrate that subjective knowledge increases search activities in high quality categories, leading to better quality decisions (e.g., better choices of nutrition). In addition, it has been shown that subjective knowledge improves the overall perception of value (Barrutia and Gilsanz, 2012) and the perception of a salesperson's motivation to help (DeCarlo, Laczniak and Leigh, 2013).

Subjective knowledge is gauged through a self-assessment test reflecting a consumer's self-assessment of knowledge (Cordell, 1997). The existing scales of subjective knowledge include a single item scale involving overall knowledge (e.g., Cordell, 1997), a multiple item scale about overall knowledge (Koufaris, 2002), and a multiple item scale about different components of knowledge (e.g., Flynn and Goldsmith, 1999). The latter method is combined with scales measuring objective knowledge that are referred to as subjective probability measures, showing a high level of accuracy (Alba and Hutchinson, 2000). The subjective probability paradigm will be explained in the methodology chapter as a research method for measuring subjective and objective knowledge in this research.

2.3.2.1 Antecedents of Subjective Knowledge

Subjective knowledge is determined by three main factors: memory, external cues and motivational biases. Firstly, subjective knowledge depends on how well a consumer is able to remember the evidence for assessing the accuracy of objective knowledge. For instance, when we judge our knowledge about the calories in milk, we recall the last time we looked at the nutritional label of the milk as evidence for the accuracy of our knowledge. If we accurately remember the moment, we think our knowledge about the amount of calories in milk is true. Park *et al*. (1994) indicate that consumers with consumption-related information (e.g., information about consumption processes or information search processes) have better access to their memory and therefore a higher subjective knowledge than those with product-related information (e.g., product features). In other words, consumers with higher consumption-related information can easily remember the evidence for validity of their objective knowledge. For example, considering the objective knowledge to be the colour of the writing of a pen, a consumer who uses the pen has more evidence about the colour (e.g., she can remember the colour of the written text) than someone who only memorises the colour.

Other researchers have identified a number of factors influencing subjective knowledge that can be explained by their impact on memory. For instance, Brucks (1985) identifies the number of product or service use occasions as an antecedent of subjective knowledge, showing that consumers who use a product or service on a number of occasions have a high level of subjective knowledge. The reason for this finding is that

the frequency of product or service use intensifies the memory of the learning processes through which product or service related information is stored in the long-term memory. Therefore, the frequency of use increases the chance of remembering the evidence for the accuracy of knowledge. For example, a consumer who uses a pen every day is very confident about her knowledge of the colour of the writing of the pen as she has a lot of information to validate her knowledge of the colour.

In another example, personal relevance (i.e., the importance of the context of information to the person) is identified as having an effect on subjective knowledge (Radecki and Jaccard, 1995). Consumers with more interest in price comparisons have a higher subjective knowledge regarding a product's price (Mägi and Julander, 2005). Similarly, Park and Moon (2003) indicate that subjective knowledge is correlated with consumer involvement (i.e., a consumer's perceived relevance of a product). In these studies, as the context is important, the person puts in a great deal of information acquisition effort, and it is therefore more likely that she will easily remember the validity of her knowledge. For example, a consumer who likes one of her pens is more likely to have more information regarding the colour of the pen.

Secondly, subjective knowledge is shaped based on external cues. In order to evaluate the validity of their knowledge people use external cues (e.g., other people's level of knowledge), particularly when they do not have enough evidence in their memory. Radecki and Jaccard (1995) document the impact of 'frame of reference', which refers to one's perception of others' knowledge on subjective knowledge. They show that if a consumer thinks many people know a lot about a product, her subjective knowledge will be reduced. Furthermore, Carlson, Bearden and Hardesty (2007) indicate that consumers use their evaluation of their best friend's knowledge to shape their subjective knowledge. In another example, Serra and Dunlosky (2005) reveal that people use difficulty in recalling information as a cue to shape their subjective knowledge; they illustrate that those who spend more time recalling a fact have lower subjective knowledge.

In particular, when these external cues carry no information about objective knowledge, they lead to inaccurate subjective knowledge. Consistent with Serra and Dunlosky (2005), Frankenberger and Albaum (1997) show that consumers use the level of task

difficulty to evaluate their own knowledge. They also show that as task difficulty contains no information about objective knowledge, it leads to inaccurate subjective knowledge. The effect of task difficulty on subjective knowledge can be explained through the concept of fluency; fluency is the ease with which information is brought to mind or new information is processed (Schwarz, 2004). Furthermore, Burrati and Allwood (2012) find that fluency affects subjective knowledge in such a way that consumers who easily retrieve information from their memory have high subjective knowledge. It can be concluded that in difficult tasks consumers experience less fluency in retrieving information, leading to low subjective knowledge.

Thirdly, subjective knowledge is directed by motivational biases. In fact, people are motivated to give themselves a higher or lower assessment to achieve their personal needs. For instance, someone might diminish her self-assessment to reduce the expectations of others, or might increase it to enhance her personality. As motivational biases are one of the sources of knowledge miscalibration, they are explained in the next section along with other determinants of knowledge miscalibration.

Radecki and Jaccard (1995) indicate that objective knowledge is a predictor of subjective knowledge. A possible explanation is that the correlation between objective and subjective knowledge observed in several studies (please see Carlson *et al.*, (2009) for a review of literature) results from the fact that often the actual information and the evidence for the validity of information are identical. For instance, a consumer's objective knowledge of the colour of the writing of a pen can be based on the text written by the pen, which can also be used as evidence to shape subjective knowledge.

As explained above, subjective knowledge is built on evidence that may not be the source of objective knowledge. Therefore, although both objective and subjective knowledge reflect the level of consumer knowledge, they can have different effects on the same consumption outcome. For instance, subjective knowledge has a stronger effect than objective knowledge on perceived decision outcomes such as confusion in decision-making and perceived quality of decision-making (Raju, Lonial, and Mangold, 1995). The amount of information searching is directly correlated with subjective knowledge, whereas it has an inverted U-shaped relationship with objective knowledge (Raju *et al.*, 1995). Indeed, consumers with moderate objective knowledge are more

engaged with products and search for more information than those with low objective knowledge. However, consumers with high objective knowledge are more selective about the information they need and search for less information than those with moderate objective knowledge. This is not the case for subjective knowledge, which is not based on actual knowledge; those with high subjective knowledge are motivated to further search for information, and are not necessarily selective about the information they need as they may have high or low levels of objective knowledge (Raju *et al.*, 1995). Objective knowledge is also a better predictor of consumers' willingness to pay for product categories that have a strong price-quality relationship than subjective knowledge (Cordell, 1997).

Besides occasions where subjective and objective knowledge are based on the same information, most of the time subjective knowledge is built on factors that do not necessarily support the validity of objective knowledge (e.g., external cues and motivational biases). Therefore, subjective knowledge is often inaccurate and does not match objective knowledge (Alba and Hutchinson, 2000). There are contexts where subjective and objective knowledge are less aligned, for instance for services rather than products and for utilitarian products rather than hedonic products (Carlson *et al.*, 2009). Subjective knowledge may be inaccurate due to failure in remembering the validity of evidence for objective knowledge, misinterpretation of evidence or motivational biases (Alba and Hutchinson, 2000). The next section discusses knowledge miscalibration, which is defined as inaccuracy in subjective knowledge.

Self-assessment has been of interest to psychologists and one of the well-established and well-defined concepts that explains self-assessment is *self-efficacy*, introduced by Bandura (1977) as the self-assessment of performance. The definition of subjective knowledge is slightly different from the definition of self-efficacy; while subjective knowledge is the self-assessment of knowledge (Brucks, 1985), self-efficacy is referred to as the self-assessment of performance (Bandura, 1977). As one of the main predictors of performance is knowledge, the characteristics of subjective knowledge and self-efficacy are similar in many cases. Therefore, in the next sub-section self-efficacy is explained and discussed in order to provide a better understanding of subjective knowledge and its characteristics as a self-assessment phenomenon.

2.3.2.2 Self-efficacy

Self-efficacy is understood as "judgments of how well one can execute courses of action required to deal with prospective situations" (Bandura, 1982, p. 122). Perceived self-efficacy influences people's activities, choices and performance. Consequently, tasks perceived as exceeding one's performing abilities are avoided, and those within one's coping capabilities are undertaken confidently (Bandura, 1977). Self-efficacy also affects one's efforts in coping with difficulties and obstacles. Those with some uncertainty about their capabilities give up during aversive experiences, while people with a strong sense of their abilities apply greater efforts to cope with challenges (Bandura and Schunk, 1981; Weinberg, Gould, Yukelson and Jackson, 1979). Furthermore, a low level of self-efficacy causes stress and weakens performance by diverting attention from the task, which may be being perfectly executed, to concerns about failing to perform (Bandura, 1982).

Self-efficacy is formed based on four basic information sources: performance achievements (enactive), vicarious experiences of observing others' performances (vicarious), verbal persuasion and social influences (exhortative), and physiological states from which people partly appraise their capabilities, strengths, and weaknesses (emotive). From these four sources, performance achievement has the biggest impact on self-efficacy. However, the effect of each source is influenced by social, situational and temporal events (Bandura, 1977; 1982).

Self-efficacy varies by three dimensions: magnitude, generality and strength (Bandura, 1977). Magnitude refers to the extent of task difficulty; people perceive their abilities as lower in more difficult tasks. Generality is about the effect of efficacy expectation in a task on efficacy expectation in other similar tasks. For instance, Bong (2001) emphasises the importance of self-efficacy specificity, as well as the differences and relationships between maths problem solving self-efficacy and general educational self-efficacy. Finally, strength shows how strong the self-efficacy belief is; generally, it is difficult to alter strong self-efficacy judgments (Bandura, 1977).

Self-efficacy has been investigated in order to explain consumer behaviour. Self-efficacy has a positive relationship with task performance (Gist *et al.*, 1989; Kuo *et al.*,

2004; Paulsen and Gentry, 1995), expectation (Lankton and Wilson, 2007), satisfaction (Artino, 2008; Bin Masrek, 2007; Lin, Lin and Laffey, 2008; Henry and Stone, 1994; Zhao, Mattila and Tao, 2008), perceived task performance (van Beuningen *et al.*, 2009), perceived quality (Artino, 2008; Bin Masrek, 2007), enjoyment (Artino, La Rochelle and Durning, 2010; Brantmeier, 2005), a lack of anxiety and boredom (Artino *et al.*, 2010), the perceived economic worth of a service (McKee *et al.*, 2006; van Beuningen *et al.*, 2009) and the perceived experiential value (Lin, 2010).

Researchers have further investigated the positive relationship between self-efficacy and performance. Bandura (1977) finds that self-efficacy and performance have a reciprocal relationship, meaning that better performance in a task increases people's confidence in their capabilities, leading to higher self-efficacy. Higher self-efficacy also leads to better performance (e.g., Gist *et al.*, 1989; Kuo *et al.*, 2004; Paulsen and Gentry, 1995). By contrast, Beattie, Lief, Adamoulas and Oliver (2011) show that, although better performance increases subsequent self-efficacy, self-efficacy has no relationship with subsequent performance. Beattie *et al.* (2011) argue that what is believed to be the effect of self-efficacy on performance is in fact the effect of previous performance and not that of self-efficacy. These contradictory findings result from the way self-efficacy is operationalised. Researchers using a covariance-based method to measure self-efficacy and performance find a positive relationship between these two concepts (e.g., Gist *et al.*, 1989; Kuo *et al.*, 2004; Paulsen and Gentry, 1995). However, those investigating this relationship experimentally through manipulating an increase in self-efficacy have found no effect on performance (e.g., Beattie *et al.,* 2011).

Interestingly, it has been discovered that an increase in self-efficacy leads to a higher consumer perceived economic worth of a service (van Beuningen *et al*., 2011). The perceived economic worth of a service is shaped by the evaluation of what is received against what is given (Zeithaml, 1988). The evaluation of the outcome of the consumption task is affected by how well consumers perform the consumption task. As there is no relationship between an increase in self-efficacy and task performance (Beattie *et al.*, 2011), this finding explores the existence of another mechanism(s) describing this phenomenon. This can be explained by the motivational effect of self-efficacy (Bandura, 1977). Consumers who have an increase in their self-efficacy are

highly motivated to perform the consumption task, and thus it becomes important and is valued higher by consumers despite their actual performance in the task.

Self-efficacy also moderates the relationship between a product or service's attributes, types and varieties on the one hand, and perceived value on the other hand. Consumers with lower self-efficacy are interested in attributes that help them to consume the product or service more easily, such as the quality of information on a web-page. However, consumers with higher self-efficacy value the outcome of the product or service use, for example reliability and emotional benefit (Yi and Gong, 2008).

Researchers have also explored the relationship between different levels of self-efficacy in terms of generality and performance. Norwich (1987) indicates that in controlling the effect of specific self-efficacy, general self-efficacy has no effect on the task performance in mathematics training. In another study, self-efficacy regarding a combination of computer specific tasks (e.g., typing letters and using the mouse) shows a stronger relationship with performance than general self-efficacy or self-efficacy involving one specific computer task (Downey and McMurtrey, 2007).

Self-efficacy does not match with actual performance. Winne and Jamieson-Noel (2002) suggest that the sources of error in self-efficacy are external information sampling bias (e.g., focusing on a compliment), internal information searching bias (e.g., forgetting facts) and inserting invalid information, or deleting valid information, to reconstruct a scene. Kim *et al*. (2010) explain that inaccurate self-assessment, in particular overconfidence, can be explained primarily in two ways: the first source of inaccuracy is the outcome of a lack of cognitive ability for self-assessment or a lack of meta-cognitive ability to express the accurate assessment, and the second source of inaccuracy is the motivation to self-enhance. Indeed, people tend to assess themselves favourably in spite of their actual performance (Kim *et al*., 2010).

2.4 KNOWLEDGE MISCALIBRATION

In the consumer behaviour literature, the term *calibration* is used for conceptualising knowledge miscalibration with a reciprocal meaning. For instance, Alba and Hutchinson (2000) defined knowledge calibration as “the agreement between subjective

and objective assessment of the validity of information" (Alba and Hutchinson, 2000, p. 123). Similarly, Pillai and Hofacker (2007, p. 254) define it as "the correspondence between accuracy and confidence in knowledge". However, in reality they investigated knowledge calibration by measuring and analysing the disagreement between subjective and objective knowledge. Therefore, in order to avoid discrepancies, this PhD uses the term *knowledge miscalibration*. Furthermore, the existing definitions do not clarify whether the disagreement between subjective and objective knowledge is the result of variations in subjective knowledge, objective knowledge or both. As subjective knowledge is the self-assessment of objective knowledge, the difference between subjective and objective knowledge shows that there is inaccuracy in subjective knowledge rather than variation in objective knowledge. Therefore, this research defines knowledge miscalibration as inaccuracy in subjective knowledge (i.e., relative to objective knowledge).

This research categorises the sources of knowledge miscalibration into three categories: sources related to memory failure, misinterpretation of external cues, and finally motivational biases. Firstly, knowledge miscalibration can be the result of failure in memorising the evidence for the validity of objective knowledge. Consumers may not be able to remember accurate evidence for the validity of objective knowledge and consequently they will base their self-assessment on the wrong evidence (Alba and Hutchinson, 2000). On the other hand, consumers might remember the evidence, but the objective knowledge is distorted in memory (Alba and Hutchinson, 2000). For example, a consumer might remember that she read the nutritional information on the milk label and validate her knowledge about it (i.e., subjective knowledge), whereas she might not be aware that she has forgotten the actual nutritional information (i.e., objective knowledge).

Coupey and Narayanan (1996) found that consumers receiving product-specific information (e.g., product features and feature importance) were more miscalibrated about their knowledge of choice quality than those receiving information about decision-making strategies (e.g., how to evaluate alternatives). Indeed, providing consumers with information about decision-making strategies strengthens their memory of the learning process, leading to more accurate evidence for evaluating their objective

knowledge. In other words, consumers with information about the decision-making process have a strong memory regarding the evidence supporting objective knowledge, which leads to accurate subjective knowledge.

Unconscious learning (i.e., gaining knowledge about a service or product at a very low level of conscious awareness and control; Alba and Hutchinson, 2000) is one of the predictors of memory failure. In fact, consumers unconsciously learning how to use a product or service are not completely aware of their gained knowledge and have a lower subjective knowledge in relative terms, leading to underconfidence. On the other hand, those with higher conscious learning in product or service use are aware of their attained knowledge, and have higher subjective knowledge. For this group of consumers, when objective knowledge declines (e.g., as a result of forgetting information) their subjective knowledge is not affected to the same extent and they will have inaccurate, inflated subjective knowledge (i.e., overconfidence) (Alba and Hutchinson, 2000).

Pillai and Hofacker (2007) point to consumer involvement (i.e., a consumer's perceived relevance of the product or service) as a predictor of knowledge miscalibration. They show that the higher the consumer involvement, the lower the knowledge miscalibration regarding internet use. This effect can also be explained by the memory failure phenomenon. In fact, more involved consumers are motivated not only in searching and processing more product or service information, but also in attending to these learning processes; therefore, they have a more accurate subjective and objective memory, resulting in less knowledge miscalibration.

Memory failure is also influenced by contextual factors. For instance, people in a good mood are less miscalibrated when recalling positive information than negative information, and those in a bad mood are less miscalibrated when recalling negative information than positive information (Kuvaas and Kaufmann, 2004). Furthermore, the unexpected arrangement of alternative products (e.g., grouping charitable companies with unrelated fields of activity) reduces knowledge miscalibration (Poynor and Wood, 2010). In another study, Zimmerman and Kelley (2010) show that paired negative words (e.g., prison-cancer) increase knowledge miscalibration, highlighting the effect of emotionality on memory. Koellinger and Treffers (2012) also document the effect of a joyous mood on overconfidence. These effects are due to the fact that some contexts

such as unexpected product arrangement (or paired negative words with a joyous mood) help (or hinder) consumers to attend to the consumption and their learning processes, leading to a more (or less) accurate subjective knowledge.

Secondly, knowledge miscalibration occurs as a result of misinterpretation of external cues. This could be due to an overreliance on an external cue to validate objective knowledge or misjudgement of external cues (Alba and Hutchinson, 2000). For instance, a consumer might evaluate her objective knowledge of the country-of-origin of a product based on the name of the brand, overestimating the association between the brand name and country-of-origin. Peterson and Pitz (1986) document that when there is limited information, people show higher overconfidence. Peterson and Pitz (1986) also show that people use the amount of information as an external cue to assess their objective knowledge. Therefore, those who receive limited information think they have a high level of knowledge.

A consumer might also attribute the complexity of a consumption task to her lack of objective knowledge. Frankenberger and Albaum (1997) show that high engagement with difficult tasks leads to underconfidence, while high engagement with easy tasks results in overconfidence. People also interpret their cognition strategy as an external cue for their assessment of objective knowledge; for instance, those who use rational strategies (i.e., consistently using the same strategy or using systematic and algorithmic strategies) to assess their objective knowledge are more overconfident than those who apply ad hoc approaches (Williams, Dunning and Kruger, 2013).

Thirdly, knowledge miscalibration is determined by motivational biases. For instance, desirability of outcome leads to optimism and a positive evaluation of objective knowledge (Alba and Hutchinson, 2000). Indeed, when the outcome is desirable people select supportive information to judge their objective knowledge, leading to inflated subjective knowledge (Windschil, Scherer, Smith and Rose, 2013). Self-enhancement is another motivational bias influencing knowledge miscalibration, as people tend to assess themselves favourably regardless of their actual ability (Blanton, Pelham, DeHart and Carvallo, 2001; Kim *et al.*, 2010). They might enhance their self-assessment to protect or increase their self-esteem (Radecki and Jaccard, 1995). Another example of motivational biases is the miscalibration of knowledge regarding information provided

by close friends. Indeed, consumers are overconfident about their friends' product knowledge, particularly when they have a close relationship with those friends. In other words, they tend to overestimate their friends' knowledge in order to maintain and protect their close relationship (Gershoff and Johar, 2006).

A summary of factors predicting subjective knowledge and knowledge miscalibration (i.e., inaccuracy in subjective knowledge) is shown in Figure 3. Memory, external cues and motivational biases determine subjective knowledge. Furthermore, knowledge miscalibration is the inaccuracy in subjective knowledge. Therefore, any inaccuracy in the determinants of subjective knowledge leads to knowledge miscalibration. These biases include motivational biases, memory failure and misinterpretation of external cues. In fact, although subjective knowledge and its antecedents do not determine knowledge miscalibration, inaccuracies in any of these factors are the main determinants of knowledge miscalibration. Thus, knowledge miscalibration is an area of subjective knowledge that is not accurate. In the next section, the consequences of knowledge miscalibration are explained and discussed to provide a basis for the conceptualisation of hypotheses regarding the effect of overconfidence and underconfidence on consumer value.

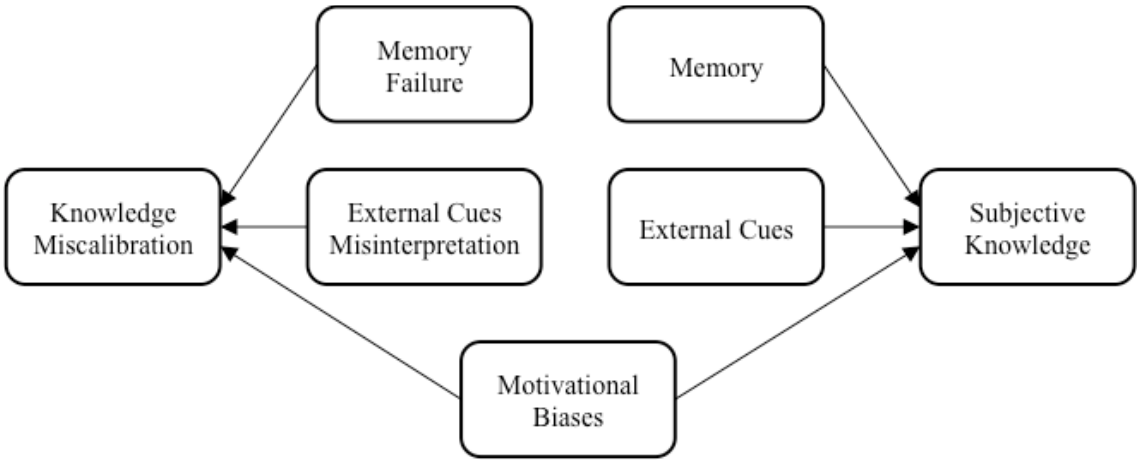


Figure 3: Antecedents of Subjective Knowledge and Knowledge Miscalibration

2.4.1 Consequences of Knowledge Miscalibration

Although antecedents of knowledge miscalibration have been widely researched (e.g., Coupey and Narayanan, 1996; Frankenberger and Albaum, 1997; Pillai and Hofacker,

2007; Poynor and Wood, 2010), its consequences have received considerably less attention (Puligadda, Grewal, Rangaswamy and Kardes, 2010). Alba and Hutchinson (2000) summarise empirical evidence in psychology literature to report that miscalibrated consumers rely on knowledge which they do not possess, are confident on their decisions based on inaccurate evaluations, and evaluate future outcomes of their decisions poorly. Based on this study and few others (e.g., Pillai and Hofacker, 2007; Puligadda *et al.,* 2010) looking at the effects of knowledge miscalibration, this research identifies three different ways in which overconfidence and underconfidence influence the consumption of a product or service: the extent of resources allocated to consumption, the way people act during consumption, and the level of consumption outcome expectations.

Firstly, knowledge miscalibration influences the level of resources (e.g., effort, time and energy) allocated to consumption. Overconfidence leads to suboptimal allocation of resources for the consumption task; for instance, overconfidence causes the use of less than optimal effort in an information search (Alba and Hutchinson, 2000) as overconfident consumers think they already hold the information required and are not motivated to search for more information (Radecki and Jaccard, 1995). Likewise, overconfidence negatively influences the educational performance of students due to the failure to allocate optimal resources to their studies (Kim *et al*., 2010; Winne and Jamieson-Noel, 2002). On the other hand, underconfidence is associated with the superoptimal allocation of resources (i.e., allocating more resources than required) to consumption, which happens because underconfident consumers think that their knowledge is insufficient to perform the consumption task and that they need to spend more resources to overcome this perceived lack of knowledge. The superoptimal allocation of resources may lead to negative consequences such as frustration (Pillai and Hofacker, 2007).

Secondly, knowledge miscalibration influences the way people act during consumption. On the one hand, overconfident consumers "act presumptuously" (Pillai & Hofacker, 2007, 263) (i.e., they engage in actions that are too difficult to perform), as they think they have enough knowledge to handle these actions. Puligadda *et al.* (2010) show that, in a customisation task, overconfident consumers are more satisfied with a high number

of personalisable attribute options (i.e., those attribute options that are evaluated based on personal preferences, such as mobile phone colour) than underconfident consumers. They show that consumers with low objective knowledge welcome a high number of options as they have no clear preference stored in their memory. On the other hand, consumers with high subjective knowledge are more satisfied with a higher number of options as they believe they are capable of evaluating them. Therefore, overconfident consumers (who have higher subjective knowledge compared to objective knowledge) are more satisfied than underconfident consumers (who have lower subjective knowledge compared to objective knowledge) with a variety of options. In other words, overconfident consumers are willing to perform difficult tasks, while underconfident consumers prefer easy tasks.

Acting presumptuously might lead to inappropriate purchasing decisions (Alba and Hutchinson, 2000; Hansen and Thomsen, 2013; Kidwell *et al.*, 2008), risky investment decisions (Hadar, Sood and Fox, 2013), a lack of flow state of mind (i.e., an optimal state of mind where there is a deep engagement with a consumption task; Csikszentmihalyi, 1990) (Pillai and Hofacker, 2007), and frustration (Pillai and Hofacker, 2007). Conversely, this research suggests that underconfident consumers act timidly (i.e., they engage in actions that are too easy to perform due to the fact that they think they do not have enough knowledge to engage with challenging actions). As a consequence of underconfidence, acting timidly decreases the quality of purchasing decisions (i.e., selecting too simple products; Alba and Hutchinson, 2000), and the flow state of mind (Pillai and Hofacker, 2007).

Thirdly, knowledge miscalibration impacts upon the level of consumption outcome expectations. Overconfident consumers set their expectations high based on the inaccurate perception that they have enough objective knowledge to achieve a higher level of consumption outcome. For instance, in making basketball shots overconfidence leads to high expectation, which decreases the feeling of pleasure from actually achieving success (McGraw, Mellers and Ritov, 2004). Even though this aspect has not been investigated for underconfident consumers, it is sensible to assume that based on their low assessment of objective knowledge they set low expectations of consumption outcome.

The three types of consequences of knowledge miscalibration are summarised in Table 4, along with the relevant literature.

Table 4: The Consequences of Knowledge Miscalibration

Impact of Miscalibration on Consumer Behaviour	Consequence	Source
Overconfidence		
Acting Presumptuously	Satisfaction with variety of personalisable options	Puligadda *et al.*, 2010
	Reduced flow	Pillai and Hofacker, 2007
	Frustration	Pillai and Hofacker, 2007
	Risk-taking in decisions	Hadar *et al.*, 2013
	Poor quality choices	Kidwell *et al.*, 2008
	Poor quality choices	Hansen and Thomson, 2013
	Poor quality choices	Alba and Hutchinson, 2000
Suboptimal Allocation of Resources	Poor quality choices	Alba and Hutchinson, 2000
	Poor academic performance	Kim *et al.*, 2010
	Poor academic performance	Winne and Jamieson-Noel, 2002
High Expectation	Reduced pleasure from success	McGraw *et al.*, 2004
Underconfidence		
Superoptimal Allocation of Resources	Frustration	Pillai and Hofacker, 2007
Acting Timidly	Reduced flow	Pillai and Hofacker, 2007
	Dissatisfaction with variety of personalisable options	Puligadda *et al.*, 2010

The impact of these consequences on consumer value will be used to discuss the conceptual model in Chapter 4. As the discussion suggests, overconfidence and underconfidence generate different consequences, which should lead to further, different consumption outcomes. Therefore, in the conceptualisation and empirical investigation this PhD considers overconfidence and underconfidence separately, rather than dealing with them holistically as knowledge miscalibration.

2.5 CONSUMER VALUE

The nature of 'value' has been debated in philosophy, economics and management (Ng and Smith, 2012). In the marketing literature, the term *consumer value* (or *customer value*) is used to reflect different meanings and applications (Graf and Maas, 2008; Woodruff, 1997). Woodruff and Flint (2006) present four different approaches to defining consumer value. First, there is the value-added concept from a company's perspective; this concept suggests that companies create value through the products and services they offer. In the second approach, consumer value is defined as the economic worth of a customer, again from a company's perspective; the approach tries to segment customers according to their value to the company and argues that consumers have a different value for the company. The third definition is the economic worth of a seller's product or service offering, which suggests that customers measure value using their economic reference points. Finally, consumer value is defined by the concept of value-in-use.

One of the main differences in defining consumer value lies in accepting it as an objective or subjective phenomenon. The objectivity of value implies that a product or service offering consists of a 'bundle of value', which is added to systematically by a company or through a chain of companies (Christopher, 2005; Porter, 1985). This view is consistent with Woodruff and Flint's (2006) first approach of defining value. On the other hand, the subjectivity of value means that value is perceived by subjects and can be different for each consumer (Woodruff, 1997; Holbrook, 1994; Zeithaml, 1988). This view is in line with Woodruff and Flint's (2006) third and fourth categories of consumer value definition. This research follows the subjective view of consumer value as it aims to investigate the consumer's valuation of product or service use as opposed to the process of value creation by a company or companies.

The second variation in defining consumer value is positioning it as 'value-in-exchange' or 'value-in-use'. Value-in-exchange refers to the value of the exchange and can be reflected by the economic worth of the offering (Chernev and Gal, 2010; Zeithaml, 1988). Zeithaml (1988) defines consumer value as the consumer's "overall assessment of the utility of a product based on perceptions of what is received and what is given"

(Zeithaml, 1988, p. 14). This definition is in line with Woodruff and Flint's (2006) third category of consumer value definition, which focuses on the consumer's comparison of benefits and sacrifices (e.g., Kotler and Keller, 2012; Hollensen, 2015). It also embeds value in exchange as it focuses on what is given and what is received in an exchange. However, value-in-use (i.e., Woodruff and Flint's (2006) fourth category of consumer value definition) signifies that value is perceived by the consumer experiencing a product or service in a specific use situation (Woodruff and Flint, 2006). Recent literature has demonstrated that "value is best defined as value-in-use" (Grönroos and Voima, 2013, p. 144), which is consistent with the research aim of investigating the role of knowledge miscalibration in the use stage of consumption. Therefore, in the rest of this document consumer value is defined and used as value-in-use. Two important definitions which are consistent with the value-in-use view of consumer value are presented below.

Focusing on the experiential aspects of consumption, Holbrook (1996, p. 138) defines consumer value as "an interactive, relativistic preference experience". Consumer value is an interactive experience as there is an interaction between an object (e.g., a product) and a subject (e.g., a consumer). It is also a relativistic experience in a comparative, personal and situational sense. Indeed, consumer value includes a preference for one object over another (i.e., relativistic evaluation) based on an individual's comparison in a specific situation. These interactive, relativistic, preferences shape experiences, leading to value creation; for example, a consumer looks at the design of a car (i.e., the interactive experience between a subject and an object) and prefers the design over other cars (i.e., a relativistic preference experience), leading to a perception of beauty which creates consumer value (in this context, from an aesthetics point of view).

Woodruff (1997, p. 142) describes consumer value as a consumer's "perceived preference for and evaluation of those product attributes, attribute performances and consequences arising from use that facilitate (or block) achieving the customer's goals and purposes in use situations". In this definition, Woodruff and Gardial (1996) have adopted the means-end model of categorising product information for the concept of consumer value (see Figure 4). This suggests that a consumer starts valuing a product or service by thinking about product or service attributes; the valuation continues with the

use of the product or service and through experiencing the performance and consequences of those attributes. Finally, at the highest level of the hierarchy, the consumer evaluates the overall process by investigating how the performance and its consequences lead to the desired goals. Although Woodruff's (1997) definition is associated with product use, researchers have extended this definition to service (e.g., Macdonald *et al.*, 2011) and experience (e.g., Lemke *et al.*, 2011) evaluation.

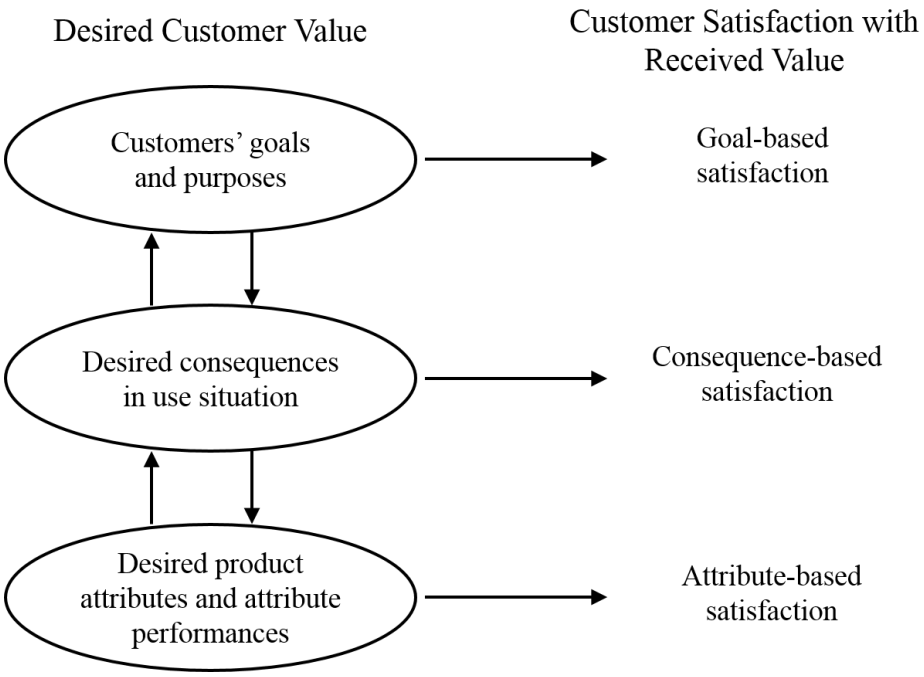


Figure 4: Customer Value Hierarchical Model (Woodruff and Gardial, 1996, p. 142)

Woodruff's (1997) definition is grounded in the means-end chain nature of consumer value. The means-end nature of consumer value is consistent with one of three primary dimensions of consumer value introduced by Holbrook (1994) referred to as intrinsic vs. extrinsic value dimension and is explained in the next section. The intrinsic vs. extrinsic dimension of consumer value demonstrates whether an experience is valued for its ability to serve an end (i.e., extrinsic) or is appreciated as an end (i.e., intrinsic; Holbrook, 1994). Indeed, Holbrook's (1994) definition of consumer value is an extension of Woodruff's (1997) definition from product to experience and from one-dimensional to multi-dimensional value.

Holbrook's (1996) definition of consumer value is consistent with the service-dominant logic and value-in-use as it associates value with an interaction between the subject and

the object. This is in line with the definition of *use* as a mental, physical or virtual application or possession of resources (Grönroos and Voima, 2013). In fact, interaction is a necessary component of use. Consistent with this view, Grönroos and Voima (2013) revisit definitions of value-in-use and conclude that the conceptualisation of value-in-use is achieved through Holbrook's definition. Therefore, Holbrook's (1994) definition of consumer value is applied in this research.

The extant literature investigating the antecedents of consumer value mainly focuses on the factors associated with the supplier of a product or service. For example, Macdonald *et al.* (2011) identify service quality (e.g., warranty maximisation and quality of repairs), relationship quality (e.g., communication) and network quality (e.g., supplier coordination) as antecedents of consumer value. Lähteenmäki and Nätti (2013) also explore the lack of employee commitment and producer-oriented business methods as barriers of consumer value. Lemke *et al.* (2011) have added product and service quality (e.g., product variety, product value for money, service accessibility and reliability) as determinants of consumer value. In addition, other studies have investigated elements in consumption associated with context, for example the dining atmosphere (Liu and Jung, 2009), complexity, involvement and hedonism of the product consumption process (Lemke *et al.*, 2011), and time, location and uncertainty of consumption (Gummerus and Pihlström, 2011).

Few studies on the antecedents of consumer value have looked at factors related to consumers; consumers' subjective knowledge (Barrutia and Gilsanz, 2012) and self-efficacy (McKee *et al.*, 2006; van Beuningen *et al.*, 2009; van Beuningen *et al.*, 2011; Zhao *et al.*, 2008) have been shown to have a relationship with consumer value, however these studies only consider value as a one-dimensional phenomenon. Therefore, this PhD aims to extend this line of research by looking at knowledge miscalibration as an antecedent of consumer value and acknowledging the consumer as a multi-dimensional phenomenon.

2.5.1 Dimensionality of Consumer Value

Researchers have conceptualised and empirically investigated consumer value as a multi-dimensional phenomenon. For instance, Mattsson (1992) introduces three consumer value dimensions that have been developed from Hartman's (1967) value

structure. These three dimensions are logical, practical and emotional value. Logical value refers to the consumer's evaluation of standards and routines (e.g., whether a car is performing its standard tasks, such as moving). Practical value is the consumer's assessment of the functionality, excellence and perfection of a specific phenomenon (e.g., how convenient a car is). Finally, emotional value focuses on a consumer's feelings in relation to an experience (e.g., how beautiful a car is).

Sheth, Newman and Gross (1991) also suggest that value has five dimensions: functional, social, emotional, epistemic and conditional. They theorise that functional value relates to the functional, utilitarian or physical attributes of a product or service (e.g., the perceived convenience of a car). Social value refers to the perceived utilities associated with others (e.g., the perceived status gained from having a car). Emotional value is associated with feelings and affective states (e.g., the perceived enjoyment from driving a car). Epistemic value is based on the capacity of a product or service to meet curiosity, the need for novelty or the desire for knowledge (e.g., the perceived innovativeness of a car). Conditional value is associated with a product or service's capacity to provide utility in specific conditions (e.g., the appreciation of a car for its ability to use four wheel drive in specific conditions, such as heavy snow). Some of these dimensions overlap at the use stage of product or service consumption, for instance conditional value can be categorised as functional value and epistemic value can be classified as social or functional value.

Axiologists (i.e., philosophers who study value) use different dimensions of value in their explanations and investigations. In particular, they look at the aspects of consumption that are completely distinct (Ng and Smith, 2012). Holbrook (1994) summarises the value dimensions used by axiologists into three main dimensions, conceptualising eight sub-dimensions of value. This framework is applied in this research as it is developed based on distinct dimensions, has been empirically investigated and has proved to be one of the appropriate methods used in academic research. Holbrook's (1994) value dimensions have been empirically investigated in several studies in different contexts, for example restaurant services (Sanchez-Fernandez, Iniesta-Bonillo and Holbrook, 2009), online shopping (Mathwick *et al.*, 2001), consumer electronic products (Munnukka and Jarvi, 2012), travelling (Gallarza

and Saura, 2006) and fast-moving consumer goods (Leroi-Werelds, Streukens, Brady, and Swinnen, 2014). Moreover, Holbrook's (1994) method for investigating consumer value is an appropriate choice in terms of its predictability, psychometric properties and actionability (Leroi-Werelds *et al.*, 2014).

		Extrinsic	**Intrinsic**
Self-Oriented	**Active**	EFFICIENCY (O/I, Convenience)	PLAY (Fun)
	Reactive	EXCELLENCE (Quality)	AESTHETICS (Beauty)
Others-Oriented	**Active**	STATUS (Success, Impression Management)	ETHICS (Justice, Virtue, Morality)
	Reactive	ESTEEM (Reputation, Materialism, Possessions)	SPIRITUALITY (Faith, Ecstasy, Sacredness)

Figure 5: A Typology of Consumer Value (Holbrook, 1996, p. 139)

Holbrook (1994) uses three dimensions to present a typology of consumer value (see Figure 5). These dimensions are 1) intrinsic value vs. extrinsic value, 2) others-oriented vs. self-oriented and 3) active vs. reactive. *Extrinsic* value is a valuation of a consumption experience in terms of its ability as a means to serve an end. For instance, we value using a drill for its ability to create a hole in a wall. *Intrinsic* value on the other hand is when a consumption experience is prized as an end. Enjoyment from resting in a hotel is an example of intrinsic value (Holbrook, 1999).

Active value is the outcome of the valuation of a consumption experience when the consumer is mentally or physically doing something with a product or within a service, such as how fast a consumer can turn a computer on. *Reactive* value occurs when an experience is appreciated for the consequences of an act or attribute associated with a

product or service (rather than the consumer), such as a product's aesthetic effect on a consumer (Holbrook, 1999).

Value is *self-oriented* when a consumer appreciates an aspect of consumption for her own sake and for its direct personal effects. Convenience, quality, fun and aesthetic responses are examples of self-oriented value. On the contrary, value is *others-oriented* when an experience is valued for its effect on someone or something. Feelings of acceptance by others, justice and spirituality are categorised as others-oriented values (Holbrook, 1999).

Some researchers have only focused on self-oriented dimensions of consumer value (e.g., Mathwick *et al.*, 2001; Munnukka and Jarvi, 2012; Overby and Lee, 2006; Steenkamp and Geyskens, 2006). These studies limit their research to self-oriented dimensions as a result of decisions regarding the research scope (e.g., Chang and Tseng, 2013; Lee, Kim and Fairhurst, 2009; Mathwick *et al.*, 2001; Mathwick and Rigdon, 2004; Munnukka and Jarvi, 2012), an inability to explore others-oriented dimensions in the context studied (e.g., Babin, Barden and Griffin, 1994; Steenkamp and Geyskens, 2006), and the universal applicability of self-oriented dimensions (e.g., Overby and Lee, 2006).

However, there are contexts where others-oriented value is an important aspect of the consumption, such as holiday travel packages (Gallarza and Saura, 2006), restaurants (Sanchez-Fernandez *et al.*, 2009), social networks (Vock, van Dolen and de Ruyter, 2013), luxury clothing and fashion accessories (Choo, Moon, Kim and Yoon, 2012), and hospitals (Chahal and Kumari, 2011). Indeed, the self- vs. others-oriented continua is closely related to whether a context involves private or public consumption. For example, social value is perceived in relation to other people and altruistic value is perceived in relation to the environment, society or an external power.

This research focuses on self-oriented value dimensions for three main reasons. Firstly, self-oriented value dimensions are universal in consumption tasks. In fact, in a consumption task a consumer interacts with a product or service and perceives value (Holbrook, 1999); therefore, the self is always a necessary component of consumption and value dimensions relevant to the self (i.e., self-oriented dimensions) are always

created. However, others are not a necessary part of a consumption task. In other words, consumers can use a product or service which has no relevance to an external entity. The consumption of low-cost commodity products (e.g., low-cost petrol, low-cost internet etc.) is a good example of a context having no connection to other entities. Therefore, as the first to investigate the effect of knowledge miscalibration on consumer value, this study focuses on self-oriented value dimensions which have relevance to all consumption contexts.

Secondly, the operationalisation of others-oriented aspects of consumption, if not impossible in this research, is hardly achievable. Although others-oriented value dimensions are operationalised in the literature (e.g., Gallarza and Saura, 2006; Sanchez-Fernandez *et al.*, 2009), others-oriented consumer knowledge or others-oriented knowledge miscalibration have not been clearly defined and investigated. In particular, others-oriented knowledge differs from consumer to consumer as it is linked to entities other than products or services. For example, knowledge derived from friends and family is different from consumer to consumer. Consider two consumers who have an identical level of knowledge about the social impact of a luxury product; one of these consumers perceives a high level of social value from that luxury product as she interacts in a social context that has the same appreciation of that luxury product, whereas the other consumer however does not perceive a high level of social value as her social interactions are with those who have no appreciation or knowledge about that luxury product. Therefore, operationalising others-oriented consumer knowledge and knowledge miscalibration and investigating its effect on consumer value (i.e., particularly others-oriented value dimensions) are both empirically challenging. Therefore, this research focuses on the self-oriented value dimensions, and suggests future research on others-oriented consumer knowledge such as social knowledge and ethics knowledge to provide a platform for performing this study in others-oriented contexts.

Thirdly, the contexts for this research and the way concepts are operationalised only involve private consumption. As explained in Chapter 5, amazon.com and prezi.com are selected as contexts of this research. Others-oriented value dimensions are less relevant to these contexts. Therefore, the focus of this study is Holbrook's (1999) self-oriented

value dimensions. Hence, the four types of self-oriented consumer value from Holbrook's (1999) framework of efficiency, excellence, play and aesthetics have been selected for further investigation in the research into the effect of knowledge miscalibration on consumer value. In the following sub-sections, the four self-oriented dimensions of consumer value investigated in this research are explained in detail. Four others-oriented consumer value aspects (i.e., status, esteem, ethics and spirituality) are also described below so as to provide a better understanding of consumer value.

Status refers to the situation when an experience is used as a means to influence others' responses. For example, a teenager goes to a certain college to gain approval from her parents. *Esteem* is similar to status since the consumer seeks others' approval in a certain experience; while esteem is defined through the reaction of others, status is the self-assessment of a social position. The example of esteem is a consumer who wears a certain brand to increase her self-perception in the reactions of others. *Ethics* occurs in the involvement of an experience and its effect on others. Finally, *spirituality* closely resembles ethics, with a focus on the reactive side of others-orientated experiences that are valued for their own sake (Holbrook, 1999).

2.5.1.1 Efficiency and Excellence Value

In marketing literature, efficiency and excellence value are represented together as functional (Sheth *et al.*, 1991), utilitarian (Choo *et al.*, 2012), instrumental (Smith and Colgate, 2007) and economic value (Holbrook, 2006). Although these two dimensions of consumer value are very similar, they are different in terms of being active or reactive. Indeed, efficiency occurs when an experience is actively used as a means to a self-orientated end, whereas excellence is the capacity of an experience as a means-to-an-end in functioning well regardless of whether it is used for achieving the end (i.e., the purpose) (Holbrook, 1999). For example, a high-resolution digital camera in a smartphone reflects its excellence value and if it results in easy photography, it is perceived as having efficiency value. Studies on value as a difference between benefits and sacrifices consider value as efficiency and excellence. For example, Zeithaml's (1988) definition of perceived quality includes elements from both excellence and efficiency, such as product attributes and their consequences. Indeed in Zeithaml's (1988) study, product attributes are means that may (or may not) satisfy an end. This

can also explain the difference between the active nature of efficiency and the reactive nature of excellence. Excellence value is the appreciation of a means that can potentially lead to an end, while efficiency is the evaluation of a satisfied end.

Efficiency is usually measured by comparing the output and input of an experience, for example the economic worth of a product or service or the time it takes to consume that product (Holbrook, 1999). It represents convenience (Maenpaa *et al*., 2008), easiness (Munnukka and Jarvi, 2012), financial worth (Sparks, 2008), time and effort efficiency (Gallarza and Saura, 2006), and reliability (Shamdasani, Mukherjee and Malhotra, 2008). Indeed, efficient utilisation of consumer resources such as money, time, cognition and effort leads to efficiency value. For example, convenience means less resource investment is needed to achieve consumption goals (Mathwick *et al.*, 2001).

Excellence is usually referred to as 'quality' in practical and academic references. Although the original definitions of quality included efficiency as a part of quality (e.g., Zeithaml, 1988), there is now a distinction between excellence and efficiency among marketing scholars (e.g., Holbrook, 1999; Leroi-Werelds *et al.*, 2014; Munnukka and Jarvi, 2012). As excellence is a reactive value (Holbrook, 1999), it is created when there is no physical interaction between a consumer and a product or service. Therefore, excellence represents the consumer's appreciation of the product or service potential in functioning well. For example, the maximum power and speed of a car can shape a perception of excellence regardless of whether they are actually utilised. These appreciations are relative to the standards available changing over time. For instance, 80 MB hard drives were excellent in the early 90s, whereas in 2015 terabyte hard drives perceived as excellent. In fact, excellence reflects the sophistication, craftsmanship (Choo *et al.*, 2012), workmanship (Lee, Trail, Kwon and Anderson, 2011), durability (Sweeney and Soutar, 2001), standard (Sanchez-Fernandez *et al.*, 2009), quality (Leroi-Werelds *et al.*, 2014) and excellence (Munnukka and Jarvi, 2012) of a product or service.

2.5.1.2 Play Value

Play leads to having fun during a self-orientated experience and is an important element of hedonic experience (Babin *et al.*, 1994). Feelings of enjoyment and entertainment

usually reflect the perception of play in product or service consumptions (Holbrook, 1999). Play is a type of value that consumers perceive from actively performing the consumption task (not from the outcome of the consumption task), by creating fun, happiness or enjoyment (Grayson, 1999). It is associated with feelings of enjoyment, entertainment and escapism (Babin *et al.*, 1994; Mathwick *et al.*, 2001). Some researchers have investigated play as a representative of hedonic (e.g., Bourdeau, Chebat and Couturier, 2002; Lee *et al.*, 2009; Overby and Lee, 2006) or emotional (e.g., Pura, 2005; Roig, Garcia, Tena and Monzonis, 2006; Sigala, 2010) value.

Perceived play has positive consequences such as a positive consumer attitude (Mathwick and Rigdon, 2004), satisfaction (Gallarza and Saura, 2006), consumer preference (Lee *et al.*, 2009; Overby and Lee, 2006), intention to use (Yang *et al.*, 2012), perceived relationship investment by the provider (Mimouni-Chaabane and Volle, 2010), loyalty (Pura, 2005) and new product adoption (Antón, Camarero and Rodriguez, 2013). Indeed, marketing scholars have explored play as an important part of experiential aspects of consumption (Holbrook and Hirschman, 1982).

One of the important psychological mechanisms generating perceived play is flow (Mathwick and Rigdon, 2004). Csikszentmihalyi and Csikszentmihalyi (1988) identify four states of mind: anxiety (i.e., where a task challenge exceeds human skills), apathy (i.e., where both the task challenge and human skills are bellow a critical threshold), boredom (i.e., where human skills exceed a task challenge) and flow. Flow is an optimal state of mind where there is a deep engagement with a consumption task, and it depends on a close match between task challenges and consumer skills (Csikszentmihalyi, 1990). In the online context, flow is defined as "a cognitive state experienced during online navigation" (Novak *et al.*, 2000, p. 24). Flow has been shown to have positive consequences such as perceived behavioural control and satisfaction (Hoffman and Novak, 2009; Rose *et al.*, 2012). In fact, flow is a psychological experience that leads to perceived play due to a deep engagement and absorption in a consumption task (Mathwick and Rigdon, 2004). Scholars have operationalised flow through subjectively measuring the occurrence of flow (e.g., Rose *et al.*, 2012) or subjectively measuring situations (i.e., consumption task difficulty and consumer skills) leading to flow (e.g., Mathwick and Rigdon, 2004). This research considers flow as an objective experience

and in the next chapter it is explained that a low level of knowledge miscalibration creates a situation where there is a high flow state of mind during a product or service use, leading to a higher perception of play.

2.5.1.3 Aesthetic Value

Aesthetics refers to the reactive, self-orientated appreciation of an experience. Responses to beauty and art are categorised as aesthetic responses (Holbrook, 1999); aesthetic value is an "immediate, dynamic, unified, meaningful, pleasant, and vividly felt" experience, emerging from the perception of an aesthetic object (Wagner, 1999, p. 128). As an intrinsic value, aesthetics are concerned with the interaction between the consumer and the product or service (Holbrook, 1999). Aesthetic value is reactive, meaning that the consumption experience controls the consumer; it is different from active value, such as play, where the consumer controls the consumption experience (Wagner, 1999). For instance, aesthetic value is created by observing a well-designed product, whereas play is perceived from using that product.

Aesthetic value is associated with visual appeal (Methwick *et al.*, 2001), attractiveness (Munnukka and Jarvi, 2012), and the appreciation of design (Choo *et al.*, 2012) and arrangement (Sanchez-Fernandez *et al.*, 2009). The few studies that have investigated the post-use behavioural consequences of aesthetic value have found mixed results (e.g., Choo *et al.*, 2012; Gallarza and Saura, 2006). Sonderegger, Sauer and Eichenberger (2014) show that visually appealing websites create a higher perception of usability and trustworthiness. Surprisingly, Choo *et al.* (2012) have found no support for the relationship between aesthetic value and brand relationship in a luxury fashion context. A possible explanation for this is that in contexts where visual appeal is the core function of a product or service, consumers perceive the visual appeal as efficiency, excellence and play value in addition to aesthetic value (Choo *et al.*, 2012).

Aesthetic value is directly related to human cognition. Lewicki (1986) suggests that aesthetic responses involve the unconscious development of people's cognitive algorithms. Indeed, people are sensitive to the violation of proportion and the unity of objects learnt unconsciously; for example, the *golden ratio,* which is a specific ratio of length to height of approximately 1.6 to 1, is used in art and architecture as an element

of aesthetics (Berlyne, 1971). People unconsciously learn this proportion through facing it in the natural environment, for instance in human body proportions. Further development in this area has shown that aesthetic value is associated with fluency (Reber, Schwarz and Winkielman, 2004) which is the ease with which information is brought to mind or new information is processed (Schwarz, 2004). For example, consumers appreciate symmetry in design as it creates fluency (Reber, 2002). In particular, aesthetic responses are strong when the source of fluency is unknown (Reber *et al.*, 2004). This explains Lewicki's (1986) argument regarding the association of unconscious development of cognitive algorithms and aesthetics (e.g., the golden ratio). For instance, people perceive objects containing the proportions of the golden ratio as beautiful as they generate fluency with no indication of the source of fluency. The effect of fluency on aesthetics is established in the consumer behaviour literature as well (Cho and Schwarz, 2010). Cho and Schwarz (2010) show that a consumer prefers a pair of eyeglasses when she sees it on the face of her friend directly rather than through a mirror, as it is more fluent to process. In a similar vein, Tuch, Roth, Hornbæk, Opwis and Bargas-Avila (2012) show that those with a high perception of aesthetics perceive websites to be easy to use. The next chapter explains that a low level of knowledge miscalibration generates fluency, leading to higher perceived aesthetic value.

As the research is conducted in two online settings, relevant literature in the area of online consumer value is reviewed in the following section.

2.5.2 Online Consumer Value

Consumer value has been investigated in online settings such as online shopping (Steenkamp and Geyskens, 2006; Methwick *et al.*, 2001; Overby and Lee, 2006), online trip planning (Sigala, 2010), online auctioning (Lee *et al.*, 2009), and online banking (Maenpaa *et al.*, 2008; Shamdasani *et al.*, 2008). Like the other contexts, researchers show that consumer value has positive consequences in online settings. Consumer value is positively associated with preference, loyalty, repeat purchase intention and satisfaction in online contexts (e.g., Kim and Niehm, 2009; Overby and Lee, 2006; Shih, 2012; Yang and Peterson, 2004).

Researchers identify that online features can improve consumer value, such as perceived information quality (i.e., accurate, informative, updated and relevant information; Kim and Niehm, 2009), customisability (i.e., the level of control over a website, innovativeness and the ability to appreciate aesthetic elements; Mathwick, Wagner and Unni, 2010), online image (i.e., speed, reliability, usefulness, enjoyment, ease of use, trustworthiness and style; Chang and Tseng, 2013; Shamdasani *et al.*, 2008), website environmental elements (i.e., virtual agents, control command and 3D design; Charfi and Lombardot, 2015), perceived information searching and switching costs (Wu, Chen, Chen and Cheng, 2014) and social capital (i.e., the ability to share information with others and trust other consumers; Vock *et al.*, 2014).

Few studies have also looked at the role of consumer characteristics in shaping consumer value. Lee *et al.* (2009) demonstrate that price insensitivity, variety-seeking tendency (i.e., seeking new ideas, products and activities) and compulsive buying behaviour (i.e., "chronic, repetitive purchasing that becomes a primary response to negative events or feeling", O'Guinn and Faber, 1989, p.155) leads to a better perception of value. Maenpaa *et al.* (2008) also show that consumers with little experience with online banking prefer auxiliary features such as voice effects and virtual figures more than those with extensive experience. Furthermore, Barrutia and Gilsanz (2012) find that consumer expertise (i.e., cognitive effort, memory, analysis and elaboration of information) increases the perception of value.

Furthermore, studies on online customer experience have investigated concepts relevant to consumer value. For example, Novak *et al.* (2000) introduce flow as a core element of online customer experience. In their definition, flow is associated with high levels of task challenge, skills and control, focused attention and telepresence (i.e., the sense of being present in a virtual environment). Alternatively, Rose *et al.* (2012) show that a cognitive experiential state (i.e., flow) and an affective experiential state (i.e., aesthetics, perceived control and perceived benefits) lead to purchase intentions through trust and satisfaction. However, consumer value researchers consider some of these elements of experience to be dimensions of consumer value. For example, telepresence and focused attention are considered as consequences of flow and as part of perceived play (i.e., perceived enjoyment and escapism; Mathwick and Rigdon, 2004). Alternatively,

aesthetics is referred to as aesthetic value and perceived control as efficiency value. These inconsistencies are the result of the close relationship between customer experience and consumer value. In fact, customer experience is a customer's internal response to any direct or indirect interaction with a company (Meyer and Schwagner, 2007). Consumer value is also a preferential experience (Holbrook, 1996). Therefore, consumer value is a part of experience that is perceived through preferences. Consumers may not be aware of their whole experience with a company, nor do they make preferences out of each experiential response. In other words, consumer value is an outcome of customer experience (Zeithaml, Parasuraman and Malhorta, 2002). Consistently, Mollen and Wilson (2010) suggest that the experience of telepresence is an antecedent of consumer value (which they define under a broader concept of engagement). Therefore, when components of experience such as telepresence and flow are operationalised through subjective evaluations (e.g., Novak *et al.*, 2000; Rose *et al.*, 2012), they may reflect the perception of value (as respondents focus on their perceptions and those responses that they are aware of).

Similar to the studies on consumer value, customer experience research has focused on online features as antecedents of customer experience. Hausman and Siekpe (2009) show that website usefulness, informativeness and entertainment lead to the experience of flow. Hoffman and Novak (2009) review the literature and identify online attractiveness, novelty, playfulness and content as antecedents of flow, while Van Noort *et al.* (2012) add interactivity as another determinant of flow. Chen and Dibb (2010) find that website usability, security, privacy and information presentation quality increase website approach intentions among consumers through improving the experience of trust. Dickinger and Stangl (2013) form a formative measurement model for website performance based on these determinants of online customer experience, demonstrating that website performance affects consumer value. Furthermore, Kim *et al.* (2013) illustrate that when a consumer is able to collaborate with other consumers on a website, they are highly likely to enjoy the experience.

Studies investigating technology acceptance models in online contexts have also examined concepts related to consumer value and customer experience. Koufaris (2002) shows that perceived enjoyment and perceived usefulness determine consumers'

intention to return to a website, while Hsu and Lu (2004) have similarly found that in addition to perceived usefulness and perceived ease of use, flow experience is a determinant of the intention to play an online game. In addition to these factors, Ha *et al.* (2007) further develop the technology acceptance model by adding perceived attractiveness as one of the adoption intention antecedents. Morgan-Thomas and Veloutsou (2013) have shown brand reputation and trust to be elements defining consumers' website use intentions, and Page and Uncles (2014) reveal that online participation is a multidimensional phenomenon. For example, Page and Uncles (2014) show that perceived ease of use increases the duration and depth of website use, but not the breath of website use.

2.6 SUMMARY

This chapter has explained the service-dominant logic and the way it informs this research, before continuing to review literature exploring consumer knowledge, objective knowledge and subjective knowledge. In particular, the concept of self-efficacy is explained to provide a better understanding of subjective knowledge. As a core construct in this research, knowledge miscalibration, defined as the inaccuracy in subjective knowledge, is introduced, and its antecedents and consequences have been explained. The second core concept in this research, consumer value, and its sub-dimensions, particularly efficiency, excellence, play and aesthetics, have also been critically reviewed and explained. Additionally, the literature relevant to consumer value and its sub-dimensions in online settings is acknowledged. Having developed the understanding of the two concepts of consumer value and knowledge miscalibration in this chapter, the next chapter advances the research by explaining philosophical and methodological implications in investigating the effect of knowledge miscalibration on consumer value.

3 RESEARCH PHILOSOPHY

This chapter sets out the philosophical implications of this PhD research. The philosophical assumptions of the research are discussed first, followed by the research strategy employed in the study.

3.1 PHILOSOPHICAL IMPLICATIONS

In the 1980s, the paradigm debate started between the positivism and the interpretivism paradigm followers in consumer research (Anderson, 1986). Several alternatives to the positivist side of the debate were suggested, such as semiotics (Holbrook and Grayson, 1986), critical relativism (i.e., a multifaceted contingent philosophy of social sciences) (Anderson, 1986), and existential phenomenology (i.e., a paradigm with a focus on the lived experience of the consumer) (Thompson, Locander and Pollio, 1989). These alternatives are represented as a family of theoretical perspectives focusing on social and cultural meanings in consumption entitled *consumer culture theory* (Arnold and Thompson, 2005).

For an interpretivist researcher, knowledge is not developed from the standpoint of an external observer but rather from the experiences of the research co-participants, such as consumers (Tadajewski, 2006). Consequently, "a methodological strategy to understand the lived experience of consumer interpretive researchers generally (although not exclusively) use qualitative methods" (Tadajewski, 2006, p. 430). In particular, interpretivism paradigms are aligned with an idealistic ontology, which assumes reality is created in individuals' minds; this means there is no single reality as different people have different interpretations of a phenomenon (Blaikie, 2007). However, this research assumes that the reality perceived by people results from actual events that exist independent from the perceiver. In this PhD for instance, although consumers perceive the value of a product differently this difference results from their cognition structure (i.e., knowledge miscalibration), which exists independently from their perception of value.

The positivism paradigm on the other hand relies on the realist ontological assumption, implying that there is "an external reality, consisting of things, and/or events and/or

states of affairs, which are controlled by natural or social law" (Blaikie, 2007, p. 14). Causal relationship studies in consumer research were perceived to have an underlying positivism philosophical assumption. However, in positivism, when a regularity is observed, it is assumed that there is no way to deductively show (e.g., through an experiment or a covariance-based study) anything other than the regularity (Hunt, 1991). Alternatively, in the critical rationalism paradigm, an observed regularity is perceived as real when there is no way to deductively falsify it (Blaikie, 2007). Therefore, causal studies such as experiments which do not assume that an observed regularity is real and try to operationalise its causal mechanisms (e.g., through the manipulation of causal mechanisms) follow another philosophical paradigm that sees reality in different layers: a layer consisting of causal mechanisms and a layer consisting of resulted regularities. As will be explained, the most relevant philosophical paradigm supporting this statement is critical realism.

This research pursues the *critical realism* paradigm, largely as a result of a fit between the research and *depth realist* ontology relying on the existence of reality in three domains: the empirical, the actual and the real. The empirical domain is the world that is experienced and observed by the senses, the actual domain consists of events, whether observed or not, and the real domain includes the processes and mechanisms that create those events and experiences (Bhaskar, 2008).

In marketing, Easton (2002) introduces critical realism as an alternative way of approaching marketing research. He suggests that the exchange school of thought of marketing (Sheth, Gardner and Garrett, 1988) can provide material for critical realism, with the main question being "why did this exchange take place between this buyer and this seller on this occasion?" (Easton, 2002, p. 106). This PhD extends this claim by arguing that the service-dominant logic of marketing (Vargo and Lusch, 2004; 2006; 2008) feeds the critical realism paradigm better. The basis of the service dominant logic is the service and competency exchange. Accordingly, the main question relating to this logic is: what are the underlying structures that shape and influence this exchange of the service between firms and consumers? In fact, in the service-dominant logic, consumers integrate resources proposed by companies (i.e., products or services) with their own resources to create value (Vargo and Lusch, 2004; 2006; 2008). Therefore, in order to

study consumer behaviour from the viewpoint of the service-dominant logic and also to apply the critical realism paradigm, the research question needs to explore causal mechanisms in the real domain that lead to consumer value. As explained in Chapter 1, this PhD addresses this issue by defining the research question as:

- What is the effect of knowledge miscalibration on consumer value?

Indeed, interpretivism paradigms aim to understand how consumers perceive value. In these paradigms consumer value is established by the perception of consumers. The positivism paradigm on the other hand looks for the observed effects of consumer value such as 'observed performance', 'observed happiness' or existing theories to understand consumer value. However, in critical realism, observed consumer value (empirical domain) or perceived consumer value (actual domain) are the outcomes of causal mechanisms in the real domain. Definitions of these causal powers are only possible through the researcher's imagination of such causal powers, as they are not based on any observable reality or existing theory. In this PhD research, knowledge miscalibration is identified as one of the mechanisms in the real domain that affect consumer value.

The main benefit of critical realism is that it overcomes the limitations of objectivism and interpretivism paradigms. It gives the researcher the freedom to expand the area of knowledge by imagining possible causal mechanisms of an observed event. Critical realism, as is evident from its name, has a critical view of scientific discoveries; in fact, it encourages researchers to think beyond the existing theories and observations and explore and investigate new possible theories (Bhaskar, 1998).

Figure 6 sets out the process of scientific discovery in critical realism. It starts with the establishment of observable regularities, which is the objective of classical empiricism, followed by an exploration of the underlying structures and causes of those regularities, which is the aim of interpretivist research (particularly transcendental idealism, which deals with the imagination of causal mechanisms), and is completed by testing the causal model, which again is the aim of the objectivism paradigm (Bhaskar, 1998).

In fact, in critical realism, the researcher starts by observing a regularity, in this case the differences in the perception of consumer value. Following this, the researcher imagines the potential causal mechanisms generating those regularities. Finally, the mechanisms imagined are tested for their validity. This can happen through logical explanation and further empirical evidence. In this PhD, knowledge miscalibration is identified as a generative mechanism and its validity is investigated by conceptualisation (Chapter 4) and empirical evidence (Chapters 5 and 6).

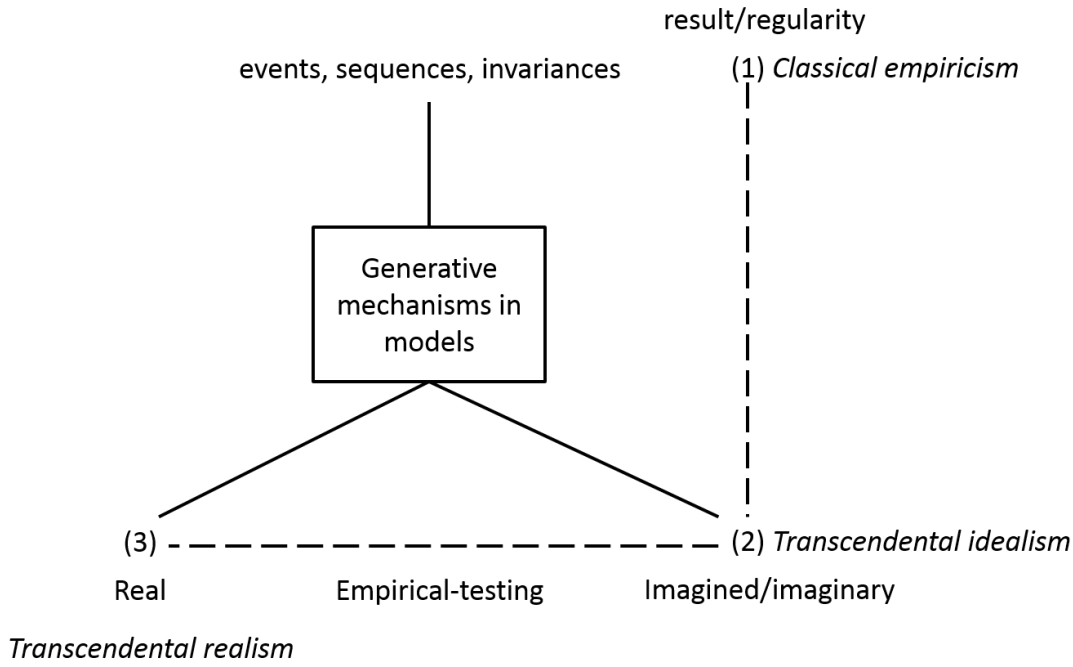


Figure 6: The Logic of Scientific Discovery (Bhaskar, 1998, p. 50)

The ontological and epistemological assumptions informing critical realism in relation to the research question are described below.

3.2 ONTOLOGICAL ASSUMPTION

Depth realist is the ontology associated with the critical realism paradigm. It claims that there is an objective reality out there, similar to the shallow realist ontology of positivism. However, it argues that this reality may not be observable and exists in three domains of reality: the empirical, the actual and the real (Blaikie, 2007). This ontology

has two forms in social sciences. On the one hand, Bhaskar (1998) sees a social structure independent of its actors, having a causal relationship with social events. On the other hand, Harre (1986) rejects the independence of social structures and claims that they are abstracts and reifications and do not exist independently of their social actors, so they cannot cause any event. Harre's (1986) view leans toward social constructionism (Blaikie, 2007). This PhD commits to Bhaskar's version of depth realism ontology, consisting of three levels of reality with causal relationships and the independent nature of generative mechanisms. The reason behind this choice is that, like Bhaskar (1998), this research follows the fact that generative mechanisms are independent from their consequences. For instance, consumers' knowledge could be miscalibrated (i.e., the generative mechanism in the real domain of reality) whether or not they use a product or perceive value from using a product (i.e., the regularity in the actual or empirical domain of reality).

This research begins by observing a regularity in the empirical domain. This is described as different consumers having varied perceptions of value from the same product or service use. For instance, only certain people will say they derive value from a particular service, and the aim of this research is to discover the real domain by discovering why this happens. In other words, in considering the research question of the effect of knowledge miscalibration on consumer value, consumer value happens in the empirical and actual domain and knowledge miscalibration exists in the real domain. The purpose of science is to investigate the imagination of such a relationship in the same domain, normally in the empirical domain (Bhaskar, 1998). In fact, as shown in Figure 6, the empirical testing part of critical realism is consistent with the classical objectivism paradigm. In particular, at this stage the research aims to operationalise both causal mechanisms and events in the same (usually empirical) domain. Consistently, this PhD validates the imagined generative mechanism of knowledge miscalibration through conceptually and empirically investigating its effect on consumer value.

3.3 EPISTEMOLOGICAL ASSUMPTION

The epistemology associated with critical realism is *neo-realism* (Blaikie, 2007). In this epistemology, establishing regularity through the observation of experiences in the empirical domain of reality is the beginning of the research process. It is followed by shaping a model of generative mechanisms. This stage includes both imagining and testing the model of the mechanisms, which includes causal relationships between mechanisms and events (Bhaskar, 1998).

Neo-realism, like rationalism, looks for underlying realities and causal powers. However, while rationalism sees the underlying reality as shared, innate ideas, neo-realism sees those causal powers as an external, independent reality. In other words, rationalism aims to discover the collective attitude to a phenomenon, while neo-realism uses imagination for discovering the reality that exists in a domain not experienced (Blaikie, 2007).

In this PhD, the research process starts by establishing a regularity that accounts for variances in different consumers' perceptions while they consume the same product or service. The aim is to explain why such variations exist and the consumer value concept is applied in the research in order to describe this phenomenon. The next step consists of discovering the model of the generative mechanisms. Defining the research question through imagining knowledge miscalibration is part of this process. Indeed, in the question, this research implies that knowledge miscalibration is a generative mechanism for the observed regularity that is consumer value. Then, this relationship is conceptually and empirically validated. The final outcome of this step is a model of the causal relationships between powers (i.e., knowledge miscalibration including overconfidence and underconfidence) and events (i.e., different dimensions of consumer value).

3.4 RESEARCH STRATEGY

The *retroductive* research strategy is associated with the depth realist ontology and the neo-realist epistemology. In particular, it is consistent with Bhaskar's (1998) critical realism paradigm. The retroductive strategy is based on a process for discovering a

causal model responsible for an observable phenomenon; while induction is a theorisation of regularity based on a particular event and deduction is the theorisation of a regularity based on its generality, retroduction aims to identify the mechanisms generating the regularity (Blaikie, 2007). For instance, in the induction strategy, it is concluded that consumer knowledge impacts upon consumer value if a knowledgeable consumer perceives a high level of value. In the deduction strategy, the same conclusion is viable if a sample representative of knowledgeable consumers perceives a high level of value. Finally, a retroductive strategy identifies and investigates non-observable reasons contributing to a high or low perceived value of a product, such as knowledge miscalibration.

The retroductive process starts by explaining an observed regularity. This is followed by imagining power mechanisms for the observed event or experience, and finally the discovered model of generative mechanisms is conceptually and empirically tested (Bhaskar, 1998). This strategy is similar to the cycle of theory construction and testing suggested by Wallace (1971). However, Wallace (1971) bases theory, or conceptual model building, on empirical generalisation, which is in contrast with the retroductive strategy that uses imagination to shape the conceptual model in the real domain and not in the empirical or actual domains of reality.

With the same research paradigm and strategy, researchers have applied a range of methods to conduct critical realism research. In particular, depending on the needs of the research and the importance of the scientific discovery stage, different parts of this process have been highlighted and validated by scientists. For example, Easton (2010) suggests using case studies to observe generative mechanisms, focusing on the discovery of a generative model. In contrast, Miller and Tsang (2010) argue that experimental methods are required to test the generative mechanisms and covariance-based methods are needed to show the existence of these mechanisms.

The main aim of this PhD is to show that knowledge miscalibration is a generative mechanism of consumer value. Firstly, the relationships between knowledge miscalibration and consumer value dimensions are conceptually investigated in Chapter 4, and secondly an extensive empirical investigation is designed to validate the conceptualised model. Therefore, the focus of the empirical investigation is to infer the

causality between knowledge miscalibration and consumer value. In particular, as this causal relationship is not observable (e.g., in case studies), the focus of empirical investigation is to test the validity of this causal relationship. Chapter 5 explains the methodology designed to empirically investigate the conceptual model developed in Chapter 4.

4 CONCEPTUAL MODEL

4.1 INTRODUCTION

This chapter presents the conceptualisation of the relationships between knowledge miscalibration and consumer value dimensions, which has been imagined as the research question following the critical realism paradigm. Indeed, this chapter aims to provide conceptual validity for the relationship between knowledge miscalibration and consumer value. The effects of knowledge miscalibration on value dimensions are explained through its impact on the extent of resources allocated to consumption, the way people act during consumption, and the level of consumption outcome expectations, which have already been explained. Additionally, as discussed in Chapter 2, underconfidence and overconfidence influence consumption differently. Therefore, the following sections outline the potential relationships between knowledge miscalibration (overconfidence and underconfidence) and efficiency, excellence, play and aesthetics. The conceptual model for these relationships is represented in Figure 7.

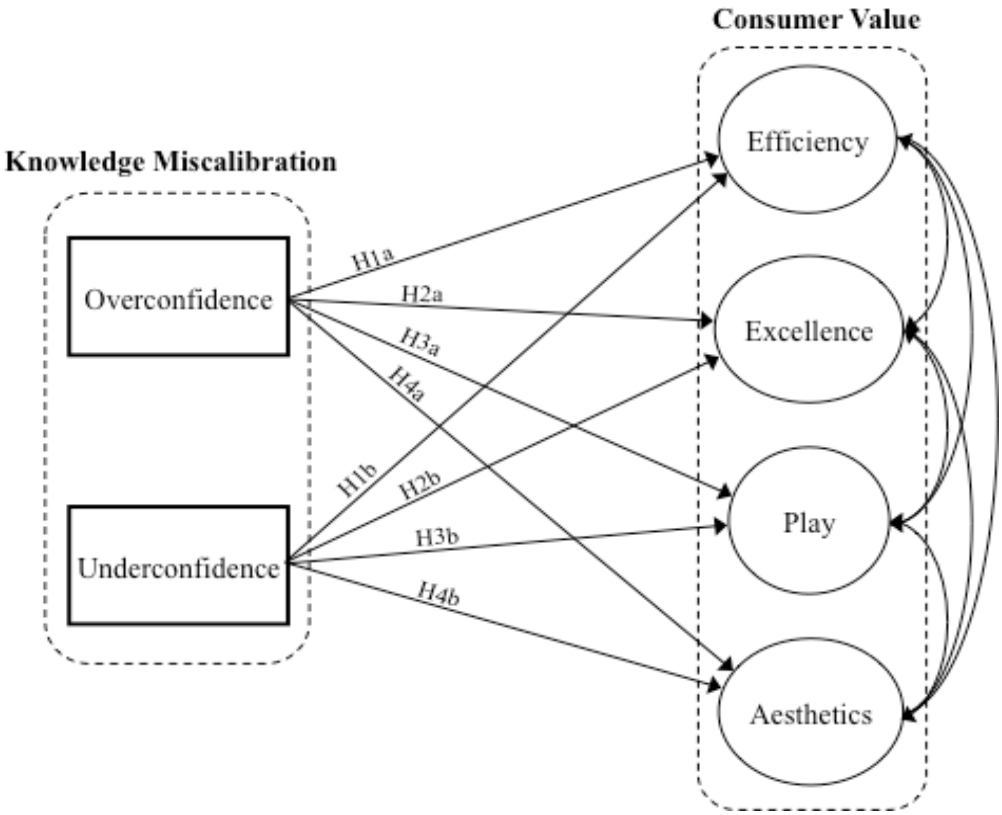


Figure 7: Conceptual Model of the Effect of Knowledge Miscalibration on Consumer Value

The development of the conceptual model builds on the research question and the critical review of the existing literature. This process is mainly based on the interpretation of established regularities, which have been sourced from the existing literature. A critical review of the existing literature has been carried out to explore the existing empirically investigated causal relationships between the dimensions of knowledge miscalibration and those of consumer value, and the outcome of the literature review has been interpreted to provide further conceptual validity for the relationship between knowledge miscalibration and consumer value.

4.2 KNOWLEDGE MISCALIBRATION AND CONSUMER VALUE

4.2.1 Knowledge Miscalibration and Efficiency

Efficiency occurs when an experience is actively used as a means to a self-orientated end. It is concerned with the ratio of perceived outputs to perceived inputs (Holbrook, 1996); outputs are evaluated based on the consumer's performance in the consumption task, and inputs are consumer resources such as knowledge and money. Overconfidence decreases a consumer's efforts (input) during the use of a product or service through the lack of resource allocation, while also keeping the consumer unaware of this input shortage. This lack of inputs may lead to decreased actual outputs as a result of the consumer engaging in consumption tasks that are too difficult for the consumer (because overconfident consumers tend to act presumptuously). These decreased outputs are detected by overconfident consumers in comparison with their high expectations. Therefore, the decreased outputs may result in a low ratio of perceived output to perceived input for overconfident consumers, leading to a reduced perception of efficiency. It is hypothesised that:

H1a: Overconfidence negatively influences perceived efficiency value.

On the other hand, underconfidence is associated with a low expectation of outcomes and a tendency to act timidly in consumption. As a consequence of low expectations and acting timidly, underconfident consumers are less likely to undertake challenging tasks. This might reduce their likelihood of achieving superior outcomes. In addition,

underconfident consumers allocate more resources than are required in use. Therefore, their perceived input to the consumption task is high. This high resource investment does not lead to a better outcome as there is an over-investment for the easy actions they are undertaking. Thus, the low ratio of perceived output to perceived input (due to a high perception of inputs and low outcome realisation) by underconfident consumers leads to a reduced perception of efficiency. It is hypothesised that:

H1b: Underconfidence negatively influences perceived efficiency value.

4.2.2 Knowledge Miscalibration and Excellence

Perceived excellence is associated with the capacity of a product or service in functioning well, which may or may not be exploited entirely in the consumption task (Holbrook, 1999). Therefore, those who have a better ability to identify and positively evaluate the potential benefits of a product or service relative to its potential risks have a higher perception of excellence. Even though the level of outcome expectation is a consequence of underconfidence and overconfidence, it is not associated with perceived excellence value because it is an estimation of future use outcome, while perceived excellence is the evaluation of potential benefits regardless of whether they are going to be utilised. For instance, although a consumer is likely to evaluate the quality of a laptop by the capacity of its memory, she might not use the entire laptop's memory.

As a result of overconfident consumers acting presumptuously, it is likely they will identify more potential benefits and risks. Therefore, their perceived excellence is likely to be built on their perceived potential risks and benefits (rather than on other cues such as their emotional state during the use of a product or service) as they have enough information about them. Due to the lack of appropriate resource allocation, challenging actions lead to more errors in use rather than resulting in benefits being achieved. Therefore, it is likely that overconfident consumers perceive more risks and think that the product or service has a low capacity to function well, leading to a low perception of excellence. Therefore, it is hypothesised that:

H2a: Overconfidence negatively influences perceived excellence value.

By involving themselves in less challenging rather than more challenging consumption tasks, underconfident consumers are unlikely to identify numerous risks and benefits in products and services. Therefore, their perceived quality is shaped based on factors other than the actual benefits and risks of the product or service, for example their emotional state during the use of a product or service. Underconfident consumers' over-allocation of resources to consumption tasks generates negative emotions such as frustration (Pillai and Hofacker, 2007), which are likely to negatively affect the excellence value of a product or service (e.g., Murry and Dacin, 1996; Romani, Grappi and Dalli, 2012; White, 2010). In conclusion, it is hypothesised that:

H2b: Underconfidence negatively influences perceived excellence value.

4.2.3 Knowledge Miscalibration and Play

Overconfident consumers act presumptuously and select more challenging tasks. Furthermore, they allocate inadequate resources to those tasks. Therefore, consumption tasks become too difficult for overconfident consumers, meaning they face unexpected issues. In other words, the consumption task becomes too challenging for overconfident consumers' skill sets and decreases the flow state of mind.

A high level of outcome expectation creates a motivation to meet expectation, leading to actions that support outcome realisation being selected. Therefore, overconfident consumers are extrinsically motivated as a result of high outcome expectation and are motivated to achieve the outcome of the consumption task, rather than its intrinsic value. However, perceived play is associated with intrinsic motivation during the task (Grayson, 1999). In particular, as overconfident consumers do not allocate enough resources to perform consumption tasks properly, they are motivated to overcome this lack of performance rather than intrinsically enjoy the task. Overall, it is hypothesised that:

H3a: Overconfidence negatively influences perceived play value.

Underconfident consumers may limit themselves to engaging in tasks that are too easy for them. Indeed, they engage with less challenging tasks but allocate more resources to those tasks. Therefore, the consumption task does not match underconfident consumers'

skills, diminishing the flow state of mind (Pillai and Hofacker, 2007) and reducing the perceived play value.

Although as a consequence of the low expectation of outcome underconfident consumers are less extrinsically motivated, this low outcome expectation does not lead to high intrinsic motivation. Rather, it diminishes the general motivation for performing the task, creating a lower perception of play. Therefore, it is hypothesised that:

H3b: Underconfidence negatively influences perceived play value.

4.2.4 Knowledge Miscalibration and Aesthetics

Overconfident consumers are engaged with tasks that are too challenging for them, as they act presumptuously and do not allocate enough resources to their actions. Therefore, they waste their cognitive capability dealing with the issues they encounter, and are less able to fluently process aesthetic information. Moreover, as a result of high outcome expectation, overconfident consumers are motivated in dealing with extrinsic-related stimuli rather than intrinsic aesthetic information. Therefore, not only does overconfidence decrease fluency, it also reduces the likelihood of aesthetic information being processed. Therefore, it is hypothesised that:

H4a: Overconfidence negatively influences perceived aesthetic value.

Although underconfident consumers pursue tasks that are too easy, they allocate extra resources to perform those consumption tasks. Therefore, they have a low level of cognitive capacity to process aesthetic stimuli in the consumption task. In other words, underconfident consumers process aesthetic stimuli with a low level of fluency. It is thus hypothesised that:

H4b: Underconfidence negatively influences perceived aesthetic value.

5 METHODOLOGY

This chapter describes the methodology employed for validating the conceptual model, which includes an explanation of the empirical investigation, the research process and the implications of validation, which are consistent with the ontological and epistemological assumptions discussed earlier.

5.1 EMPIRICAL INVESTIGATION

In order to test the conceptual model, the research needs to infer the causality of each hypothetical relationship. In science and social science, causal relationships are inferred through observational (or regression) and experimental investigations (Rubin, 1990). Observational investigation is the analysis of an observed phenomenon, for instance scientists have observed that there is an association between heart disease and smoking or, in other words, it is evident that those who smoke (or smoke more) have more heart related diseases. Consequently, they infer that smoking is a cause of heart disease. Experimental investigation involves the random assignment of subjects to either an experimental group (i.e., the group who receive the causal factor) or a control group (Easterby-Smith, Thorpe and Jackson, 2008). For example, in order to test whether a new drug is effective in curing a disease, scientists give the drug to one group and compare the results with those from a control group who do not receive the drug (or receive a placebo).

In the consumer behaviour literature, knowledge miscalibration is predominantly investigated through covariance-based studies, which are classified as observational investigations because they consist of the analysis of an observed phenomenon (e.g., Alba and Hutchinson, 2000; Kidwell *et al.*, 2008; Pearson and Liu-Thompkins, 2012; Pillai and Hofacker, 2007). As part of the covariance-based studies run to date, the subjective probability paradigm where knowledge miscalibration is measured by the difference between subjective and objective knowledge, is the dominant paradigm for capturing knowledge miscalibration (Alba and Hutchinson, 2000). The main assumption behind this paradigm is that consumers are naturally miscalibrated (i.e., are overconfident or underconfident) and, in order to examine the effect of overconfidence

and underconfidence on their behaviour, we simply need to observe this natural knowledge miscalibration. The vast majority of the research supports this assumption by showing that overconfidence and underconfidence exist in different contexts (e.g., Carlson *et al.*, 2007; Park *et al.*, 1994; Pillai and Hofacker, 2007). The empirical work in this PhD consists of two studies, the first of which follows the subjective probability paradigm to investigate the existence of the hypothesised relationships (i.e., Study 1).

Although covariance-based studies are extensively used in social sciences, the validity of inferring causal relationships through such studies is a concern (Freedman, 1991). Indeed, a causal relationship happens when the cause precedes the effect, the cause is related to the effect and there is no other explanation for this relationship (Shadish, Cook and Campbell, 2001). In a covariance-based investigation, the order of the occurrence of the investigated variables is not identified; moreover, the correlational evidence proved by observations might be the outcome of a third variable not accounted for through conceptualisation, data collection or data analysis. For instance, in the case of the relationship between smoking and heart disease, this relationship might be the outcome of a third factor, for example stress, causing a higher smoking rate and a higher rate of heart disease at the same time.

The subjective probability paradigm has similar validity issues. Indeed, knowledge miscalibration might be the outcome of other personal or environmental factors. For instance, consumer involvement in a consumption task leads to both lower knowledge miscalibration (Pillai and Hofacker, 2007) and higher perceived play (Mittal and Lee, 1989). As a result, the discovery of a relationship between knowledge miscalibration and the relevant outcome variables might be due to such an alternative explanation (i.e., consumer involvement in the example above). Furthermore, in examining the relationship between knowledge miscalibration and consumer value, it is hard to distinguish whether knowledge miscalibration impacts upon consumer value or the consumer value derived from previous consumption episodes affects knowledge miscalibration.

However, whereas in consumer research knowledge miscalibration has not been investigated experimentally, such endeavours do exist in decision sciences and psychology literature. Specifically, Sieck and Arkes (2005) experimentally investigate

overconfidence; after a set of three experiments, they were successful in manipulating knowledge miscalibration and testing the effect of overconfidence on people's use of actuarial guides in their financial decision-making. Other researchers in the decision sciences and psychology areas have also manipulated overconfidence (e.g., Gonzalez-Vallejo and Bonham, 2007; Ryvkin, Krajc and Ortmann, 2012). As mentioned, in order to investigate knowledge miscalibration, the experimental paradigm has not been applied in the consumer behaviour literature. To overcome the internal validity issues highlighted in the first part of the empirical investigation, the second part of this research experimentally investigates the effects of knowledge miscalibration on different dimensions of consumer value (i.e., Study 2). As documented in this dissertation, Study 2 manipulates not only overconfidence but also underconfidence.

As a co-variance based study, Study 1 aims to identify the hypothesised relationships between overconfidence/underconfidence and the dimensions of consumer value. Once Study 1 confirms the existence of significant relationships, Study 2 is run in order to establish the temporal ordering of the independent and the dependent variables and to rule out alternative explanations by means of experimental and statistical control (Study 2 is statistically controlled for subjective and objective knowledge levels). Furthermore, the multi-method approach to investigating knowledge miscalibration that is adopted in this PhD provides an opportunity to compare the experimental method with the more conventional co-variance based approach.

Therefore, the empirical part of this PhD consists of two main studies: a covariance-based study and an experimental study. Each study includes a pilot and a main data collection and analysis phase (Table 5). The main goal of the pilot stage is to ensure the instruments designed for data collection are working as expected.

Table 5: The Structure of the Research Empirical Investigations

	Pilot	**Main**
Covariance-based study	Study 1 - Pilot	Study 1
Experimental study	Study 2 - Pilot	Study 2

5.2 EMPIRICAL INVESTIGATION DESIGN

5.2.1 Context

The empirical studies are performed in the online contexts of amazon.com (i.e., Study 1) and prezi.com (i.e., Study 2). Online consumer behaviour has received extensive attention from researchers (e.g., Koufaris, 2002; Novak *et al.*, 2000; Methwick *et al.*, 2001). In particular, online settings generate a high level of interactivity (e.g., Haubl and Trifts, 2000) that makes consumer knowledge an important factor in these settings. Furthermore, both consumer knowledge and consumer value have been investigated in online settings (e.g., Barrutia and Gilsanz, 2012; Overby and Lee, 2006). Online contexts involve both hedonic (i.e., play and aesthetics) and utilitarian (i.e., efficiency and excellence) aspects of consumption (Childers, Carr, Peck and Carson, 2001), and therefore different dimensions of consumer value have been investigated in these contexts, for example in online shopping contexts (Mathwick *et al.*, 2001) and online software contexts (Sigala, 2010).

Study 1 is designed in the online shopping context of amazon.com, as the focal consumer experience. To acknowledge that amazon.com is a relevant context of consumer use, the context can be analysed through the lens of the service-dominant logic of marketing. In the service-dominant logic, the focus is on the exchange of services rather than goods, meaning that value is embedded in use situations where resources are integrated in order to solve life problems (Vargo and Lusch, 2004). In an online shopping context, although the goal of its use is to exchange goods, focusing on the use of the online shopping follows the service-dominant logic and concentrating on the selection of an online shopping website adopts a traditional goods-dominant logic. In other words, shopping is a life problem and the matter of where to shop is a goods-dominant logic issue, whereas the issue of using a certain platform for shopping is consistent with the service-dominant logic. Therefore, focusing on the consumer value-in-use of an online shopping context such as amazon.com is consistent with the aim of this research. Other studies have also investigated value-in-use in online shopping contexts (e.g., Mathwick *et al.*, 2001; Overby and Lee, 2006).

For each study, a pilot study is performed to make sure that the various data collection instruments are working as expected. The pilot study in Study 1 is conducted in the context of amazon.co.uk as the data was collected in the UK and from Cranfield University students. However, due to the low response rate, in the main studies data is collected from United States (US) respondents through the Amazon Mechanical Turk. Paolacci, Chandler and Ipeirotis (2010) have empirically investigated the Amazon Mechanical Turk and have identified it as a viable data collection platform. Marketing scholars also use this platform in their research (e.g., Parker and Lehman, 2011; Sussman and Olivola, 2011). All data collection instruments and measurement items are designed for US respondents, therefore the recruitment of UK respondents in the pilot study does not influence the results of the main study.

In addition to the interactivity of the context, the novelty of the use context was a criterion for the selection of the context in Study 2. In other words, in order to manipulate knowledge miscalibration before consumers derived any perception of the value of product or service use, the consumption task needed to be novel for the consumers. Had the research manipulated knowledge miscalibration in a consumption task that participants were already familiar with, any measurement of consumer value might have also reflected participants' perceived value as derived from previous consumption experiences. This research has chosen Prezi online software as the context for Study 2, as it provides a consumption experience characterised by both user interaction and consumption newness. Prezi (www.prezi.com) is an online software platform that has been developed relatively recently and enables users to create presentation slides and move between them during the presentation. Those already familiar with Prezi were excluded from the study, before the remaining participants were randomly assigned to the experimental groups.

As with Study 1, this study includes two steps: the pilot, examining whether the manipulations designed are effective, and the main study, investigating the causal effects of the independent variables manipulated.

5.2.2 Measurement and Manipulation

5.2.2.1 Knowledge miscalibration, overconfidence and underconfidence – Study 1

Knowledge miscalibration is measured using the subjective probability method (Alba and Hutchinson, 2000). In line with this method and in order to measure objective knowledge, a set of true or false questions about the service use of amazon.com have been developed and the objective knowledge score has been calculated by adding together the number of correct answers. These true or false items were developed based on company materials and were refined through three sets of interviews with expert users of amazon.com (Table 6). Subjective knowledge was measured by using subjective probability ratings (Alba and Hutchinson, 2000). Respondents identified the confidence in their answers on a 50%-100% scale (Hansen and Thomsen, 2013; Pillai and Hofacker, 2007): 100% reflected that they were completely sure their answer was correct, whereas 50% meant they were unsure about the question and picked an answer at random with a 50/50 chance of it being correct. Subjective knowledge items were converted to a 0.5-1.0 scale and a total score was calculated by summing the confidence ratings of all the items. Finally, knowledge miscalibration was calculated by subtracting the objective knowledge score from the subjective knowledge score (Alba and Hutchinson, 2000). Participants with a knowledge miscalibration score greater than zero were classified as overconfident and those with a knowledge miscalibration score lower than zero were classified as underconfident.

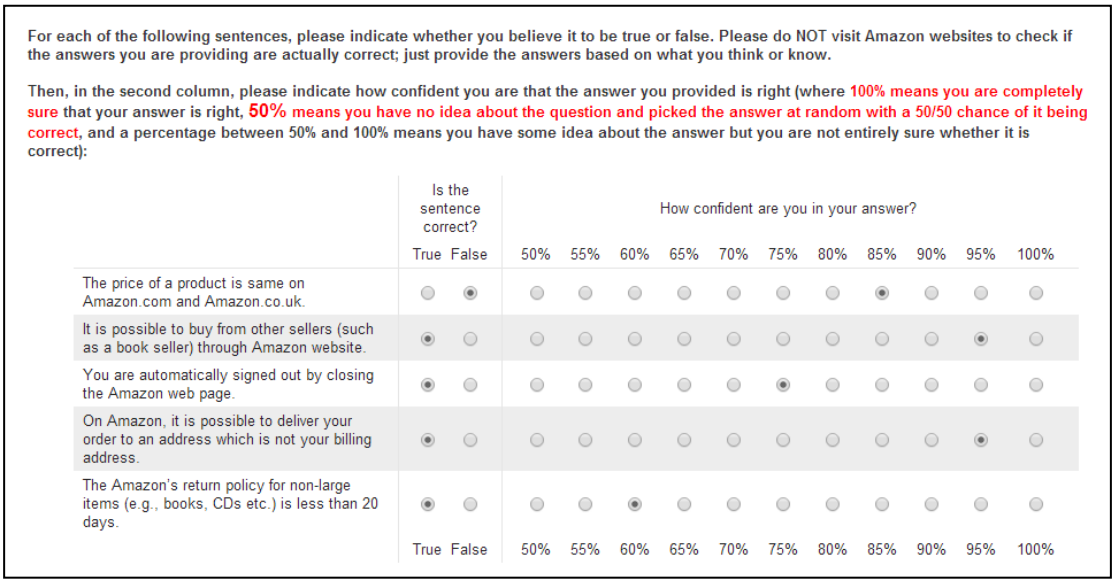
In order to measure subjective knowledge, a 0%-100% scale was applied in the pilot study in accordance with Kidwell *et al.* (2008). However, the 0%-100% scale does not account for the probability of randomly selected correct answers in the true or false questions (i.e., if someone answers all the questions randomly, 50% of the questions are likely to be correct). Therefore, a 50%-100% scale was used in the main study for measuring subjective knowledge (Alba and Hutchinson, 2000; Pillai and Hofacker, 2007; Sieck and Arkes, 2005). Figure 8 illustrates the final format used for measuring subjective and objective knowledge.

Table 6: Amazon.com Objective Knowledge Items

Item No.	Item Description	True or False
1	The price of a product is the same on amazon.com and amazon.co.uk.	False
2	It is possible to buy from other sellers (such as a book seller) through Amazon's website.	True
3	You are automatically signed out by closing the Amazon web page.	False
4	On Amazon it is possible to deliver your order to an address which is not your billing address.	True
5	Amazon's return policy for non-large items (e.g., books, CDs etc.) is less than 20 days.	False
6	When you shop on Amazon, it is always possible to track your order.	False
7	There is a discount for purchasing a large number of the same one item on Amazon.	False
8	Amazon changes its webpage appearance for special events such as Christmas.	True
9	The standard shipping rate per item for the contiguous US for books is under $1.	True
10	It is possible to return an unopened product brought on Amazon if you no longer want it.	True
11	The sales rank information for each item appears on the product details information page on the Amazon website.	True
12	It is possible to purchase groceries on Amazon.	True
13	Amazon 1-click ordering is automatically enabled for second time buyers.	True
14	It is not possible to cancel your order after the order is placed on Amazon.	False
15	It is possible to upload a recorded video as a review for a product on Amazon.	True

The subjective probability paradigm does not offer a "don't know" option to measure objective knowledge (Alba and Hutchinson, 2000). In fact, the subjective probability paradigm forces respondents to pick one of the answers (e.g., true or false). This is the case for the operationalisation of subjective knowledge. Providing with a "don't know" option, respondents who are less than 50% sure about their objective knowledge potentially choose "don't know" option and in their subjective knowledge rating choose 100%. This distorts the results by turning consumers with less than 50% subjective knowledge into ones with 100% subjective knowledge. Consider a respondent who knows the correct answer (i.e., 100% objective knowledge) but is only 10% sure that the answer is correct (i.e., 10% subjective knowledge); this respondent is 90% underconfident on that knowledge item. Having a "don't know" option incorrectly turns this underconfident respondent into someone whose subjective knowledge matches her

objective knowledge (i.e., she knows that she does not know, while in fact she do know). In order to consider those who know for sure that they don't know the answer, this method offers a random selection of answers and allows 50% subjective knowledge to be selected (as explained above). With a 50% chance that an answer can be true or false in random selection, it matches the subjective knowledge rating and reflects respondents with an accurate subjective knowledge relative to their objective knowledge. Considering a respondent who accurately knows that she has no knowledge about the product or service studied. She randomly selects all the answers, and selects a 50% subjective knowledge rating. 50% of her answers will be correct (as a result of random selection). Therefore, her objective knowledge will be 50% and her subjective knowledge will also be 50%, reflecting a respondent who knows exactly that she does not have any knowledge.



For each of the following sentences, please indicate whether you believe it to be true or false. Please do NOT visit Amazon websites to check if the answers you are providing are actually correct; just provide the answers based on what you think or know.

Then, in the second column, please indicate how confident you are that the answer you provided is right (where 100% means you are completely sure that your answer is right, 50% means you have no idea about the question and picked the answer at random with a 50/50 chance of it being correct, and a percentage between 50% and 100% means you have some idea about the answer but you are not entirely sure whether it is correct):

	Is the sentence correct?		How confident are you in your answer?										
	True	False	50%	55%	60%	65%	70%	75%	80%	85%	90%	95%	100%
The price of a product is same on Amazon.com and Amazon.co.uk.	○	◉	○	○	○	○	○	○	○	◉	○	○	○
It is possible to buy from other sellers (such as a book seller) through Amazon website.	◉	○	○	○	○	○	○	○	○	○	○	◉	○
You are automatically signed out by closing the Amazon web page.	◉	○	○	○	○	○	○	◉	○	○	○	○	○
On Amazon, it is possible to deliver your order to an address which is not your billing address.	◉	○	○	○	○	○	○	○	○	○	○	◉	○
The Amazon's return policy for non-large items (e.g., books, CDs etc.) is less than 20 days.	◉	○	○	○	◉	○	○	○	○	○	○	○	○
	True	False	50%	55%	60%	65%	70%	75%	80%	85%	90%	95%	100%

Figure 8: Example of Objective and Subjective Knowledge Measurement Format

5.2.2.2 The manipulation of knowledge calibration – Study 2

As suggested by Sieck and Arkes (2005), knowledge miscalibration has been manipulated through enhanced calibration feedback. *Enhanced calibration feedback* involves informing participants about their objective knowledge score, subjective knowledge score and the direction in which they can calibrate their knowledge. The enhanced calibration feedback method achieves manipulation by making people aware of how far away their subjective knowledge is from their objective knowledge, therefore

prompting the experimental group to bring their assessment of their subjective knowledge closer to their actual level of objective knowledge (while keeping each participant's objective knowledge the same). The manipulation does not intend to contrast miscalibrated consumers (i.e., overconfident or underconfident consumers) with calibrated ones, but rather explores different degrees of miscalibration (i.e., overconfident consumers vs. manipulated less overconfident consumers, and underconfident consumers vs. manipulated less underconfident consumers respectively). Further, as consumers are naturally miscalibrated with different levels of knowledge miscalibration ranging from highly underconfident to highly overconfident, the manipulation needs to be performed after measuring the knowledge miscalibration level. Manipulating knowledge miscalibration through enhanced calibration feedback has been successfully applied in other studies (Gonzalez-Vallejo and Bonham, 2007; Ryvkin *et al.*, 2012).

Table 7: Prezi.com Objective Knowledge Items

Item No.	Item Description	True or False
1	You can create an online Prezi without creating an account.	False
2	To start a Prezi, you can choose from the existing templates.	True
3	To move around Prezi, you need to press and hold the mouse, right-click on any blank area and drag up, down, left and right.	False
4	There are plus and minus buttons for zooming in and out on the left-hand side of the Prezi window.	False
5	When you do not select an object in Prezi, you can type text wherever you click the left button of the mouse.	True
6	You can add a new frame through the "add frame button".	True
7	In addition to zooming facilities, there is a map in the software that can be used for navigation in a Prezi.	True
8	Thumbnails are located to the right-hand side of a Prezi.	False
9	You can click on SHIFT and then hold left-click to select contents and frames.	True
10	You can add a frame only through clicking on the "add frame button".	False
11	Other users need to have a Prezi account to be able to read through your Prezi.	False
12	Other users are able to copy and use your Prezi if you allow this through the privacy settings.	True
13	You can invite others to collaborate with you on making a Prezi.	True
14	Up to 20 user accounts can take part in a Prezi meeting at one time.	False

Knowledge miscalibration was first measured using the subjective probability method in Study 1. A set of true or false questions have been developed to assess objective knowledge about using prezi.com, which were adjusted through three sets of interviews with expert users (Table 7). These knowledge measurement items were developed based on the 2013 version of Prezi at the same time that the data was collected. There have been changes to Prezi in its newer versions which would make it necessary to adjust these items for researchers who are planning to use them for future research using the Prezi platform.

After the subjects' knowledge miscalibration was measured, they were randomly divided into experimental and control groups, with enhanced calibration information provided to the experimental group (see Figure 9 and Figure 10 for examples of enhanced calibration feedback). For instance, if a subject answered eight out of 14 questions correctly and thought she had answered 11 out of 14 questions correctly, she was informed that, firstly, she answered 60% of the questions correctly, secondly that she thought she answered 80% of questions correctly, and finally that she actually has 20% less Prezi knowledge than she thought (see Figure 9).

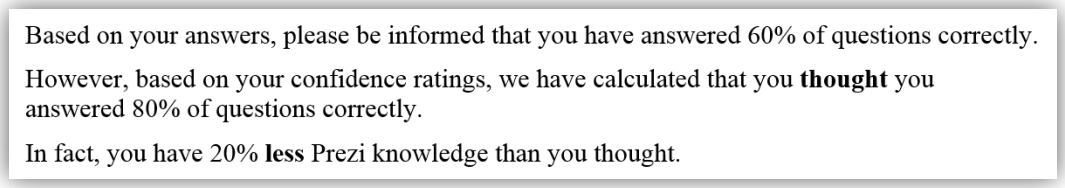


Figure 9: Example of Enhanced Calibration Feedback for an Overconfident Participant

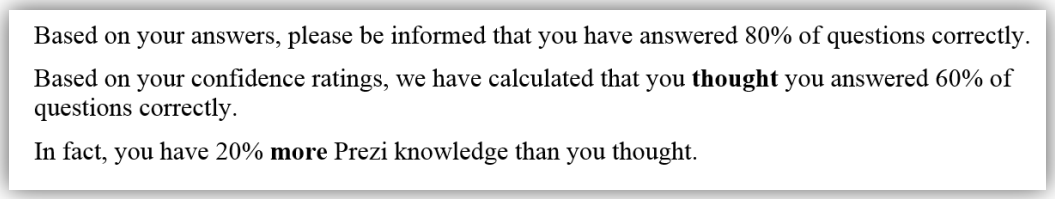


Figure 10: Example of Enhanced Calibration Feedback for an Underconfident Participant

Alternatively, if a subject answered 11 out of 14 questions correctly and thought she had answered eight out of 14 questions correctly, she was informed that, firstly, she answered 80% of the questions correctly, secondly that she thought she answered 60%

of questions correctly, and finally that she actually has 20% more Prezi knowledge than she thought (see Figure 10).

5.2.2.3 Consumer value – Study 1 and 2

In the marketing literature, different scales have been developed for measuring the consumer value of consumer durable goods (Sweeny and Soutar, 2001), tourism products (Sanchez, Callarisa, Rodriguez and Moliner, 2006), online shopping (Mathwick *et al.*, 2001), shopping (Babin, Barden and Griffin, 1994), banking services (Roig *et al.*, 2006), healthcare services (Chahal and Kumari, 2011), and electronic products (Munnukka and Jarvi, 2012). Table 8 summarises different scales for measuring the four dimensions of consumer value investigated: efficiency, excellence, play and aesthetics.

Due to its comprehensiveness and applicability to the context, this PhD has adopted the consumer value scale developed by Munnukka and Jarvi (2012) (Table 9). The advantage of applying this scale over others in online or digital contexts is that three items are considered when measuring each of the four dimensions of consumer value, therefore a high level of construct validity and parsimony can be achieved (Hinkin, 1995).

Munnukka and Jarvi (2012) use measurement items from two constructs of escapism and intrinsic enjoyment to measure play value. In this research however, perceived play was measured by using only the intrinsic enjoyment items from Munnukka and Jarvi's (2012) scale as the escapism items can be associated with consumer engagement in the task and could have biased the perceived play measurements (consistent with, Leroi-Werelds *et al.,* 2014; Sigala, 2006; Sigala, 2010). Participants were asked to rate each item on a 7 point Likert scale, with 1 representing strongly disagree and 7 strongly agree.

The scale created by Mathwick *et al.* (2001) was used in the pilot study. The excellence value dimension was measured through two items. The pilot study showed that this dimension lacked internal consistency reliability, therefore in order to increase the validity of the scale, Munnukka and Jarvi's (2012) scale, which is mainly based on the

scale from Mathwick *et al.* (2001) and consists of three-item scales for all dimensions, was used in the main study.

Table 8: Consumer Value Scales

Authors	Year	Context	Dimensions
Mathwick *et al*.	2001	Online shopping	Efficiency, Excellence, Play, Aesthetics
Sweeney and Soutar	2001	Durable goods	Efficiency, Excellence, Play
Bourdeau *et al.*	2002	Online shopping	Efficiency, Play
Pura	2005	Mobile phone services	Efficiency, Play
Sigala	2006	Mobile phone services	Efficiency, Play, Aesthetics
Roig *et al*.	2006	Banking services	Efficiency, Excellence, Play
Overby and Lee	2006	Online shopping	Efficiency, Play
Hui, Tan and Goh	2006	Online businesses	Efficiency, Play
Steenkamp and Geyskens	2006	Online shopping	Efficiency, Play
Gallarza and Saura	2006	Travelling	Efficiency, Excellence, Play, Aesthetics
Smith and Colgate	2007	Any	Efficiency, Play, Aesthetics
Sparks, Butcher and Bradley	2008	Timeshare ownership	Efficiency, Excellence, Play
Shamdasani, Mukherjee and Malhorta	2008	Online banking	Efficiency, Excellence, Play
Maenpaa, Kale, Kuusela and Mesiranta	2008	Online banking	Efficiency
Sanchez-Fernandez *et al.*	2009	Restaurants	Efficiency, Excellence, Play, Aesthetics
Lee *et al.*	2009	Online auctions	Efficiency, Play
Sigala	2010	Online trip planners	Efficiency, Play, Aesthetics
Mimouni-Chaabane and Volle	2010	Loyalty programmes	Efficiency, Play
Lee *et al.*	2011	Licensed sport merchandise	Efficiency, Excellence, Play, Aesthetics
Chahal and Kumari	2011	Hospitals	Efficiency, Excellence, Aesthetics
Yang *et al.*	2012	Mobile internet	Play
Munnukka and Jarvi	2012	Laptop computers, digital cameras and mobile phones	Efficiency, Excellence, Play, Aesthetics
Choo *et al.*	2012	Luxury clothing or accessories	Efficiency, Excellence, Play, Aesthetics
Leroi-Werelds *et al.*	2014	DVD players, toothpaste, soft drinks and day cream	Efficiency, Excellence, Play, Aesthetics

Table 9: Study 1, The Consumer Value Scale Used in the Study

Items	Cronbach Alpha
Perceived Efficiency	0.75
Shopping on Amazon helps with time management.	
Shopping on Amazon makes life easier.	
Shopping on Amazon fits in with my timetable.	
Perceived Excellence	0.78
Amazon has an image of high quality and excellence.	
Amazon represents a top online software/retailer.	
Amazon is a top expert in the field.	
Perceived Play	0.73
Shopping on Amazon is entertaining.	
I gain pleasure from shopping on Amazon.	
I shop on Amazon to obtain a pleasant sensation.	
Perceived Aesthetics	0.87
Amazon has a pleasant appearance.	
Amazon has an attractive appearance.	
Amazon has an effective design.	

Table 10: Study 2, The Consumer Value Scale Used in the Study

Items	Cronbach Alpha
Perceived Efficiency	0.90
Using Prezi helps with time management.	
Using Prezi makes life easier.	
Using Prezi fits in with my timetable.	
Perceived Excellence	0.87
Prezi has an image of high quality and excellence.	
Prezi represents a top online software/retailer.	
Prezi is a top expert in the field.	
Perceived Play	0.86
Using Prezi is entertaining.	
I gain pleasure from using Prezi.	
I use Prezi to obtain a pleasant sensation.	
Perceived Aesthetics	0.89
Prezi has a pleasant appearance.	
Prezi has an attractive appearance.	
Prezi has an effective design.	

In Study 2, consumer value was measured with the same scale used in Study 1 and was based on the study conducted by Munnukka and Jarvi (2012) (Table 10).

5.2.2.4 Manipulation check – Study 2

Two items were used to test the effectiveness of manipulations: "I think I have a pretty good knowledge of Prezi" and "I think I have a lot of Prezi knowledge" (Cronbach Alpha = 0.78). Participants were asked to rate each item on a 7 point Likert scale, with 1 representing strongly disagree and 7 strongly agree. These items measure consumers' subjective knowledge. The manipulation needed to change the average subjective knowledge for the experimental group as this study tried to decrease subjective knowledge (in the case of overconfidence) or increase subjective knowledge (in the case of underconfidence). Meanwhile, participants' objective knowledge stayed the same. Therefore, in order to test the effectiveness of the manipulation, the research compared the control and experimental groups' subjective knowledge by using the manipulation check items indicated above.

5.2.3 Procedure

5.2.3.1 Study 1 Procedure

The Qualtrics preview of Study 1 is presented in Appendix A. At the beginning of the study, respondents were informed about the context and assured that the their data would be anonymised and only used for the research purpose. The following text was provided in the actual study:

> Thanks for participating in the survey! The aim of this survey is to explore your experience of shopping online on amazon.com. As you might know, your experience might involve purchasing items such as books, CDs, DVDs or electronic devices to be delivered within USA. It would be appreciated if you dedicate 10 minutes and answer the following questions.
>
> Information collected in this survey will be collected for the purpose of research only and will be stored in an anonymised format which does not identify any person.

In Study 1, it is important that the participants have already used amazon.com, as it attempted to measure both their knowledge miscalibration level and consumer value, which are shaped based on participants' existing experience. Therefore, respondents were asked whether they had previously purchased a product on amazon.com. Those answering "No" have been excluded from the study.

In the next step, consumer value was measured as explained in Section 5.2.2.3. In Study 1, dependent variables were measured before independent variables to remove any possible priming effect on dependent variable. Therefore, knowledge miscalibration was measured after consumer value as explained in Section 5.2.2.1. Finally, the respondents answered questions about their previous internet and online shopping experiences, age, gender and education.

In order to ensure respondents have genuinely responded to the questions, the pages associated with the measurement of consumer value and knowledge miscalibration have been timed. Those who completed these pages in a time significantly lower than the minimum possible time are excluded from the study. For example, it has been observed in the pilot study that minimum time for completing the first page of knowledge miscalibration scale is 40 seconds. Therefore, those who filled in the page in less than 25 seconds have been excluded from the study.

5.2.3.2 Study 2 Procedure

Study 2 is a 2 (overconfidence vs. underconfidence) x 2 (lowered knowledge miscalibration vs. natural knowledge miscalibration) quasi-experiment (Figure 11). In this quasi-experiment, participants' level of knowledge miscalibration was measured first in order to divide them into two overconfident and underconfident groups. In the second stage participants were randomly assigned into two groups, where the level of knowledge miscalibration was reduced in the experimental group and was not changed in the control group.

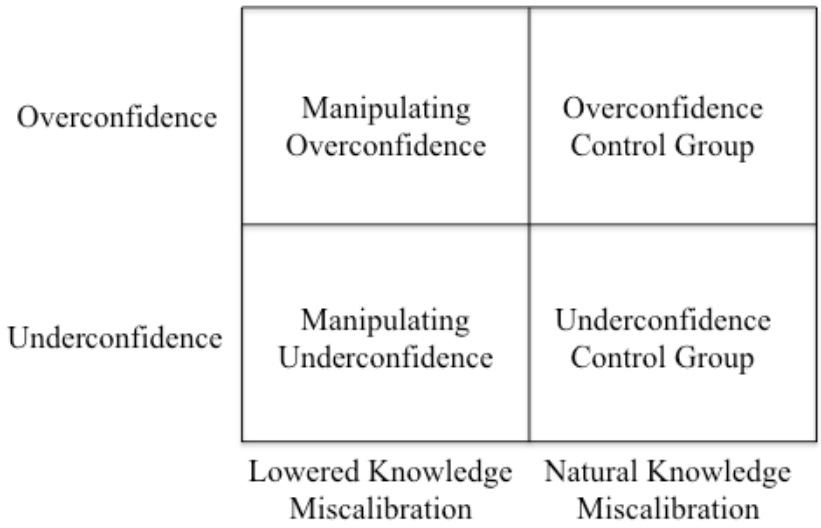


Figure 11: Study 2 Experiment Setting

The Qualtrics previw of Study 2 is presented in Appendix B, and the procedure of the main experiment is illustrated in Figure 12. Like Study 1, at the beginning of the study respondents were informed about the context and assured that the their data would be anonymised and only used for the research purpose. The following text was provided in the actual study:

> Thank you for participating in this study! The aim of this study is to explore your experience of using the Prezi Software. Prezi is an online software tool helping you to create dynamic presentations. It would be greatly appreciated if you could dedicate 30 minutes of your time to answering the following questions and performing the required tasks. Please attend to the information in the study carefully and without any distraction (e.g., talking to others, listening to music, browsing the internet).
>
> Information collected in this survey will be collected for the purpose of research only and will be stored in an anonymised format which does not identify any person.

In Study 1, it is important that the participants have not used prezi.com as it tries to capture the first time experiences so as to avoid any effect of consumer value from previous experiences. Therefore, respondents were asked whether they have created a Prezi (i.e., an online prezi presentation). Those answering “Yes” have been excluded

from the study. Although the respondents may use their existing knowledge of other contexts to learn and use prezi.com, these effects (in particular on subsequent knowledge miscalibration) have been eliminated in Study 2 through the random assignment of respondents to control and experimental groups.

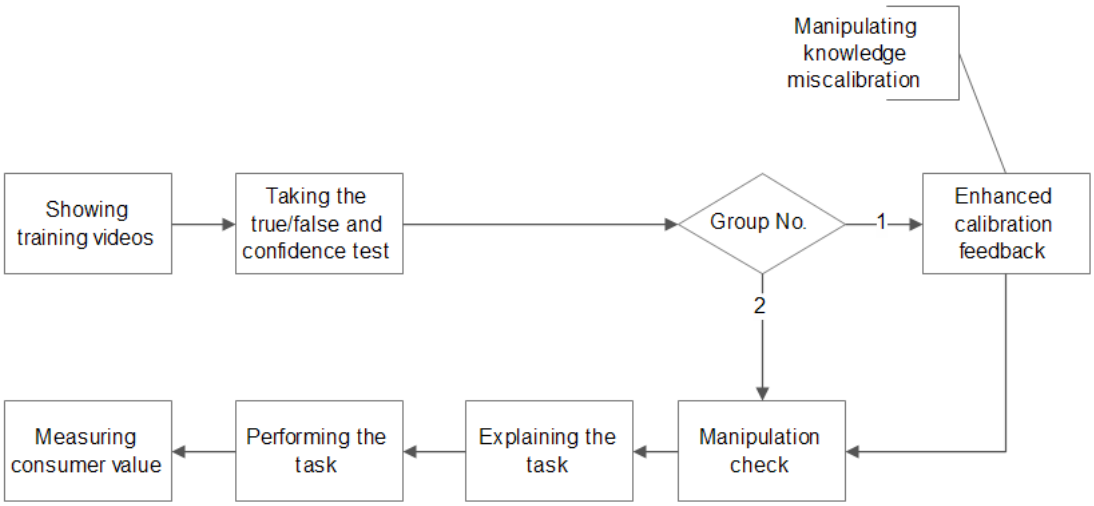


Figure 12: The Process of Experimental Investigation

In the next step, participants watch two tutorial videos describing how they can create and share a Prezi (i.e., an online dynamic presentation). The latest version of these tutorial videos can be found at "https://prezi.com/support". Time measurement was imposed during this step to identify participants who were not actively engaged in the task. For instance, those participants who quickly skipped this stage have been excluded from the study. The following statement was provided to prepare respondents for this stage:

> In the next step, you need to watch two tutorial videos carefully. You need to watch them in order to be able to perform tasks that you will be required to perform in the next stages. You have time to watch each of the videos only once. A timer shows you the remaining time. It automatically brings you to the next page when the time is finished. Please click on the "next" button if you finished watching the video earlier.
>
> Please go to the next page when you are ready to watch the first video.

Next, participants' knowledge miscalibration level was measured (i.e., using the subjective probability paradigm) as explained in Section 5.2.2.1, and participants were randomly allocated to either an experimental or control group. The participants in the experimental group were manipulated by being provided with enhanced calibration feedback (Sieck and Arkes, 2005), to reduce their level of miscalibration (see Figure 9 and Figure 10, Section 5.2.2.2). Then, all respondents answered manipulation check items.

In the next step, all the participants were asked to create and share a Prezi online presentation (thus using the Prezi software). The presentation asked for relates to different categories of human needs. Participants were given a sample figure about the categories of human needs (Figure 13), and were asked to create and share a dynamic presentation about it. This section was also timed to make sure participants genuinely created a Prezi.

A snapshot of a dynamic presentation created and shared by a participant is illustrated in Figure 14. The presentations have all been checked and those that do not comply with the instructions are excluded from the study.

Finally, participants were asked to rate consumer value items and to answer general demographic and Prezi use-related questions.

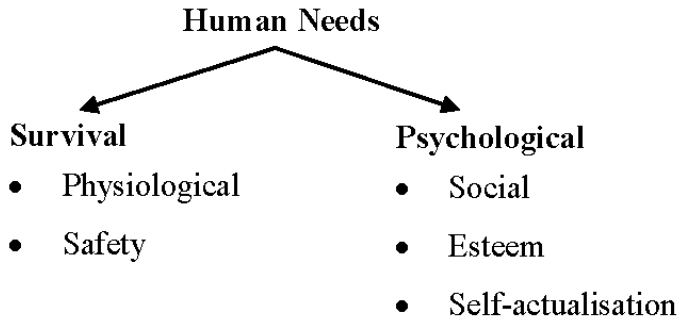


Figure 13: Sample of the Presentation Given to the Participants

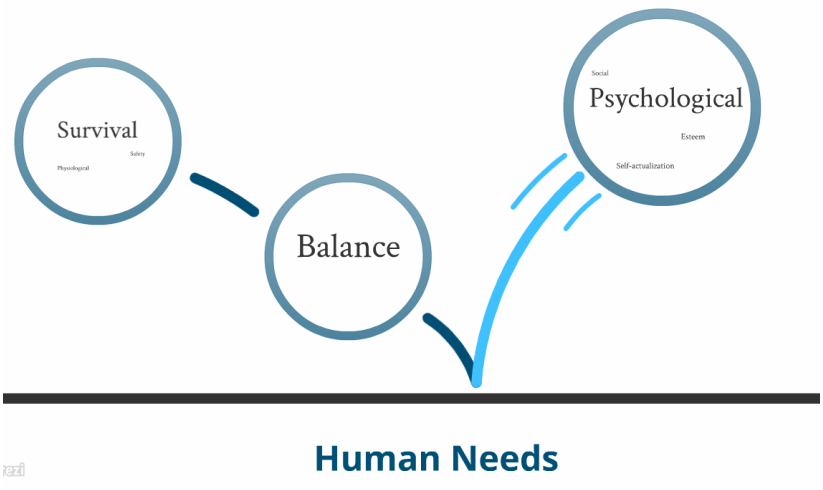


Figure 14: Example of the Presentation Created by a Participant

5.2.4 Data analysis

In order to account for both the validity of the measurement of consumer value dimensions and causal mechanisms, structural equation modelling (SEM) is applied for data analysis (Bagozzi and Yi, 1989). The analysis is performed by using AMOS and SPSS software packages (version 21). In investigating the effect of overconfidence and underconfidence separately, a piecewise linear model data analysis is followed (Harring, 2013). Piecewise models are used when the behaviour of a model is expected to change at a change-point(s) (e.g., Do, Wang and Elliot, 2013; Gale, Allerhand and Deary, 2012). In this research, the change-point is the point where subjective knowledge matches objective knowledge and divides knowledge miscalibration into two pieces: underconfidence and overconfidence. The conceptual model distinguishes overconfidence from underconfidence and piecewise modelling provides the opportunity to investigate each piece (i.e., overconfidence or underconfidence) separately.

To analyse a piecewise linear model, one can either set a dummy variable (i.e., 0 for underconfidence and 1 for overconfidence) and use it in the analysis or run a multi-group analysis (i.e., one group of underconfident, the other of overconfident, consumers) (Riverra and Satorra, 2002). For the current case of analysing the effects of overconfidence and underconfidence on consumer value, a multi-group analysis is

employed as it does not require the assumption of homogeneity in groups (Bagozzi and Yi, 1989). Therefore, multi-group analysis is used in each study, with one group being underconfident consumers and the other overconfident consumers. Multi-group analysis provides the possibility of investigating the effect of overconfidence and underconfidence on consumer value dimensions separately, as well as testing for the multiple-group invariance.

The goodness of fit for the models has been evaluated by Hair, Black, Babin and Anderson's (2009) proposed metrics, who suggest that a model with a comparative fit index (CFI) of equal or greater than 0.95 and a root mean square error of approximation (RMSEA) of equal or lower than 0.08 provides a good fit with the data.

In Study 2, a MANCOVA analysis is performed and its results are compared with the results of the SEM analysis so as to increase the confidence in the statistical findings.

5.2.5 Sample size

The minimum sample size for an SEM is calculated based on two main criteria: the minimum sample size for the model structure and the minimum sample size for detecting the effect. For the appropriateness of the sample size for the model structure of both studies, the following formula suggested by Westland (2010) is used:

$$N = 50\, r^2 - 450\, r + 1100$$

Where r is the ratio of the number of observed variables to the number of latent variables. In fact, when r is lower we need a higher sample size. In both studies, the model uses knowledge miscalibration as an independent variable (i.e., measured in Study 1 and manipulated in Study 2) and the four consumer value dimensions of efficiency, excellence, play and aesthetics as dependent variables. Therefore, there are four latent variables as the dimensions of consumer value (i.e., efficiency, excellence, play and aesthetics). Each of these dimensions is measured using three measurement items as observed variables. Tables 9 and 10 list consumer value items that constitute observed variables. Therefore in Study 1, there are 13 observed variables in the model and r is 3.25, and based on the above formula the minimum sample size for Study 1 is 166. In Study 2, objective knowledge and subjective knowledge are also entered as

control variables (i.e., observed variables). Therefore, for Study 2 *r* is 3.75 and based on the above formula the minimum sample size is 116.

The appropriateness of the sample size for detecting the effect is calculated using the online SEM sample size calculator suggested by Westland (2012), which is built on an algorithm also developed by Westland (2010). In this algorithm, the minimum sample size to detect an effect is calculated based on the number of latent variables, minimum effect size, significance level and power. This research considers the significance level as 0.05 and power as 0.8, the specification proposed as a convention (Cohen, 1992). A significance level of 0.1 as used in this research to evaluate the hypotheses needs a lower sample size than the 0.05 significance level. Therefore, the 0.05 significance level is applied to calculate a conservative sample size. To start with, the minimum effect size in the SEM in this research is anticipated to be small to medium, which is 0.1 to 0.3 (Cohen, 1992). Durlak (2009) identifies the direct effect size in the SEM as the standardised path coefficient. The later analysis demonstrates that the minimum significant standardised path coefficient in both studies was 0.14. For both studies, there are four latent variables that function as dimensions of consumer value. By using the SEM sample size calculator (Westland 2012), the minimum sample size for detecting the effect in both studies is 194.

In conclusion, a conservative minimum sample size for each study was selected as 200.

5.2.6 Control variables

Participants' characteristics such as age, level of education, gender and level of familiarity with the internet have been measured in order to account for any variation in outcome as a result of these variables.

In Study 2, objective knowledge and subjective knowledge are included in the analysis as control variables to remove any effect of objective and subjective knowledge differences between the control and experimental groups. This is not the case for Study 1, where knowledge miscalibration is the subtraction of the objective knowledge score from the subjective knowledge score. In Study 1, adding either of these two types of

knowledge into the model removes the statistical variation in knowledge miscalibration due to high multicollinearity (Parker and Stone, 2014).

The validity considerations of the research method used in this research are described in the next section.

5.3 VALIDITY CONSIDERATIONS

Positivist validation criteria are used to consider the validity of the empirical investigation. In particular, construct validity (or validity), internal validity (or reliability) and external validity (or generalisability) criteria are concerned with the validity of an empirical model testing investigation (Easterby-Smith *et al.*, 2008).

Internal validity is concerned with systematic factors of bias or other reasonable explanations for the observed variances (Easterby-Smith *et al.*, 2008). The selection of an experiment in the second study to test the conceptual model maximises the internal validity. Subjects are randomly assigned to experimental and control groups, which are identical in all aspects apart from the level of knowledge miscalibration. Therefore, the knowledge miscalibration is the explanation for any observed variations in consumer value dimensions.

Construct validity deals with the extent to which measures correspond to the constructs investigated (Easterby-Smith *et al.*, 2008). The measurement tool is investigated against several construct validity criteria. In each study, a confirmatory factor analysis (CFA) has been performed to ensure that the measurement model achieves a goodness of fit; the precision of the measurement items has been investigated through Cronbach alphas (to account for single construct measurement precision) and composite reliabilities (to account for multiple construct measurement precision) (Raykov, 1998). Furthermore, discriminant validity (i.e., a validity criterion to ascertain whether the constructs measured are unrelated to each other) and convergent validity (i.e., a validity criterion to explore whether the measurement items measure the same construct) are investigated based on Fornell and Larcker's (1981) criteria. Chapter 6 will explain that these considerations showed a lack of construct validity in Pilot Study 1, resulting in a change

in the consumer value measurement instrument in the main studies. However, the new measurement instrument has shown a strong construct validity in the main studies.

External validity refers to the generalisability of the research (Easterby-Smith *et al.*, 2008; Johnson, 1997). Three issues are raised in evaluating the generalisability of an experimental investigation: *statistical generalisability*, *robustness* and *realism*. *Statistical generalisability* refers to the appropriate use of probability sampling for extending the results to a larger population; *robustness* is concerned with assigning particular subjects or conducting the study in a particular time interval; and *realism* refers to the realistic design of tasks, stimuli and settings (Lynch, 1982). Lynch (1982) translates external validity issues into three factors that influence the ability for generalisation:

1. Whether there is a background factor interacting or combining with manipulated variables in the experiment
2. The sampling of that background factor in the experimental design
3. The researcher's awareness of the background factor in data analysis

The use of the Amazon Mechanical Turk for hiring participants increases the heterogeneity of the sample, which reduces the chance of a background factor existing (Lynch, 1982). Furthermore, the potential background variables such as age, gender, use experience and objective knowledge (in Study 2) are accounted for in the studies (i.e., both statistically across the studies and by random assignment to experimental conditions in the second study). Finally, in order to maximise the external validity, the research has been replicated in two different settings (i.e., amazon.com for the observational study and prezi.com for the experiment). Besides these considerations, any background factor which is not empirically accounted for is conceptually discussed and its implications on the results are considered for any generalisation claims.

5.4 SUMMARY

This PhD research starts by establishing an observable regularity in the empirical domain of reality. This regularity is the variation in consumers' perception of the value of the consumption of a product or service. It is followed by discovering the conceptual

model of generative mechanisms for the observed regularity in the real domain of reality. The associated research paradigm is that of critical realism, which relies on neo-realism's epistemological assumptions and the retroductive research strategy. Consequently, the conceptual model of generative mechanisms has been tested empirically for all hypothesised relationships. Two studies, a covariance-based and an experimental investigation, have been designed to empirically test the conceptual model; each has a pilot study to make sure the data collection instruments are appropriate for the studies. In addition, the SEM is set for data analysis to cover both the measurement model validity of the dependent variable (i.e., consumer value) and for causal relationship analysis.

6 FINDINGS

6.1 STUDY 1: COVARIANCE-BASED STUDY

6.1.1 Study 1: Pilot Study

184 postgraduate students at Cranfield School of Management were invited to undertake the pilot study, with 167 completing it. Amazon.co.uk vouchers were randomly given to three respondents as an incentive. The study took around ten minutes to complete and included measures of consumer value and the objective knowledge and subjective knowledge consumers had regarding amazon.co.uk. The online questionnaire was designed using the online survey software Qualtrics.

Before launching the survey, the data collection instruments were refined through three sets of expert reviews and a pre-pilot study. 22 PhD students participated in the pre-pilot study, the main focus of which was to refine and validate the index for measuring consumer knowledge. The survey's characteristics were also pre-tested, such as the time it took to fill in the survey, the survey format, the range of scales and the response rate.

6.1.1.1 Study 1: Pilot Study Data Analysis

There were 88 observations of overconfident consumers and 79 observations were categorised as underconfident consumers. In general, a portion of 47% for underconfident consumers is not consistent with the findings of past studies, which have shown a significantly higher number of overconfident consumers than underconfident consumers (e.g., Pillai and Hofacker, 2007; Hansen and Thomsen, 2013). This was the outcome of using the 0%-100% scale for measuring subjective knowledge. In fact, if someone answers all the questions randomly, she would answer 50% of the questions correctly as there is a 50% chance of selecting the correct answer. However, as her subjective knowledge is measured by a 0%-100% scale this 50% chance is not addressed in calculating subjective knowledge, and hence the measurement system is biased towards underconfidence. A solution to this problem was the conversion of the 0%-100% scale to a 0.5-1.0 scale. After the conversion of the scale, the portion of underconfident consumers decreased to 9%. However, converting the scale did not

account for consumers who considered the 50% chance in their subjective knowledge rating. Indeed, some consumers accounted for chance in their subjective evaluations, which disproves the conversion method. Therefore, in the main study a restricted scale (i.e., a 50%-100% scale) (Pillai and Hofacker, 2007; Hansen and Thomsen, 2013) has been used in order to measure subjective knowledge.

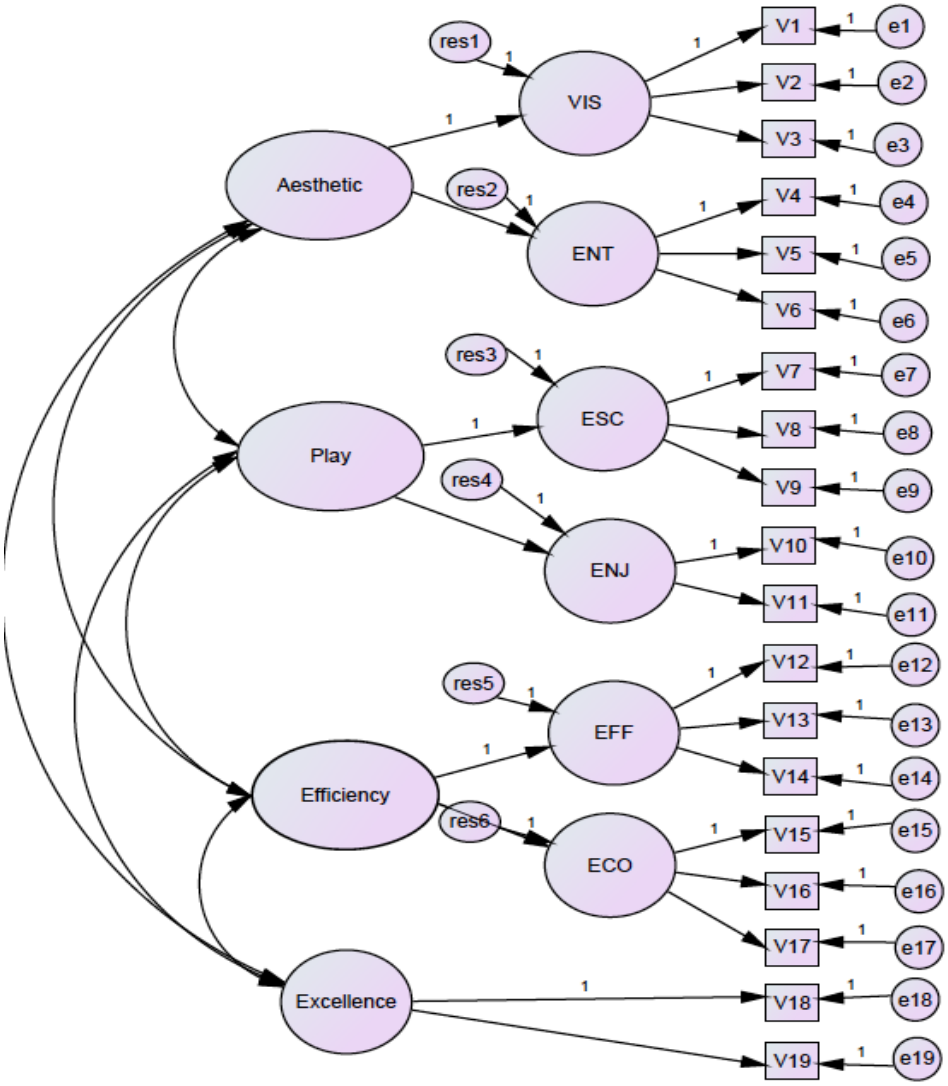


Figure 15: Study 1, Pilot Study SEM Model for CFA (Adapted from Mathwick *et al.,* 2001)

An SEM was built to test the validity of the measurement model of consumer value dimensions (Figure 15). A confirmatory factor analysis (CFA) model was conducted based on the scale items of consumer value developed by Mathwick *et al.* (2001). Regression weights, standard regression weights, covariances and correlations are presented in Tables 11 and 12. The model did not fit the data well ($\chi^2 = 266$, $df = 140$, p

= .00; CFI = .938; RMSEA = .074). In particular CFI was lower than 0.95, which is the criteria for goodness of fit (Hair *et al.*, 2009). The main reason for this lack of fit was the association among scale items measuring enjoyment, escapism and entertainment in the scale devised by Mathwick *et al.* (2001). For example, the standardised residual covariance between an item measuring escapism and an item measuring enjoyment was higher than 2.0, showing a strong association between these two items. Therefore, in order to increase the reliability of the measurement model in the final study, aesthetic value was measured only by items representing visual appeal and the play value was measured only by items representing enjoyment.

Table 11: Study 1, Pilot Study CFA Regression and Standard Regression Weights

	Regression Weights	Standard Regression Weights	S.E.	C.R.	p
EFF <--- Efficiency	1.000	.555			
ECO <--- Efficiency	1.397	.883	.446	3.132	.002
ENJ <--- Play	.655	.664	.097	6.753	***
VIS <--- Aesthetics	1.000	.435			
ENT <--- Aesthetics	3.041	1.342	.886	3.434	***
ESC <--- Play	1.000	1.061			
V1 <--- VIS	1.000	.883			
V2 <--- VIS	1.163	.948	.060	19.264	***
V3 <--- VIS	1.123	.933	.060	18.680	***
V4 <--- ENT	1.000	.801			
V5 <--- ENT	1.262	.898	.095	13.337	***
V6 <--- ENT	1.250	.863	.098	12.696	***
V7 <--- ESC	1.000	.821			
V8 <--- ESC	1.097	.883	.083	13.203	***
V9 <--- ESC	.992	.758	.092	10.824	***
V10 <--- ENJ	1.000	.889			
V11 <--- ENJ	.940	.906	.077	12.221	***
V12 <--- EFF	1.000	.544			
V13 <--- EFF	1.054	.870	.147	7.181	***
V14 <--- EFF	1.163	.900	.163	7.154	***
V15 <--- ECO	1.000	.779			
V16 <--- ECO	1.120	.940	.114	9.839	***
V17 <--- ECO	-.756	-.496	.119	-6.323	***
V18 <--- Excellence	1.000	.790			
V19 <--- Excellence	.844	.611	.159	5.295	***

Note: *** p < .000, S.E. means Standard Error, C.R. means Critical Ratio

For items measuring excellence composite reliability (CR) was 0.66, which is lower than 0.7 (i.e., the criteria for CR), and the average variance extracted (AVE) was 0.49, which is lower than the minimum 0.5 criteria for convergent validity (Table 13). Therefore, the convergent validity of the scale was not supported (Fornell and Larcker, 1981). The discriminant validity of the scale was evident as both the maximum and average shared squared variances (MSV and ASV) were lower than AVE for all dimensions (Fornell and Larcker, 1981). Moreover, the Cronbach alpha of excellence value was 0.65, which is lower than the 0.7 required for achieving internal consistency reliability (Nunnally and Berstein, 1994). Therefore, the measurement scale needed to account for convergent validity and consistency reliability. In particular, the use of the two item scale for measuring excellence value was one of the reasons for the lack of validity.

Table 12: Study 1, Pilot Study CFA Covariances and Correlations

	Covariances	Correlations	S.E.	C.R.	p
Efficiency <--> Play	.129	.231	.063	2.041	.041
Excellence <--> Efficiency	.243	.560	.085	2.873	.004
Excellence <--> Play	.445	.411	.112	3.976	***
Excellence <--> Aesthetics	.135	.342	.052	2.592	.010
Efficiency <--> Aesthetics	.023	.115	.017	1.359	.174
Play <--> Aesthetics	.281	.553	.096	2.921	.003

Note: *** p < .000, S.E. means Standard Error, C.R. means Critical Ratio

Table 13: Study 1, Pilot Study Validity Criteria

	CR	AVE	MSV	ASV
Play	0.873	0.783	0.306	0.176
Efficiency	0.694	0.544	0.314	0.127
Aesthetics	0.997	0.995	0.306	0.145
Excellence	0.662	0.499	0.314	0.200

6.1.1.2 Study 1: Pilot Study Conclusion

Based on the above analysis, two main changes were made to the instruments for collecting data. Firstly, the subjective knowledge scale was converted to a 50%-100% scale to account for random error. Secondly, the scale of consumer value developed by Mathwick *et al.* (2001) showed a lack of construct validity; therefore, other consumer value scales were reviewed and Munnukka and Jarvi's (2012) scale was chosen for the

final study, as it resolved the problems caused by inter-dimensional associations between aesthetic value and play value as well as the inconsistency in excellence value.

6.1.2 Study 1: Main Study

For the main study, data was collected from the Amazon Mechanical Turk and 260 participants completed the study. Due to the Amazon Mechanical Turk being limited to US citizens, the study used CrowdFlower, which provides facilities for internationals to use the Amazon Mechanical Turk. Participants were given 65 US cents to complete the study, which took about ten minutes to complete. 51% of participants were female, 56% had a degree education, 44% spent less than 25 hours a week on the internet, and 52% shopped online more than three times a month. The age of participants ranged from 18 to 71 years old, with an average age of 31.6 and a standard deviation of 11.3 (Tables 14, 15 and 16). These statistics showed a heterogeneous sample, which increases the external validity of the research. Based on the knowledge miscalibration scores in Study 1, 75% of participants were classified as overconfident consumers and 25% of participants were classified as underconfident consumers.

Table 14: Study 1, Respondents' Descriptive Statistics

Variable	Valid Reponses	Minimum	Maximum	Mean	S.D.	Variances
On average, how many hours per week, if any, do you spend on the internet?	250	.00	37.50	27.068	9.892	97.865
About how long have you been using the internet?	250	.00	14.00	12.132	2.594	6.732
How often, if ever, do you go online to shop?	250	.00	11.50	4.307	3.802	14.456
How often, if ever, do you go on Amazon to shop?	250	.00	11.00	3.305	3.292	10.838
When you know the name of the book you are going to buy, how long (on average) does it take to purchase?	250	.00	15.00	4.562	3.496	12.226
Age (years)	248	18.00	71.00	31.645	11.308	127.890

Note: S.D. means Standard Deviation

Table 15: Study 1, Gender Descriptive Statistics

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	122	46.9	49.2	49.2
	Female	126	48.5	50.8	100.0
	Total	248	95.4	100.0	
Missing	System	12	4.6		
Total		260	100.0		

Table 16: Study 1, Respondents' Highest Level of Education Descriptive Statistics

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not finished high school	3	1.2	1.2	1.2
	High school diploma	106	40.8	42.7	44.0
	Undergraduate degree	114	43.8	46.0	89.9
	Postgraduate degree	25	9.6	10.1	100.0
	Total	248	95.4	100.0	
Missing	System	12	4.6		
Total		260	100.0		

A CFA of consumer value dimensions is performed in Study 1 (Figure 16). Descriptive statistics, regression weights, standard regression weights, covariances and correlations are presented in Tables 17, 18 and 19. The research has compared the measurement model (i.e., the model with factor loadings constrained as equal across groups) and the structural model (i.e., the model with factor covariances constrained as equal across groups) with the unrestricted model to investigate multiple-group invariance (i.e., equality) (Byrne, 2010), and the unrestricted model fits the data well (χ^2= 126, *df* = 96, *p* = .02; CFI = .979; RMSEA = .035). The measurement model also fits the data well (χ^2 = 131, *df* = 104, *p* = .04; CFI = .982; RMSEA = .031). The measurement model invariance was supported as the χ^2 change was insignificant ($\Delta\chi^2$ = 5, Δ *df* = 8) and the difference in CFI was small (ΔCFI = 0.003 < 0.01) (Cheung and Rensvold, 2002). The structural model also fits the data well (χ^2 = 138, *df* = 110, *p* = .04; CFI = .981; RMSEA = .031). The structural model invariance was also supported given that there was a non-significant χ^2 change ($\Delta\chi^2$ = 12, Δ *df* = 14) and a small difference in CFI (ΔCFI = 0.002

< 0.01) (Cheung and Rensvold, 2002). For all dimensions in the three models, CR was greater than 0.7 and AVE was greater than 0.5, supporting the convergent validity of the consumer value scale (Fornell and Larcker, 1981). The discriminant validity of the scale also received support as MSV and ASV were lower than AVE for all dimensions (Fornell and Larcker, 1981). The results of the validity criteria calculations are presented in Tables 20 and 21. Furthermore, with a Cronbach alpha greater than 0.7 for all dimensions, the scale has displayed reliable internal consistency (Nunnally and Berstein, 1994).

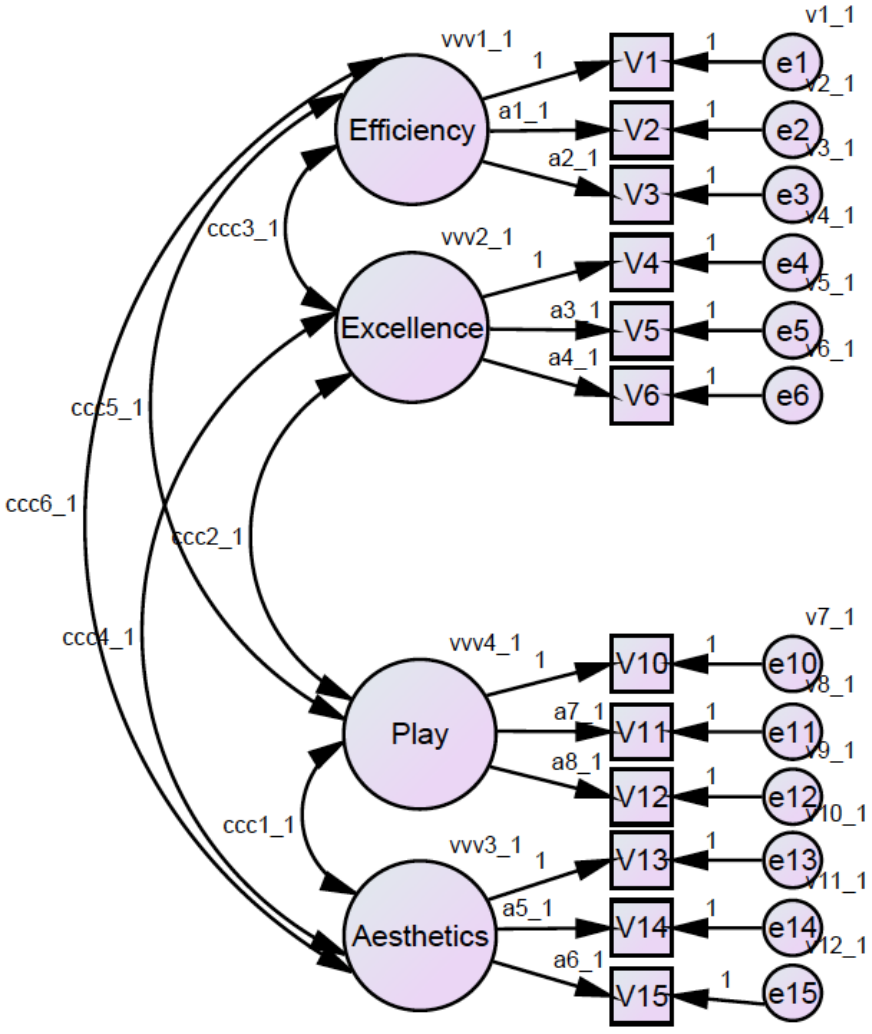


Figure 16: Study 1, SEM Model for CFA

Table 17: Study 1, Consumer Value Items Descriptive Statistics

Variable	Variable Name	Valid Reponses	Mean	S.D.	Variances
Shopping on Amazon helps with time management.	V1	260	5.74	1.121	1.258
Shopping on Amazon makes life easier.	V2	260	6.24	.708	.501
Shopping on Amazon fits in with my timetable.	V3	260	6.12	.764	.584
Amazon has an image of high quality and excellence.	V4	260	6.00	.870	.757
Amazon represents a top online retailer.	V5	260	6.20	.901	.812
Amazon is a top expert in the field.	V6	260	5.98	1.021	1.042
Shopping on Amazon is entertaining.	V10	260	5.38	1.042	1.086
I gain pleasure from shopping on Amazon.	V11	260	5.35	1.110	1.231
I shop on Amazon to obtain a pleasant sensation.	V12	260	3.73	1.659	2.753
Amazon has a pleasant appearance.	V13	260	5.74	.878	.771
Amazon has an attractive appearance.	V14	260	5.69	.900	.810
Amazon has an effective design.	V15	260	5.85	.935	.874

Note: S.D. means Standard Deviation

Table 18: Study 1, CFA Regression and Standard Regression Weights

	Regression Weights	Standard Regression Weights (Underconfident)	Standard Regression Weights (Overconfident)	S.E.	C.R.	p
V1 <--- Efficiency	1.000	.897	.654			
V2 <--- Efficiency	.715	.792	.805	.066	10.903	***
V3 <--- Efficiency	.682	.753	.694	.065	10.505	***
V4 <--- Excellence	1.000	.774	.740			
V5 <--- Excellence	1.100	.879	.776	.101	10.854	***
V6 <--- Excellence	1.050	.700	.663	.109	9.671	***
V13 <--- Aesthetics	1.000	.938	.918			
V14 <--- Aesthetics	1.023	.913	.923	.049	20.704	***
V15 <--- Aesthetics	.795	.808	.654	.059	13.571	***
V10 <--- Play	1.000	.757	.821			
V11 <--- Play	1.222	.916	.925	.104	11.702	***
V12 <--- Play	1.010	.527	.505	.128	7.908	***

Note: *** p < .000, S.E. means Standard Error, C.R. means Critical Ratio

Table 19: Study 1, CFA Covariances and Correlations

			Covariences	Correlations (Underconfident)	Correlations (Overconfident)	S.E.	C.R.	p
Aesthetics	<-->	Play	.342	.559	.490	.063	2.041	.041
Excellence	<-->	Play	.226	.447	.404	.085	2.873	.004
Efficiency	<-->	Excellence	.316	.607	.617	.112	3.976	***
Excellence	<-->	Aesthetics	.288	.556	.546	.052	2.592	.010
Efficiency	<-->	Play	.263	.427	.388	.017	1.359	.174
Efficiency	<-->	Aesthetics	.334	.528	.521	.096	2.921	.003

Note: *** p < .000, S.E. means Standard Error, C.R. means Critical Ratio

Table 20: Study 1, Validity Criteria for Overconfident Group

	CR	AVE	MSV	ASV
Efficiency	0.763	0.519	0.381	0.268
Aesthetics	0.876	0.707	0.298	0.270
Play	0.807	0.595	0.240	0.185
Excellence	0.771	0.530	0.381	0.281

Table 21: Study 1, Validity Criteria for Underconfident Group

	CR	AVE	MSV	ASV
Efficiency	0.856	0.666	0.368	0.277
Aesthetics	0.918	0.789	0.312	0.300
Play	0.787	0.563	0.312	0.232
Excellence	0.829	0.621	0.368	0.292

The hypotheses were analysed through a piecewise linear SEM (Harring, 2013). In this model, knowledge miscalibration was an observed exogenous cause variable. Therefore, there was no need to assign it a latent variable or to fix an error term (Mulaik, 2009), meaning that knowledge miscalibration has been measured as a single indicator formative variable, such as age, gender and height. The SEM model for the overconfident group is presented in Figure 17.

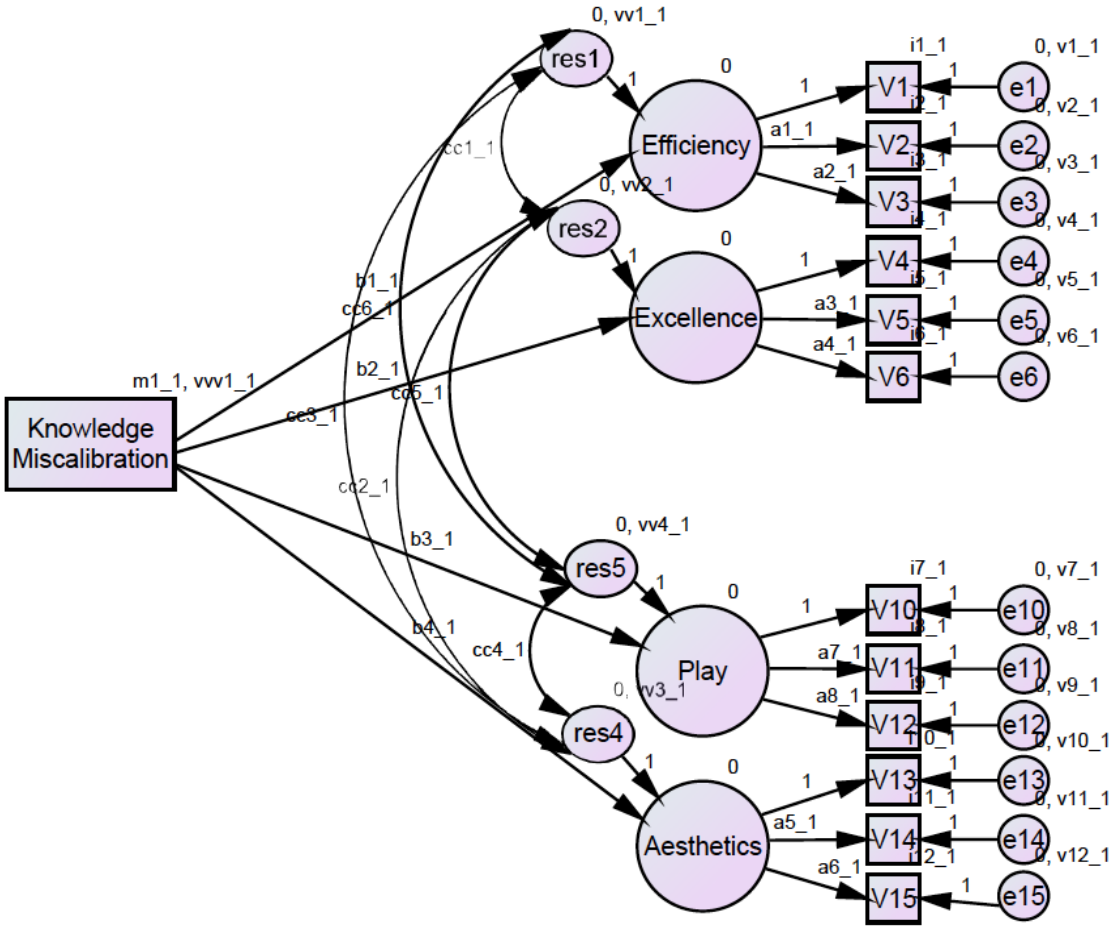


Figure 17: Study 1, SEM Model for Path Analysis

The model of the hypothesised relationships between knowledge miscalibration and consumer value dimensions fits the data extremely well (χ^2= 151, *df* = 126, *p* = .06; CFI = .983; RMSEA = .028). Descriptive statistics, regression weights and standard regressions weights for multiple groups are presented in Tables 22, 23 and 24.

Table 22: Study 1, Consumer Knowledge Descriptive Statistics

Variable	Valid Reponses	Minimum	Maximum	Mean	S.D.	Variances
Objective Knowledge	260	5	14	10.46	1.714	2.937
Subjective Knowledge	260	8.9	15.0	11.886	1.3174	1.736
Knowledge Miscalibration	260	-3.7	9.5	1.425	1.9371	3.752
Knowledge Miscalibration (Absolute value)	260	.00	9.45	1.9188	1.44685	2.093

Note: S.D. means Standard Deviation

Table 23: Study 1, Overconfident Group Regression and Standard Regression Weights

			Regression Weights	Standard Regression Weights	S.E.	C.R.	p
Efficiency	<---	Knowledge Miscalibration	.026	.049	.044	.601	.548
Excellence	<---	Knowledge Miscalibration	-.015	-.034	.036	-.410	.682
Play	<---	Knowledge Miscalibration	-.096	-.164	.044	-2.155	.031
Aesthetics	<---	Knowledge Miscalibration	.004	.007	.041	.098	.922

Note: *** p < .000, S.E. means Standard Error, C.R. means Critical Ratio

Table 24: Study 1, Underconfident Group Regression and Standard Regression Weights

			Regression Weights	Standard Regression Weights	S.E.	C.R.	p
Efficiency	<---	Knowledge Miscalibration	-.220	-.231	.123	-1.791	.073
Excellence	<---	Knowledge Miscalibration	-.179	-.228	.103	-1.741	.082
Play	<---	Knowledge Miscalibration	-.342	-.360	.120	-2.858	.004
Aesthetics	<---	Knowledge Miscalibration	-.337	-.350	.116	-2.909	.004

Note: *** p < .000, S.E. means Standard Error, C.R. means Critical Ratio

As summarised in Table 25, H3b and H4b were significantly supported at a .01 significance level, H3a was significantly supported at a .05 significance level, and H1b and H2b were significantly supported at a .1 significance level. Moreover, the paths corresponding to H1a, H2a and H4a were not significant. Overall, the negative effect of underconfidence is supported for all four dimensions of consumer value, whereas the negative effect of overconfidence is only supported for perceived play value.

Table 25: Summary of Path Analysis

Hypothesis	Independent Variable	Dependent Variable	Standardised Regression Weight	p	Supported (yes/No)
H1a	Overconfidence	Efficiency	.05	.55	No
H1b	Underconfidence	Efficiency	-.23	.07*	Yes
H2a	Overconfidence	Excellence	-.03	.68	No
H2b	Underconfidence	Excellence	-.23	.08*	Yes
H3a	Overconfidence	Play	-.16	.03**	Yes
H3b	Underconfidence	Play	-.36	.00***	Yes
H4a	Overconfidence	Aesthetics	.01	.92	No
H4b	Underconfidence	Aesthetics	-.35	.00***	Yes

Note: * .1 significance level, ** .05 significance level, *** .01 significance level

6.2 STUDY 2: EXPERIMENTAL STUDY

6.2.1 Study 2: Pilot Study

The experimental process was pre-piloted by 11 participants and was refined and revised to provide a smooth flow for participants. Pre-pilot participants were taken through the experiment and reflected on their experience of completing the experiment, which resulted in questions or instructions that were unclear being identified and refined, adding further instructions and information and changing inappropriate formats.

The pilot study was performed twice. The first pilot study showed that manipulations were not working effectively, therefore the manipulations were modified and the pilot study was repeated. The main issue with the first pilot study was the terminology used in the manipulation. In particular in the failed pilot test, using sentences carrying negative meanings in the enhanced calibration feedback such as “You underestimated your knowledge” did not encourage underconfident consumers to adjust their subjective knowledge. In the second pilot study (as well as in the main study), using neutral sentences in the enhanced calibration feedback such as “You have X% more knowledge than you thought” (as explained in Section 5.2.2.2) corrected this issue. The following results are the outcome from the second pilot study, showing that the manipulations successfully reduced participants’ knowledge miscalibration.

The main purpose of the second pilot study was also to make sure the manipulations worked effectively. The data was collected from the Amazon Mechanical Turk through the CrowdFlower platform. Participants were given 65 US cents to complete the pilot study, and the process took about ten minutes.

174 participants completed the pilot study. 45% of participants were female and the average age was 33.5 years old. 50 participants were underconfident, 122 were overconfident and two participants were calibrated. Calibrated participants were excluded from the analyses.

6.2.1.1 Study 2: Pilot study data analysis

For overconfident consumers, an independent t-test showed that manipulation effectively decreased the subjective knowledge of participants, which brought them closer to being calibrated. The t-test indicated a significant decrease in the experiment group's subjective knowledge (t = 2.05, df = 120, $p < 0.05$). The group statistics and t-test results are presented in Tables 26 and 27. For underconfident consumers, the independent t-test supported the manipulation to effectively increase the subjective knowledge of participants, which is what makes them less underconfident (i.e., less miscalibrated). The t-test showed a significant decrease in the experiment group's subjective knowledge (t = -2.37, df = 48, $p < 0.05$), and the group statistics and t-test results are presented in Tables 28 and 29.

Table 26: Study 2, Pilot Study Manipulation Check Descriptive Statistics for Overconfident Group

	Group	N	Mean	S.D.	S.E.
Manipulation Check	Control	64	4.9219	1.16911	.14614
	Manipulation	58	4.4655	1.29053	.16945

Note: S.D. means Standard Deviation, S.E. means Standard Error

Table 27: Study 2, Pilot Study Independent Samples Test Results for Overconfident Group

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	S.E.	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	3.747	.055	2.049	120	.043	.4563	.2226	.0154	.8972
Equal variances not assumed			2.039	115.5	.044	.4563	.2237	.0131	.8995

Note: S.E. means Standard Error

Table 28: Study 2, Pilot Study Manipulation Check Descriptive Statistics for Underconfident Group

	Group	N	Mean	S.D.	S.E.
Manipulation Check	Control	22	4.1591	1.23815	.26397
	Manipulation	28	4.9107	1.00050	.18908

Note: S.D. means Standard Deviation, S.E. means Standard Error

Table 29: Study 2, Pilot Study Independent Samples Test Results for Underconfident Group

	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	S.E.	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	1.637	.207	-2.375	48	.022	-.75162	.3164	-1.3878	-.1153
Equal variances not assumed			-2.315	39.9	.026	-.75162	.3247	-1.4079	-.0953

Note: S.E. means Standard Error

6.2.2 Study 2: Main Study

In the main study, 215 participants were recruited via the Amazon Mechanical Turk. Similar to Study 1 and the pilot study, the study used CrowdFlower to collect data from the Amazon Mechanical Turk. Participants were given 165 US cents to complete the study. The study took about 30 minutes. 59% of participants were female, 59% had a degree education, 45% spent less than 25 hours a week on the internet, and 51% created power point presentations more than three times a year. The age of participants ranged from 18 to 66 years old with an average age of 31.9 and a standard deviation of 11.3 (Tables 30, 31 and 32). Based on knowledge miscalibration scores, 70% of participants were classified as overconfident consumers and 30% of participants were classified as underconfident consumers.

Table 30: Study 2, Gender Descriptive Statistics

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	89	41.4	41.4	41.4
	Female	126	58.6	58.6	100.0
	Total	215	100.0	100.0	
Missing	System	0	0		
Total		215	100.0		

Table 31: Study 2, Respondents' Highest Level of Education Descriptive Statistics

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not finished high school	1	.5	.5	.5
	High school diploma	86	40.0	40.0	40.5
	Undergraduate degree	102	47.4	47.4	87.9
	Postgraduate degree	26	12.1	12.1	100.0
	Total	215	100.0	100.0	
Missing	System	0	0		
Total		215	100.0		

Table 32: Study 2, Respondents' Descriptive Statistics

Variable	Valid Reponses	Minimum	Maximum	Mean	S.D.	Variances
On average, how many hours per week, if any, do you spend on internet?	215	4.50	37.50	27.027	10.5409	111.111
About how long have you been using the internet?	215	1.50	14.00	12.269	2.5115	6.308
On average, how many power point (or any other digital) presentations do you create per year?	215	.00	20.00	5.253	6.0038	36.046
Age (years)	215	18.00	66.00	31.920	10.4003	108.167

Note: S.D. means Standard Deviation

The first step was to check whether the manipulation of knowledge miscalibration performed as intended. The study converted the manipulation check item scores on a 50%-100% scale and recalculated the knowledge miscalibration score. For overconfident consumers, an independent t-test showed that the manipulation effectively decreased the knowledge miscalibration level of participants in the experimental group compared to the control group ($t = 4.04$; $df = 149$; $p < .001$). A one-sample t-test was also run on the experimental group to make sure that manipulation did not move participants into the underconfidence zone. The results showed that knowledge miscalibration level after the manipulation in the experimental group was significantly higher than 0 ($t = 5.58$; $df = 78$; $p < .001$). Therefore, the manipulation decreased the knowledge miscalibration level of overconfident participants, while it did not make them underconfident.

Similarly, for underconfident consumers, the independent t-test showed that the manipulation effectively increased the level of knowledge miscalibration of participants in the experimental group compared to the control group ($t = 3.26$; $df = 62$; $p = .002$). Furthermore, a one-sample t-test on the experimental group showed that the knowledge miscalibration level after the manipulation was significantly higher than 0 ($t = 4.08$; $df = 63$; $p < .001$). Therefore, the manipulation decreased the knowledge miscalibration level of underconfident participants but it did not turn them into overconfident consumers.

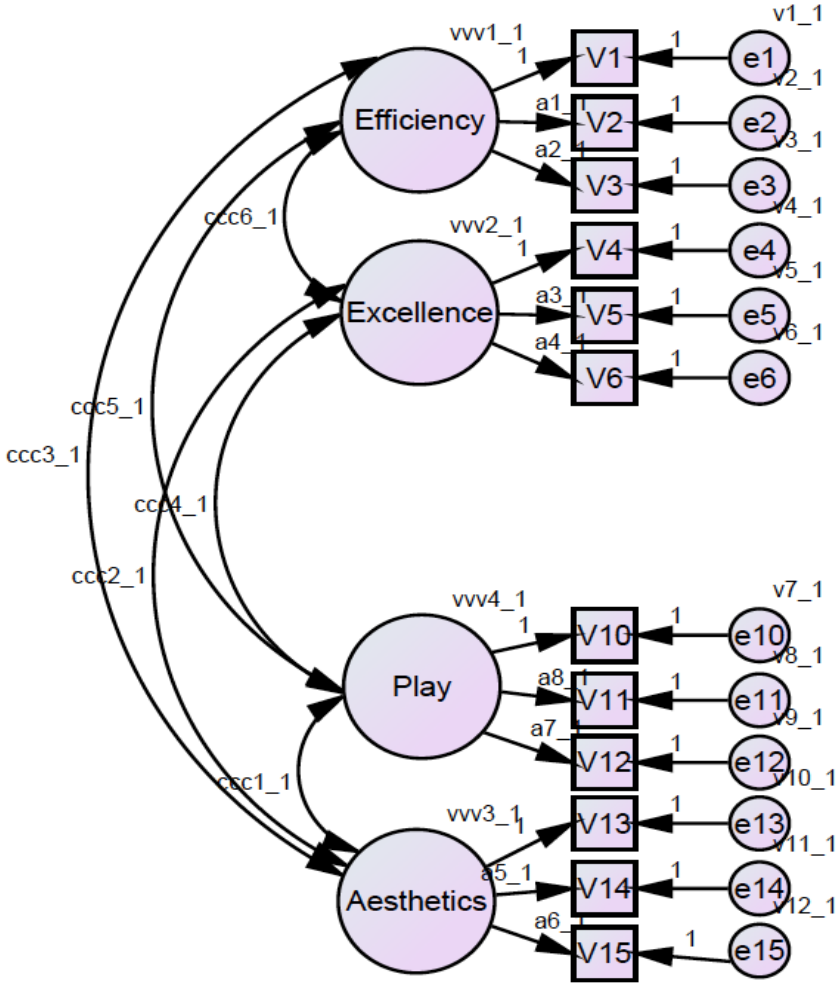


Figure 18: Study 2, SEM Model for CFA

Similar to Study 1, an SEM model for CFA of consumer value measurement items has been performed (Figure 18). Descriptive statistics, regression weights, standard regression weights, covariances and correlations are presented in Tables 33, 34 and 35. The CFA unrestricted model fits the data well (χ^2 = 168, *df* = 96, *p* = .00; CFI = .964; RMSEA = .059), as does the measurement model (χ^2 = 172, *df* = 104, *p* = .00; CFI = .966; RMSEA = .056). The measurement model invariance was supported through a non-significant CMIN change ($\Delta\chi^2$ = 4.2, Δdf = 8) and a small difference in CFI (ΔCFI = 0.002 < 0.01) (Cheung and Rensvold, 2002). The structural model also fits the data well (χ^2 = 183, *df* = 110, *p* = .00; CFI = .964; RMSEA = .056). The structural model invariance was supported through a non-significant CMIN change ($\Delta\chi^2$ = 15, Δdf = 14) and a small difference in CFI (ΔCFI = 0.000 < 0.01) (Cheung and Rensvold, 2002). For all dimensions in the three models, CR was greater than 0.7 and AVE was greater than

0.5, which supports the convergent validity of the scale (Fornell and Larcker, 1981). The discriminant validity of the scale is also supported as the MSV and ASV were lower than AVE for all dimensions (Fornell and Larcker, 1981). The results of validity criteria calculations are presented in Tables 36 and 37. Furthermore, with a Cronbach alpha greater than 0.7 for all dimensions, the scale has displayed reliable internal consistency (Nunnally and Berstein, 1994).

Table 33: Study 2, Consumer Value Items Descriptive Statistics

Variable	Variable Name	Valid Reponses	Mean	S.D.	Variances
Prezi helps with time management.	V1	215	4.88	1.333	1.776
Prezi makes life easier.	V2	215	5.02	1.348	1.817
Prezi fits in with my timetable.	V3	215	5.04	1.336	1.784
Prezi has an image of high quality and excellence.	V4	215	5.84	1.001	1.003
Prezi represents a top online software.	V5	215	5.65	1.062	1.127
Prezi is a top expert in the field.	V6	215	5.18	1.122	1.258
Using Prezi is entertaining.	V10	215	5.41	1.308	1.710
I gain pleasure from using Prezi.	V11	215	4.97	1.387	1.924
I use Prezi to obtain a pleasant sensation.	V12	215	4.19	1.578	2.492
Prezi has a pleasant appearance.	V13	215	6.04	.959	.919
Prezi has an attractive appearance.	V14	215	6.00	1.002	1.005
Prezi has an effective design.	V15	215	5.88	1.121	1.256

Note: S.D. means Standard Deviation

Table 34: Study 2, CFA Covariances and Correlations

	Covariences	Correlations (Underconfident)	Correlations (Overconfident)	S.E.	C.R.	p
Aesthetics <--> Play	.627	.586	.665	.089	7.084	***
Excellence <--> Aesthetics	.493	.663	.702	.068	7.249	***
Efficiency <--> Aesthetics	.458	.511	.547	.076	6.056	***
Excellence <--> Play	.632	.630	.717	.090	7.043	***
Efficiency <--> Play	.777	.643	.739	.112	6.965	***
Efficiency <--> Excellence	.519	.618	.663	.080	6.511	***

Note: *** p < .000, S.E. means Standard Error, C.R. means Critical Ratio

Table 35: Study 2, CFA Regression and Standard Regression Weights

			Regression Weights	Standard Regression Weights (Underconfident)	Standard Regression Weights (Overconfident)	S.E.	C.R.	p
V1	<---	Efficiency	1.000	.804	.728			
V2	<---	Efficiency	1.266	.928	.944	.088	14.454	***
V3	<---	Efficiency	1.208	.931	.893	.086	14.116	***
V4	<---	Excellence	1.000	.831	.826			
V5	<---	Excellence	1.163	.932	.904	.074	15.670	***
V6	<---	Excellence	1.016	.827	.743	.079	12.797	***
V13	<---	Aesthetics	1.000	.968	.892			
V14	<---	Aesthetics	1.100	.939	.978	.046	23.752	***
V15	<---	Aesthetics	.926	.697	.739	.068	13.648	***
V12	<---	Play	.994	.821	.665	.079	12.568	***
V11	<---	Play	1.150	.929	.945	.063	18.188	***
V10	<---	Play	1.000	.876	.856			

Note: *** p < .000, S.E. means Standard Error, C.R. means Critical Ratio

Table 36: Study 2, Validity Criteria for Overconfident Group

	CR	AVE	MSV	ASV
Efficiency	0.894	0.740	0.546	0.428
Aesthetics	0.907	0.766	0.493	0.411
play	0.867	0.689	0.546	0.501
Excellence	0.866	0.684	0.514	0.482

Table 37: Study 2, Validity Criteria for Underconfident Group

	CR	AVE	MSV	ASV
Efficiency	0.919	0.791	0.413	0.352
Aesthetics	0.907	0.768	0.440	0.348
Play	0.908	0.768	0.413	0.385
Excellence	0.899	0.748	0.440	0.406

Unlike Study 1, the independent factor was coded as a categorical variable rather than as continuous variable. Thus, for the overconfidence sample "1" represented the unchanged overconfidence (i.e., control) condition and "0" the reduced overconfidence (i.e., experimental) condition, while for the underconfidence sample "1" represented the unchanged underconfidence (i.e., control) condition and "0" the reduced

underconfidence (i.e., experimental) condition. The SEM model for the overconfident group is presented in Figure 19.

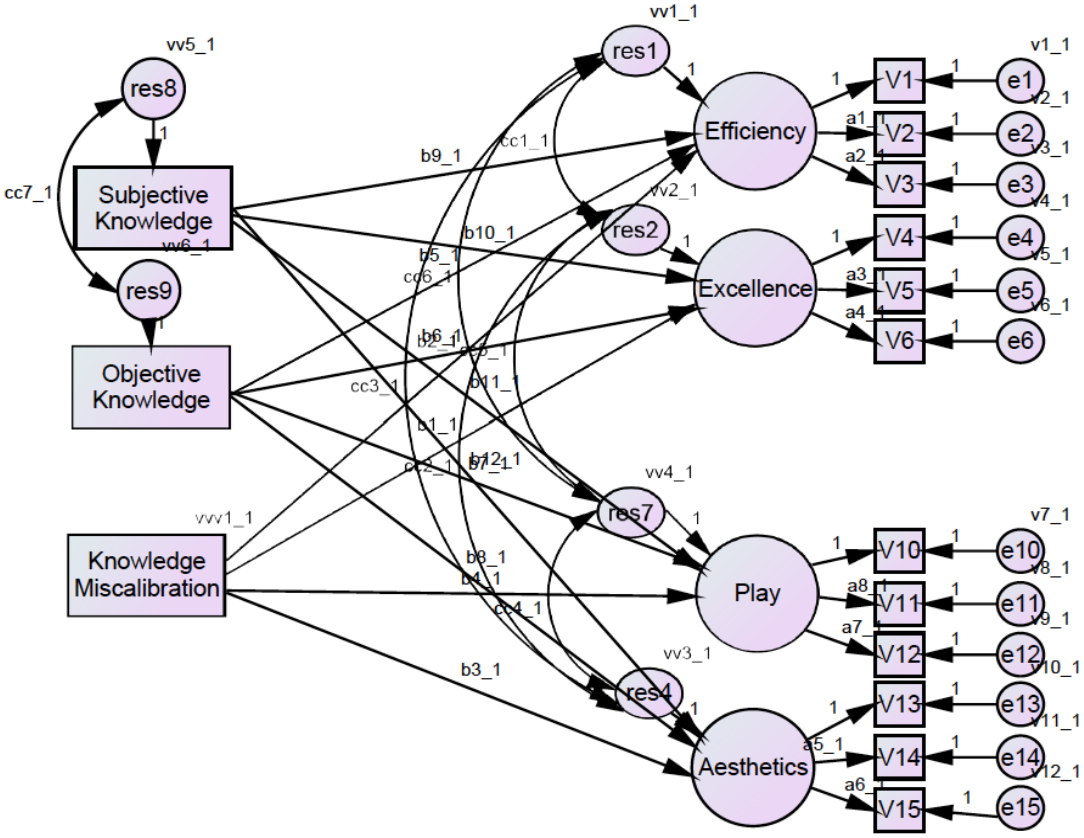


Figure 19: Study 2, SEM Model for Path Analysis

Similar to Study 1, the research hypotheses have been analysed through a multi-group SEM. The model with the hypothesised relationships between knowledge miscalibration and consumer value dimensions fits the data well (χ^2 = 257, *df* = 171, *p* = .00; CFI = .959; RMSEA = .049). Descriptive statistics, regression weights and standard regressions weights for multiple groups are presented in Tables 38, 39 and 40.

Table 38: Study 2, Consumer Knowledge Descriptive Statistics

Variable	Valid Reponses	Minimum	Maximum	Mean	S.D.	Variances
Objective Knowledge	215	35	98	70.49	12.804	163.933
Subjective Knowledge	215	57.05	98.30	82.1786	7.5276	56.666
Knowledge Miscalibration	215	-27.00	53.55	11.6902	15.4933	240.044
Knowledge Miscalibration (Absolute value)	215	.35	53.55	15.6135	11.5075	132.424

Note: S.D. means Standard Deviation

Table 39: Study 2, Overconfident Group Regression and Standard Regression Weights

			Regression Weights	Standard Regression Weights	S.E.	C.R.	p
Excellence	<---	Knowledge Miscalibration	-.253	-.156	.139	-1.823	.068
Efficiency	<---	Knowledge Miscalibration	-.226	-.117	.161	-1.405	.160
Aesthetics	<---	Knowledge Miscalibration	-.235	-.135	.140	-1.673	.094
Play	<---	Knowledge Miscalibration	-.487	-.222	.181	-2.690	.007

Note: *** p < .000, S.E. means Standard Error, C.R. means Critical Ratio

Table 40: Study 2, Underconfident Group Regression and Standard Regression Weights

			Regression Weights	Standard Regression Weights	S.E.	C.R.	p
Excellence	<---	Knowledge Miscalibration	-.394	-.231	.218	-1.809	.070
Efficiency	<---	Knowledge Miscalibration	-.471	-.230	.257	-1.831	.067
Aesthetics	<---	Knowledge Miscalibration	-.398	-.222	.221	-1.800	.072
Play	<---	Knowledge Miscalibration	-.257	-.107	.310	-.827	.408

Note: *** p < .000, S.E. means Standard Error, C.R. means Critical Ratio

As summarised in Table 41, H3a was significantly supported at a .01 significance level and H1b, H2a, H2b, H4a and H4b were significantly supported at a .1 significance level. Moreover, the paths corresponding to H1a and H3b were not significant. Overall, the effect of underconfidence on efficiency, excellence and aesthetics and the impact of overconfidence on excellence, play and aesthetics are supported.

In addition to these findings, it has been found that subjective knowledge (as a covariate) had a significant effect on efficiency ($\gamma = 0.16$, $p < .05$), play ($\gamma = 0.16$, $p < .05$) and aesthetics ($\gamma = 0.17$, $p < .05$) in the overconfident group. There was no significant effect of objective knowledge or subjective knowledge on the consumer value dimensions in the underconfident group.

Table 41: Summary of Path Analysis

Hypothesis	Independent Variable	Dependent Variable	Standardised Regression Weight	p	Supported (yes/No)
H1a	Overconfidence	Efficiency Value	-.12	.16	No
H1b	Underconfidence	Efficiency Value	-.23	.07*	Yes
H2a	Overconfidence	Excellence Value	-.16	.07*	Yes
H2b	Underconfidence	Excellence Value	-.23	.07*	Yes
H3a	Overconfidence	Play Value	-.22	.01***	Yes
H3b	Underconfidence	Play Value	-.11	.41	No
H4a	Overconfidence	Aesthetic Value	-.14	.09*	Yes
H4b	Underconfidence	Aesthetic Value	-.22	.07*	Yes

Note: * .1 significance level, *** .01 significance level

The hypotheses were also analysed through MANCOVA to compare the results with those of the SEM analysis. The overconfident and the underconfident conditions did not differ significantly in terms of their value dimension scores (i.e., there is no significant effect from the overconfidence vs. underconfidence factor). Furthermore, participants with lowered knowledge miscalibration had significantly higher efficiency ($F(1, 209) = 6.46$, $p < .05$), excellence ($F(1, 209) = 5.56$, $p < .05$), play ($F(1, 209) = 3.72$, $p < .1$) and aesthetics ($F(1, 209) = 5.05$, $p < .05$) than those with natural knowledge miscalibration, implying that knowledge miscalibration had a negative effect on efficiency, excellence, play and aesthetics.

In order to test the conceptual model, planned contrasts were performed separately for the underconfident and overconfident groups in order to analyse the effect of the reduction in knowledge miscalibration on the dependent variable scores (calculated here as averages of the items for each construct). Similar to the SEM analysis, H1b, H2a, H2b, H3a, and H4b were significantly supported and H1a and H3b had negligible support. Contrary to the results of the SEM analysis, the results failed to support H4a (Table 42). This slight difference in the results is due to the fact that, unlike SEM, MANCOVA does not account for the measurement errors in the model. Since each of the four dependent variables (i.e., the four value dimensions) was measured using a three-item scale, the study relies on the results of the SEM analysis in the following discussion.

Table 42: Summary of MANCOVA Results

Hypothesis	Independent Variable	Dependent Variable	Mean Experimental Group	Mean Control Group	F Value	*df*	*p*	Supported (yes/No)
H1a	Overconfidence	Efficiency	5.3	5.0	2.37	209	.13	No
H1b	Underconfidence	Efficiency	4.9	4.3	5.00	209	.03**	Yes
H2a	Overconfidence	Excellence	5.8	5.6	3.18	209	.08*	Yes
H2b	Underconfidence	Excellence	5.4	5.1	3.18	209	.08*	Yes
H3a	Overconfidence	Play	5.2	4.7	5.21	209	.02**	Yes
H3b	Underconfidence	Play	4.8	4.6	0.70	209	.40	No
H4a	Overconfidence	Aesthetics	6.2	5.9	2.23	209	.14	No
H4b	Underconfidence	Aesthetics	6.0	5.6	3.05	209	.08*	Yes

Note: * .1 significance level, ** .05 significance level

6.3 SUMMARY

In general, the measurement model has demonstrated a high level of validity in both studies. The hypothesis tests in Study 1 and Study 2 are summarised in Table 43. H1b, H2b, H3a and H4b were supported in both studies, whereas H3b was only supported in Study 1 and H2a and H4a were only supported in Study 2. These findings are discussed in the next chapter.

Table 43: Summary of Hypothesis Tests in Study 1 and Study 2

Hypothesis	Independent Variable	Dependent Variable	Study 1		Study 2				Hypothesis Supported? (Yes, No, Partially)
					SEM Analysis		*MANCOVA Analysis*		
			Standard Regression Weight	*p*	Standard Regression Weight	*p*	F Value	*p*	
H1a	Overconfidence	Efficiency	.05	.55	-.12	.16	2.37	.13	No
H1b	Underconfidence	Efficiency	-.23	.07*	-.23	.07*	5.00	.03**	Yes
H2a	Overconfidence	Excellence	-.03	.68	-.16	.07*	3.18	.08*	Partially
H2b	Underconfidence	Excellence	-.23	.08*	-.23	.07*	3.18	.08*	Yes
H3a	Overconfidence	Play	-.16	.03**	-.22	.01***	5.21	.02**	Yes
H3b	Underconfidence	Play	-.36	.00***	-.11	.41	0.70	.40	Partially
H4a	Overconfidence	Aesthetics	.01	.92	-.14	.09*	2.23	.14	Partially
H4b	Underconfidence	Aesthetics	-.35	.00***	-.22	.07*	3.05	.08*	Yes

Note: * .1 significance level, ** .05 significance level, *** .01 significance level

7 DISCUSSION AND CONCLUSION

7.1 GENERAL DISCUSSION

The adoption of the critical realism research philosophical paradigm has helped this research to investigate an important antecedent of consumer value (i.e., knowledge miscalibration). Other paradigms have limitations in defining such a question as this relationship (i.e., the relationship between knowledge miscalibration and consumer value) is not observable and has not yet been examined conceptually or empirically. This PhD conceptually and empirically probes the following research question:

- What is the effect of knowledge miscalibration on consumer value?

In particular, the effect of two types of knowledge miscalibration, overconfidence and underconfidence, on four dimensions of consumer value, efficiency, excellence, play and aesthetics, are investigated. Table 44 and Figure 20 summarise the outcome of the hypothesis analysis; the discussion on the findings can be classified into those hypotheses supported in both studies, hypotheses not supported at all and hypotheses supported in just one study.

Table 44: Summary of Hypothesis Investigation

Hypothesis	Description	Study 1	Study 2
H1a	Overconfidence on Efficiency	-	-
H1b	Underconfidence on Efficiency	x	x
H2a	Overconfidence on Excellence	-	x
H2b	Underconfidence on Excellence	x	x
H3a	Overconfidence on Play	x	x
H3b	Underconfidence on Play	x	-
H4a	Overconfidence on Aesthetics	-	x
H4b	Underconfidence on Aesthetics	x	x

Note: “x” means that the hypothesis is supported, “-” means that the hypothesis is not supported

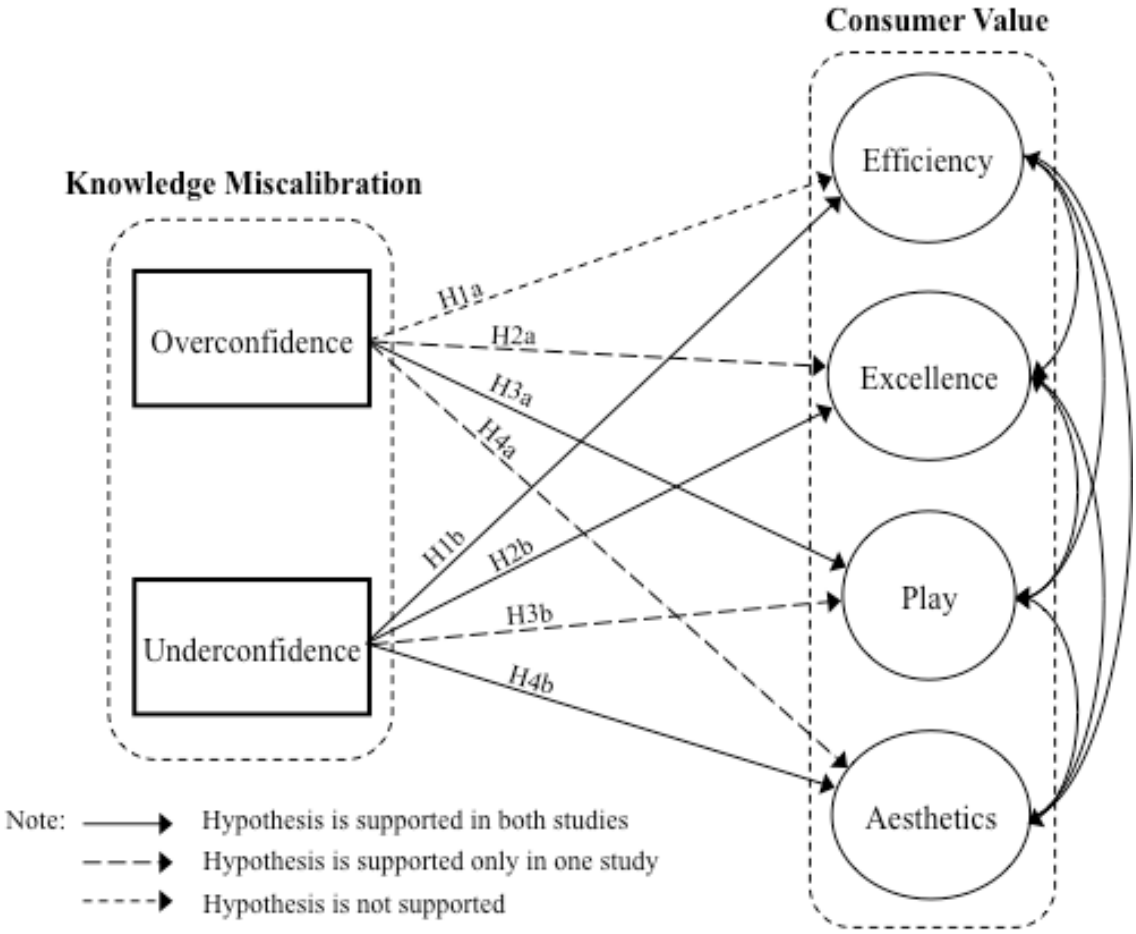


Figure 20: Summary of Hypothesis Investigation

Hypotheses H1b and H2b are supported in both studies. In fact, underconfidence has a negative effect on efficiency and excellence. van Beuningen *et al*. (2011) show that an increase in self-efficacy leads to a higher perception of the economic worth of a product or service; as explained in Chapter 2, the economic worth of a product or service is associated with a combination of efficiency and excellence. Furthermore, self-efficacy is closely associated with subjective knowledge. Therefore, H1b and H2b are consistent with the findings of van Beuningen *et al*. (2011) as they show that among underconfident consumers with the same level of objective knowledge, those who have a higher level of subjective knowledge (Study 1) or experience an increase in their subjective knowledge (Study 2) perceive a higher level of efficiency and excellence. However, this PhD limits this finding to underconfident consumers. In particular, the lack of support for H1a and the partial support for H2a illustrate that this is not the case for overconfident consumers. Indeed, for overconfident consumers not only does an

increase in subjective knowledge not lead to a better perception of efficiency but also it may lead to a lower perception of excellence (i.e., as supported in Study 2). Therefore, this research shows that subjective knowledge can improve perceptions of efficiency and excellence as long as it is in agreement with objective knowledge.

H3a is supported in both studies, proving the negative effect of overconfidence on play. H3b, representing the effect of underconfidence on play, is only supported in Study 1. These findings are consistent with Pillai and Hofacker's (2007) conceptualisation of the negative effect of knowledge miscalibration on flow, showing that overconfidence and underconfidence as subjective biases negatively affect a consumer's experience of flow, which leads to a lower perception of play. It further supports the idea of flow experience as an objective event rather than a subjective perception. In fact, flow happens when a task objectively is challenging enough for a consumer. This research reveals that miscalibrated consumers perform tasks that are objectively too challenging or too simple for their level of objective knowledge, which leads to a lower experience of flow and a lower perception of play. Therefore, studies subjectively looking at flow (e.g., Novak *et al.*, 2000; Rose *et al.*, 2012) benefit from the objective operationalisation of flow that removes any subjective biases such as overconfidence.

H4b is supported in both studies, illustrating the negative effect of underconfidence on perceived aesthetics. H4a is also supported in Study 2, showing the negative effect of overconfidence on aesthetics. These findings are consistent with the modern psychologists idea of aesthetics as an interactive phenomenon rather than something associated only with objects (e.g., Reber *et al*., 2004). Indeed, knowledge miscalibration creates a low level of fluency leading to a low perception of aesthetics. This is also consistent with consumer behaviour studies finding the relationship between fluency and aesthetics (e.g., Cho and Schwarz, 2010; Tuch *et al.*, 2012). This PhD extends these studies by showing an antecedent of fluency that is linked to the consumer (i.e., knowledge miscalibration) rather than the product or service.

Hypotheses H2a (i.e., the effect of overconfidence on excellence value) and H4a (i.e., the effect of overconfidence on aesthetic value) are only supported in the second study. The lack of significant results in Study 1 may be due to its co-variance based nature; a possible explanation is that the impact of overconfidence and underconfidence on

consumer value dimensions in the context of Study 1 could be due to the consumer value derived from previous consumption experiences. In particular, value of a reactive nature (i.e., appreciated based on no physical or mental engagement with the product or service, for example excellence and aesthetics; Holbrook, 1999) can increase subjective knowledge. As discussed before, knowledge miscalibration is a product of the misinterpretation of external cues (Alba and Hutchinson, 2000). If the external cues do not carry any information about objective knowledge, they can create an inaccuracy in subjective knowledge. For instance, Frankenberger and Albaum (1997) show that consumers use the level of consumption task difficulty as a cue for their self-assessment of knowledge; those involved in more difficult tasks are underconfident, whereas those engaged in easy tasks are overconfident. In Frankenberger and Albaum's (1997) research, as the cue (i.e., task difficulty) does not have any information about consumers' objective knowledge, it leads to knowledge miscalibration. Therefore, it can be concluded that consumers' perceptions of reactive value dimensions (i.e., excellence and aesthetics) can lead to further knowledge miscalibration, particularly as they do not carry any information about the consumer and her performance. In other words, consumers use their higher perception of aesthetics or excellence as a cue to assess their objective knowledge, which leads to overconfidence. Consistent with this argument, Burrati and Allwood (2012) show that fluency predicts subjective knowledge as people use fluency as a cue to judge their level of objective knowledge (i.e., which is reflected in subjective knowledge ratings). Therefore, the lack of support for H2a and H4a in Study 1 can be explained by the fact that consumers who experience higher excellence or aesthetics have higher overconfidence, which neutralises the subsequent negative effect of overconfidence on excellence or aesthetics (i.e., as per the hypotheses). Conversely, in Study 1 this effect is not likely to neutralise the negative effect of underconfidence; rather, it should increase the negative effect of underconfidence on aesthetics and excellence. Overall, these findings support the appropriateness of experimental methods in investigating the effect of knowledge miscalibration on consumer value dimensions.

Another possible explanation for the lack of support for H2a and H4a in Study 1 is the existence of a third factor positively affecting both overconfidence and the excellence and aesthetics dimensions of consumer value, removing their negative relationship. For

instance, it can be concluded from Peterson and Pitz's (1986) research that a high amount of information can lead to underconfidence. There is also a chance that consumers use the amount of information to evaluate excellence and aesthetics. For example, product catalogues with detailed information may lead to a high perception of excellence; therefore, a possible explanation for the lack of support for the effect of underconfidence on excellence and aesthetics is the role of a third variable distorting the actual effect. This is not the case in Study 2 as the random assignment of participants to experimental and control group limits the possibility of the variation of a third variable in two groups.

Hypothesis H1a (i.e., the effect of overconfidence on efficiency value) is not supported in either of the studies. It has been argued that although overconfident consumers expect to perform well, they actually perform poorly as a result of acting presumptuously and through the suboptimal allocation of resources, leading to a lowered perceived efficiency. However, the findings from both studies failed to corroborate the hypothesis. This result might be explained by the definition of perceived efficiency being amended. In addition to the perceived inputs and outputs of the task, consumers' perceptions of efficiency could also be the result of motivational biases; people tend to draw conclusions when a result is desirable or comforting (Windschitl *et al.*, 2013). This thesis suggests that although the actual performance (i.e., output) of overconfident consumers is low, they perceive it to be higher in order to enhance themselves. This is especially the case for efficiency value, which depends on how well a consumer can perform the consumption task (i.e., self) in addition to how well the product can help the consumer.

Hypothesis H3b (i.e., the effect of underconfidence on play value) is only supported in Study 1. The research proposed the hypothesis based on the fact that underconfident consumers choose consumption tasks that are too simple for them as they underestimate their higher actual knowledge. Therefore, they have a lack of flow state of mind, leading to lower perceived play. In Study 2, the consumption task was new to the consumers. In such a new context, even a simple task could be challenging enough for the underconfident consumers to derive perceptions of play. Indeed, although Study 1 found evidence that underconfidence is related to lower perceived play, Study 2 did not find a

similar result, most likely due to the effect of the consumption novelty on the perception of play. This is not the case for overconfident consumers, who already suffer from a lack of flow resulted from acting presumptuously and allocating resources suboptimally. A new task can increase the challenges overconfident consumers already face, leading to an even lower flow state of mind and lower perceived play.

Another possible explanation for the lack of support for H3b in Study 2 is that the determinant of knowledge miscalibration plays a role in the relationship between knowledge miscalibration and consumer value. In fact, if knowledge miscalibration occurs due to a certain factor, it may not lead to all three categories of consequences (i.e., allocating resources, taking actions and setting expectations). For example, if underconfidence only exists because of misinterpretation of external cues (e.g., Peterson and Pitz, 1986) it may not have any consequence on the allocation of resources, which is an internal cognition process. Therefore in Study 2, there may be some mechanisms shaping underconfidence which do not lead to all of the consequences conceptualised in this research. However, there is no evidence in the literature to support this argument, and its validity needs to be investigated in further research.

The findings and the discussion above support the argument that overconfidence and underconfidence are distinct phenomena and need to be investigated separately. In Study 2, overconfidence significantly influences play, while the effect of underconfidence on play is not significant as the contextual element (i.e., the new consumption task) removes the negative consequence of underconfident consumers acting timidly. In Study 1, underconfidence affects excellence and aesthetics, whereas the effect of overconfidence on these dimensions of value is not significant. As debated above, this is likely to occur as a result of the counterbalancing effect of accumulated previous consumption experiences of aesthetics and excellence, resulting in overconfidence. In both studies, underconfidence is negatively associated with efficiency; while this effect is not significant for overconfidence, it is likely to be because overconfident consumers attach motivational biases to their evaluations of efficiency.

In addition to the findings above, in Study 2 this PhD accounted for the effect of subjective knowledge and objective knowledge when testing the effect of knowledge

miscalibration. The findings show that, for overconfident consumers, the initial subjective knowledge (i.e., subjective knowledge before knowledge miscalibration manipulation) has a significant and positive relationship with efficiency, play and aesthetic value. This means that although the manipulation decreases the level of subjective knowledge, it does not remove the positive effects of motivational biases attached to the initial degree of subjective knowledge. In other words, when consumers receive enhanced calibration feedback, they adjust their subjective knowledge without changing their motivation. Interestingly, this is not the case for underconfident consumers. Presumably, the reason for this is that enhanced calibration feedback increases both the subjective knowledge and motivation of underconfident consumers. Overall, it is concluded that making consumers' subjective knowledge more accurate decreases underconfident their lack of motivation while also maintaining a high level of motivation in overconfident consumers.

7.2 THEORETICAL CONTRIBUTIONS

Firstly, the main contribution of this research is that is demonstrates the effect of knowledge miscalibration on the dimensions of consumer value as derived from use. In the consumer behaviour literature, existing studies on knowledge miscalibration tend to focus on the purchasing decision (e.g., Alba and Hutchinson, 2000; Hadar *et al.*, 2013; Hansen and Thomsen, 2013; Kidwell *et al.*, 2008). Very few studies have conceptually investigated the consequences of knowledge miscalibration in the use stage of consumption. For instance, Pillai and Hofacker (2007) hypothesise the effect of knowledge miscalibration on flow and frustration. This PhD extends this area of knowledge by conceptually and empirically investigating the effect of knowledge miscalibration on consumer value dimensions, which reflect consumer valuations of different aspects of use.

Secondly, studies looking at the antecedents of consumer value (in particular, value-in-use) have predominantly focused on the aspects of consumption related to the supplier. These antecedents can include the quality of the supplier's internal processes (e.g., Lähteenmäki and Nätti, 2013; Macdonald *et al.*, 2011), the quality of products and services (e.g., Lemke *et al.*, 2011; Liu and Jang, 2009) and the context of use (e.g.,

Gummeras and Pihlstrom, 2011; Lemke *et al.*, 2011). Few works, investigating those antecedents of consumer value related to the consumer define consumer value as a one-dimensional phenomenon. For instance, the relationship between subjective knowledge on the one hand and the perceived economic worth of a service (i.e., equivalent to efficiency and excellence value) (McKee *et al.*, 2006; van Beuningen *et al.*, 2009; van Beuningen *et al*., 2011) and overall value and satisfaction (Barrutia and Gilsanz, 2012; Zhao *et al.*, 2008) on the other hand has been empirically established. This research adds to this area of knowledge, firstly by looking at consumer value as a multi-dimensional phenomenon and secondly by investigating both objective and subjective knowledge (i.e., knowledge miscalibration).

Thirdly, this PhD advances studies on the role of subjective knowledge in consumption. In particular, the extant research shows a positive association between self-efficacy and the perceived economic worth of a product or service (McKee *et al.*, 2006; van Beuningen *et al.*, 2009; van Beuningen *et al*., 2011). Alternatively, Barrutia and Gilsanz (2012) have found a positive relationship between subjective knowledge and overall perception of value (i.e., as a one-dimensional phenomenon). This PhD extends this strand of research by showing that subjective knowledge improves value only if it does not exceed objective knowledge; in other words, overconfidence (i.e., inflated subjective knowledge) not only fails to improve consumer value but also negatively impacts upon certain aspects of consumer value such as excellence, play and aesthetics.

Fourthly, this PhD extends existing studies on perceived play and flow experience. In particular, the existing literature shows consumer skills as a one-dimensional concept which leads to flow and play (e.g., Hoffman and Novak, 2009; Mathwick and Rigdon, 2004; Rose *et al.*, 2012). This PhD advance these studies by conceptualising and showing that knowledge miscalibration, being the inaccuracy in subjective knowledge in relation to objective knowledge, leads to a lower level of flow and perceived play. Therefore, objectivity and subjectivity have been revealed to be important factors in investigating flow and play. In particular, skills and challenges as antecedents of flow need to be objectively measured to provide more accurate results.

Fifthly, this study advances the existing consumer behaviour literature research on perceived aesthetics. Consumer researchers have shown that fluency is a determinant of

perceived aesthetics (Cho and Schwarz, 2010). This PhD enhances this area of study by illustrating that overconfidence and underconfidence negatively affect perceived aesthetics, which is explained through their negative effect on fluency. Existing studies focus on the factors associated with the product or service offering (e.g., Cho and Schwarz, 2010; Tuch *et al.*, 2012), whereas this PhD advance the literature on aesthetics by identifying factors associated with consumer (i.e., knowledge miscalibration).

Sixthly, this PhD extends the existing studies on online consumer value. In particular, it advances the studies looking at the role of consumers' characteristics in online consumer value (e.g., Lee *et al.*, 2009; Maenpaa *et al*., 2008; Barrutia and Gilsanz, 2012) by showing the effect of knowledge miscalibration on consumer value. In fact, this study has found that in addition to price sensitivity, variety-seeking tendency, compulsive buying behaviour (Lee *et al.*, 2009), the number of experiences with the website (Maenpaa *et al*., 2008) and expertise (Barrutia and Gilsanz, 2012), knowledge miscalibration is also an important element in the way consumers evaluate online websites.

Seventhly, this research contributes to online consumer behaviour literature. In particular, it advances studies in the areas of online customer experience and technology acceptance models. These studies mainly look at the ways online interfaces can improve customer experiences and intentions to use those interfaces. For example, Chen and Dipp (2010), Kim *et al.* (2013) and van Noort *et al.* (2012) have all shown how website features can improve customer experience. Alternatively, Koufaris (2002) and Hoffman and Novak (2009) reveal that consumer skills is also a factor that directly affects experience and use intention, mainly by increasing the experience of flow. However, this PhD shows that factors associated with consumers (i.e., knowledge miscalibration in this research) impact different dimensions of experience such as efficiency, excellence, play and aesthetics. Therefore, it is suggested that an interactive view of the online behaviour of consumers is presented where consumers' subjective and objective knowledge interacts with online features, leading to experience, value and use intentions.

Eighthly, this PhD conceptually and empirically distinguishes between overconfidence and underconfidence. It has been shown that these two types of knowledge

miscalibration have different consequences and in some cases might have different effects on consumer value dimensions (e.g., on efficiency perceived value). In previous studies (e.g., Hadar *et al.*, 2013; Hansen and Thomsen, 2013; Kidwell *et al.*, 2008; Pillai and Hofacker, 2007; Puligadda *et al.*, 2010), knowledge miscalibration has been studied as a single phenomenon with similar consequences for both overconfidence and underconfidence. In particular, Study 2 is the first attempt to manipulate underconfidence in addition to overconfidence. In fact, the small amount of empirical research in psychology and decision sciences that has experimentally investigated knowledge miscalibration has tended to focus solely on overconfidence (Gonzalez-Vallejo and Bonham, 2007; Ryvkin *et al.*, 2012; Sieck and Arkes, 2005).

Finally, as a methodological contribution, this study extends the understanding of knowledge miscalibration through an experimental study and compares the results with the findings of an initial covariance-based study. Similar to Study 1 of this PhD, previous studies in the consumer behaviour domain have measured subjective and objective knowledge in order to examine knowledge miscalibration (e.g., Hadar *et al.*, 2013; Hansen and Thomsen, 2013; Kidwell *et al.*, 2008; Pillai and Hofacker, 2007; Puligadda *et al.*, 2010). To the best of the researcher's knowledge, this work is the first in consumer research to experimentally document the consequences of knowledge miscalibration. In particular, the experimental study performed maximises the internal validity of the results.

7.3 MANAGARIAL IMPLICATIONS

Previous research has shown that providing consumers with training helps them have a better experience of a product by utilising more benefits, which in many cases leads to greater satisfaction and positive post-purchase intentions (Hennig-Thurau, 2000). This study suggests that companies also benefit from investing in consumer learning because of its effect on overconfidence, underconfidence and eventually on experiences in use. Study 2 demonstrates that providing consumers with simple textual information (i.e., enhanced calibration feedback) has a significant impact on consumer value. This PhD encourages companies to generate mechanisms for measuring consumers' knowledge and to provide consumers with such information in order to reduce their knowledge

miscalibration, which will lead to a higher level of perceived value. For example, an online retailer such as amazon.com can offer an application to its consumers where they can evaluate their knowledge so as to reduce their knowledge miscalibration. Such an application would not only create a context for further engagement and enjoyment, but also indirectly improve consumer value through reducing knowledge miscalibration.

In particular, in online settings websites can be designed in a way that reduces knowledge miscalibration. Websites can be designed in an interactive and intelligent way to respond to incorrect actions by consumers and provide them with the correct information to reduce knowledge miscalibration. For example, if a consumer thinks Smart Watches are in the watch category and searches for them in the watch category on a retailer website, they can be informed that Smart Watches are in the electronic category (in addition to automatically transferring them to the electronic category). Indeed, websites can also have an educational role in addition to a service provider role.

The findings of this research highlight the importance of knowledge miscalibration in the adoption behaviour of new products. Existing studies mainly show consumer skills (including consumer knowledge) as a determinant of new product adoption intention (e.g., Koufaris, 2002). Therefore, companies aim to increase consumer skills in order to improve new production adoption rates. However, companies are often only are able to subjectively improve consumer skills (or consumer subjective knowledge) through advertisements and other communication strategies. This research shows that an increase in subjective knowledge without a similar improvement in objective knowledge leads to overconfidence, which negatively influences consumer value and potentially future use intentions. Therefore, this PhD suggests that companies should aim to improve consumer skills objectively through educational mechanisms. As an example, Apple shops should promote new Apple products by encouraging consumers to engage with new products and actually use them before the product is purchased.

Overall, many promotional strategies are designed to persuade consumers to purchase a product or service. Some of these strategies result in knowledge miscalibration, for instance, exaggerated advertising claims (Cowley, 2006). As demonstrated here, such strategies can indirectly influence consumption experiences through the impact that knowledge miscalibration subsequently has on consumer value. For instance, an

advertisement enhancing overconfidence in order to increase sales can indirectly lead to a lack of perceived consumer value in the stage of product or service use. Therefore, an important implication is that companies with an interest in the consumer journey beyond the purchasing decision step should avoid creating miscalibration through their sales claims in order to minimise the risk of diminished consumer value.

The results of this research can also help companies in specific contexts to improve their marketing strategies. In particular, the results support the conceptualisation of three main consequences of knowledge miscalibration: high and low expectation, suboptimal and superoptimal allocation of resources, and acting presumptuously and timidly. Any of these consequences may be more important in specific contexts. For instance, Study 2 did not support the effect of underconfidence on play, potentially as a result of the study being conducted in a new context with existing challenging tasks that reduced the chance of underconfident consumers acting timidly. Therefore, in specific contexts, the negative consequences of overconfidence and underconfidence may be removed. For example, where superoptimal allocation of resources is a positive consequence (e.g., where excessive resources are available, such as exercising to lose weight, or where superoptimal allocation of resources is needed, such as meditation), underconfidence can play a positive role or at least has no negative effect on the consumption effect.

Knowledge miscalibration can also be a basis for consumer segmentation. Marketers can segment their consumers based on different dimensions and levels of miscalibration and propose different value packages to them. These segments can be miscalibrated with high knowledge, miscalibrated with low knowledge, calibrated with low knowledge or calibrated with high knowledge (Burson, 2007). Based on this research, dividing consumers into the two segments of overconfident or underconfident is another possible method of categorising them as they have different requirements in terms of the use of products and services. For instance, companies could implement mechanisms encouraging underconfident consumers to seek more challenging consumption tasks, while they could have other mechanisms for overconfident consumers encouraging them to allocate more resources to the consumption task.

7.4 LIMITATIONS

The first limitation lies in the measurement of knowledge miscalibration. It can be argued that what is measured in the subjective probability paradigm is a proxy of the participants' knowledge miscalibration and not their exact knowledge miscalibration level. In this method, a representative number of questions are used to measure objective and subjective knowledge. Although these questions can reflect participants' objective and subjective knowledge, they are not measuring the participants' entire knowledge about the product or service. This error can be minimised if the number of questions increases. However, it is practically impossible to measure all aspects of consumer knowledge. For instance, in the amazon.com context, a large number of questions are required to measure knowledge about the location of information and relevant buttons for online purchasing. Therefore, similar to previous studies (e.g., Alba and Hutchinson, 2000; Hadar *et al.*, 2013; Hansen and Thomsen, 2013; Kidwell *et al.*, 2008; Pillai and Hofacker, 2007; Puligadda *et al.*, 2010), this research has measured consumer knowledge using a representative set of questions about knowledge.

The second limitation is to experimentally create pure accuracy in subjective knowledge. In other words, what is manipulated in Study 2 is the level of knowledge miscalibration; therefore, Study 2 compares knowledge miscalibration with a low level of knowledge miscalibration rather than the inexistence of knowledge miscalibration. The reason behind this is that providing enhanced calibration feedback does not guarantee that the participant will adjust her subjective knowledge to an accurate level. For instance, a participant may not believe in the feedback, or may believe in it but not able to accurately adjust her subjective knowledge. In their studies, Gonzalez-Vallejo and Bonham (2007) increase the possibility of accuracy in subjective knowledge by motivating participants through offering monetary awards and imposing punishments. However, they still show that some participants are not able to adjust their subjective knowledge. Furthermore, in this PhD monetary rewards and punishments could have had an impact on the dependent variable (i.e., consumer value) as well. Therefore, as with previous studies that manipulate knowledge miscalibration (e.g., Ryvkin *et al.*, 2012; Sieck and Arkes, 2005), this research has applied enhanced calibration feedback

to manipulate knowledge miscalibration and compared it with a low level of knowledge miscalibration.

Finally, following a critical realist view that reality exists in three domains of the empirical, actual and real (Bhaskar, 1998), in the two studies conducted there has been a chance that some non-observable causal mechanisms in the real domain have had an impact on the observable events in the study. The mixed method nature of this research has helped to explore some of these mechanisms by comparing the results of two studies. Furthermore, contextual factors have been rigorously considered in the interpretations and conceptualisation. However, the nature of the structure of reality implies further research is needed to account for the exploration and investigation of further mechanisms involved in constructing the relationship between knowledge miscalibration and consumer value. Some of these themes are suggested in the next section.

7.5 FURTHER RESEARCH

Further research can be summarised into four categories as represented in Table 45. Firstly, the moderators and mediators used in the conceptualisation phase need to be empirically investigated. Secondly, the emotional consequences of knowledge miscalibration should be empirically and conceptually investigated. Thirdly, further research can experimentally investigate the effect of knowledge miscalibration on consumer value in a context where consumer value is already shaped (i.e., a familiar context). Finally, the findings of existing research need to be experimentally investigated. These lines of further research are explained below.

Firstly, further research needs to look at the constructs mediating and moderating the effect of overconfidence and underconfidence on consumer value dimensions. In particular, this PhD has based the conceptualisation on three main consequences of knowledge miscalibration: the level of resources allocated to consumption, the people act during the consumption, and the extent of setting outcome expectations. These consequences, along with other constructs including consumers' performance in the consumption tasks, perceived potential benefits and risks, flow and fluency have all

been used in this study to theorise the effect of overconfidence and underconfidence on consumer value. They all need to be further empirically investigated.

Table 45: Suggested Further Research

Line of Further Research	Specific Concepts/Contexts Applied in the Literature	Specific Concepts/Contexts Applied in this PhD	Specific Concepts not being Applied
Factors Mediating and Moderating the Effect of Knowledge Miscalibration on Consumer Value	Expectation, Resource allocation, Action strategy	Performance, Perceived risk and benefit, Flow, Fluency	NA
Emotional Consequences of Knowledge Miscalibration	Frustration	NA	Anger, Fear, Sadness, Shame, Contentment, Happiness
Experimental Investigation of the same Relationship in a Familiar Context	NA	amazon.com	Any other context where consumers regularly use the product or service
Experimental Investigation of the Existing Studies	Food Choice, Investment Choice, Product Choice	NA	NA

Secondly, further research is needed to investigate the emotional consequences of overconfidence and underconfidence in order to gain a better understanding of the role of knowledge miscalibration in use. Pillai and Hofacker (2007) theorise that calibration decreases frustration with websites. Therefore, other positive and negative emotions such as anger, fear, sadness, shame, contentment and happiness (Laros and Steenkamp, 2005) can be examined in future studies as the consequences of overconfidence and underconfidence in use.

Thirdly, further studies could experimentally probe the potential effects of knowledge miscalibration in terms of changing the perception of consumer value. This PhD has primarily examined the effect of overconfidence and underconfidence on the perception of consumer value; in particular, in Study 2 consumers were faced with a new context (i.e., a new consumption task) and the results showed how overconfident and

underconfident consumers initially shape their perceptions of consumer value. A relevant question for further research would therefore be: even if a consumer has already used a product or service and has an established perception of its value, could this perception of value be changed due to a further reduction in knowledge miscalibration?

Finally, further research is required to use the experimental method and investigate the effect of knowledge miscalibration on purchasing decision quality. The findings of this PhD question the results of previous co-variance based studies (e.g., Alba and Hutchinson, 2000; Kidwell *et al.*, 2008; Hadar *et al.*, 2013; Hansen and Thomsen, 2013). The common claim of these studies is that knowledge miscalibration has a negative effect on the quality of decisions (i.e., mainly purchasing decisions). As has been shown, the correlation observed in co-variance based studies could be due to the reciprocal relationship between independent and dependent variables, or a third variable might have an effect on both independent and dependent variables. Therefore, the negative association between knowledge miscalibration and purchasing decision quality could be due to the effect of previous bad decisions on knowledge miscalibration (and not the effect of knowledge miscalibration on decisions). For instance, it can be explained that consumers who purchase products which are not appropriate for them do not have the opportunity to learn about their level of objective knowledge and therefore are miscalibrated. Therefore, further experimental investigation into the effects of knowledge miscalibration on purchasing decision quality is encouraged. Furthermore, previous studies have not made a distinction between overconfidence and underconfidence to demonstrate its effect on outcomes such as the quality of purchase decisions (e.g., Alba and Hutchinson, 2000; Kidwell *et al.*, 2007). As demonstrated here, there is merit in assessing such results by experimentally manipulating knowledge miscalibration and distinguishing between overconfidence and underconfidence.

7.6 CONCLUSION

This PhD aims to investigate the effect of knowledge miscalibration on consumer value. It conceptually and empirically investigates the effect of overconfidence and underconfidence (i.e., two form of knowledge miscalibration) on four dimensions of

consumer value: efficiency, excellence, play and aesthetics. Two studies, covariance-based and experimental, show that overconfidence and underconfidence negatively influence consumers' perceived value.

The research contributes to both consumer knowledge and consumer value literature, extending the knowledge miscalibration literature into the use stage of consumption and also shedding light on the way consumer value is shaped. The PhD distinguishes between overconfidence and underconfidence and investigates them through a covariance-based study and an experimental study.

The research shows that consumers' cognitive structure is a determinant of their experience of using a product or service. This provides an opportunity for companies to improve their consumers' perceived value through increasing their self-awareness. Furthermore, this research can help companies to understand their customers better and have an awareness of the ways through which they can improve their customers' experience.

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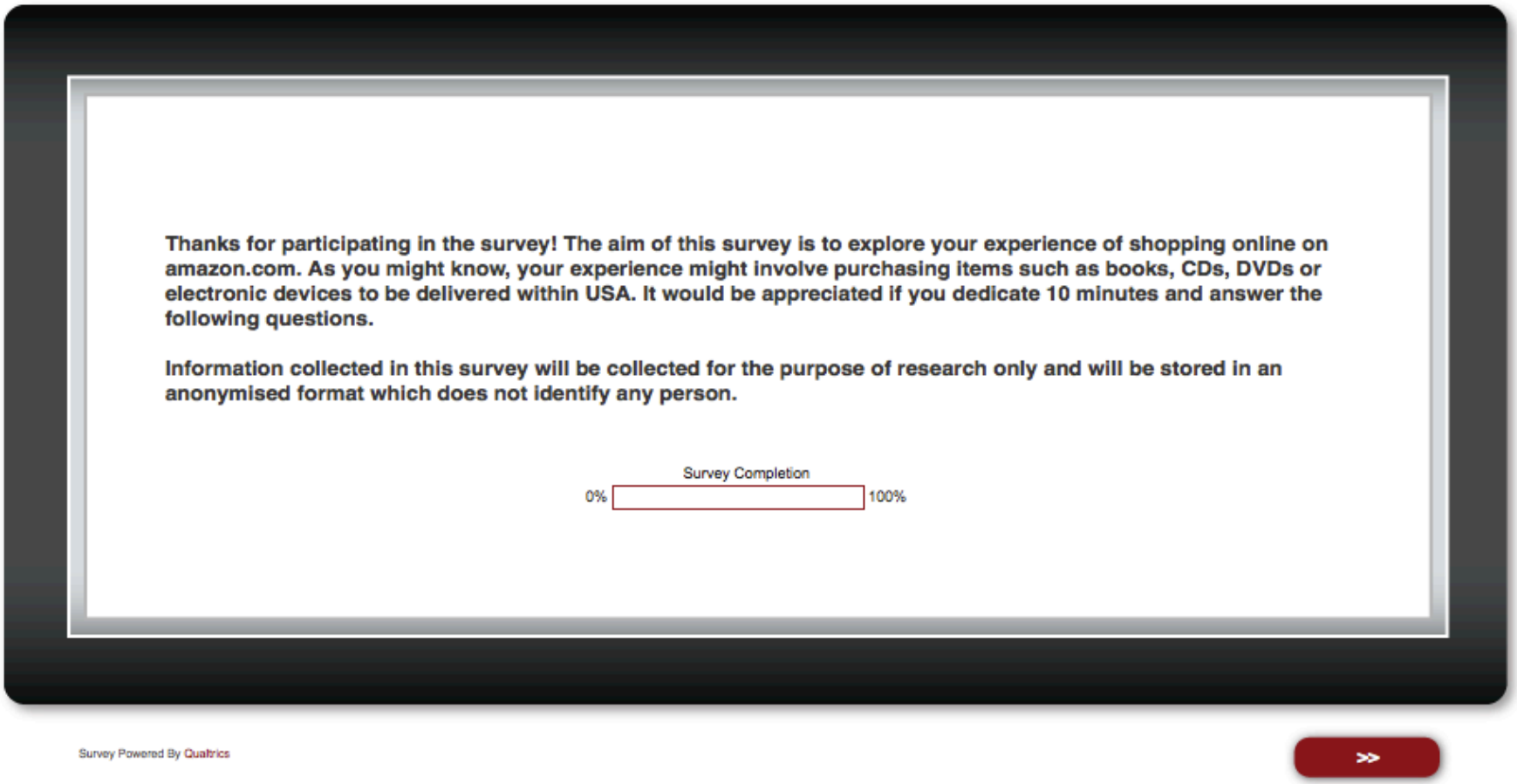
APPENDIX A: STUDY 1 – QUALTRICS OVERVIEW



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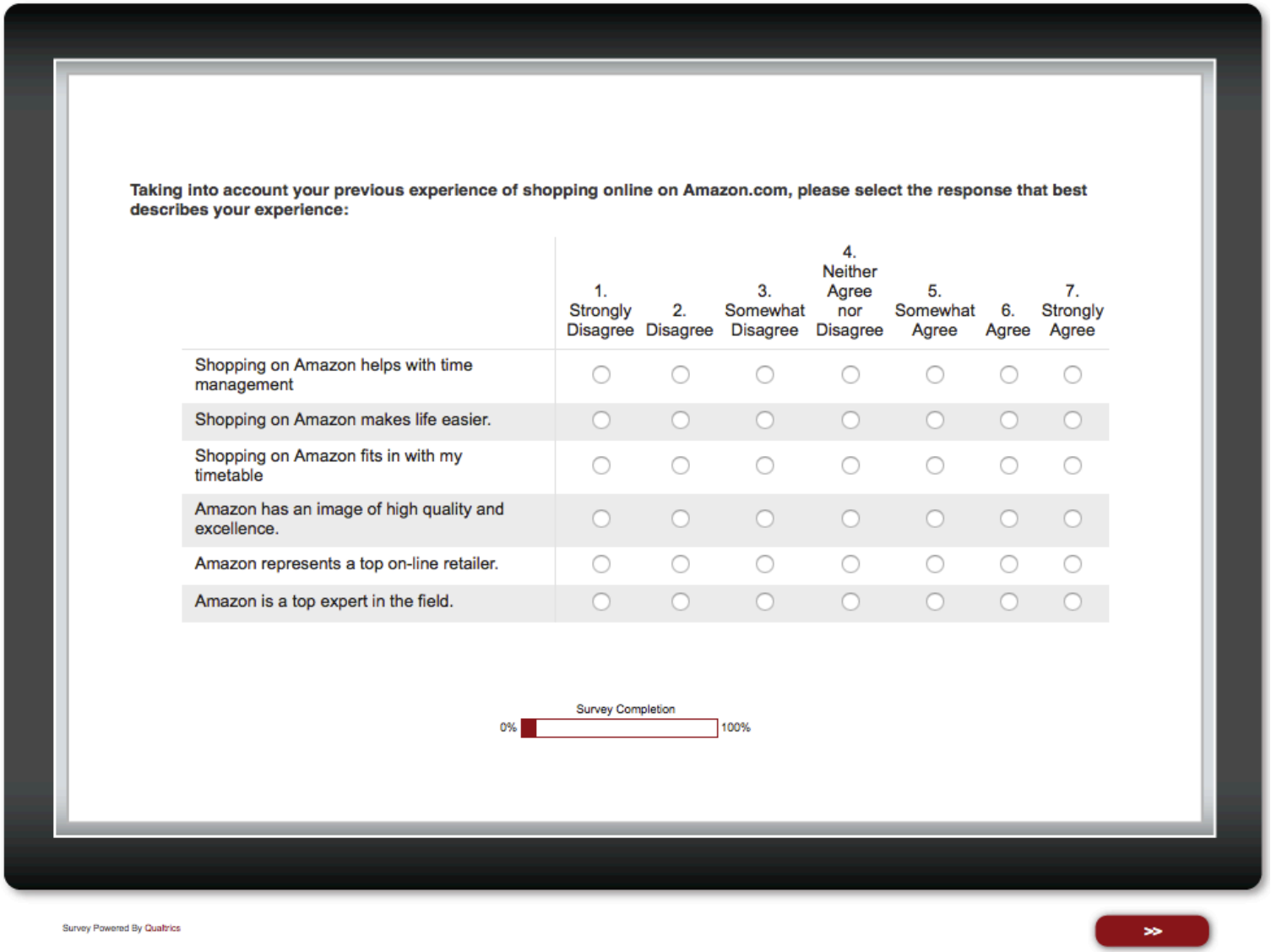
Taking into account your previous experience of shopping online on Amazon.com, please select the response that best describes your experience:
1. Strongly Disagree
2. Disagree
3. Somewhat Disagree
4. Neither Agree nor Disagree
5. Somewhat Agree
6. Agree
7. Strongly Agree
Shopping on Amazon helps with time management
Shopping on Amazon makes life easier.
Shopping on Amazon fits in with my timetable
Amazon has an image of high quality and excellence.
Amazon represents a top on-line retailer.
Amazon is a top expert in the field.
Survey Completion
0%
100%
Survey Powered By Qualtrics
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Please continue with the following statements:

	1. Strongly Disagree	2. Disagree	3. Somewhat Disagree	4. Neither Agree nor Disagree	5. Somewhat Agree	6. Agree	7. Strongly Agree
Amazon has a pleasant appearance.	○	○	○	○	○	○	○
Amazon has an attractive appearance.	○	○	○	○	○	○	○
Amazon has an effective design.	○	○	○	○	○	○	○
Shopping on Amazon is entertaining	○	○	○	○	○	○	○
I gain pleasure from shopping on Amazon.	○	○	○	○	○	○	○
I shop on Amazon to obtain a pleasant sensation.	○	○	○	○	○	○	○

Survey Completion

0% 100%

Survey Powered By Qualtrics

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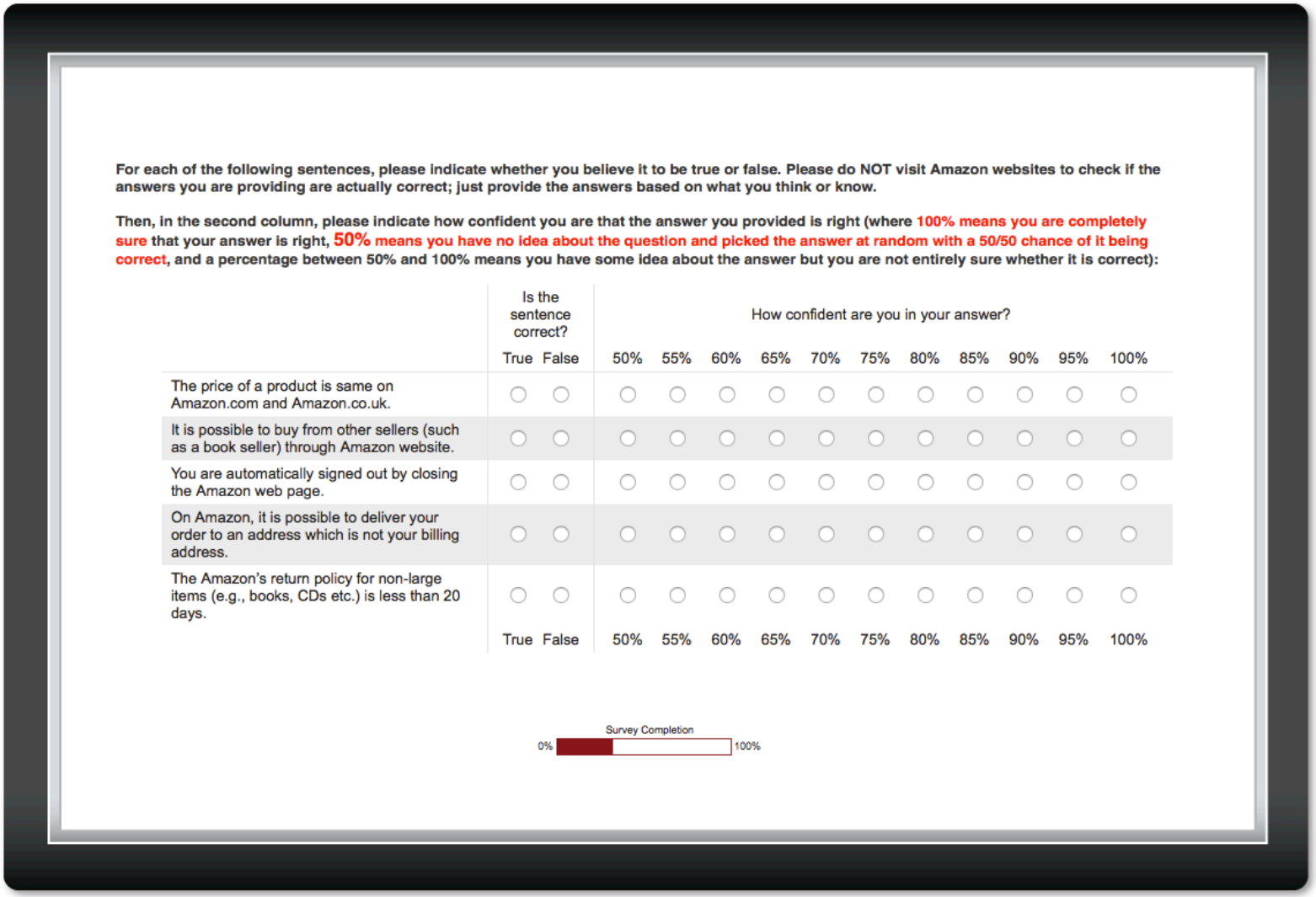

For each of the following sentences, please indicate whether you believe it to be true or false. Please do NOT visit Amazon websites to check if the answers you are providing are actually correct; just provide the answers based on what you think or know.

Then, in the second column, please indicate how confident you are that the answer you provided is right (where 100% means you are completely sure that your answer is right, 50% means you have no idea about the question and picked the answer at random with a 50/50 chance of it being correct, and a percentage between 50% and 100% means you have some idea about the answer but you are not entirely sure whether it is correct):

	Is the sentence correct?		How confident are you in your answer?										
	True	False	50%	55%	60%	65%	70%	75%	80%	85%	90%	95%	100%
The price of a product is same on Amazon.com and Amazon.co.uk.	○	○	○	○	○	○	○	○	○	○	○	○	○
It is possible to buy from other sellers (such as a book seller) through Amazon website.	○	○	○	○	○	○	○	○	○	○	○	○	○
You are automatically signed out by closing the Amazon web page.	○	○	○	○	○	○	○	○	○	○	○	○	○
On Amazon, it is possible to deliver your order to an address which is not your billing address.	○	○	○	○	○	○	○	○	○	○	○	○	○
The Amazon's return policy for non-large items (e.g., books, CDs etc.) is less than 20 days.	○	○	○	○	○	○	○	○	○	○	○	○	○
	True	False	50%	55%	60%	65%	70%	75%	80%	85%	90%	95%	100%

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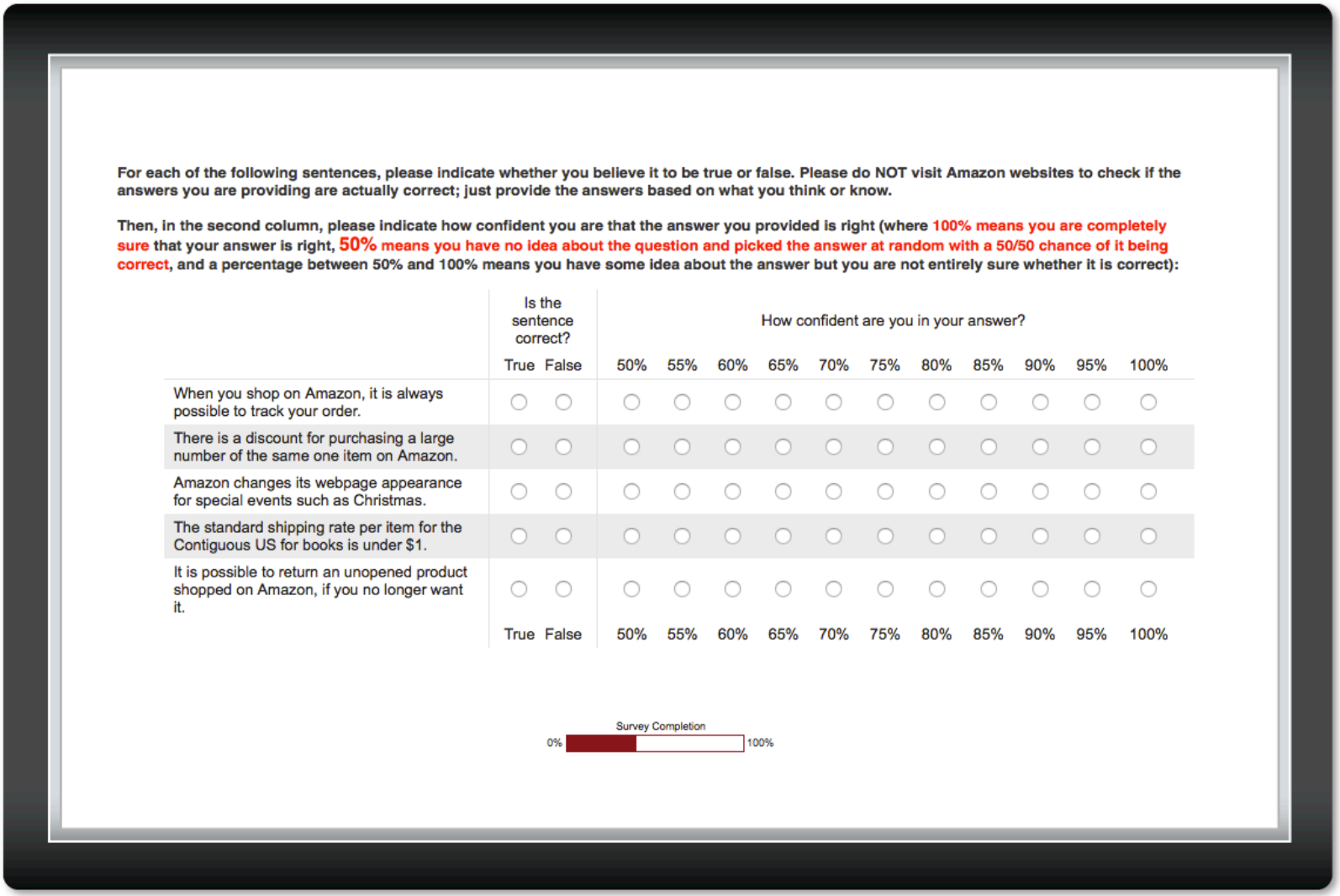

For each of the following sentences, please indicate whether you believe it to be true or false. Please do NOT visit Amazon websites to check if the answers you are providing are actually correct; just provide the answers based on what you think or know.

Then, in the second column, please indicate how confident you are that the answer you provided is right (where 100% means you are completely sure that your answer is right, 50% means you have no idea about the question and picked the answer at random with a 50/50 chance of it being correct, and a percentage between 50% and 100% means you have some idea about the answer but you are not entirely sure whether it is correct):

	Is the sentence correct?		How confident are you in your answer?										
	True	False	50%	55%	60%	65%	70%	75%	80%	85%	90%	95%	100%
When you shop on Amazon, it is always possible to track your order.	○	○	○	○	○	○	○	○	○	○	○	○	○
There is a discount for purchasing a large number of the same one item on Amazon.	○	○	○	○	○	○	○	○	○	○	○	○	○
Amazon changes its webpage appearance for special events such as Christmas.	○	○	○	○	○	○	○	○	○	○	○	○	○
The standard shipping rate per item for the Contiguous US for books is under $1.	○	○	○	○	○	○	○	○	○	○	○	○	○
It is possible to return an unopened product shopped on Amazon, if you no longer want it.	○	○	○	○	○	○	○	○	○	○	○	○	○
	True	False	50%	55%	60%	65%	70%	75%	80%	85%	90%	95%	100%

Survey Completion

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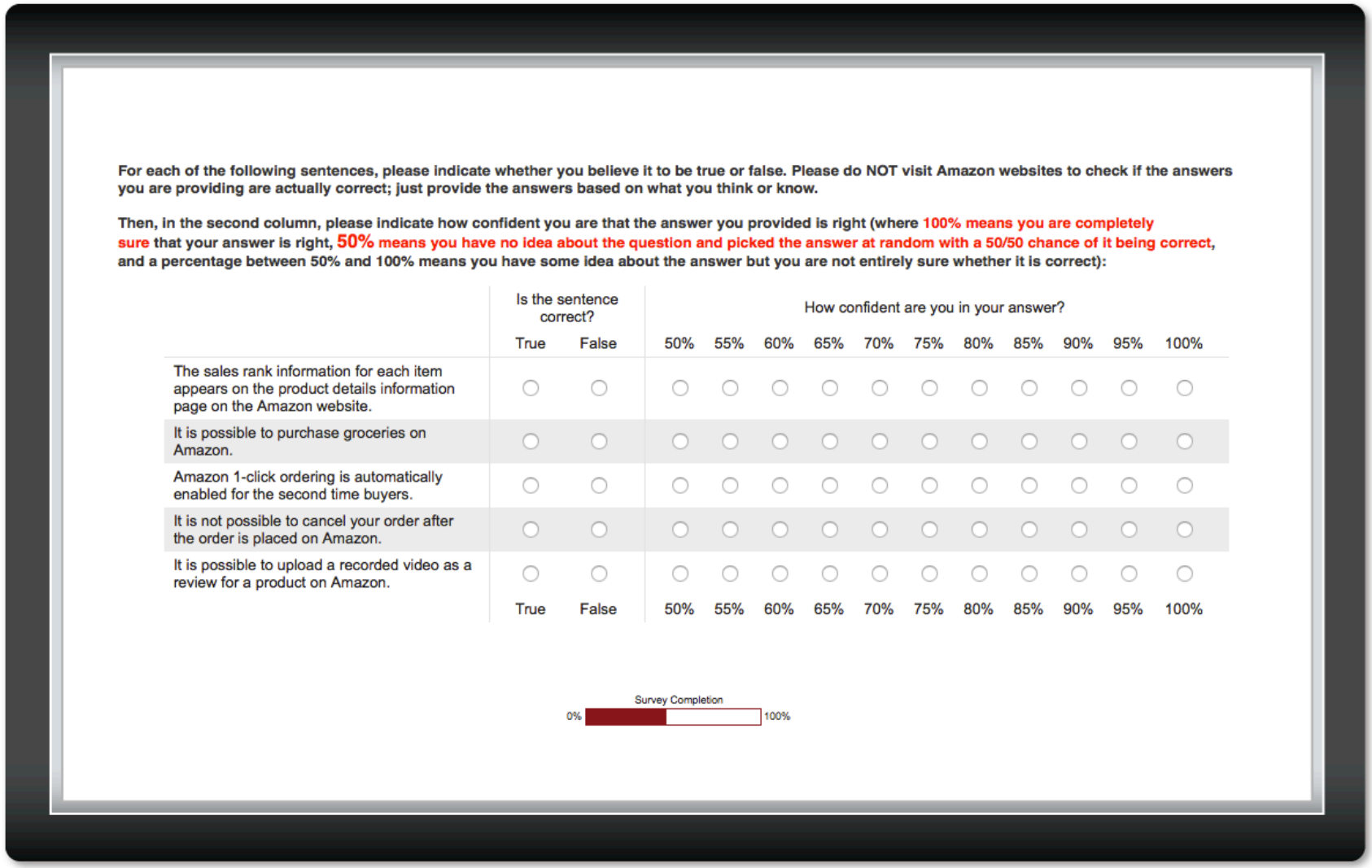

For each of the following sentences, please indicate whether you believe it to be true or false. Please do NOT visit Amazon websites to check if the answers you are providing are actually correct; just provide the answers based on what you think or know.

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	Is the sentence correct?		How confident are you in your answer?										
	True	False	50%	55%	60%	65%	70%	75%	80%	85%	90%	95%	100%
The sales rank information for each item appears on the product details information page on the Amazon website.	○	○	○	○	○	○	○	○	○	○	○	○	○
It is possible to purchase groceries on Amazon.	○	○	○	○	○	○	○	○	○	○	○	○	○
Amazon 1-click ordering is automatically enabled for the second time buyers.	○	○	○	○	○	○	○	○	○	○	○	○	○
It is not possible to cancel your order after the order is placed on Amazon.	○	○	○	○	○	○	○	○	○	○	○	○	○
It is possible to upload a recorded video as a review for a product on Amazon.	○	○	○	○	○	○	○	○	○	○	○	○	○
	True	False	50%	55%	60%	65%	70%	75%	80%	85%	90%	95%	100%

Survey Completion

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Survey Powered By Qualtrics

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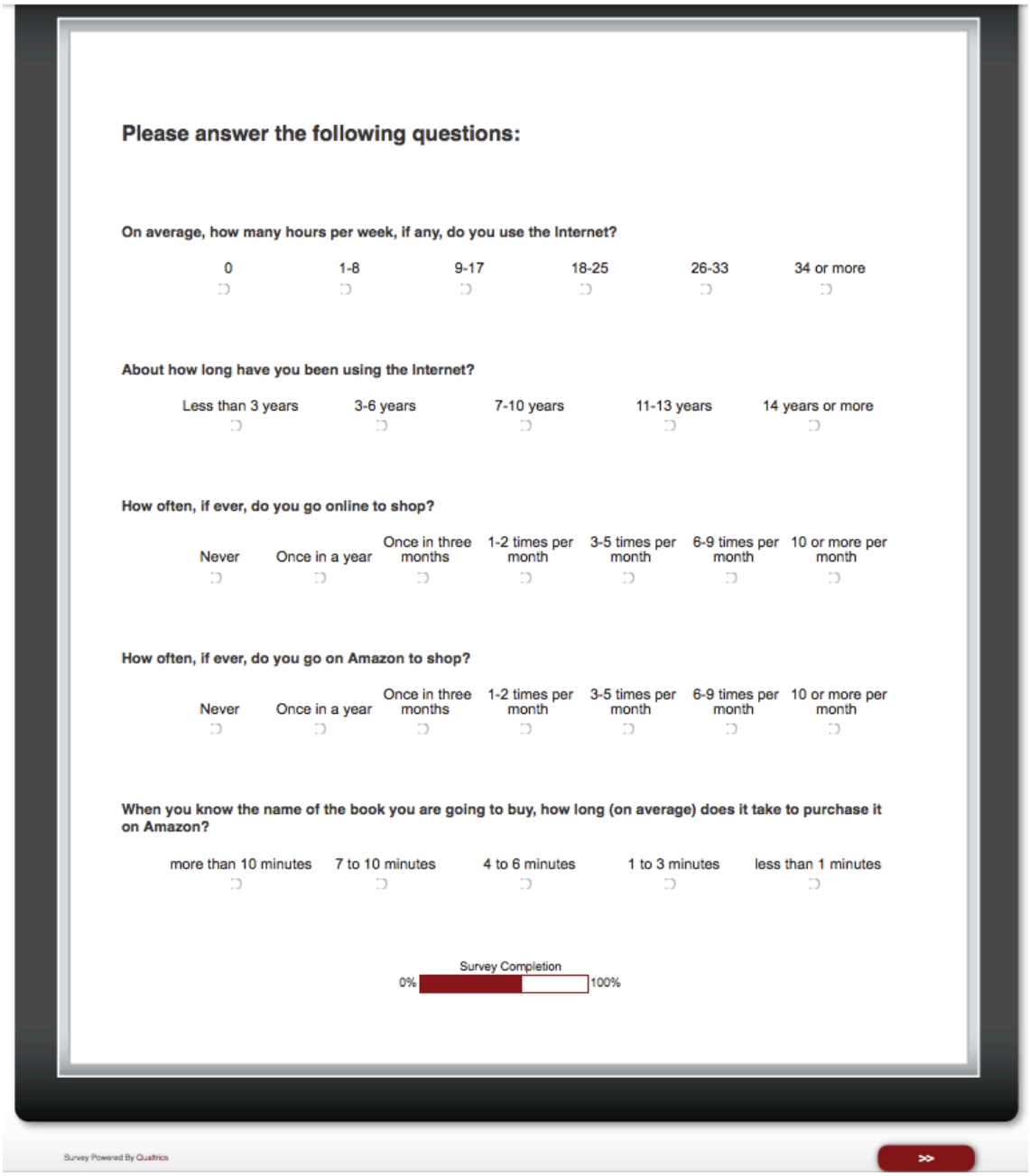
Please answer the following questions:
On average, how many hours per week, if any, do you use the Internet?
0
1-8
9-17
18-25
26-33
34 or more
About how long have you been using the Internet?
Less than 3 years
3-6 years
7-10 years
11-13 years
14 years or more
How often, if ever, do you go online to shop?
Never
Once in a year
Once in three months
1-2 times per month
3-5 times per month
6-9 times per month
10 or more per month
How often, if ever, do you go on Amazon to shop?
Never
Once in a year
Once in three months
1-2 times per month
3-5 times per month
6-9 times per month
10 or more per month
When you know the name of the book you are going to buy, how long (on average) does it take to purchase it on Amazon?
more than 10 minutes
7 to 10 minutes
4 to 6 minutes
1 to 3 minutes
less than 1 minutes
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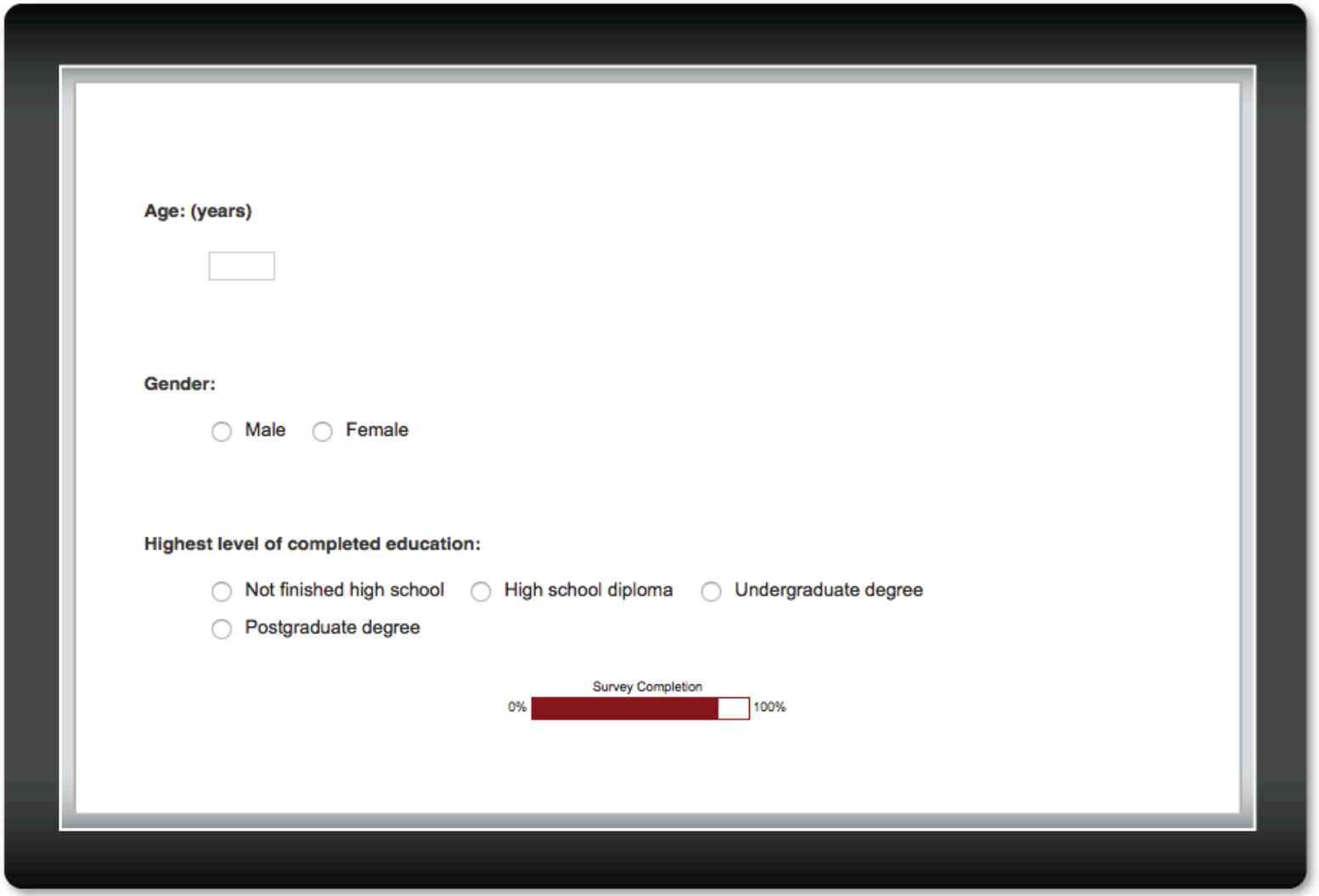
Age: (years)
Gender:
Male
Female
Highest level of completed education:
Not finished high school
High school diploma
Undergraduate degree
Postgraduate degree
Survey Completion
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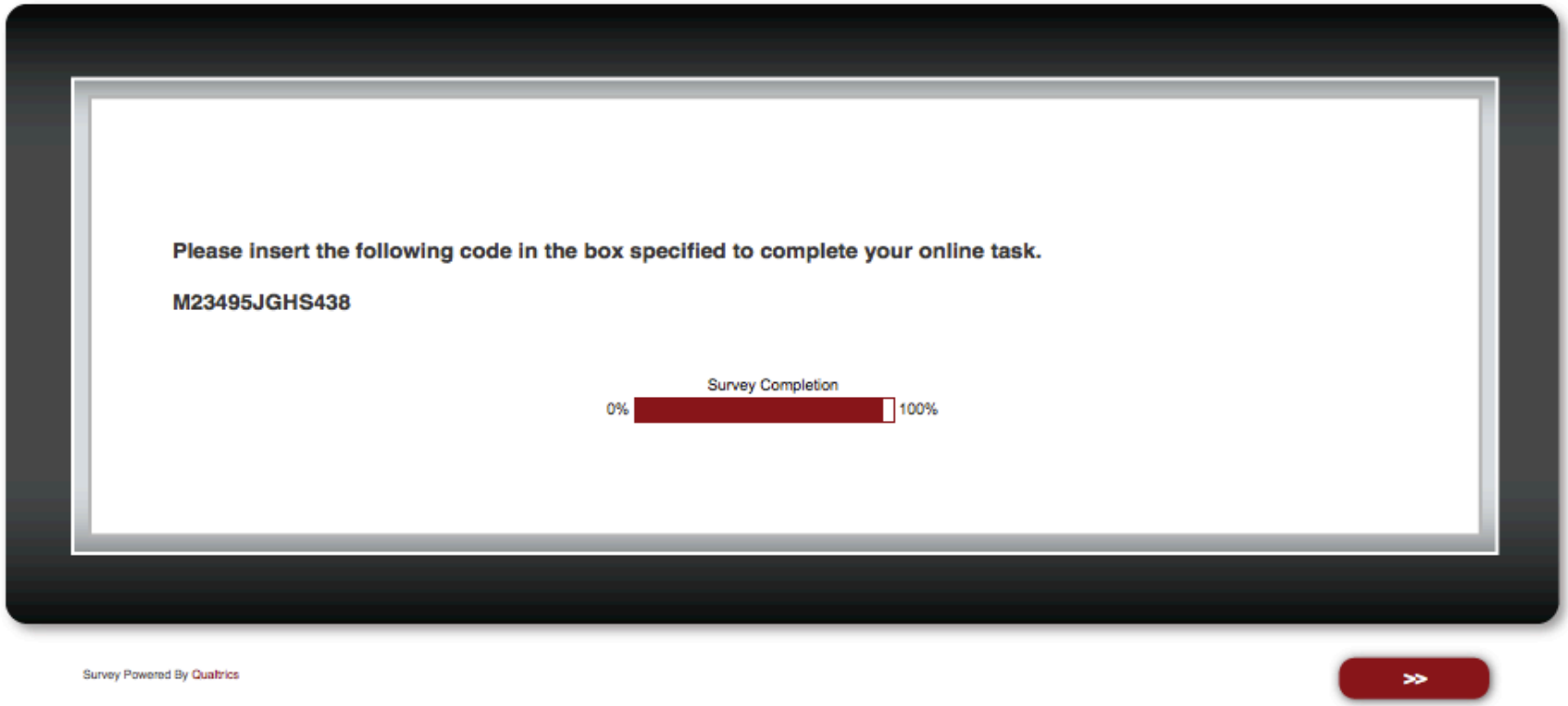
Please insert the following code in the box specified to complete your online task.
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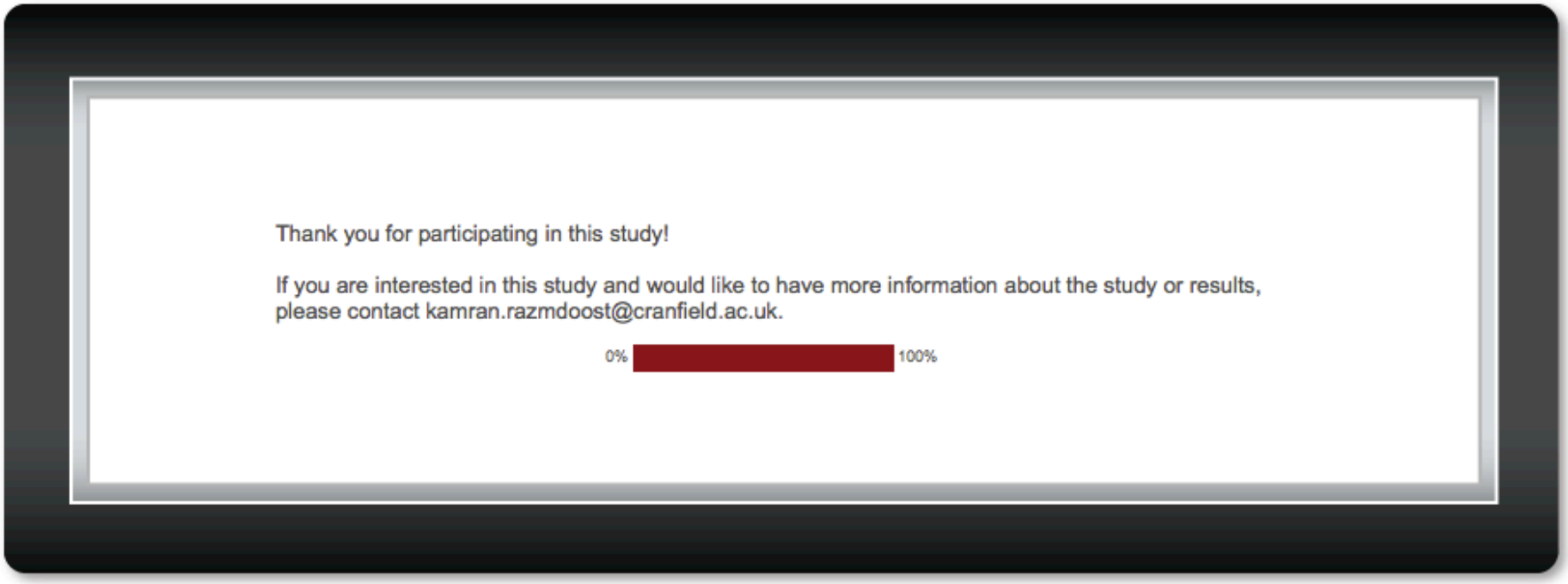
Thank you for participating in this study!
If you are interested in this study and would like to have more information about the study or results, please contact kamran.razmdoost@cranfield.ac.uk.
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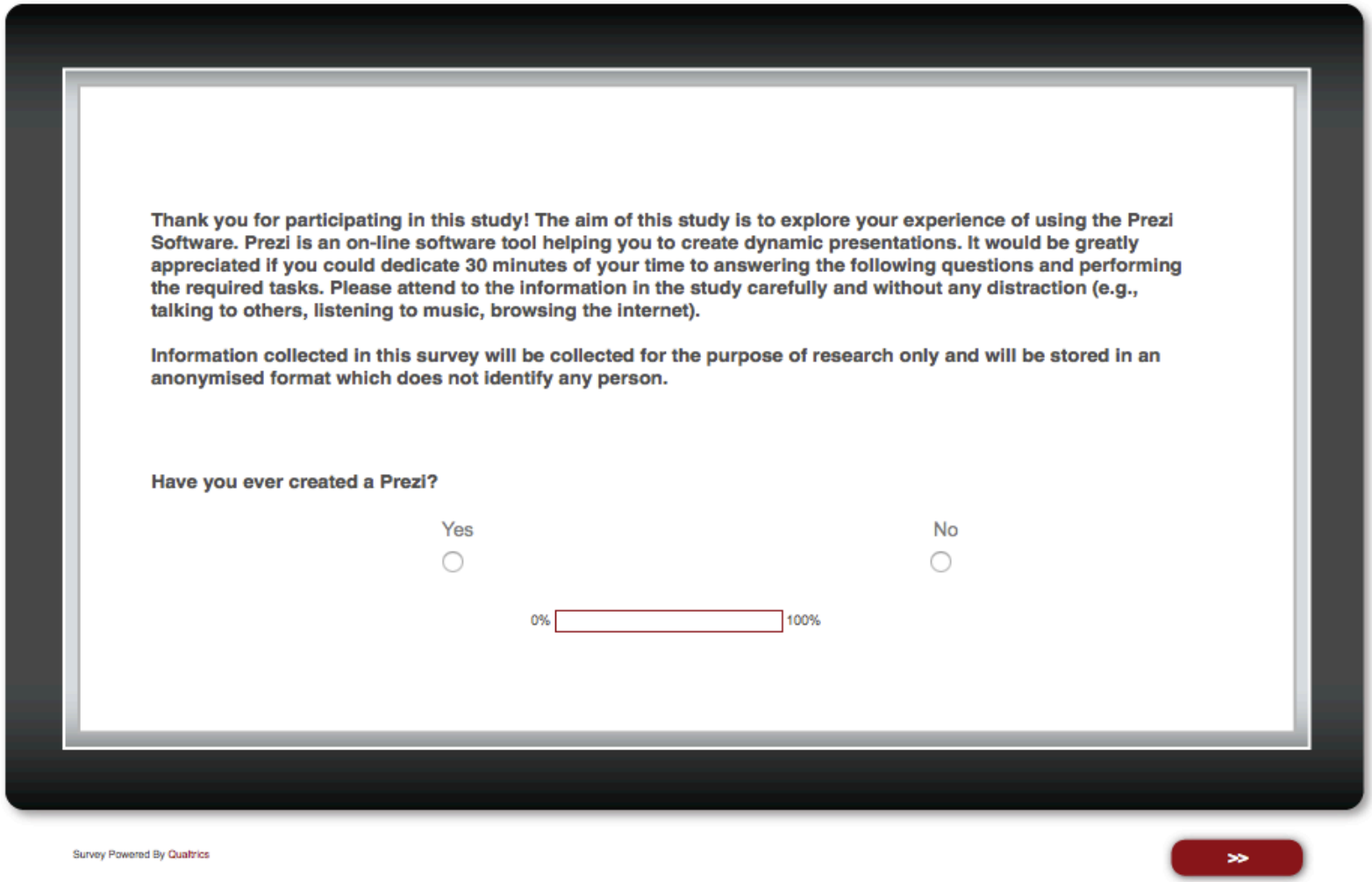
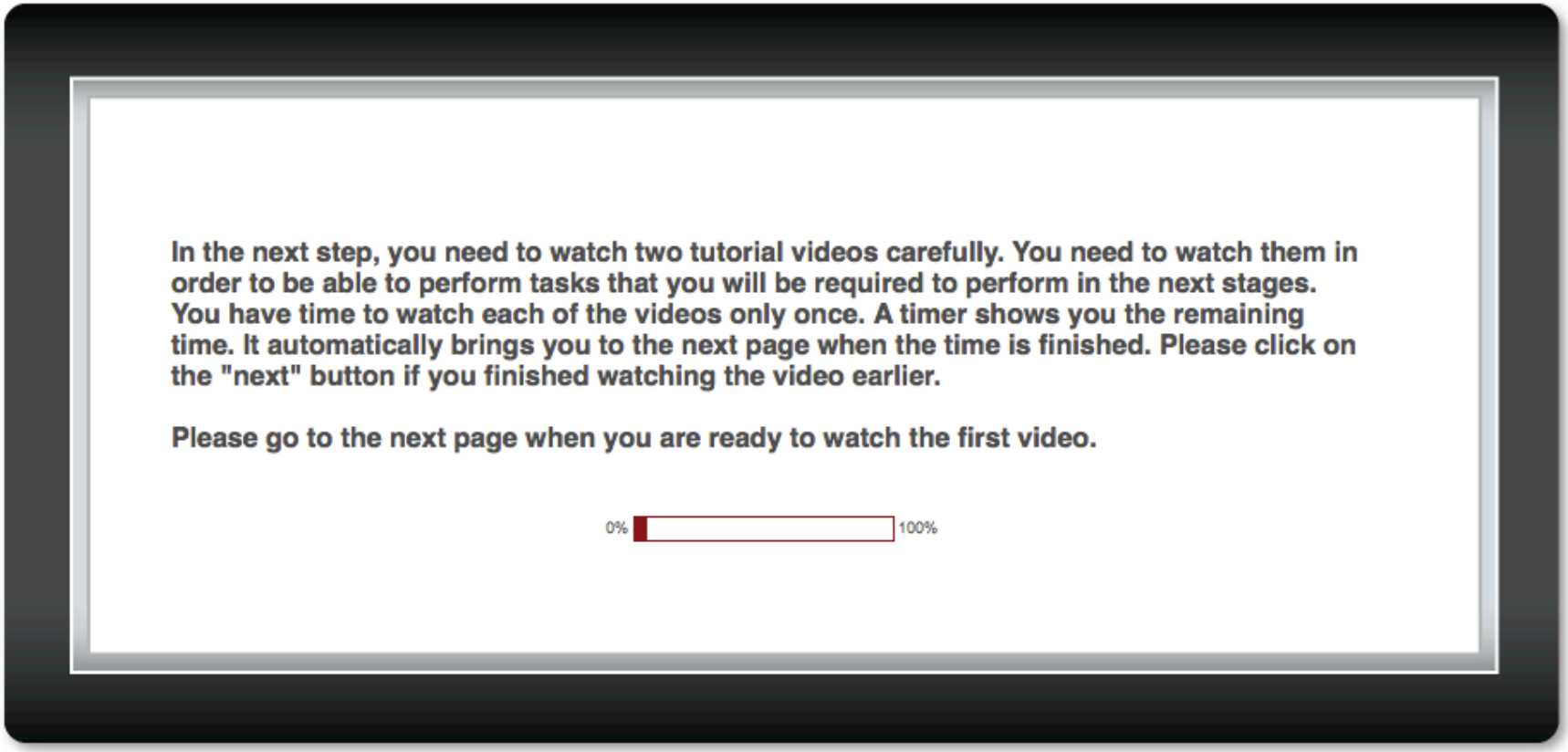
APPENDIX B: STUDY 2 – QUALTRICS OVERVIEW




In the next step, you need to watch two tutorial videos carefully. You need to watch them in order to be able to perform tasks that you will be required to perform in the next stages. You have time to watch each of the videos only once. A timer shows you the remaining time. It automatically brings you to the next page when the time is finished. Please click on the "next" button if you finished watching the video earlier.
Please go to the next page when you are ready to watch the first video.
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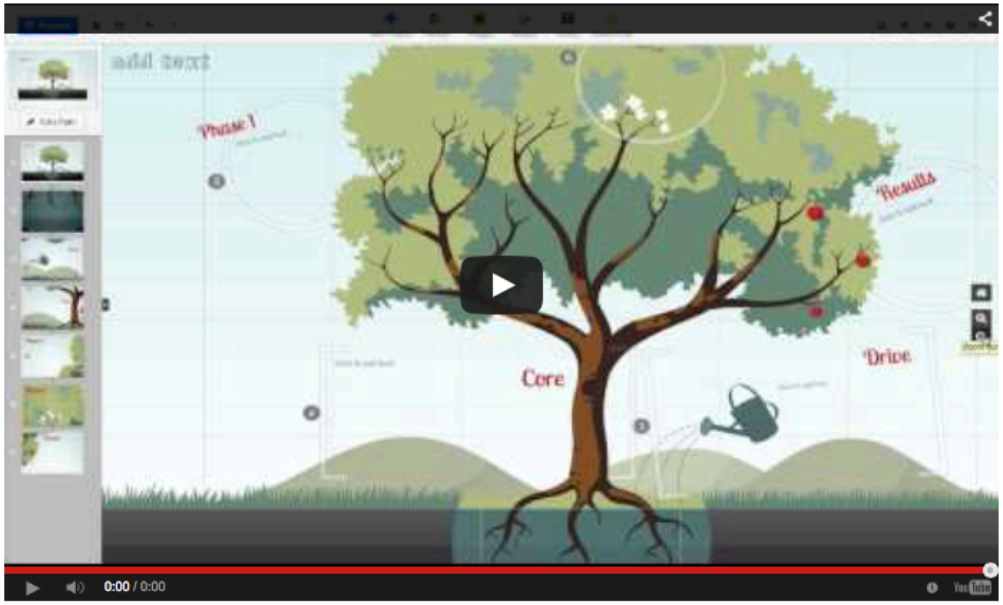
VIDEO NUMBER 1



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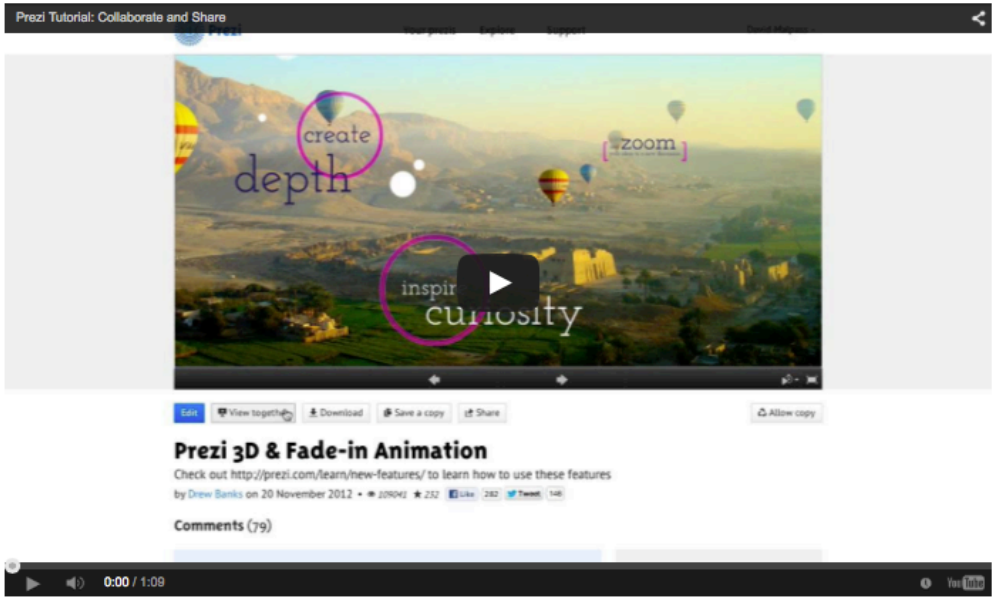
VIDEO NUMBER 2



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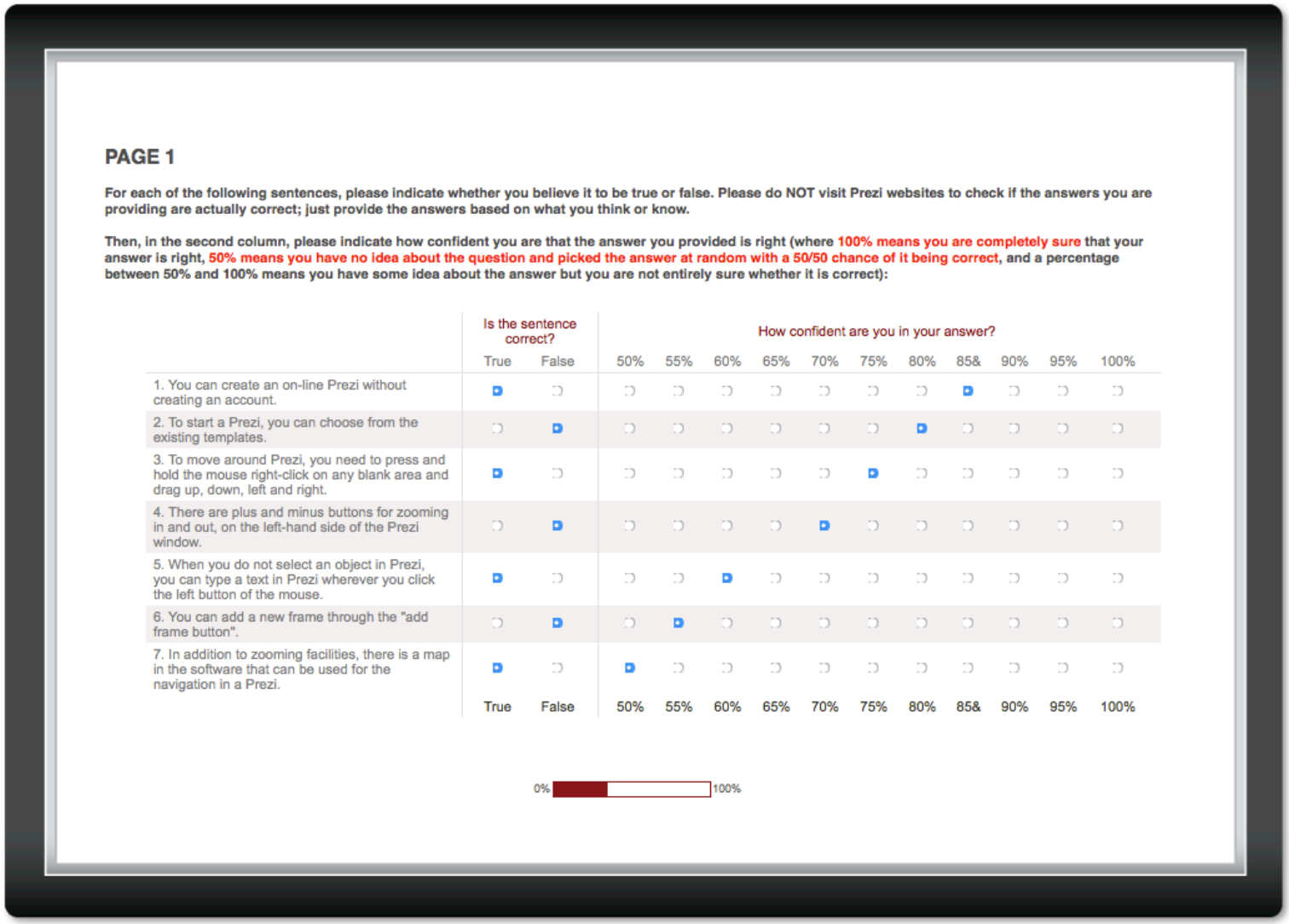

PAGE 1

For each of the following sentences, please indicate whether you believe it to be true or false. Please do NOT visit Prezi websites to check if the answers you are providing are actually correct; just provide the answers based on what you think or know.

Then, in the second column, please indicate how confident you are that the answer you provided is right (where 100% means you are completely sure that your answer is right, 50% means you have no idea about the question and picked the answer at random with a 50/50 chance of it being correct, and a percentage between 50% and 100% means you have some idea about the answer but you are not entirely sure whether it is correct):

	Is the sentence correct?		How confident are you in your answer?										
	True	False	50%	55%	60%	65%	70%	75%	80%	85&	90%	95%	100%
1. You can create an on-line Prezi without creating an account.	●	○	○	○	○	○	○	○	○	●	○	○	○
2. To start a Prezi, you can choose from the existing templates.	○	●	○	○	○	○	○	○	●	○	○	○	○
3. To move around Prezi, you need to press and hold the mouse right-click on any blank area and drag up, down, left and right.	●	○	○	○	○	○	○	●	○	○	○	○	○
4. There are plus and minus buttons for zooming in and out, on the left-hand side of the Prezi window.	○	●	○	○	○	○	●	○	○	○	○	○	○
5. When you do not select an object in Prezi, you can type a text in Prezi wherever you click the left button of the mouse.	●	○	○	○	●	○	○	○	○	○	○	○	○
6. You can add a new frame through the "add frame button".	○	●	○	●	○	○	○	○	○	○	○	○	○
7. In addition to zooming facilities, there is a map in the software that can be used for the navigation in a Prezi.	●	○	●	○	○	○	○	○	○	○	○	○	○
	True	False	50%	55%	60%	65%	70%	75%	80%	85&	90%	95%	100%

0% 100%

Survey Powered By Qualtrics

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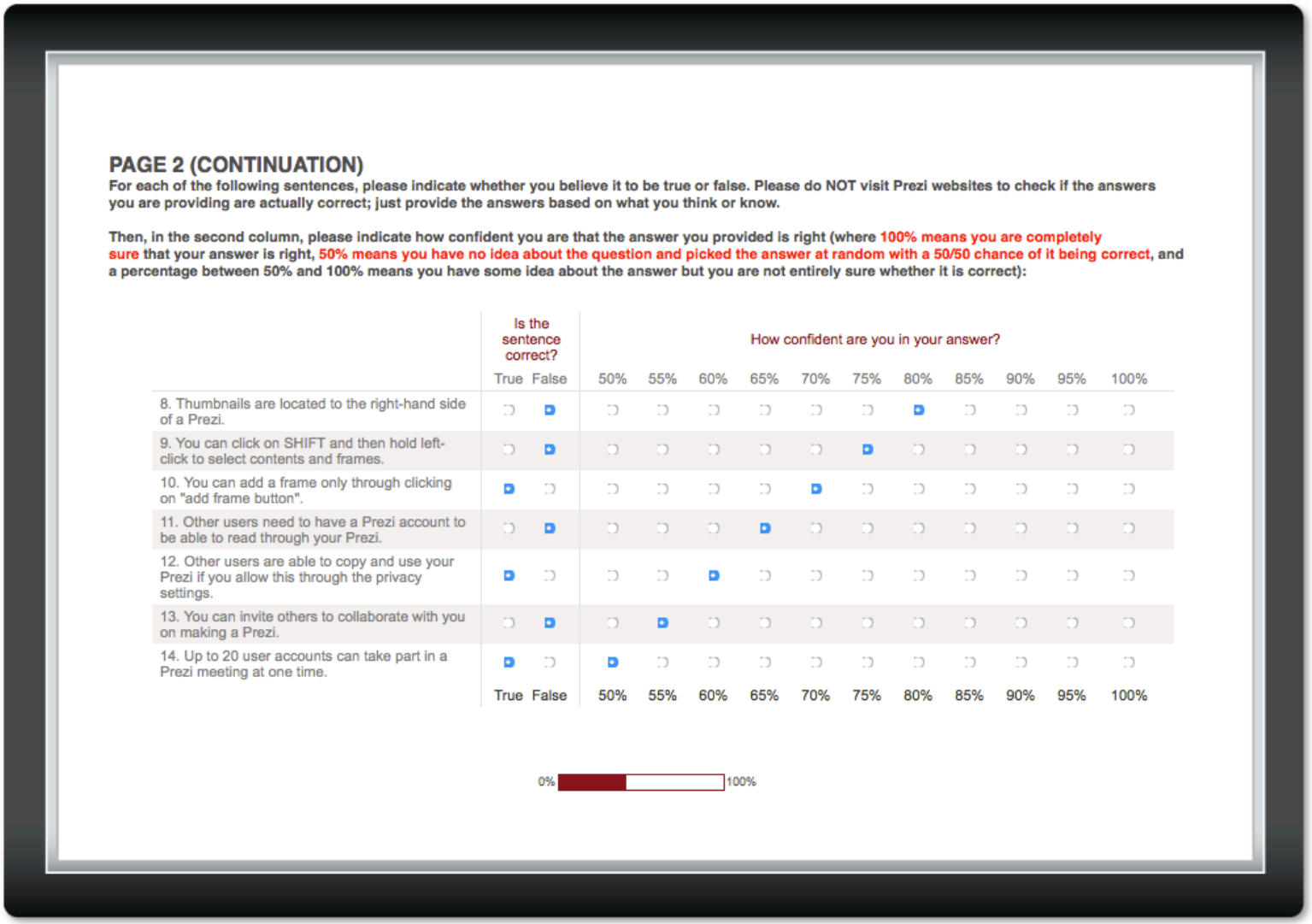

PAGE 2 (CONTINUATION)

For each of the following sentences, please indicate whether you believe it to be true or false. Please do NOT visit Prezi websites to check if the answers you are providing are actually correct; just provide the answers based on what you think or know.

Then, in the second column, please indicate how confident you are that the answer you provided is right (where 100% means you are completely sure that your answer is right, 50% means you have no idea about the question and picked the answer at random with a 50/50 chance of it being correct, and a percentage between 50% and 100% means you have some idea about the answer but you are not entirely sure whether it is correct):

	Is the sentence correct?		How confident are you in your answer?										
	True	False	50%	55%	60%	65%	70%	75%	80%	85%	90%	95%	100%
8. Thumbnails are located to the right-hand side of a Prezi.	○	●	○	○	○	○	○	○	●	○	○	○	○
9. You can click on SHIFT and then hold left-click to select contents and frames.	○	●	○	○	○	○	○	●	○	○	○	○	○
10. You can add a frame only through clicking on "add frame button".	●	○	○	○	○	○	●	○	○	○	○	○	○
11. Other users need to have a Prezi account to be able to read through your Prezi.	○	●	○	○	○	●	○	○	○	○	○	○	○
12. Other users are able to copy and use your Prezi if you allow this through the privacy settings.	●	○	○	○	●	○	○	○	○	○	○	○	○
13. You can invite others to collaborate with you on making a Prezi.	○	●	○	●	○	○	○	○	○	○	○	○	○
14. Up to 20 user accounts can take part in a Prezi meeting at one time.	●	○	●	○	○	○	○	○	○	○	○	○	○
	True	False	50%	55%	60%	65%	70%	75%	80%	85%	90%	95%	100%

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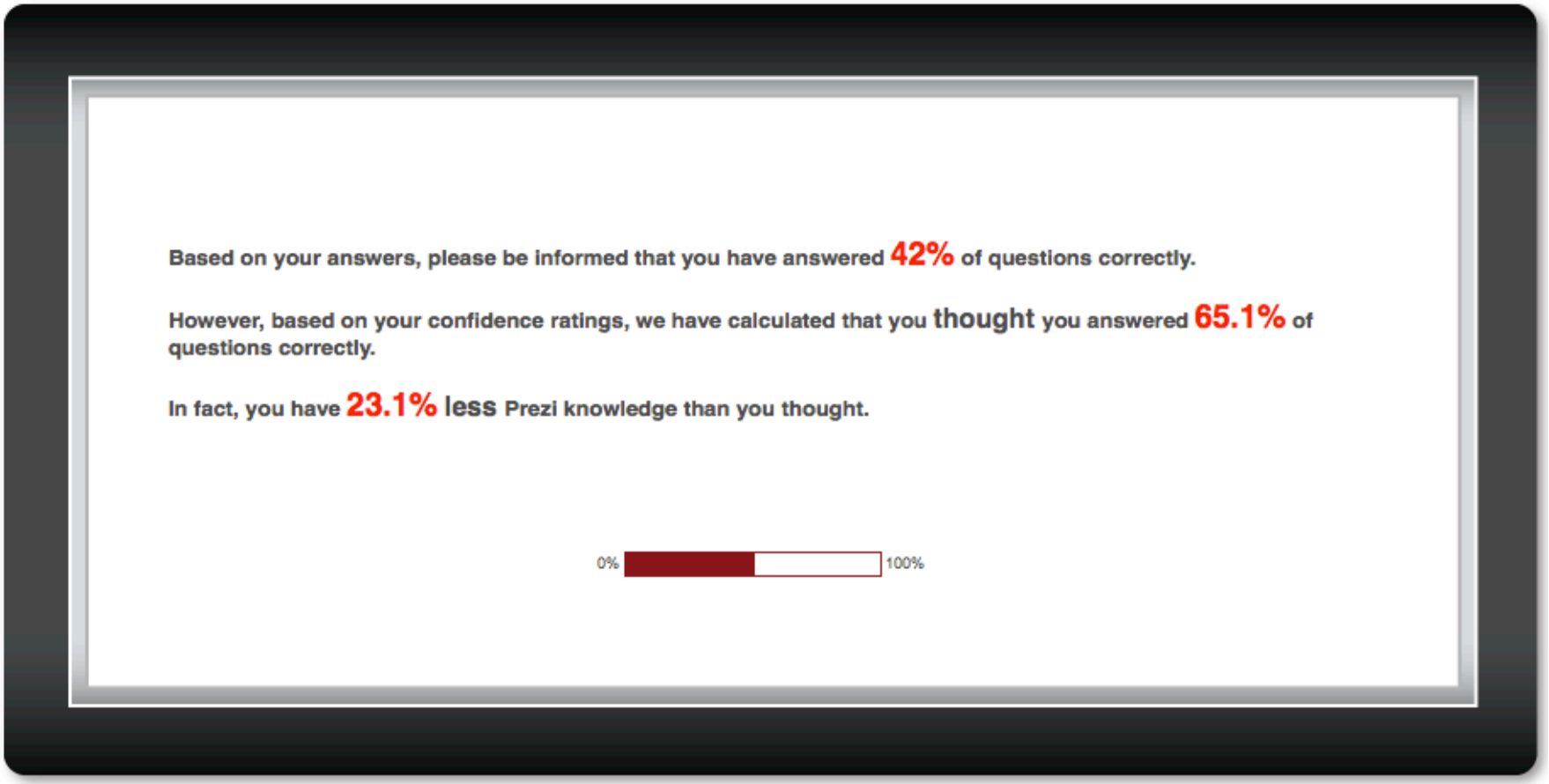

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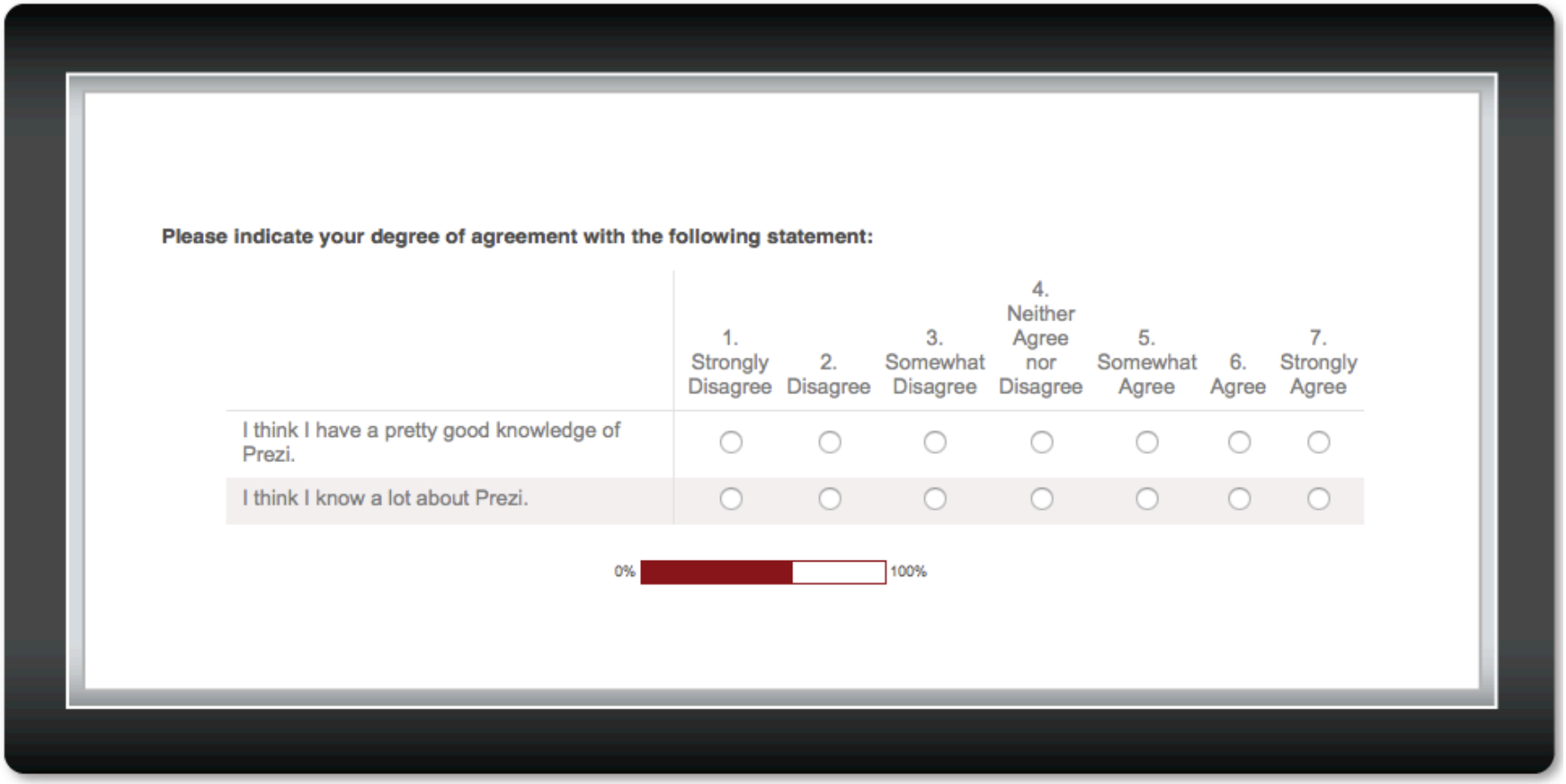
Please indicate your degree of agreement with the following statement:
1. Strongly Disagree
2. Disagree
3. Somewhat Disagree
4. Neither Agree nor Disagree
5. Somewhat Agree
6. Agree
7. Strongly Agree
I think I have a pretty good knowledge of Prezi.
I think I know a lot about Prezi.
0%
100%
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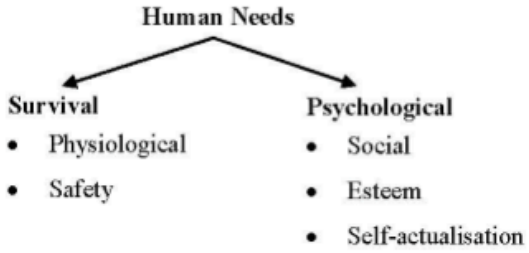
The next stage requires you to create a Prezi which explains the following graph in two or three slides. You are free to arrange your Prezi in any format you like. Be informed that there is no time limit for this step. Please share the link of your Prezi with us, after you have completed the task.



Click here to start (to start, create a Prezi account): *https://prezi.com/profile/registration/?license_type=PUBLIC*

When you are done, please paste the link of your Prezi here:

0% 100%

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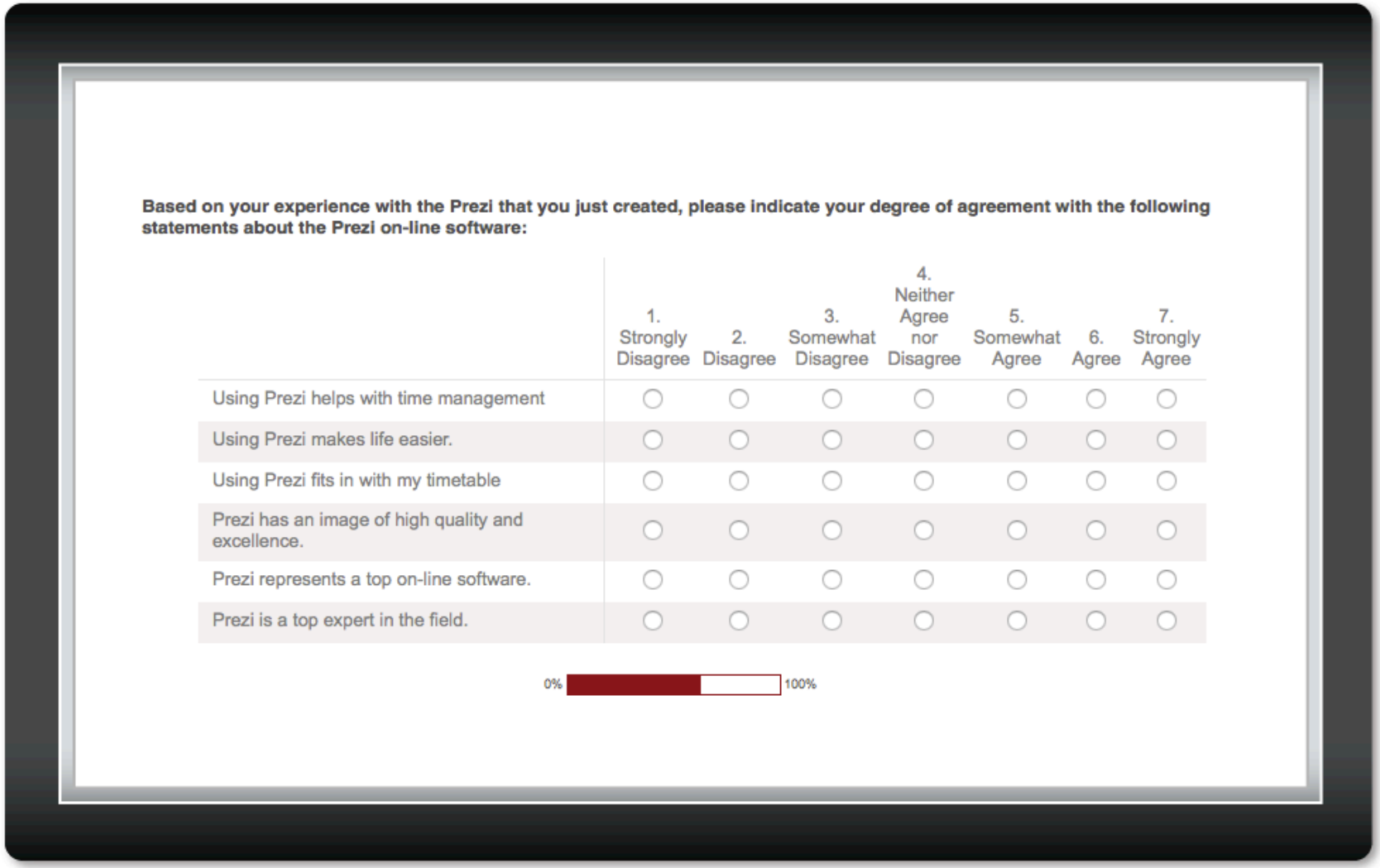
Based on your experience with the Prezi that you just created, please indicate your degree of agreement with the following statements about the Prezi on-line software:
1. Strongly Disagree
2. Disagree
3. Somewhat Disagree
4. Neither Agree nor Disagree
5. Somewhat Agree
6. Agree
7. Strongly Agree
Using Prezi helps with time management
Using Prezi makes life easier.
Using Prezi fits in with my timetable
Prezi has an image of high quality and excellence.
Prezi represents a top on-line software.
Prezi is a top expert in the field.
0%
100%
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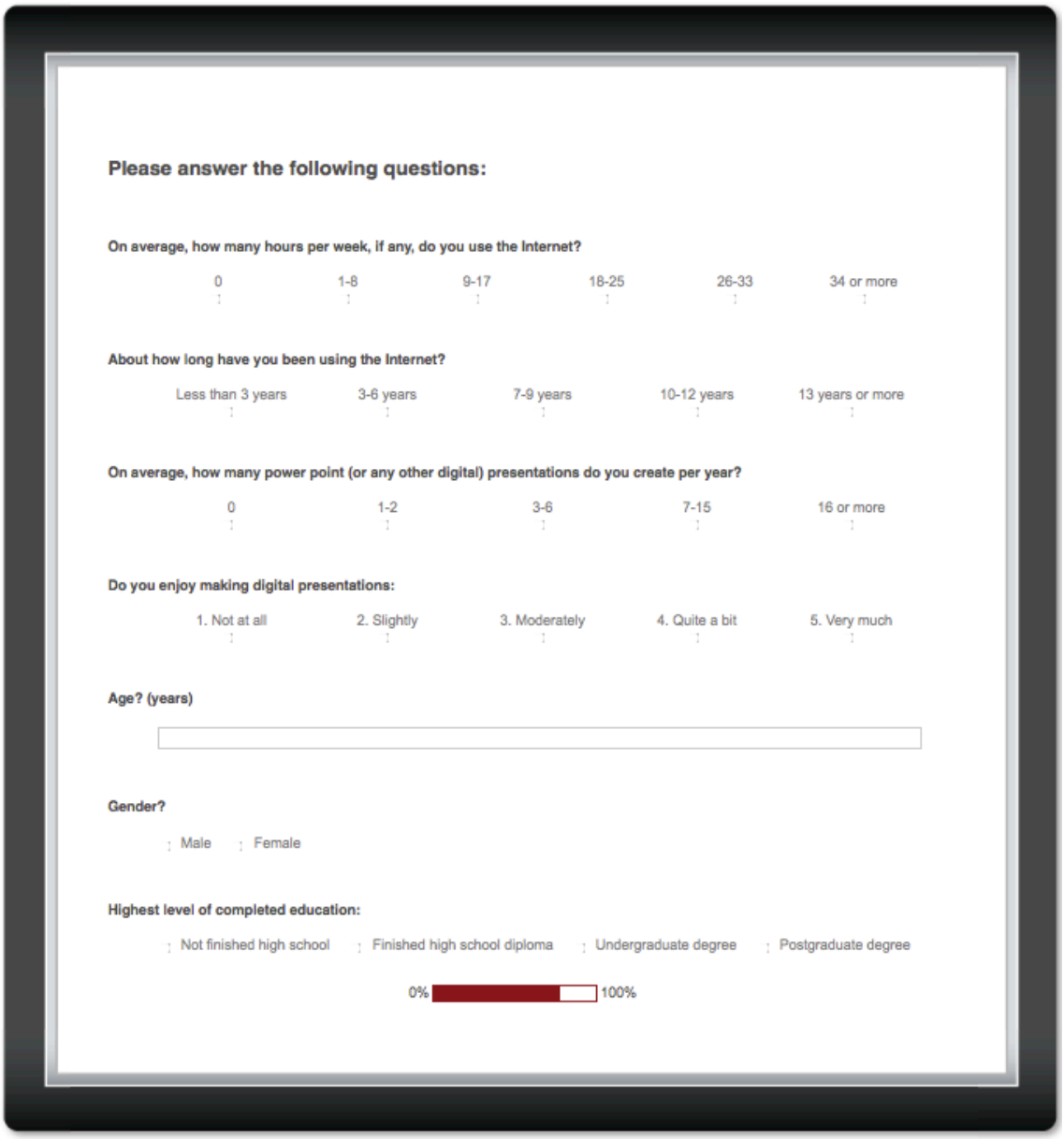
Please answer the following questions:
On average, how many hours per week, if any, do you use the Internet?
0
1-8
9-17
18-25
26-33
34 or more
About how long have you been using the Internet?
Less than 3 years
3-6 years
7-9 years
10-12 years
13 years or more
On average, how many power point (or any other digital) presentations do you create per year?
0
1-2
3-6
7-15
16 or more
Do you enjoy making digital presentations:
1. Not at all
2. Slightly
3. Moderately
4. Quite a bit
5. Very much
Age? (years)
Gender?
Male
Female
Highest level of completed education:
Not finished high school
Finished high school diploma
Undergraduate degree
Postgraduate degree
0%
100%
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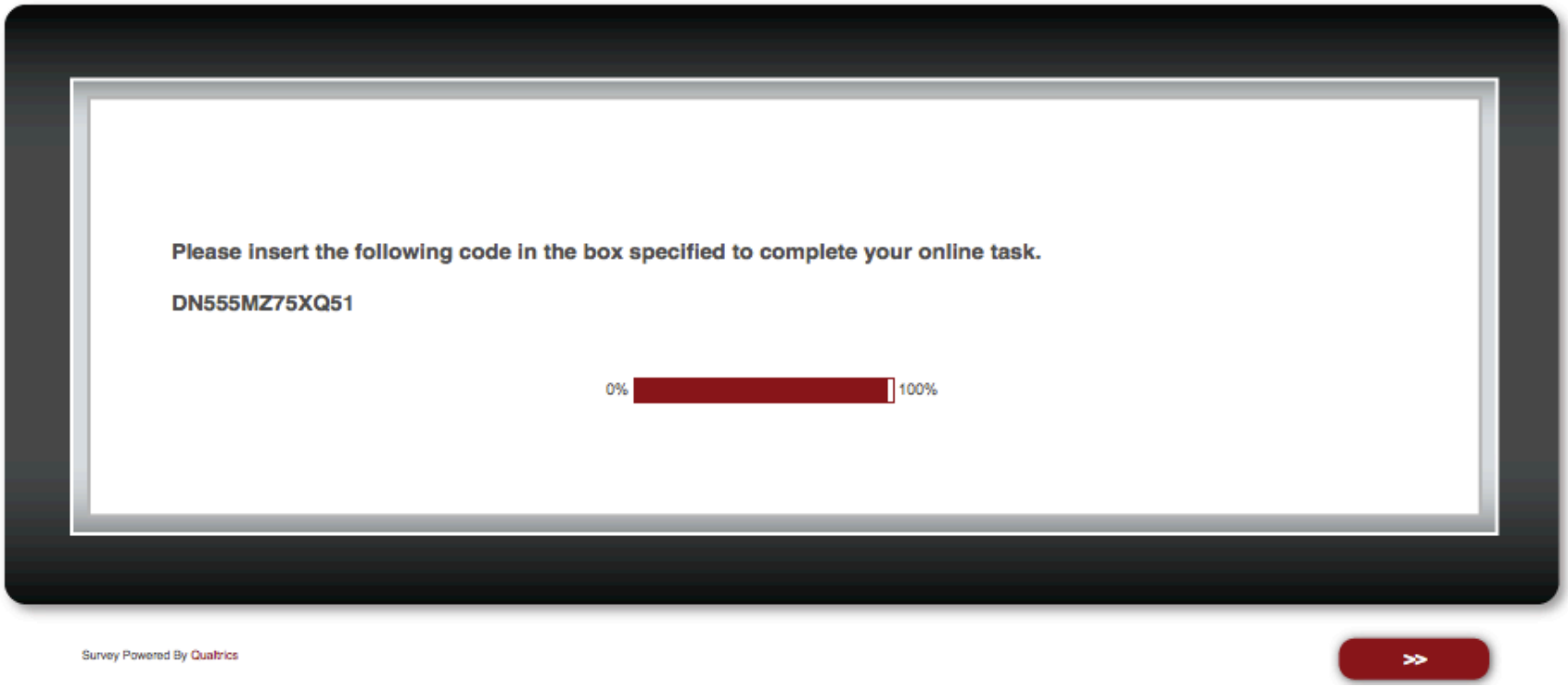
Please insert the following code in the box specified to complete your online task.
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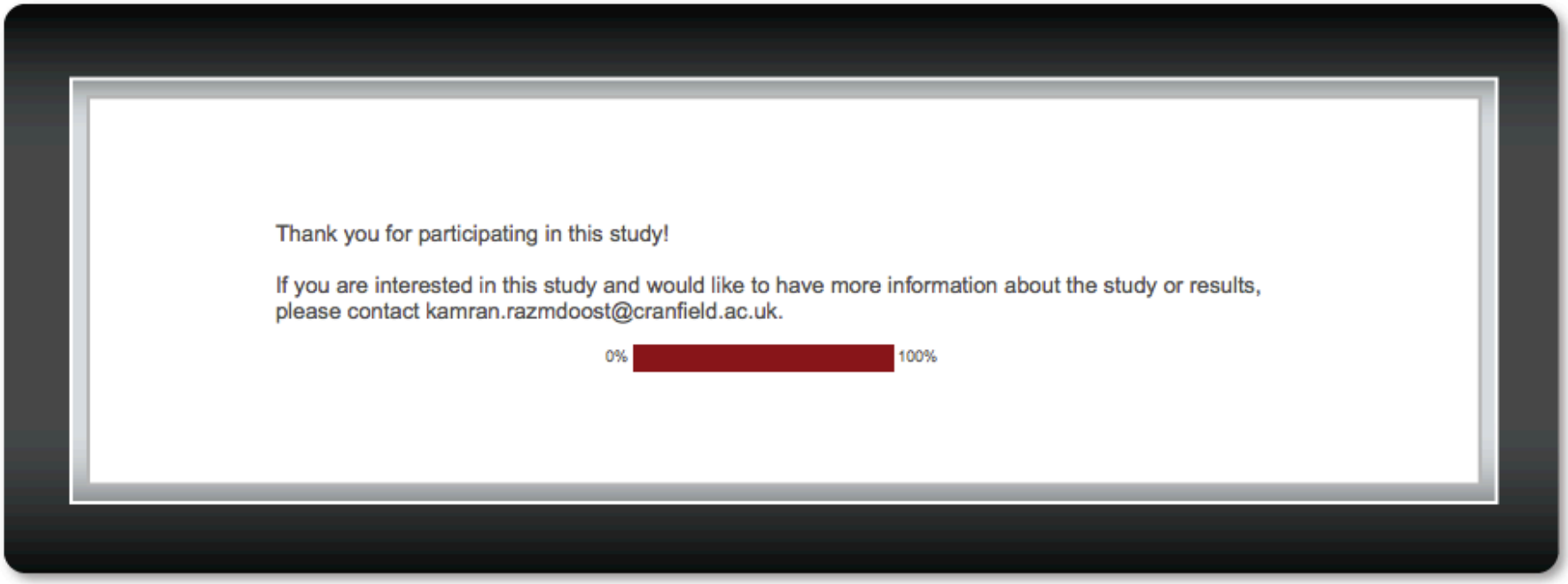
Thank you for participating in this study!
If you are interested in this study and would like to have more information about the study or results, please contact kamran.razmdoost@cranfield.ac.uk.
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Survey Powered By Qualtrics